Older Adults' Views of their Communication Difficulties and Needs while Driving in a Motor Vehicle

Point de vue d'adultes plus âgés concernant leurs difficultés et besoins de communication pendant la conduite automobile

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Abstract

With an aging population the number of older drivers will continue to increase. Associated with aging are many health related factors such as hearing loss, vision loss, cognitive changes, and central processing deficits that can impact driving. Research suggests that as individuals get older they may rely more heavily on passengers while driving to help with various driving tasks. Therefore, the need for clear communication in the vehicle is important. However, little is known about what older adults consider important or necessary to hear while driving. The purpose of this exploratory study was to gain a better understanding of the specific communication difficulties older adults experience while driving in a motor vehicle as well as the communication needs of both passengers and drivers. Thirteen adults, 50-70 years of age who are frequently the driver or passenger in a motor vehicle participated in focus group sessions. Qualitative content analysis of focus group transcripts revealed four major themes related to driving, the importance of clear communication while driving in the car as well as strategies individuals use to facilitate communication. The themes identified were *concentration and focus, importance of hearing conversation, the impact of missing the conversation,* and *responses to breakdowns in communication*. We concluded that clear communication between drivers and passengers is important for both practical and social reasons. This research provides evidence for audiologists and other health care professionals to discuss in-vehicle communication difficulties with their clients.

Abrégé

Comme la population vieillit, le nombre de conducteurs automobiles âgés continue d'augmenter. Le vieillissement s'accompagne de changements dans l'état de santé, comme les pertes auditives, les pertes visuelles, les changements cognitifs et les difficultés de traitement central, qui peuvent avoir des répercussions sur la conduite. La recherche suggère que les personnes âgées se fient davantage aux passagers pour les aider à accomplir diverses tâches pendant qu'ils conduisent. C'est pourquoi il est important d'avoir une communication claire dans le véhicule. Or, on sait peu sur ce que les personnes âgées jugent important ou nécessaire d'entendre pendant qu'elles conduisent. Cette étude exploratoire visait à mieux comprendre les difficultés de communication précises que vivent les personnes plus âgées pendant qu'elles conduisent une automobile, ainsi que les besoins de communication des passagers et des conducteurs. Treize adultes âgés de 50 à 70 ans qui sont souvent le conducteur ou le passager d'une automobile ont participé à quatre groupes de discussion. L'analyse qualitative du contenu transcrit des discussions révèle quatre grands thèmes liés à la conduite, l'importance d'une communication claire pendant la conduite, ainsi que les stratégies utilisées pour faciliter la communication. Les thèmes identifiés étaient la concentration et l'attention, l'importance d'entendre la conversation, les répercussions si on manque la conversation et les réactions aux bris de communication. Nous avons conclu que la communication claire entre les conducteurs et les passagers est importante pour des raisons tant pratiques que sociales. Cette étude fournit des preuves pour aider les audiologistes et autres professionnels de la santé à discuter des difficultés de communication dans un véhicule avec leurs clients.

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INTRODUCTION

Many individuals have experienced difficulty understanding or following a conversation while driving in a motor vehicle, regardless of age or hearing ability. However, there is limited research in this area and very little information regarding specific communication difficulties individuals experience or what the specific communication needs of both passengers and drivers may be. Older adults comprise a segment of the population that may have the greatest difficulty in this situation due to the high prevalence of hearing loss as well as other age related factors.

Evidence of communication difficulties in motor vehicles was obtained in a recent adult aural rehabilitation group conducted at the National Centre for Audiology (Cheesman & Jennings, 2009). Participants in their intake interview were asked to identify difficult listening situations and to keep a journal of their experiences. Seventeen of 43 individuals spontaneously reported communication in motor vehicles as a difficult listening situation.

Vehicles provide a difficult listening environment, mostly due to interior noise of the vehicle while it is running (Hoshino, Wakita, & Takeda, 2008). The acoustic characteristics of interior noise of a vehicle are dependent on the vehicle model and driving conditions, such as road texture and wind noise, as well as the speed of the vehicle (Hoshino et al., 2008). Interior noise in the low frequencies is primarily comprised of engine and road noise (below 1000 Hz) as well as wind noise (above 500 Hz; Hoshino et al., 2008). The majority of noise present in a car is within the frequency region that masks speech for individuals with hearing loss as well as for normal hearing individuals (Klein, Mills, & Adkins, 1990).

Placement of passengers within the vehicle also contributes to communication difficulty. Instead of being able to communicate face-to-face, passengers in a car are generally positioned behind or next to each other. This configuration can make communication more difficult as it does not allow for the use of visual cues, such as facial expressions and lip movement to aid in understanding (Laurier et al., 2008). Therefore, individuals are forced to rely on auditory only information for communication purposes.

There are many factors that may contribute to the communication difficulties that older drivers experience while driving in a motor vehicle. With an aging population, there will be an increase in the number of older drivers with hearing deficits. A recent study suggests that 49% of adults 60-69 years of age have a hearing loss between 0.5 and 4 kHz and 77% have a high frequency hearing loss at 3, 4 and 6kHz (Agrawal, Platz, & Niparko, 2008). Older adults often report more difficulty understanding spoken language than younger listeners (Kiessling et al., 2003). These difficulties can be attributed, in part, to the effects of sensorineural hearing loss but may also be associated with other age-related factors. Studies have shown that older adults demonstrate poorer speech understanding, especially in noisy listening conditions compared to younger listeners when matched for hearing threshold (Kricos, 2006). When listening becomes more challenging because of either noise or age-related deficits of the auditory system, cognitive resources are reallocated to attend to the stimuli of interest. This decreases the availability of cognitive resources for central cognitive processes such as storage and retrieval functions of working memory (Kricos, 2006; Pichora-Fuller, Schneider, & Daneman, 1995). This may also be associated with the reduced ability for an individual to inhibit potential sources of interference in the environment (Wingfield, Tun, & McCoy, 2005). Difficulties that older adults experience may also be due to central auditory processing deficits (Kiessling et al., 2003). Older adults have demonstrated auditory processing deficits for degraded, competing, and altered speech and perform more poorly on temporal and frequency resolution tasks (Kricos, 2006; Wingfield et al., 2005). These types of deficits may lead to greater difficulty with communication in noisy and distracting driving environments.

Older adults have reported that navigation tasks such as route-planning and way-finding are key factors that impede their driving performance (Burns, 1999). Vrkljan and Polgar (2007) found that as individuals get older they rely more heavily on their passenger to provide support, feedback, or assistance while driving. The passenger may help with tasks such as adjusting the radio and using the temperature controls. They may also be more involved in navigation and provide verbal warnings of obstacles in the driving environment (Vrkljan & Polgar, 2007). Sharing tasks with a passenger allows for some of the cognitive demands to be alleviated so the driver can focus on driving safely. This is of particular importance as older adults are more likely to be involved in multi-vehicle crashes in complex traffic conditions and at intersections compared to younger drivers (McGwin Jr. & Brown, 1999; Preusser, Williams, & Ferguson, 1998). Higher crash rates have also been associated with hearing loss and poor visual acuity in older adults (Gallo, Rebok, & Lesikar, 1999; Ivers, Mitchell, & Cumming, 1999). In a recent study, Hickson, et al. (2010) showed that older adults with poor hearing were found to have greater difficulty with driving in the presence of auditory and visual distractors than older adults with better hearing thresholds.

The current research suggests that as adults get

older they experience more difficulty understanding communication in noisy environments, are more affected by distractions in the driving environment, and begin to rely on their passenger to aid with certain driving related activities. These changes in older drivers highlight the importance of clear communication between driver and passenger. In light of the apparent difficulties individuals with and without hearing loss experience with communicating in vehicles and the importance of communication in vehicles for both navigational and social purposes, more research on this topic is needed.

PURPOSE

The purpose of this exploratory study was to gain a better understanding of the specific communication difficulties older adults experience while driving in a motor vehicle as well as the communication needs of both passengers and drivers.

METHOD

Study Design

An exploratory study using qualitative content analysis of focus group data was conducted to identify the difficulties and needs of drivers and passengers while driving in a motor vehicle. An inductive approach to content analysis was chosen to analyse the focus group transcripts. This method is defined as a means to "provide knowledge and understanding of the phenomenon under study" (Downe-Wamboldt, 1992). This is achieved through the subjective interpretation of text data by a researcher or research team "through the systematic classification process of coding and identifying themes or patterns in the data" (Hsieh & Shannon, p. 1278). Content analysis is an appropriate method of analysis when there is limited knowledge on the topic under study and no pre-existing theories are present in the literature (Elo & Kyngäs, 2008). Ultimately, knowledge generated through the use of content analysis is grounded in the data and represents the perspectives, thoughts, and emotions of the participants involved in the study (Hsieh & Shannon, 2005).

Focus groups have been recommended as a means of data collection for content analysis (Downe-Wamboldt, 1992; Hsieh & Shannon, 2005). Group discussion can generate novel topics that may not arise in a one-on-one interview (Agan, Koch, & Rumrill Jr, 2008; Freeman, 2006).

Participants

Participants were recruited in London, Ontario and surrounding communities using newspaper advertisements and flyers distributed in the community. Participants were eligible to take part in the study if they were between 50 and 70 years of age, had recent experience as either a driver or passenger in a motor vehicle, and could communicate effectively in English. The University of Western Ontario Research Ethics Board approved the study and all participants provided written informed consent.

Thirteen participants, including 7 males (mean age of 68 years) and 6 females (mean age of 60 years) participated in this study. All participants underwent a hearing screening to determine hearing sensitivity. Otoscopy was performed and pure tone air-conduction audiometry was completed using a GSI-61 audiometer (Grason-Stadler, Eden Prairie, MN) with ER-3A insert earphones. Octave thresholds were tested between 250 and 4,000 Hz bilaterally. Hearing loss was defined as audiometric thresholds greater than 25 dB hearing level in more than two frequencies in at least one ear. Pure tone bone-conduction audiometry between 500 to 4,000 Hz was only conducted when air conduction thresholds were greater than 25 dB hearing level.

Three participants had been previously identified with hearing loss and wore hearing aids. Two of these participants wore binaural, behind-the-ear (BTE) hearing instruments. Of those with hearing loss, one participant presented with normal hearing to 1,000 Hz, sloping to a moderately severe sensorineural (SNHL) hearing loss. The second participant presented with normal hearing sloping to a moderate SNHL in the right ear and a mild, sloping to moderately severe SNHL in the left ear. The third participant presented with a severe mixed loss sloping to a profound SNHL bilaterally and wore a BTE hearing instrument in the right ear only. Of the remaining 10 participants, 5 presented with normal hearing and 5 presented with a previously undiagnosed hearing deficit. All five participants who were identified with hearing loss at the time of this study presented with normal hearing in the low to mid frequencies and elevated thresholds at 3000 Hz or above. The mean pure tone air conduction thresholds with minimum and maximum threshold values for the left and right ears of all participants are plotted in Figure 1.

Focus Groups

Three focus group sessions were held in May and June 2010 at the National Centre for Audiology at the University of Western Ontario. Focus group discussions were facilitated using an open-ended question guide (see Appendix A) that had been developed using evidence from previous research (Cheesman & Jennings, 2009) and discussion with colleagues. Probe questions were used to elicit responses when novel topics arose or more detail was required from the participant. Two groups had

four participants and one group had five participants. The size of the focus groups was kept small to allow for all participants to contribute and to provide for easier moderation of the group (Agan, et al., 2008). The same researcher facilitated all three focus groups. All focus groups lasted approximately 1.5 to 2 hours and were videotaped. After each focus group session, videotapes were reviewed to help inform and revise the question guide for the following sessions. After the third focus group session, no new themes emerged from the data, eliminating the need for further data collection.

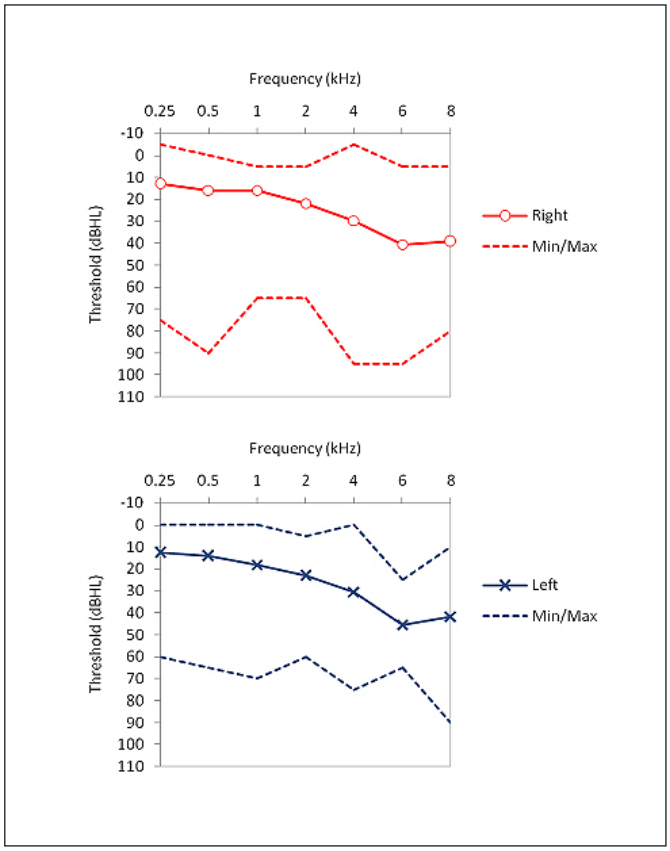

Figure 1.
Mean, minimum and maximum thresholds in dB hearing level for the right and left ears of all participants.

Analysis

Focus group videotapes were transcribed verbatim by the researcher who conducted the focus groups. The three lead investigators read each transcript individually, manually coding, and identifying categories or overarching themes within the data. The three investigators discussed their findings together and any differences were discussed and resolved. Transcripts were imported into NVivo 8 software (QSR International, Cambridge, MA) to organize the identified themes. NVivo 8 is a qualitative data analysis software package that provides a means of organizing and labelling data to assist the researcher in classifying, arranging and sorting data. Data were analyzed again by the researcher to confirm the major themes and subthemes in the data and to link the supporting quotations from the data.

FINDINGS

Participants in this study stated the importance of driving in their lives and identified driving as their primary mode of transportation as either a driver or a regular passenger. Several themes were identified from the transcripts of the three focus group sessions. The common themes were *concentration and focus, importance of hearing conversation, the impact of missing the conversation,* and *responses to breakdowns in communication.* These themes and related subthemes will be discussed in further detail below.

Concentration and Focus

A main issue participants identified was the importance of maintaining concentration and focus while driving. While the need for an increase in concentration while driving was mentioned in the context of aging, participants also felt that, generally, concentration and focus were important issues while driving. They stated that there were many distractions that occur while driving, and maintaining concentration and focus should be a priority. Participants identified noise, driving conditions and conversation in the car as distractions to driving that required an increase in concentration on the part of the driver. Subthemes identified in this category were, *conversation as a distraction to driving, challenging driving conditions and driving* and *aging.*

Conversation as a Distraction

Participants indicated that conversation in a motor vehicle, regardless of driving conditions, could be extremely distracting for the driver. In the example below, one participant commented that although he did not feel he has had difficulty understanding conversation while driving in the car, he noted that conversation can be a distraction and takes attention away from the driving task at hand.

> *I, uh, was thinking about this, and I don't know if I have difficulty hearing anybody when I'm driving, but, I think conversation can be a distraction from driving...it takes your attention away."*

Challenging Driving Conditions

Participants expressed a need for a higher level of concentration and focus in more challenging driving conditions. Participants who were drivers identified situations such as driving in traffic, driving in unfamiliar

areas or driving in bad weather (such as rain or snow) as more challenging and requiring a higher level of concentration. Some participants indicated that driving at night was another situation where driving was more challenging. In these situations, drivers stated that they needed to focus on the driving task and not engage in non-essential conversation.

But there again, when it comes into the traffic, you're into an unknown territory, everybody quiets down, the radio's down, your navigator then speaks, tells you where to go and the girls will talk quiet in the back seat or something.

This reflected comments made by several participants who noted that passengers are aware of the needs of the driver and will limit conversation when a driver needs to concentrate. In the example below, one participant commented that if a situation becomes challenging, he concentrates on the driving task at hand and ceases all conversation.

When I'm concentrating I don't want anything interfering with my concentration whether it be a bad storm, snow storm, bad traffic, whatever the conditions are I want to concentrate on that particular task and I don't want to have conversation when that's happening.

Although participants generally agreed that talking was a distraction, they did not regularly refrain from all conversation while driving. However, under conditions where they felt a higher level of concentration was needed they refrained from participating in conversation. However, all participants agreed that being able to understand a conversation with passengers in the car was important to them.

Driving and Aging

Participants commented that as they age they feel the need to be more focused or concentrate more on the driving task. As a result, they reduce conversation or eliminate unwanted distractions to allot more attention to their driving.

I find the older I get, the more I have to concentrate on my driving, not to engage in conversation, because I find it distracts more, way more than when I was younger.

Some participants noted they have more difficulty following conversation while driving in a vehicle. Participants who drove regularly with elderly passengers also commented on changes in the ease of communication and facilitating conversation.

I have a 97 year old mother in a nursing home. I drive her to a restaurant once in a while. She's got a hearing aid in each ear. So, she always rides in the front and my wife rides in the back so she can see me talk because she lip-reads a lot.

Importance of Hearing Conversation

All participants commented that the ability to understand others' speech in the vehicle was important. Participants who identified as drivers noted that it was important to hear their passengers if they were providing a warning about hazards in the driving environment or if they were acting as navigators and providing driving directions. However, participants felt the majority of conversation that occurred in a vehicle was unrelated to the driving task and could range from idle chat to important conversation. Subthemes in this category include *passengers as another pair of eyes and ears, passengers as navigator,* and *the vehicle provides an opportunity for conversation.*

Passengers as another pair of eyes and ears

All participants identified sirens from emergency vehicles and other emergency warning signals as the most important auditory signal to hear while driving in the car.

And I always try to make sure, even if I have the radio on, that I can hear outside, signals from outside; things I should be hearing, breaks screeching, or emergency vehicles, somebody calling for something…

Participants shared experiences when they had not heard emergency vehicles approaching and were slow to pull over. Many participants found these experiences caused feelings of anxiety and/or distress. Participants noted that passengers in the vehicle would act as a second set of eyes and ears to identify potential hazards in the driving environment or warning signals. One participant commented that a passenger may see something that the driver may have missed or was slow to respond to.

… your partner, the person that's with you, sometimes they might see something that you don't. They'll say "oh gosh look out for that." you know. I mean, that's happened, somebody'll say, "that guy's turning right".

Other participants shared experiences when the passenger played a key role in helping the driver identify the location of emergency vehicles.

…recently, I was driving with a friend. And, um, we were both talking and I was driving and concentrating 'cause I didn't know the way, and she was telling me how to get there. And, all of a sudden we realized there was an emergency vehicle … we could hear the sound, but we hadn't really been paying attention. So, we both had to be quiet and listen to which direction it was coming from.

Passengers as Navigator

Participants also discussed how passengers acted as navigators. Participants expressed that, as a driver, it was important to hear the passenger clearly in this situation. Passengers may be in charge of giving directions in unfamiliar areas, or may be the individual interpreting the map or the GPS system in the vehicle. One participant described the teamwork between her husband, the driver, and herself as the passenger in navigating.

> *When my husband and I drive long distances, he drives most of the time, he'll have a GPS, but I will usually have a map as well. And we'll talk about directions and so on and if it's a tricky situation in a city or something where you're trying to find something.*

This demonstrated how the passenger helps reading the map and/or GPS system in the car and provides directions for the driver. Several participants noted that having a navigator reduced stress, especially when travelling in unfamiliar locations, allowing the passenger to share the task. Another participant in the same group reiterated the importance of hearing the passenger acting as a navigator while driving in the car.

> *Oh definitely, yeah, because she'll say well, "another two miles we've got to veer to the right". Or she'll say "veer to the right". Yeah, you have to, you have to hear.*

Vehicle Provides an Opportunity for Conversation

Although it is important to hear what a passenger is saying while driving in a motor vehicle for safety or navigation purposes, participants expressed that conversation in the car could be on any topic and could vary greatly depending on the individual or individuals in the vehicle. Many participants felt the vehicle provided an opportunity for conversation and it was important for them to take part. In addition, participants indicated that conversation kept them stimulated and alert on a long drive.

> *I like a little conversation because it's comforting, you know, you're driving down to [restaurant name] for lunch and you're talking about what your grandson did or something, you know...To me, it's important to have some conversation with a person. Nothing heavy, or stressful, or arguing or, you know...nice, comfortable communication.*

When driving with family or friends, time spent in the car was a good opportunity to have a more important or intimate conversation. One participant felt the car provided her with a captive audience with her teenage children.

> *I think sometimes, the car is a great opportunity to have deep discussions... It's great to get into some deeper conversations because you have a captive audience. And you know, they often say with teenagers too, get them in the car and drive, because they can't run and hide. And then you can deal with issues.*

Similarly, another participant agreed that the car was an ideal place to have important conversations. This participant shared that she and her adult daughter have busy lives and the car was the only place where they were able to have an extended conversation without interruption.

> *I would agree, to me it's very important to be able to hear, because my daughter and I, we're busy. She's in university, I'm usually working. And so that's usually the time we connect, when we're in the car together, 'cause it's just the two of us… I think we have our best conversations in the car... And so when we're in the car, that's when I think we have our best talks. So to me it's very important to be able to hear.*

Impact of Missing the Conversation

Participants stated that they felt frustrated, embarrassed and left out when they were unable to hear a conversation while driving in the car. One participant expressed feelings of both frustration and embarrassment when she described a time when she was unable to follow a conversation her passengers were having while driving.

> *It's frustrating, especially if you're only picking up bits and pieces, you don't feel you can contribute because you can't hear the full conversation. I hate it when I sound, not that I sound stupid, but that you say something and they say, "but we just talked about that". And it's like "oops, didn't hear it". And it's almost embarrassing if you don't get the whole gist of the conversation.*

Similar sentiments of being "left-out" were expressed by a participant when she shared a story about her husband and son sitting in the front seat and trying to hear the conversation from the backseat and demonstrated how she attempted to lean forward from the backseat to hear the conversation better.

Participant: *I was in the back seat of our sedan... my son was driving... So he and his dad are talking away and I'm listening to everything. So I'm always poking my head up, I couldn't hear what they were saying. I was [saying], "What? Whaddya say, whaddya say?"*

Moderator: *How did you feel, not being able to be part...*

Participant: *I was missing out on all the important action... just talking about school and my*

son's future and what courses he's going to take. And I'm popping up, you know, and I'm thinking, "Whaddya say, what?" I had to keep asking them to repeat themselves.

Moderator: *...Were they trying to speak louder for you to hear?*

Participant: *No, no, they forgot about me.*

Response to Communication Difficulty

Participants, whether they filled the role of passenger or driver, commented on experiences when there was a breakdown in communication or when an individual had difficulty understanding the conversation while driving. All participants shared ways in which accommodations where made in these situations in response to the communication difficulty. Two subthemes identified were *tuning in* and *tuning out.*

Tuning In

Participants discussed strategies commonly employed to facilitate conversation while driving in a motor vehicle. Strategies included talking louder, repeating what was said, or asking the talker to repeat what they said. They also discussed reducing noise in the vehicle such as turning down the radio, turning off the air conditioning or heating, and closing the windows. Many participants indicated that these strategies easily repaired any breakdown in communication that occured. While strategies such as turning down the radio and closing windows lead to a consistent improvement, many participants noted that asking individuals to speak louder had inconsistent outcomes. One participant verbalized this during the focus group session.

I think people will speak up for maybe a sentence or two. And then they start to talk in the normal [volume]…and then you have to ask them again, to do it again.

Participants also discussed how seating within the vehicle plays a significant role in effective communication in the car. Participants who were drivers noted that it was harder to hear passengers sitting in the backseat. Conversely, passengers found it difficult to hear conversation in the front of the car when sitting in the backseat.

So, I'd sit in the back. And I find it's hard to hear people having the conversation in the front seat, because they're speaking forward so you just naturally can't hear as well in the back. So, I actually will lean forward to listen so I can be part of the conversation.

Several participants noted that they attempted to arrange seating in the vehicle to best accommodate certain individuals.

Yeah, and if mum's a passenger, she's fine, but if she's in the back seat, she doesn't hear that well either. So, quite often we'll try to put her, if it's the four of us in the car, we'll try to put mum in the passenger seat.

Although there is awareness among both passengers and drivers that seating configuration can improve the ability to communicate, this is not always feasible. One participant who frequently drives his elderly parent shared the following:

Yeah, my mother has a hard time hearing in the car. I think it's just road noise and you have to really speak up for her to hear you. Um, I like to put her in the front seat, but she likes to get in the backseat.

Another participant shared a similar dilemma. Due to a more severe hearing loss in his left ear, he was able to have a conversation in the car with his wife when he sat in the driver's seat. Although he was able to communicate with his wife much easier when he was the driver, this did not mean that he was always the driver.

Participant: *If I'm in the driver's seat it's easier because this ear [right ear] is the better ear.*

Moderator: *So do you try to drive more often so that your better ear…*

Participant: *No, because I know she likes to drive.*

Tuning Out

Participants identified several strategies that facilitated communication while driving in the car. However, many participants shared experiences where the solution to a communication difficulty was to not engage in conversation. Drivers were more likely to engage in this behaviour; letting the passengers in the car talk and turn their attention instead to the task of driving. Similar experiences were reported by passengers sitting in the backseat.

I've tuned out of conversations sometimes. If people are talking in the front and I didn't have to be in the conversation, I would just look out the window if I was in the backseat.

DISCUSSION

Through the course of the focus group discussions, participants provided significant insight into difficulties individuals experience with communication while driving in a motor vehicle. Although, many individuals found distractions in the driving environment to be less tolerable as they age, they agreed on the importance of

clear communication within the vehicle for social, safety, and navigation purposes.

Participants in this study were aware of changes in their driving ability as well as changes in their comfort level while driving under certain conditions as they got older. With age, they noted the need to reduce conversation or to eliminate unwanted distractions to allot more attention to their driving. They also felt they could not tolerate the same level of distractions when driving as compared to when they were younger. This resulted in a need to reduce the amount of conversation occurring in the vehicle especially when driving conditions became challenging. Several participants associated these changes to aging and in particular to changes in their eyesight. Some of these difficulties, however, may be associated with other age related changes. Hearing loss is associated with increased difficulty in speech perception, which may make it more difficult for an individual to participate in a conversation in a noisy vehicle with reduced visual cues. Changes in cognitive and central processing abilities that occur with age may contribute to older adults perceptions that they cannot tolerate as much distraction, carry on a conversation, manage challenging driving situations or drive and navigate simultaneously compared to when they were younger. This may be associated with the need to reallocate cognitive resources to attend to conversation in challenging listening conditions or can cause increased distractibility due to the inability to inhibit competing input in the environment (Pichora-Fuller et al., 1995; Wingfield et al., 2005). Age-related hearing, vision, and cognitive processing deficits could affect communication in a motor vehicle as it is a noisy environment where individuals are performing multiple, complex tasks.

The older adults in this study were aware of changes in their abilities and often adjusted their driving habits accordingly. Passengers reported that they were aware of the needs of the driver and would limit conversation when driving conditions became more challenging. Although all participants agreed that conversation could be a distraction while driving, they did note the need to engage in conversation while driving in a motor vehicle. All participants felt that being able to hear conversation while driving was extremely important, especially for navigational and safety purposes. These results support findings of previous research that suggests as drivers get older they begin to rely more on passengers to help with driving tasks (Vrkljan & Polgar, 2007). Passenger assistance in navigation activities and monitoring the driving environment may alleviate cognitive load for the driver and create a safer and more relaxed driving experience (Vrkljan & Polgar, 2007).

Nonetheless, participants reported that the majority of conversation that occurred in a vehicle was usually unrelated to driving and the vehicle became a venue for casual or intimate conversation. A common type of conversation that participants engaged in while driving was described as a social activity to share gossip or catch up with friends and family. Some participants also described engaging in deeper conversation or having important talks while driving in the car. Although participants believed that conversation posed a distraction when driving, it was an extremely important activity for them.

The impact of missing the conversation while driving in the car was identified as producing feelings of frustration with oneself or with the speaker, feelings of embarrassment or feelings of being left out or not part of the group. Although participants identified several strategies that drivers and passengers utilized when communication became difficult, often these strategies were short lived and caused more frustration.

This exploratory study looked at the communication needs and difficulties that older adults experience while driving in a motor vehicle. Older adults in this study indicated that the ability to communicate in a motor vehicle was important for social and safety purposes, despite the increased difficulties associated with aging.

This exploratory study provided first insights into communication in vehicles and may inform future research looking at older drivers, drivers with hearing loss, speech perception in cars, and driver distraction. Such research could inform automotive development to implement and improve in-vehicle noise reduction technology, car amplification systems and global positioning system technology. It could also provide insight to a variety of health care professionals, such as physicians, audiologists, occupational therapists, and social workers who work with older adults and who have to better understand their needs with regards to communication and driving. With better awareness of these issues, health care professionals may be able to provide their patients with more appropriate guidance or better answer questions that may arise. Audiologists may consider discussing in-vehicle communication difficulties with their clients and can provide information and strategies to facilitate communication in the car for their clients. Audiologists may consider their client's driving habits when choosing appropriate hearing aids and assistive technologies for their client.

Limitations of the Study

The findings from this study reflect the participants' own experiences with communication while driving in motor vehicles. The data do not reflect the experiences of

all older adult drivers and are not generalizable to other populations.

CONCLUSION

This exploratory study investigates the importance of communication in vehicles for older drivers. The study highlights that clear communication between drivers and passengers is important for both practical and social reasons. This study also discusses difficulties that aging adults experience while driving in a motor vehicle, their communication needs while driving in a car as well as strategies they are using to facilitate communication. Further research is needed to look at different populations with hearing loss in order to improve in-car communication in the future.

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APPENDIX A. Sample Question Guide

Introduction:

We are interested in finding out about your communication needs in cars, that is, what is it that *you need to hear* when travelling in the car with other people?

We are also interested in learning about the experiences you have had when communicating with others while driving in the car and the kinds of difficulties you have experienced.

Instructions:

1. I am going to ask you to tell the group about a time that you experienced difficulty understanding a conversation while driving in a car.
2. Even if you feel that someone else has shared a similar experience to yours, I would still like you to hear your story as everyone's experiences, feelings and thoughts are slightly different and can contribute significantly to what we learn here today.

Everyone will have the opportunity to speak.

Remember, we are interested in the experiences of *both* passengers and drivers. If you have more than one experience to share, please do.

Probe questions:

1. Were you the driver or passenger? Where were you sitting?
2. Who were you driving with? Age?
3. Were there other passengers in the car? Where were they sitting?
4. Where were you driving to? Is this area familiar to you? What were the conditions like?
5. What difficulties did you have?
6. Was it important for you to be able to communicate in this situation? Why or why not?
7. What did you need or want to communicate in this situation?
8. What did you do when you couldn't understand what was being said in this situation?
9. How did you feel when you couldn't understand what was being said?
10. Were you able to communicate effectively with all individuals in the vehicle? Was there more than one conversation going on in the car? How did this affect your ability to hear?

Follow-up Questions:

1. What are the most important things you need to hear while in the car?
2. Is it important for you to be able to carry on a conversation while in the car? Why or why not?
3. How does it make you feel when you are unable to understand the conversation in the car?
4. What do you usually talk about while in the car?
5. Do you prefer people not to talk while you are in the car?
6. If you are the driver do you find it distracting to carry on a conversation? Why or why not?
7. Is it important for you to hear the radio or other technology while in the car?
8. Does the weather/road conditions/unknown area/known area/highway/city driving/ country/ affect your ability to have a conversation in the car?
9. Driving during the day or night?
10. Does the type of car you are in effect your ability to have a conversation?
11. What do you or the passengers do to facilitate communication in the car? Does this help? Why or why not?
12. How did they respond to any difficulties you might have had? What do you do if you have difficulty hearing someone?
13. Who do you find most difficult to hear in while driving in the car? Where do they usually sit? Where do you usually sit?
14. What would you say causes the most difficulty for you communicating in the car? How often does this situation arise?

Summary:

Was there anything not discussed here today that you think is important and should be mentioned before we go?