Self-regulation, scooters and low vision: The practice of self-regulation by older adults with low vision when they use a mobility scooter.

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Abstract

Background/purpose: Compared to non-visually impaired peers, individuals with low vision experience higher levels of social isolation, depressive symptoms and mobility impairment. Mobility scooters (hereafter scooter) allow meaningful community participation. However, as scooter popularity increases, scooters are attracting attention including concern over safety leading to discussions about regulatory approaches to managing associated risks.

By default, scooter use is self-regulated. A scooter is typically privately purchased, potentially without any prior assessment and training. Understanding is needed of the risks and barriers faced by scooter users, and their corresponding capabilities through self-management in addition to environmental strategies for overcoming these. This understanding can inform developing practice and policy in this area.

Aim/objective: To provide the perspectives of older adults with low vision of how they self-regulate their scooter use.

Method: I used an interpretive descriptive methodology with diverse methods: a 'go-along' short journey with 15 participants through their neighbourhood and a sit-down interview to explore their perspectives in depth.

Results/conclusions: Self-regulation practices included practical strategies such as speed management, or deeper decision-making like restricting scooter use to areas where risks are familiar. Each participant had calculated the meaning of a trip versus the potential risks, finding their individual comfort-zone. The life cycle of the scooter-use covered how self-regulation practices evolved with time. Lastly, participants' decision-making could be influenced by feedback from others, alternative transport options therefore participants held a variety of opinions about proposed regulatory approaches.

Documenting the self-regulation practices of this sample gives us a better understanding of barriers to effective community mobility and how to manage these. The findings have implications for environmental design, development of alternative modes of mobility and can be incorporated into any scooter training. The findings support the notion of non-mandatory scooter training as an opportunity for new users

to gain confidence and appropriate skills. Limitations caused by vision were self-managed, suggesting that measurement of vision does not directly relate to driving ability. More research is needed which evaluates the risks associated with scooter use and evaluates the effects of existing scooter training.

Contents

List of tables and figures

1 Introduction

1.1 The background of the study

In the interest of representing the capabilities, agency, and strengths of older adults with low vision, this dissertation explores the perspectives of a selected participants who use mobility scooters (hereafter scooters) and their practice of self-regulation. Such representation is necessary to contribute to the increasing conversation about scooters. The specific focus on low vision effectively demonstrates the abilities of a population who might be susceptible to being misunderstood and consequently marginalised.

In 2016 I completed my honours dissertation as a pilot on the topic of low vision and mobility scooters. My four participants described their experiences of using a scooter which fell into four categories, 'Autonomy and Wellbeing', 'Accessibility', 'Community' and 'Self-regulation'. The theme of self-regulation generated rich discussion and I felt this warranted further investigation especially in the political climate of scooters which includes calls for external regulations.

1.1.1 Low vision background

New Zealanders living with visual impairment consists of 4% of the general population, and 11% of older New Zealander's (Statistics New Zealand, 2014). Incorrigible eye conditions include age-related macular degeneration, glaucoma, retinitis pigmentosa, diabetic retinopathy and neurological vision loss (Mogk, 2011). See Figure 1 for simulations of different eye conditions from the National Eye Institute (n.d.). Of those 164,000 New Zealanders living with visual impairment, 12,109 receive services from the Blind Foundation (Blind Foundation, 2015). Two low vision clinics serve those in Auckland and Christchurch, otherwise there are no services (Butler, 2016). Many visual impairments are age-related, so as the older population increases, there will be more people living with low vision (Statistics New Zealand, 2015).

Low vision affects most areas of daily living. Several studies have shown that older adults with low vision participate in fewer activities than their non-visually impaired peers, often restricting these activities due to perceived risks (Alma et al., 2011; Blaylock, Barstow, Vogtle, & Bennett, 2015; Laliberte Rudman & Durdle, 2008; Wang et al., 2012). Social isolation, depression and anxiety are commonly experienced by those

with low vision (Desrosiers et al., 2009; Kempen, Ballemans, Ranchor, Van Rens, & Zijlstra, 2012).

Figure 1: **Simulations of eye conditions.**

Top left: Cataracts. Top right: Age-related macular degeneration. Middle left: glaucoma. Middle right: diabetic retinopathy. Bottom left: Normal vision. Bottom right: retinitis pigmentosa. Images taken from National Eye Institute (n.d.).

1.1.2 Community mobility background

Meaningful and purposeful engagement in occupation is understood to be essential for health and wellbeing. Community mobility allows occupational participation within our communities and can counteract social isolation, depression and anxiety (di Stefano, Stuckey, & Lovell, 2012). Community mobility can be difficult for individuals with visual impairment, and no less so, as they are more likely than their sighted peers to live with a physical impairment affecting mobility (Crews, Jones, & Kim, 2006).

Some degree of mobility impairment is experienced by 46% of New Zealanders aged 65 and over (Statistics New Zealand, 2014). Many use a mobility aid such as a walking frame, walking stick, wheelchair, powered wheelchair or a scooter to compensate for pain, fatigue, reduced range of motion, reduced endurance, loss of sensation, unsteady gait, imbalance, loss of limb or whatever else may have caused their mobility impairment. Scooters are increasingly chosen to compensate for mobility impairments and enable community participation, enhancing the wellbeing, independence levels and self-esteem of users (Australian Competition and Consumer Commission, 2012; Pettersson, Iwarsson, Brandt, Norin, & Månsson Lexell, 2014; Sund & Brandt, 2017; Sund, Iwarsson, Anttila, & Brandt, 2015; Thoreau, 2015).

Scooters are increasingly being scrutinised for their potential to disrupt footpaths and harm others. A recent, local newspaper article exemplifies this scrutiny. The newspaper reported on a near-miss between a fast-travelling scooter user and a child (Gillies, 2017). This article is intriguing because it is unlikely that a near-miss caused by a cyclist or a car would be mentioned, and reporting such an event displays unfair attitudes toward scooter users. No doubt there was potential for harm in this scenario, however harm could also have occurred had it been a cyclist, car or even a fast runner (see Appendix A). A review of British newspaper articles reveals the positive impacts of scooter use are balanced by negative perceptions that scooters are dangerous and driven by lazy or confused old people (Stowe & Mulley, 2010).

1.1.3 Regulation background

Communities are rallying to support their scooter users. Some areas have scooter clubs which provide a social community to share information (Schroeter, 2016). Age Concern, councils and other organisations are increasing their mobility scooter support with workshops which present the safety guidelines (McAvinue, 2013). Scooter retailers often provide some education and may choose to not sell to someone they deem unsafe however this is an uncharted area of practice, variable and potentially conflicted by the interest of making a sale.

Presently, scooters are classified as ‘pedestrian’ and are subject to little regulation in New Zealand. The NZ Transport Agency (NZTA) has written guidelines for scooter use which retailers provide, however this may not reach users who buy their scooter second-hand or through a family member (2015a).

Different jurisdictions have approached scooters with numerous regulatory strategies, often relating to speed and these strategies might guide regulatory approaches in New Zealand. In Queensland, scooters are permited only by recommendation from a general practitioner, and throughout Australia, the devices are limited to 10km/h (Townsend & Watson, 2013). In the United Kingdom (according to vehicle classification) scooters are restricted 6.4 km/h on the footpath and just shy of 13 km/h on the road, and are only to be used by a disabled person with a mobility impairment (Department for Transport, 2015). In the Netherlands, scooters can drive up to 45 km/h on the road, 30 km/h on cycle paths and 6km/h on the footpath. Finally, in New Zealand, speed restrictions are given as a guideline by NZTA (2015a) who recommend that users keep to the same speed as fellow pedestrians. Albeit very uncommon, a scooter model which travels up to 30km/h is available on the New Zealand market (Maxwell, 2015).

Due to growing concern about scooter risks, the Road Controlling Authorities Forum (RCAF) NZ has recommended increased controls and legislation for scooters. In their initial literature review the RCAF concluded:

> *Operating a mobility scooter can be beyond the fitness or competence of some elderly or disabled operators and that prior assessment and training is necessary. Operators of mobility scooters appear to be at significantly greater risk of being in an accident, and of being seriously injured or fatally injured as a result, than the general public or other road users* (2013, p.10).

In a more recent report, the RCAF presented their literature review covering health and safety concerns surrounding scooters. Justified by studies which report on scooter injuries, the RCAF recommendations included classifying and regulating mobility scooters “as a special class of motor vehicle and their use should be on the recommendation and assessment of a health professional” (Newman, 2015, p. 19). The report also recommends considering seatbelts and helmets for harm prevention (Newman, 2015). Following this report, a recent research report conducted for NZTA sets official recommendations for further consideration about low-powered e-vehicles including scooters (Lieswyn, Fowler, Koorey, Wilke, & Crimp, 2017). Their

recommendations are milder than the RCAF's report however strong debate about scooter regulation is likely to continue as scooters become prominent and enter a political domain worldwide (Hocking, 2017; Hutchinson, 2013).

On one hand, regulations might promise a standardised approach to managing risks posed by scooter. On the other hand, regulations are also a substantial approach which could threaten unnecessary exclusion of anyone who does not fit easily within measurable parameters, such as those with low vision. An assessor may lack experience and understanding of the abilities of low vision users or use arbitrary vision assessments such as an acuity test (Cordes, Heutink, Tucha, Brookhuis, Brower & Melis-Danker, 2017b). Standards may be tempting as they can provide health professionals with confidence in promoting or advising against scooter use with an 'at-risk' client, however, standardisation also risks not understanding individual capability (Cordes, Heutink, Brookhuis, Brouwer, & Melis-Dankers, 2017a).

1.1.4 Low vision and scooter research background

There is little research on the area of scooters and low vision. Cordes et al. (2017a;2017b) reported on their study of low vision scooter use where they assessed scooter competency with visually impaired participants. Deverell (2011) Master's thesis presented the perspectives of professionals working with low vision scooter users. My pilot study was the first study looking specifically at the perspectives of the low vision users themselves. This study builds on that pilot with a larger sample size and in-depth look at self-regulation.

In response to a climate of potential regulation, this dissertation presents the strategies, skills and capabilities that low vision mobility scooter users have been currently using to manage their visual impairment, mobility impairment, daily needs, and environments. This self-regulation is positioned before possible external regulations, with the aim of informing practice, policy and research.

Because this study will be of interest to the low vision community, I have chosen to use sans serif font style which goes against the project presentation guidelines. My decision recognises that sans serif font type seems to be preferred for increasing document accessibility.

1.2 The problem statement

Research from the perspective of scooter users is needed to improve understanding of the abilities and needs of older adults with low vision. Acknowledgement and

representation of their ability to self-regulate can inform policy makers, and the risks and strategies identified can be incorporated into potential scooter assessment, training and regulation.

Research question:

- How do older adults with low vision practice self-regulation when using a mobility scooter?

Objectives:

- To provide the perspectives of low vision scooter users on self-regulation.
- To provide a forum for participants who may have experienced disempowerment through their health condition/s, to express their perspectives and be heard by the wider community.
- To enter the policy and research dialogue about scooter regulation and training in New Zealand and internationally.
- To interpret the clinical implications of the findings and inform health professionals about the practice of self-regulation in older adults who use scooters.

1.3 The professional significance of the study

In New Zealand, this study could seem premature as occupational therapists do not regularly assess for mobility scooter use nor are there low vision services available nationwide. However, I predict both that more low vision services will be provided given the predicted increase in visual impairment rates, and that with increasing scooter use, occupational therapy's role will clearly emerge. Occupational therapists are also likely to encounter clients with low vision who use scooters in a variety of settings not specific to their vision or scooter use.

Access to transport, ageing in place and opportunities for community participation are recognised in the New Zealand Positive Ageing Strategy as key contributors to wellbeing and health (Ministry of Social Development, 2008). Occupational therapists consider the ability to engage occupations essential to health and wellbeing, and address challenges to function and engagement in occupation. Community mobility is an instrumental activity of daily living and essential for enabling community participation. Scooters, as a tool for community mobility, are therefore a domain of interest for occupational therapy.

In Australia, if an individual requires government funding, an occupational therapist will assess *"the reasons for needing a scooter, expected usage, medical history and existing health conditions, together with competence and safety in using a scooter"* (Maywald & Stanley, 2015, p. 87). This is a niche role and therapists reported feeling insecure due to the lack of literature and professional development opportunities (Maywald & Stanley, 2015).

In New Zealand, such an assessment existed for accessing funding from Lotteries NZ (a funding body). In 2015, this changed to an evaluation of medical history notes, presumably for financial reasons. New Zealand occupational therapists may assess scooters with funding either privately, through the Accident Compensation Corporation (ACC) or Enable, however, there is no literature regarding their process or what is assessed. Most commonly retailers, families or the consumer are responsible for mobility scooter procurement and training.

Occupational therapists are involved in low vision services (where these are available) and provide support in all activities of daily living affected by low vision, including community mobility. However, for individuals who are eligible for low vision services, community mobility is usually addressed by orientation and mobility (O&M) specialists. Occupational therapists often work in collaboration with O&M specialists (Deverell, 2011).

This study is also relevant to occupational therapy as the American Occupational Therapy Association (AOTA) (2014) has identified that low vision community mobility is a priority research area. Occupational therapists are strongly encouraged to be evidence-based in their practice therefore this study may support an occupational therapist's clinical reasoning when working with a low vision client who uses a scooter. And finally, occupational therapists' roles are diverse and one aspect is advocacy. This study provides evidence for the capabilities of a potentially marginalised group of older adults.

The potential interest in this study is indicated by the fact that, despite being unpublished, the pilot study was cited in Lieswyn et al.'s (2017) NZTA report of recommendations demonstrating the lack and the need for research on this subject.

1.4 Personal interest in the research

Social justice has been an interest of mine for as long as I can remember. Shaping this interest is my involvement in an anarchist collective and identifying with anarcha-

feminist perspectives. While I have not investigated the concept and politics of anarchy in an academic sense, my perspectives are grounded in my experience of anarchist activities. These activities include extensive do-it-yourself workshops, facilitating a safe space for marginalised identities (albeit with no wheelchair access), discussion of power imbalances and the marginalisation of different populations, facilitating an extensive library of social justice literature and zines, and providing weekly free, "dumpstered" community meals. An over-arching philosophy of this particular collective is that authority and power structures are violent and damaging, and I continue to be wary of dominant, centralised regulatory systems.

At the collective, I listened to many discussions focused on the inadequate healthcare provided for those who experienced both mental and physical health needs, and the restrictions that they had faced. These discussions struck me as I was studying my undergraduate degree in occupational therapy. In addition, I also heard stories of health professionals who did not understand the circumstances of their client, who themselves were institutionalised by the health care system or who were not available due to restricted health service resources, which led to disenfranchisement and loss of agency for the individual. I was conflicted as I was simultaneously learning of my future role within this health system for enabling health and wellbeing. I continue my interest as a health professional, with the objective of enabling health access and health equity, but am aware of my potential to perpetuate imbalances, specifically by disregarding client agency.

Reading about critical disability perspectives, I have begun my journey learning about, and reflecting on the concepts of ableism and ageism. Many of these concepts intersect with anarchist and feminist theory. I intend to advocate and provide a forum for those with disabilities, especially as the current power imbalances within our political systems hold academic research above the expert voices of those living with disability. This imbalance is clearly demonstrated by the following interaction I had with a district council. The road-safety co-ordinator told me of several requests from a scooter user to have painted lines on a ramp so that he could see where he was going. The roading engineers argued that if he couldn't see, then he shouldn't be using the scooter and wouldn't paint the lines. I have since provided my 2016 dissertation to this council, and it seems that the simple white lines will now be painted. Unfortunately, this scooter user who had so clearly articulated their needs for accessibility was not deemed to be an expert, yet I was.

I am sure that my journey with critical disability perspectives has only begun, and I will continue learning and unpacking my culturally conditioned ableist and ageist views. I acknowledge my perspective as a currently non-disabled person and my position of privilege through higher education. I look forward to my developing future in collaboratively creating equality and social justice.

1.5 Definitions of the key terms

Effective. The term 'effective' is used in preference to 'safe'. Effective implies that the scooter use satisfactorily meets the intention of the user. The word safe is avoided as this gives connotations of harm/risk avoidance or minimisation however for some scooter users exposure to harm or risk may be a necessary part of their daily life.

Footpath: "*The part of road or other public place built and laid out for pedestrian use"* (NZ Transport Agency, 2009, p. iii).

Kerb: *"A raised border of rigid material formed between the roadway and the footpath"* (NZ Transport Agency, 2009, p. iii).

Kerb ramp: *"A localised area where part of the footpath is lowered to the same level as the roadway next to it to facilitate convenient entry to the roadway"* (NZ Transport Agency, 2009, p. iii).

Low vision: I use the National Eye Institute's (NEI) definition of **low vision**: *"even with regular glasses, contact lenses, medicine, or surgery, people find everyday tasks difficult to do. Reading the mail, shopping, cooking, seeing the TV, and writing can seem challenging"* (National Eye Institue, n.d.). This definition includes those with low vision who would not be eligible for Blind Foundation services which are generally limited to individuals who have *"a visual acuity not exceeding 6/24 in the better eye with corrective lenses, or serious limitations in the field of vision, generally not greater than 20 degrees in the widest diameter in the better eye"* (Blind Foundation, n.d.).

Low vision and **visual impairment** are terms which may seem to be used interchangeably. As the World Health Organisation (2017)defines: "*low vision taken together with blindness represents all vision impairment*." Low vision refers only to those who experience a visual impairment but are not blind whereas visual impairment is a blanket term for the spectrum of vision loss including blindness.

A **mobility device** is defined by the Ministry of Transport as:

> *"a vehicle that:*

- is designed and constructed (not merely adapted) for use by persons who require mobility assistance due to a physical or neurological impairment[1]: and

- is powered solely by a motor that has a maximum power output not exceeding 1,500W" (NZ Government, 2012, p. 10).

A **mobility scooter** is a mobility device which is battery powered, has 3 or 4 wheels, and has handle-bar controls (see Figure 2).

Figure 2: **Keri on a mobility scooter. Photo credit: Holly Hoogvliet**

Mobility impairment: I use the New Zealand Disability Survey definition:

"Adults with mobility impairment have difficulty with or couldn't do one or more of the following:

- *walk about 350 metres without resting*
- *walk up or down a flight of stairs*
- *carry an object as heavy as five kilograms over a distance*
- *move from room to room within the home*

[1] However there is no requirement that a scooter user be assessed as impaired

- *stand for period of 20 minutes*
- *bend down without support*
- *get in and out of bed independently."* (Statistics New Zealand, 2014, p. 15)

Self-regulation is a term with several meanings depending on the context and is further is explored in the literature review. I use Zimmerman's (2000) definition that *"self-regulation refers to self-generated thoughts, feelings, and actions that are planned and cyclically adapted to the attainment of personal goals"* (p.14).

Shared pathways: NZTA refers to this as an 'Unsegregated shared-use path': "A path shared by pedestrians and cyclists where both groups share the same space" (NZ Transport Agency, 2009, p. iii).

Visual impairment: also referred to as 'vision impairment', individuals *"with vision impairment have difficulty seeing, or cannot see, ordinary newsprint, and/or the face of someone from across a room, even when wearing corrective lenses"* (Statistics New Zealand, 2014, p. 16).

1.6 Outline of the dissertation

In this introductory chapter I presented background to the study including relevant information about low vision, community mobility, proposed regulation and specifically the background of low vision and scooters. I stated the problem and study objectives along with the professional significance for occupational therapy. I have also introduced myself and why I am interested in this research project. Lastly, I provided a list of key terms for the dissertation.

Chapter two: Literature review. This chapter outlines the literature that is relevant to this dissertation. This chapter introduces the concept of self-regulation particularly literature about self-regulation and driving then looks at mobility in New Zealand before presenting specifics of mobilising with visual impairment or mobility devices. The literature review concludes with all the existing research about low vision and scooters.

Chapter three: Methodology. This chapter describes the paradigms which shape this investigation and the unique method of a combination of a 'go-along' and a sit-down

interview. This chapter also describes details of the study's procedures and ethical considerations.

Chapter four: Findings. This chapter presents the findings as organised under four themes: 'Strategies used by scooter users, 'Finding the comfort-zone', 'Life cycle of using scooters' and 'Influences on decision making'.

Chapter five: Discussion and conclusion. The final chapter reflects on the findings within the context of existing literature and emphasising new findings of self-regulation practices within the individual and the environmental context. The discussion reflects on why this study was needed and a vast array of implications from the study. This chapter also reflects on the methodology, my own insights, study limitations and presents recommendations for further research before concluding.

2 Literature review

2.1 Chapter overview

In this chapter, I describe my literature search process, then I focus on key literature and concepts.

The range of concepts presented relate to self-regulation and to community mobility however the sources can seem vast as I bring together knowledge from different areas which are specific for my niche topic. I look at literature from driving, mobilising in New Zealand (especially without a car), mobilising with a visual impairment and mobilising with a powered-mobility device.

The first concept introduced is self-regulation. The most relevant and established body of work for my topic is self-regulation and older drivers. I present the findings of studies which detail different strategies and factors for self-regulation and driving.

Next, I detail the context of mobility in New Zealand including the importance of mobility. This context is essential for understanding how New Zealanders mobilise and beginning to understand where scooters might fit in our transport landscape.

The third section of the literature review specifically looks at the experiences of individuals who mobilise either with a visual impairment or with a powered mobility device. As my 2016 dissertation is the only literature to look at the experiences of scooter users with low vision, insights need to be gained from literature which focuses on only one aspect of my targeted population, either a mobility or a visual impairment. I have synthesised these different literature sources into two tables, one listing the barriers to effective mobility and the other listing the strategies for managing mobility. I also present more specific insights from the reviewed literature which reveals wider influences on the practice of self-regulation. These insights include the different influences on social participation, personal demands and stigma, environmental production of disability and the limitations of the device.

Finally, I present the insights generated by the four pieces of literature which specifically consider scooter use by individuals with low vision.

2.2 Literature search process

I searched various databases including CINAHL, the Cochrane Library and Google Scholar for peer-reviewed articles and grey literature, see Appendix B for a table of search terms and these results. Terms included key-words and variations, such as ‘low

vision', 'mobility scooter', 'self-regulation', 'older adults' and 'occupational therapy'. Literature was also found through reading reference lists, searching key authors, and the 'cited-by' and 'related articles' available in Google Scholar. I searched New Zealand government websites for relevant statistics and policy. I also searched Google and New Zealand news websites for non-academic literature on low vision and mobility scooters. Forty-four pieces of literature were included in this review.

As there is little literature which directly looks at the topic of self-regulation from the perspective of scooter users with low vision, I draw on several other sources of literature which I feel relate to the topic. I draw on self-regulation and driving literature and I combine literature which relates to mobilising either with a visual or a mobility impairment.

Edwards and McCluskey (2010) warn that powered-wheelchair users and scooter users should be treated separately. However, I have assessed that the included articles which focus on powered-wheelchair experiences are generalisable to scooters, therefore it is acceptable to include such literature.

2.3 Self-regulation

Originating in psychology, 'self-regulation' is a term used in many fields including health and education settings. The term is noteworthy for its capacity to bring diverse groups into constructive dialogue, however, this broad application means that self-regulation can be fragmented. A scoping review by Martini, Cramm, Egan and Sikora (2016) detailed the diverse meanings of the term within occupational therapy literature which covered four theoretical frameworks each with a distinct use of self-regulation: synactive development, sensory integration, cognitive-behavioural theory and self-regulation theory.

In my 2016 use of the term self-regulation, I discussed the strategies that participants made to adjust their behaviour so that they could successfully use their scooter in their given environments and to meet their needs (McMullan, 2016). This framing is reflected in the Self-Regulation Theory which describes strategies which aim to guide a self-monitoring or problem-solving process and is used again in this study.

Citing Bandura's social cognitive theory, Zimmerman (2000) explains, *"self-regulation refers to self-generated thoughts, feelings, and actions that are planned and cyclically adapted to the attainment of personal goals"* (p.14). The individual uses distinct strategies to meet goals within the circumstances of their capabilities and needs, and

within their environmental presses and affordances. These strategies can change over a variety of situations, and be adjusted through constant feedback between personal, behavioural and environmental processes. The attainment of the goal is the purpose of self-regulation, and if a goal unachievable, the goal may change to fit with the available personal, behavioural and environmental factors (Zimmerman, 2000).

2.3.1 Self-regulation and driving

The self-regulation of scooter users has not been explicitly explored in the literature so, for this study, the most relevant literature about self-regulation is the considerable body of work investigating self-regulation and driving in older adults.

As I am interested in the scooter users' perspectives, I have looked for other literature which presents the users' perspectives. Particularly useful are two studies which each proposed a model of self-regulation based on older drivers' description of their self-regulation.

Laliberte Rudman et al. (2006) proposed a model of self-regulation based on the perspectives of both pre-seniors and seniors regarding self-regulation and driving in later life. This model proposed that self-monitoring and self-regulation were ongoing processes used to ensure an acceptable level of comfort while achieving mobility goals. These ongoing processes were influenced by interpersonal, intrapersonal and environmental factors. Interpersonal factors include family and physician comments and feedback. Intrapersonal factors are the self-perceived changes in physical, visual and cognitive abilities, the symbolic and practical importance of driving, and to an extent, medical conditions. Environmental factors are physical environmental hazards, social portrayal/beliefs regarding ageing and alternative transport. The regulatory system also came under environmental factors, especially when driver's licenses are screened by age, and was also considered by older drivers as they self-monitored and self-regulated their driving.

Donorfio et al. (2009) also presented a model based on older drivers' descriptions of self-regulation. Firstly they showed that self-regulation was beyond the definition of *"changes in behaviours due to declining health and ability"* (p. 225) but rather the term encompassed the *"psychological process surrounding independence, self-worth, remaining connected to life and society, and what role the automobile plays*" (p. 225). Their model of self-regulation contains four dimensions:

1) Driving skill and ability: awareness, limitations and defensive driving

2) Life and society: necessity, planning trips and forgoing of trips
3) Self-worth: psychological, importance and freedom
4) Automobile: vehicle mechanics, safety features and level of use.

Within their model, Donorfio et al. (2009) acknowledged that remaining a driver is not only motivated by the need to travel but also by their self-identity as an independent driver, therefore ceasing to drive can negatively affect older adults' self-worth.

Donorfio et al. (2008) proposed a calculation of how older drivers self-regulate*, "the calculation weighs the meaning of driving for the individual, what alternatives are available (if any) and how attractive they are, as well as age, health, and lifestyle concerns"* (p. 331). This calculation demonstrates the complexity of factors leading to the selection of self-regulation strategies used or not used. Significantly, the importance of an activity involving driving may outweigh the concerns associated with a driver's health or the driving conditions.

Both models are useful for understanding an older driver's perspective of self-regulation, and I do not have a preference for either model. Laliberte Rudman et al. (2006) give a holistic view of the person, occupation and environment fit, perhaps due to their occupational therapy background. Donorfio et al.'s (2009) model does well at emphasising the psychological factors in driving and the calculation which includes need and meaning.

2.3.1.1 Strategies

Numerous studies have listed different individual strategies used for driving self-regulation. Molnar et al. (2013) presented Michon's hierarchy of driving which divides self-regulation into strategic, tactical and life-goal practices:

- Strategic self-regulation refers to "the general planning stage of a trip" and includes "reductions in the overall amount of driving that drivers do, avoidance of specific driving circumstances that drivers consider to be challenging… and strategies for planning routes" (p.108).
- Tactical self-regulation refers to "the actual maneuvers drivers make in traffic at any given time" and "includes avoiding distractions inside the vehicle while driving, and modifying driving maneuvers in traffic relative to vehicle speed, and distance between vehicles" (p.108).

- Life-goal self-regulation refers to the “drivers’ general motives and attitudes in life and how they interact with drivers’ skills to affect driving” and includes “broader decisions such as what type of vehicle to buy or where to live in relation to driving destinations” (p.108).

Table 1 presents specific strategic, tactical and life-goal driving practices which have been selected from several studies of older drivers and self-regulatory practices. These strategies suggest the complex decision-making and problem-solving that older adults employ to continue effective mobility, and may present strategies that are relevant to scooter users.

Table 1:

Self-regulation and driving practices

Practice theme	Specific practice	Reference
Strategic: Avoidance of	Driving at night	A B C D E
	Making unprotected turns across traffic	B D E
	Bad weather	B D E
	Motorways/highways/expressways or carparks	B C D E F
	Unfamiliar areas	D E
	Situations (times or places) with heavy traffic	B C D E F
	Reversing	D E
	Long distances or pacing long distances	B E F
	Road rage or aggressive driving	B
Strategic: Other	Having a passenger to assist or avoiding having a passenger who can distract	B D E
	Planning to find the best route, and writing down the route	B D F
	Practicing ahead of time to become familiar with the route	D
	Reducing trips and only making necessary trips	A D F
	Self-monitoring: vision level, reaction time and/or cognitive ability	C
	Self-imposed driving restrictions increased with the health declines	F
Tactical	Leaving a greater distance between the car in front and own car	B D
	While driving, avoiding: talking to a passenger, eating, reading a road map, changing radio stations, talking on a cell phone and/or personal grooming	D
	Increased use of mirrors, seat belts, and cruise control	F
	Increased looking for pedestrians	B
	Driving: slower, more defensively and/or more cautiously and being more alert	B F
Life goal	Buying newer and safer car models	B D F
	Listening to family or general practitioner	C
	Maintaining an acceptable, perceived level of comfort	C

Practice theme	Specific practice	Reference
	Maintaining highly valued independence which is linked to sense of self	C F
	Moving closer to desired amenities	D
	Using alternative transport	D

Note. A= (Baldock, Mathias, McLean, & Berndt, 2006)
B= (Donorfio, Mohyde, Coughlin, & D'Ambrosio, 2008)
C= (Laliberte Rudman et al., 2006)
D= (Molnar et al., 2013)
E= (Tuokko et al., 2014)
F= (Donorfio et al., 2009)

2.3.1.2 Self-regulation factors.

Of course, the reasons for practising self-regulation are complex and the practices listed in Table 1 would not occur without due reason. In an attempt to discover what triggers the need for self-regulatory practices, many studies have investigated specific factors which may influence driving practices.

A large volume of this literature was synthesised into a report by Molnar et al. (2015). The report looked at individual factors such as age, sex, confidence and attitude, living arrangements and social supports, health (including vision and cognitive impairments), transportation environment and accident history. Molnar et al.'s synthesis found that different studies produced inconsistent correlations, perhaps due to study design. For example, several studies found that self-regulation practices increased with age whereas others found no relationship between ageing and self-regulation. Therefore, it is difficult to predict which factors lead to practice self-regulation more readily.

Specific factors may play a significant role in understanding self-regulation and driving, helping to identify particular populations are who are more or less likely to make risky driving decisions. However, I come back to Donorfio et al.'s (2008) calculation, whereby before each potential trip the driver weighs different factors against each other such as the risks, the strategies to employ and the meaning. This calculation indicates the individualised and complex approach to self-regulation beyond isolated factors.

Molnar et al. (2015) recommended future research which evaluates the relationship of self-regulation and mobility safety. This research could determine whether self-regulatory practices actually improve driving safety and how to enhance appropriate self-regulation in populations at higher risk of crashes and injury (Molnar et al., 2015).

Although determining the relationship between self-regulation and mobility safety was not a specific aim of Siren and Haustein's (2015) literature review, the findings could imply that self-regulation does maintain driving safety. Siren and Haustein (2015) reviewed 20 studies on older drivers and different age-based screening policies throughout the developed world. They found little evidence proving that regulatory approaches through age-based licence renewal led to decreased rates of vehicle accidents. They concluded that the practice of general screening of older drivers based on age has insufficient evidence, as older drivers are generally a safe driving group. Additionally, screening had unproven cost-benefit efficacy but created premature, damaging driving cessation and there was scarce support for driving cessation transitions. Siren and Haustein (2015) recommended that older driving should be approached with the intention to support and prolong safe mobility, however there are significant institutional barriers, especially with profits made from older driver screening. Siren and Haustein (2015) emphasise that older drivers should be screened by their presenting risk-factors rather than chronological age. So, this review signals that self-regulation may be sufficient for ensuring driving safety, indicated by the unchanged accident rates of the many European countries where age-based screening does not occur and older drivers' are essentially self-regulating their driving.

2.4 Mobility in New Zealand

This section introduces significant aspects of mobility, especially the mobility landscape in New Zealand. This context is important to acknowledge, as it influences how an older adult with low vision and mobility impairment decides to meet their mobility needs and goals.

Firstly, how we understand mobility is important. Ziegler and Schwanen (2011) presented an exploratory analysis of mobility and wellbeing in later life and define mobility as *"the overcoming of any type of distance between a here and a there, which can be situated in physical, electronic, social, psychological or other kinds of space"* (p. 758). Ziegler and Schwanen acknowledged the multiple influences on mobility including the individual's motivation, physical ability, psychological needs and connection to other community members. In their analysis, they argued that while mobility contributes to wellbeing, physical mobility restrictions do not automatically translate to decreased wellbeing as older adults use alternative methods for achieving mobility such as phone calls.

While we can theoretically accept that mobility may not be a physical movement, a metasynthesis of 12 studies found that older adults' perceive physical mobility as an integral part of the sense of self and vital to health (Turner Goins et al., 2015). Older adults felt that to be mobile was to be robust and capable, and they preferred to be mobile without assistance. They felt that mobility affects physical function, mental health, emotional health, social health and the sense of self. For that reason, adapting to mobility needs was perceived to be vital to wellbeing.

When considering mobility as movement, we need to incorporate the available potential for movement. New Zealand's transport system is dominated by the use of private vehicles, alternatives are challenging or non-existent for all non-drivers (Rose, Witten, & McCreanor, 2009). Rose, Witten and McCreanor (2009) report on two projects which used a series of focus groups and interviews with groups identified as vulnerable within New Zealand's dominant transport system including older adults, people with disabilities, rural, and low-income households. Public transport was often unavailable or failed to meet the needs of the user. This lack of alternative transport is particularly harmful to those who could not afford to own or maintain a private vehicle, and those whose impairments prevented them from driving, such as participants with low vision. Rose, Witten and McCreanor (2009) concluded that policy and attitudes which favour roading development and cost-effective transport hinder the dramatic change needed which prioritises a duty to those socially excluded by transport limitations.

A survey of New Zealand older adults followed by 71 semi-structured interviews investigated how they cope without a car. Davey (2007) reported that the predominant transport options were (in order of frequency) lifts (transport provided by others), walking and/or taxis. Some participants used buses (however not as a primary mode of transport), scooters and community transport. Getting lifts from others was problematic as this relied on another person, their timetable, interests and could generate the feeling of being a burden; therefore participants were less likely to make spontaneous or non-essential travel. Participants found ways of reducing their need to travel such as having grocery delivered, mail-order shopping and requiring others to visit them at home. Davey (2007) concluded that due to our transport system being dominated by private vehicle use, there is a real risk of driving cessation being followed by social isolation, decreased quality of life and strain on relationships

with people who provide lifts, especially if driving cessation was poorly accepted and unplanned (Davey, 2007).

Our transport systems, social structures and built environments are inherently designed for the *"most common bodies"* or to be more specific, as Hamraie (2013) argues, our environments are designed for the *"white, masculine"* experience (p.6). The pace that we're expected to cross the road, the range of motion for navigating infrastructure and the visual needs for orienting oneself in space are a few of the features which are based on expectations that bodies meet certain standards and do not allow for marginalised, varied human experiences. The movement for universal design aims to enable every space to be accessible to the broadest ranging variation of human experience, however, as the following literature will demonstrate, there is a lot to be desired for the universal accessibility of our communities (Hamraie, 2013).

Walking is a common mode of community mobility among older adults who have stopped driving, however, children and older adults are disproportionality represented in pedestrian casualty rates (Wilton & Davey, 2007). Wilton and Davey's (2007) report is based on data collected throughout New Zealand from older adults, Road Safety Coordinators, and local authority officers who were responsible for pedestrian infrastructure. The findings highlighted the many barriers that older pedestrians have for effective walking and are detailed later in Table 2. Wilton and Davey (2007) echoed Hamraie's assertion that pedestrian mobility is considered a low priority in a world not designed for experiences outside the "norm". Wilton and Davey's (2007) report also detailed strategies for overcoming the identified barriers, and these are included in Table 3.

The New Zealand government published a booklet detailing transport options for seniors (NZ Transport Agency, 2015c). What is particularly telling of our vehicle dependence is there are 32 pages dedicated to 'getting around by car' and only eight pages detailing 'getting around without driving'. Their suggested driving alternatives include moving closer to amenities or mobilising by bus, train, walking, cycling, a scooter or taxis.

There are schemes which aim to support and provide the potential for movement which don't rely on private vehicle use. One scheme is the use of a Gold Card (available to older adults aged 65+), in most areas this card warrants free bus and train travel at off-peak times and is funded by the New Zealand government (Ministry of Social

Development, n.d.). The Total Mobility Scheme also provides half-price taxi travel to individuals with an impairment which prevents them from using public transport (Ministry of Transport, 2017). However, Rose, Witten and McCreanor (2009) found that public transport and taxis often did not meet an individual's timetable, budget, access needs, and desired destinations. Public transport is lacking in New Zealand, particularly in rural settings where the demand is not significant enough to justify the expensive infrastructure and distances (Davey, 2007). Some local, voluntary initiatives may provide a more flexible shuttle for the supermarket, doctors or other necessary services (Weka: Disability Information, 2016).

2.4.1 Importance of mobility

Under of the section of this review, 'Mobilising with impairments' I detail many of the barriers and risks of community mobility for many. Before I detail these challenging elements, it is necessary to explain why focusing on mobility is important, including the obvious opportunity for community participation. The benefits of mobility may be a significant factor in personal self-regulation calculations, as well as a reason for clinical intervention to support an older adult with community mobility.

Community participation is well acknowledged as a contributor toward wellbeing along with ensuring thriving communities (di Stefano et al., 2012). Social isolation on the other hand, is a significant health risk, including increased likelihood of premature mortality (Holt-Lunstad, Smith, Baker, Harris, & Stephenson, 2015). The ability to mobilise within the community protects against the repercussions of being physically isolated and is therefore noteworthy for contributing to wellbeing. The importance of ageing in the community and community participation is recognised and stipulated in the New Zealand government's Positive Ageing Strategy (Ministry of Social Development, 2008).

There is also a potential fiscal argument for promoting independent community mobility such as through endorsing scooter use. Firstly, a recent British economic analysis has calculated the cost of loneliness at £6,000 per severely lonely older adult due to associated poor health outcomes and increased social services (McDaid, Bauer, & Park, 2017). McDaid et al. (2017) found that social participation interventions may be cost-effective for decreasing loneliness therefore improving wellbeing. Scooters usually cost less than £6,000 and can increase levels of social participation (Sund et al., 2015). Secondly, Gold Card schemes and subsidised taxis through the Total Mobility Scheme are financed through NZTA using government funding, and so promoting an

independent, private mode of transport may reduce financial demand on the subsidised schemes (Rose et al., 2009).

2.5 Mobilising for people with impairments

As there lacks research specific to low vision scooter users, I draw on two strands of mobility research topics and bring them together to understand nuances which might be relevant to this study's focus.

Several studies have explored the experience of community mobility by individuals with visual impairment, predominantly older adults with low vision. Of course, visual impairment alone is not the only challenge to community mobility, having a mobility impairment considerably affects how an individual moves in their community. This literature review also presents studies of mobility impairments which are compensated for with a powered mobility device.

2.5.1 Barriers to mobilising

These two impairment groups intersect, both sharing similar barriers to community mobility and practices for managing those barriers. Interestingly, many of the common barriers and practices were also identified by older pedestrians. So, in Table 2, I have drawn together the identified barriers to community mobility as identified by the three different groups: individuals with visual impairment, individuals who use a powered mobility device and older pedestrians.

Table 2:

List of barriers to community mobility for individuals with visual impairment, scooter users or older pedestrians

Feature	Cited by literature concerning:		
	Visual impairment	Mobility device	Older pedestrian
Physical			
Parked cars blocking line of sight or pathway	A B		C
Dense traffic (for road crossing)			C
Difficulty using public transport	A B D E	F G H	C
Escalators/ Elevators	I	F G	
Inaccessible spaces (narrow aisles, toilets, check outs, carparks)		F G J K	C
Inadequate lighting/ glare	I L M		C
Narrow footpaths, hallways and doorways	A	G K	C
Other pedestrians	B M	F	
Poor weather		F H J	
Poorly maintained footpath infrastructure (cracks, gradient changes, uneven surfaces)	A B E I L M	G K	C

Feature	Cited by literature concerning: Visual impairment	Mobility device	Older pedestrian
Road crossings (without designation, audio cues or too short crossing time)	A B E I	G	C
Roadworks	A		
Slippery surfaces including snow and ice	I	H J	
Stairs/ lack of disability access	A B D I L	K	
Street furniture (seating, shop signs, rubbish bins)	A M	K	C
Uneven, steep, absent or narrow kerb ramp	A I	F G H K	C
Vegetation (overgrown branches)	A M	F K	C
Social			
Disabling attitudes (e.g., stigma, exclusion)	A I M	F G H J K	C
Embarrassment	A I M	F J	
Personal safety (feeling threatened, theft)		J	C
Possibility of collisions (carparks, other pedestrians and cyclists on the footpath/ shared paths)	A D M	F	C
Restricted access by authority		F	
Unpredictable vehicle behaviour (impatience, running lights, not giving way, exiting driveways)	B		C

Note. A= (Gallagher, Hart, O'Brien, Stevenson, & Jackson, 2011)
B= (Montarzino et al., 2007)
C= (Wilton & Davey, 2007)
D= (Laliberte Rudman & Durdle, 2008)
E= (McGrath, Laliberte Rudman, Spafford, Trentham, & Polgar, 2017)
F= (Fomiatti, Moir, Richmond, & Millsteed, 2014)
G= (Korotchenko & Hurd Clarke, 2014)
H= (Mortenson, Whalley Hammell, Luts, Soles, & Miller, 2015)
I= (Laliberte Rudman et al., 2016b)
J= (Hedberg-Kristensson, Ivanoff, & Iwarsson, 2007)
K= (May, Garret, & Ballantyne, 2010)
L= (Blaylock et al., 2015)
M= (Brouwer, Sadlo, Winding, & Hanneman, 2008)

Table 2 has the benefit of highlighting barriers which are universal for the three groups, suggesting a high need for further investigation such as the barriers to using public transport, road crossings or poorly maintained footpaths. Of course, barriers which are relevant to only one group are still important and require attention. The organisation of barriers into physical or social features indicates the complexity within a footpath landscape.

The listing of barriers also has the benefit of indicating what might be experienced by this study's participants who fit into all three categories: mobility impaired, visually

impaired and an older pedestrian. These listed barriers to mobility will be analysed further in the discussion chapter and presented alongside the findings of this study.

2.5.2 Strategies for mobilising

Subsequently, these studies provided insights into the strategies that either the individual used for community mobility and social participation, or strategies which could be used at a societal level to support accessibility, and these s are presented in Table 3.

While the cited studies did not refer to self-regulation, the individual strategies to managing barriers met the criteria of being adaptations of one's behaviour to fit with the environment and to attain a goal. Therefore, I organised the individual practices into strategic, tactical and life-goal practices to align with how driving literature views self-regulation.

Table 3:

List of strategies for enabling community mobility by individuals with visual impairment, scooter users or older pedestrians

Self-regulation theme and practice		Cited by literature concerning:		
		Visual impairment	Mobility device	Older pedestrian
Individual self-regulation				
Strategic	Avoiding community mobility/ activity avoidance	A D I M	G	
	Avoiding night/bad weather	B D	H	
	Awareness of own limitations			C
	Planning routes	B E	F J	C
	Quiet times of day for outings	M	F	C
	Restriction to familiar areas or designated road crossings	B D E M	F H K	C
Tactical	Counting steps	E		
	Increased care/concentration/ courtesy	D E M	F K	C
	Increased visibility (high-viz, flag)			C
	Listening for traffic	E		C
	Orienting around landmarks	E		
	Seeking assistance from others	A D E I M	J K	
	Slower pace	D M	H	C
	Sunhat and sunglasses	M		
	Using the road as an alternative		K	
	Visual impairment identification	E M		
Environmental strategies				
Accessible public transport services (including signage, layout, ramps, audio announcements, availability, timetable and kneeling options)		A B D	H K	C

Self-regulation theme and practice	Cited by literature concerning:		
	Visual impairment	Mobility device	Older pedestrian
Adequate forewarning and alternatives around roadworks	A		
Adequate street signage	A		C
Contrast on the edge of footpaths	A		
Designated road crossings with audio indicators	B E		C
Disability access		G K	
Education and public awareness	A E	F G H K	C
Lighting			C
Reduced speed limit in shopping centres/ main street			C
Tactile markings	A		C
Taxi discounts	A		
Well maintained, wide footpaths	B E	K	C
Well-designed kerbs and ramps	A	K	C

Note. A= (Gallagher et al., 2011)
B= (Montarzino et al., 2007)
C= (Wilton & Davey, 2007)
D= (Laliberte Rudman & Durdle, 2008)
E= (McGrath et al., 2017)
F= (Fomiatti et al., 2014)
G= (Korotchenko & Hurd Clarke, 2014)
H= (Mortenson et al., 2015)
I= (Laliberte Rudman et al., 2016b)
J= (Hedberg-Kristensson et al., 2007)
K= (May et al., 2010)
L= (Blaylock et al., 2015)
M= (Brouwer et al., 2008)

Table 3 presents the rich variety of individual practices used for effective mobility by older pedestrians and individuals with mobility impairment or visual impairment, as well as the environmental facilitators for supporting mobility for these three groups. Table 3 also has the benefit of highlighting individual practices for overcoming barriers to mobility common to all three groups, such as planning routes which enable effective mobility and increased concentration when mobilising. Commonly acknowledged specific environmental facilitators are also highlighted, such as well-designed footpaths, kerbs and kerb ramps, and the need for public awareness. Of course, as with Table 2, if a strategy has only been identified in one group of literature, it is still worthy of further investigation.

The practices and strategies listed in Table 3 have the benefit of indicating what self-regulation practices might be employed by the participants and what environmental

facilitators may support the participants in this study who are older pedestrians and mobilise with a visual impairment and with a powered-mobility device. The strategies in Table 3 will be further analysed in the discussion chapter and presented alongside the findings of this study.

2.5.3 Further insights to mobilising for people with impairment

The literature presented in Tables 2 and 3, did not simply present barriers and strategies for community mobility but also presented further profound insights to the experiences of mobilising by individuals with either with a visual impairment or who mobilise with a powered-mobility device. The following section presents influences on social participation including issues with stigma, public transport, the environment, and with the device, including procurement.

2.5.3.1 Influences on social participation

Laliberte Rudman et al. (2016a) described how social participation for individuals with low vision is influenced by several factors. These factors included internal motivation, the availability of mobility options, physical environmental features, social environmental barriers and sources of informal support. Without the ability to independently mobilise, participants decreased their social participation levels, relied on social supports, lost their spontaneity and reduced 'unnecessary' activities. Participants' decision-making about whether to go out related to physical environmental features, individual mobility skills, falls history, volition, and whether they lived with a spouse. Social participation levels often directly related to the level of social supports available and each participant's comfort in asking for help. Activities were reduced if overcoming the numerous issues with mobility and the social environment, outweighed the participant's value in the particular activity, suggesting a relationship to the self-regulation and driving calculation introduced earlier by Donorfio et al. (2008). Two participants who did not decrease their activity levels displayed a high level of motivation and resilience in adapting to their impairment (Laliberte Rudman et al., 2016b). As a result of this complexity, enabling social participation cannot be facilitated by merely employing a strategy to overcome a barrier, there are a range of different factors to incorporate.

2.5.3.2 Negative elements of mobilising

Community mobility, although beneficial, could also come with negative emotions or experiences for individuals with a visual impairment or individuals who use a powered-mobility device.

Brouwer et al. (2008) found that mobilising with low vision demanded increased concentration and energy, making the act of walking tiresome, while trying social interactions could be deflating. Other negative emotions were experienced due to the individual restricting their activity levels as a manner for managing their visual impairment (Brouwer et al., 2008). Equally, Korotchenko and Hurd Clarke (2014) found that strategies for overcoming demanding environments with a powered-mobility device were fatiguing, uncomfortable and could lead to restricted activity levels. Korotchenko and Hurd Clarke's (2014) participants explained that demanding environments suggested a 'provisional' acceptance and inaccessible spaces led to powered-wheelchair users feeling excluded, reinforcing feelings of internalised stigma.

Participants associated mobilising with fear and risk in studies by Laliberte Rudman and Durdle (2008), and Gallagher et al. (2011). These visually impaired participants, along with those in Brouwer et al.'s (2008) study, would ask for assistance from others despite feeling reluctant due to guilt, a sense of burden and a threat to their sense of pride and independence. Friends and family provided support in managing social outings, however accepting this support was not always easy (Laliberte Rudman et al., 2016b).

Literature for both groups found that identifying oneself as disabled can be both beneficial and further disabling. McGrath et al.'s (2017) participants discussed the nuances of visual impairment identifiers such as a white cane or label. Identifiers could lessen aggression from members of the public when asking for assistance or following collisions, however, identifiers also labelled the person as an 'other', indicating vulnerability or inviting paternalism. In a synthesis of wheeled mobility device articles, Ripat, Verdonck and Carter (2017) identified that an individual can simultaneously experience two opposites; the device can be both enabling and disabling, and this is influenced by contextual factors. Highlighting the dualism of disability identification, Korotchenko and Hurd Clarke (2014) found that powered-wheelchair users reported that the device, which enabled independent travel, also indicated disability and created a barrier during social interactions. Meanwhile, Fomiatti et al. (2014) found

that the scooter users without a visible impairment felt unfairly judged as ineligible to use a scooter by members of the public.

Scooter users described further stigma. May et al. (2010) found that some scooter users had experienced discrimination from members of the public, one participant blaming this on the bad reputation given by other poorly behaved scooter users. Other participants discussed public resentment of the space that scooters use on footpaths and in community settings (May et al., 2010).

Lastly, stigma could be perpetuated with how we view disability. McGrath et al. (2017) comment that an individual-based view of disability is maintained by an emphasis on individual strategies, such as those listed in Table 3. Although these individual strategies are useful for maintaining mobility, there is a tendency to overemphasis individual responsibility, disregarding strategies at a societal level which ensure an accessible environment for older adults with low vision. An individual-based view of disability can perpetuate negative associations with disability such as shame and stigma, thus influencing levels of social participation.

2.5.3.3 Environmental production of disability

Listed in Table 2 are the many physical environmental barriers for both mobilising with a visual impairment, or mobilising with a powered mobility device, and responses to the barriers are listed in Table 3. What is pertinent is that often maladaptive strategies to manage physical barriers only occur when the physical environmental demands exceed the capacity of the mobiliser (Ripat et al., 2017). For example, scooter users preferred not to drive on the road but when a footpath presented too many obstacles or physical discomfort, then driving on the road was preferable (May et al., 2010). An individualised view of disability would focus on scooter users maladaptive practices, whereas Ripat et al. (2017) invited consideration of broader issues of environmental disability production.

Fomiatti, Moir, Richmond and Millsteed (2014) explained that while improved planning and maintenance of public areas could overcome issues of access, it is also necessary to address discriminatory attitudes to improve the scooter users' experiences. A participant in their study described how building staff restricted the scooter from specific spaces, resulting in painful mobilising and a significant barrier to participation. Further environmental production of disability are the social interactions which cause

the feelings of exclusion, stigma and shame, described in the section above, 'negative elements of mobilising'.

Noteworthy work has looked at the institutional environment's production of disability. Laliberte Rudman et al. (2016a) conducted a critical interpretive synthesis of 83 articles which found most research about low vision rehabilitation and age-related vision loss is inherently written from the perspective of researchers and clinicians as experts. These 'experts' favoured risk-aversion and demonstrated paternalistic attitudes describing older adults with low vision as 'at-risk'. These authors were also involved in another publication describing a broad range of stakeholders' perspectives of seniors, risk and rehabilitation. Participants identified the need to remove attitudinal barriers in both practice settings and research (Egan et al., 2017). While Egan et al. (2017) conceded the legitimacy of addressing physical risk in older adult rehabilitation practice and research, they felt that dominance solely on physical risk diminished older adults' agency and capabilities, while ignoring any benefits of risk-taking.

2.5.3.4 Limitations of the device

Unique to the powered mobility device literature, the device itself could influence levels of social participation. Korotchenko and Hurd Clarke (2014) found that the weight and bulk of the devices meant that powered-wheelchairs are difficult to manoeuvre or lift around infrastructure such as stairs. The battery life restricted the length of a journey and the design of the devices had limited adjustments to create ergonomic comfort. Lastly, when a component of the device malfunctioned, the user was rendered immobile indicating the vulnerability of dependence on technology. Fomiatti, Moir, Richmond and Millsteed (2014) found most of their 14 participants reported a lack of investigation and subsequent support when they bought their scooter. Participants had mostly purchased the first scooter without adequate adjustment and without receiving thorough education about how to use and maintain the device. This limited procurement process resulted in discomfort, accidents and restricted use, limiting the user's potential for social participation.

2.6 Low vision scooter use

Finally, in this literature review, I look at the four pieces of literature which focus specifically on low vision and scooters. There is one thesis, two articles which report on the same scooter study and my own pilot study. While only my study presented the

users' perspective, the other literature is important for setting the scene of low vision scooter use and introducing different aspects of this practice.

2.6.1 The perspectives of Australasian professionals who work with low vision scooter clients

Firstly, Deverell (2011) presented a Master's thesis looking at the perspectives of professionals who work with clients who have low vision and use scooters in Australasia. Data was collected from 29 surveys and 12 interviews with O&M specialists, and interviews with two occupational therapists and one physiotherapist. The first significant finding was that multi-disciplinary collaboration brought different skills and knowledge to a scooter assessment. Especially, occupational therapists were understood to attend to functioning with the scooter, and the O&M specialist could integrate functional vision strategies.

However, there remained issues with *"paternalistic, unwarranted concerns about safety [which] can limit client freedoms"* (p.53). Deverell introduced some issues with regulation, namely inconsistencies between different jurisdictions and the need for appropriate regulation design guided by practitioners. Participants demonstrated a spectrum of attitudes toward risk, potentially governed by policy and culture in workplaces. Some participants would not recommend, or even actively discouraged, scooter use whereas other participants recognised client's rights to autonomy and saw their role to provide relevant information and training so that the client could make an informed choice. Deverell compiled a protocol for professional practice (see Appendix C) which can support professionals in their procedure and decision-making, without over-emphasis on assessment.

Finally, the findings called for more research to present issues from the client's perspective and present concepts for professional development and accreditation. Deverell's thesis provides a context in professional practice, albeit predominately from an Australian perspective where access to low vision services is more available than New Zealand. The perspective of professionals working in this space provides critical insights for interpreting how the findings of this study will relate to clinical practice.

2.6.2 Dutch study of low vision scooter users

Two articles by lead-author Cordes looked at findings from a Dutch study which used assessment procedures to measure the ability of scooter users with a range of levels of visual impairment (Cordes et al., 2017a, 2017b). All but one participant were novice scooter users. The range of visual impairments included 10 with low visual acuity, 14

with very low visual acuity, 11 with peripheral visual field defects, 13 with multiple visual impairments and 37 controls who were normal-sighted. Participants completed a 30-minute practical driving test which included a variety of real situations. The test was recorded and then evaluated by two occupational therapists who specialised in O&M. The evaluation was guided by an adapted driving assessment and covered 13 subscales such as 'speed', 'anticipation' and 'head movement'.

Cordes et al. (2017b) reported that five of the 46 visually impaired participants failed the test (no controls failed), and this included participants with either very low visual acuity, peripheral field defect or combined visual impairment. These findings indicate that visual impairment alone is not a determinate of fitness-to-drive. The participants who failed displayed insufficient head movements, confidence and cycle lane performance. Training could support visually impaired scooter users to make sufficient head movements, build confidence and the client could be encouraged not to use a cycle lane. While the study is limited by using an assessment procedure which is not in a familiar environment for each participant and the lack of a standardised evaluation tool, the study does indicate that vision measurement has limited translation to driving ability.

Cordes et al., (2017a) continued the discussion of fitness-to-drive further. Cordes et al. (2017a) explained that visual impairment does not determine driving ability and subsequent training can achieve driving ability. Training individuals with visual impairment needed more time and attention. Following subsequent training, of the five who failed the test only one participant was unable to obtain sufficient driving ability. The authors recommended that scooter assessment is based in real life situations, and driving ability and driving behaviour be considered rather than evaluation solely based on fitness-to-drive (vision).

2.6.3 Pilot study of low vision scooter users' perspectives

My pilot study presented the experiences of using a scooter by four older adults with low vision (McMullan, 2016). Each participant had a different visual impairment and had a mobility impairment which prevented them from both driving and walking. Their experiences fell into four themes: 'Autonomy and wellbeing', 'Accessibility', 'Community' and 'Self-regulation'. Significantly, the scooter enabled meaningful, autonomous community mobility which could not be better met through other modes of transport. The participants used a scooter not because of their low vision but in

spite of it. They described strategies for managing their visual limitations as well as physical and social environmental barriers, to ensure community participation.

2.7 Chapter summary

This chapter has presented and reviewed the literature covering multiple factors relating to the self-regulation practices of older adults with low vision when they use scooters.

The self-regulation and driving literature presents the aspects involved in the self-regulatory process by older drivers. Two models are presented which demonstrate the complex factors in deciding if and how to drive, which include social and physical environmental features, and the meaning of an activity. Many self-regulatory practices are presented in a table form for quick reference when comparing this to scooter practice.

The review sets the scene of the transport landscape in New Zealand. Our systems are dominated by private vehicle use which creates substantial challenges for anyone who is unable to drive. Community mobility is known to be beneficial and the lack of alternative forms of transport impedes on vulnerable population's ability for wellbeing.

Particularly reviewed is the literature from two fields: visual impairment literature and mobility-device literature. The barriers to community mobility and the strategies for overcoming community mobility have been tabulated for a clear reference and comparison of community mobility issues and management. The literature also provided useful insight into factors of community mobility, including other influences on social participation, personal demands and stigma for both groups, the environmental production of disability and finally the limitations of the device.

Finally, the review examined the existing literature which looks specifically at low vision and scooters. This included a thesis presenting professionals' perspectives of their low vision clients' scooter use, a Dutch study which used an assessment procedure to find that most of the visually impaired sample could competently use a scooter or otherwise be trained to do so, and my own dissertation which acted a pilot to this study.

3 Methodology

3.1 Chapter overview

The methodology chapter presents an overview of the study method: the how, what, where, why, who and when of the research design. It starts with the underpinning philosophy or paradigm of understanding research, before presenting the more specific details. These details look at the study consultation, ethics, recruitment, data gathering methods, instruments, and data analysis. I then introduce particular steps taken to ensure the quality of the study, the study's rigor, credibility and trustworthiness.

3.2 Research paradigm

The paradigm of this study draws on a relativist ontology whereby reality is subjective with an interpretive epistemology and interpretive description methodology (Scotland, 2012; Thorne, Reimer Kirkman, & MacDonald-Emes, 1997). The paradigm is represented through the types of methods used in data gathering, how this data is interpreted and then presented.

3.2.1 Epistemology: Interpretive

The interpretive paradigm understands reality and meaning to be socially constructed with many individual, subjective interpretations (Scotland, 2012). This view, that there are as many interpretations of the world as there are individuals, recognises the multiple realities that are constructed according to different histories, cultures, objects and language (Scotland, 2012). Specific interpretations are acknowledged as the result of the researcher's interpretation of their dialogue with respondents and that these interpretations are open to change (Cohen & Crabtree, 2006).

Acknowledging the construction of knowledge, there are established concepts which guide my interpretation of the data in this study. Namely these concepts are ableism and ageism, which I view with critical disability perspectives.

3.2.1.1 Ableism and ageism

Ableism and ageism are concepts which describe the cultural environment and attitudes which underplay any discussion of disability and age. Ableism and ageism can be present in social attitudes, institutional practices and policy, so it's important to acknowledge these concepts when presenting a study on older adults who experience disability.

As various models of disability have been defined, critiqued, and adapted, concepts of oppression associated with disability are clear. Oxford Dictionaries defined "ableism" as *"discrimination in favour of able-bodied people"* (n.d.). Wolbring (2008) explained that *"ableism values certain abilities, which lead to disableism the discrimination against the 'less able'"* (p.51). Ableism is generally used in reference to preference which marginalises people with disabilities.

Closely intertwined with ableism is ageism: *"the systematic stereotyping and discriminating against people, simply because of their age*" (Butler, 1975, p. 5). Overall (2008) explained that *"the systems of ableism and ageism function to make, respectively, certain bodily features (limbs, organs, or systems), and certain numbers of years lived, into social liabilities, rationalizations for subordination, and sources of shame"* (p.131). Overall (2008) continued that although there are correlations between chronological age and rate of impairment, this does not condone the oppressive *"social practices and institutions"* associated with ableism and ageism. While ageism can refer to discrimination against young people, in this dissertation the reference is to older people.

The importance of including ageism and ableism into this study is to question the accepted assumptions and practices which discriminate against older adults and those who experience impairments. Older adults with low vision who use scooters not only live with dual impairments; visual and mobility, but may also experience dual discrimination; ageism and ableism[2].

3.2.1.2 Critical disability perspectives

By taking critical disability perspectives (CDP) it becomes possible to acknowledge and potentially counter the oppressive nature of ageism and ableism. Egan et al. (2017) encourage practitioners and researchers working with older adults to challenge established beliefs of ageism and ableism and move toward CDP, for example by valuing client expertise and practicing under a harm reduction model rather than risk aversion.

Ableism and ageism can be partly addressed by incorporating four tenets from CDP presented by McGrath et al. (2016): interdependence, questioning normalcy, reflection on language and the environmental production of disability. Firstly, CDP maintain that

[2] Individual participants may also experience other forms of discrimination such as sexism, classism and racism

interdependence is also to be valued rather than the dominant Western view of independence as a priority. Secondly, CDP welcome representations of diversity which can then deconstruct the idea of "normalcy" from the current, narrow view of able-bodies. Thirdly, CDP request that language and accepted phrases receive reflection. For example, the phrase 'she suffers from glaucoma', gives negative connotations to disability whereas saying 'she has glaucoma' or 'she lives with glaucoma' are neutral statements. Lastly, CDP assess that the environment produces disability and requires due attention for inclusion of individuals with age-related vision loss.

3.2.2 Methodology: Interpretive description

Sally Thorne introduced interpretive description as an appropriate methodology for nursing research. Thorne, Reimer Kirkham and MacDonald-Emes (1997) explained that nursing researchers often depart from the more traditional methodologies (such as phenomenology, ethnography and grounded theory). Traditional methodologies come with rigid procedures to ensure methodological purity and generate theory, however, the results generated by these methodologies may not translate to applicable research in practice. If departing from traditional methodologies, there's risk of poorly conceived research, therefore, alternative and appropriate methodologies must be available for clinical research.

Interpretive description provides nursing researchers with a non-categorical, generic methodology which incorporates their clinical context, practice knowledge and nursing science, and meets the research goal of having direct relevance to a clinical setting. Traditional methodologies serve the social sciences well in creating theory of health phenomena but as Thorne (2008) describes, the clinical researcher is concerned with the practical application of their research, and so interpretive description meets this need.

While interpretive description methodology was founded in nursing research, the principles are recognised to apply in occupational therapy and other health practitioner research. Indeed since referring to the methodology within the nursing research context in the first article, Thorne then describes interpretive description as a methodology for clinician researchers in her 2008 book (Thorne, 2008; Thorne et al., 1997).

Thorne et al. (1997) explain that the interpretive description methodology "*acknowledges the constructed and contextual nature of much of the health-illness*

experience, yet also allows for shared realities" (p. 172) and this fits *"within the interpretivist and naturalistic traditions"* (p.176). This methodology looks for patterns within data but with the understanding of infinite variation of patterns, and the interpretation of the data is then understood to be influenced by the researcher's lens including their discipline and clinical experience. The aim of the interpretation is not to theorise, but to integrate and synthesise ideas for clinical application.

Interpretive description was an appropriate method for this study, as the principles guided me through building an understanding of an experience, acknowledging the multiple influences and allowing for shared realities, then interpreting the gained understanding into what health professionals can do in response. This interpretation provided a clear connection of the data to the context of practice and policy. The particular methods described under 'Data gathering' fit under an interpretive description methodology. The findings are then presented as multiple representations, not an absolute truth.

3.3 Consultation

As this study followed from a pilot, much of the consultation is based on this previous consultation (McMullan, 2016). To establish the need for such a study, I consulted with O&M specialists, several academics in either occupational therapy or physiotherapy who had an interest either in low vision or scooters, and several visual impairment organisations. In both years I contacted Otago Polytechnic's Te Kaitohutohu to ensure that my research was appropriate from a Māori perspective and meets with bicultural duties under Te Titiri o Waitangi (see Appendix D).

Consultation for this second study was less formal and mainly based on feedback from when I shared my findings from the pilot study. I felt that my first study proved its need from the extensive interest it gained. From presenting to two peer-support visual impairment meetings, feedback reinforced my interest in wider physical and cultural environmental influences as audience members shared their responses to my presentations. Discussion following my presentations had audience members mentioning courtesy in shared environments, such as the need to bring their rubbish bins in promptly and the need for adequate financial support to make using a taxi viable.

3.4 Ethics

The Otago Polytechnic Ethics Review Committee gave their approval for this study on the 12th of April 2017 (see Appendix E). Many of the following ethical issues had been identified and addressed in the pilot study and were considered again in this study. The following paragraphs outline all the ethical considerations in this study.

Any written information must be accessible. For this reason, by default participation information, informed consent forms, and transcripts for member-checking were provided in size 18, Arial font. Additionally, when I provided transcripts for member-checking, I also provided a summarised narrative report (see QUAGOL under 'data analysis') which was more accessible for those who experienced fatigue when reading.

I informed participants that they would be seen in public with me during the go-along prior to our meeting so they could assess whether this was acceptable and this was included in the informed consent. There could have been issues if an interaction with a member of the public greatly influenced the observation. Any interactions with non-consenting study participants were bracketed from the transcription and analysis.

There was a possibility that due to feeling distracted or under pressure from the research process, participants could operate their scooter in a dangerous manner. To reduce the risk of harm, I reassured participants that the purpose of the study was to present their perspective and specifically, the go-along was not to judge but to gain a familiarity with their environment. I maintained a friendly rapport with the participants so that they felt at ease. Prior to the go-along I let them make a small manoeuvre so that I could judge their comfort levels, and I asked where they would like me to stand and if I could talk during the go-along. I gave priority to the participant on the footpath and refrained from leading too much conversation during the go-along, preferring to let the participant talk or only asking simple questions so that the participant could dedicate their attention to the scooter operation. I was especially vigilant at road-crossings where I stopped talking and allowed participants to lead the crossing unless they asked for support.

As I was aware of the higher rates of depression and/or social isolation with older adults who have visual impairment. I was prepared to stop any interview and I had large-print information sheets about Age Concern and contact details for each local branch if a participant displayed or divulged negative feelings.

Because Māori have higher rates of visual impairment, it was likely that a participant might also identify as Māori. I asked participants on first contact, and was prepared to contact both Kāpō Māori Aotearoa (an organisation for Māori with visual impairment) and Te Kaitohutohu (Otago Polytechnic's support service for assisting research relating to Māori) for further consultation if this arose.

I requested that participants share their most recent optometrist or ophthalmologist report with me. Participants either had this readily available or could sign a consent form to release this to me. I understood the gravity of holding patient's information and so any written material was scanned then destroyed at the earliest time available. The consent form clearly stipulated only the vision report was needed so that I did not gain unnecessary medical history. The release of information then went through the relevant District Health Board or optometrist's process, which ensured the correct procedure was followed. Participants could choose not to provide this information, in which case their personal description of their visual status was used.

There was a possibility that I may have judged a participant unable to safely use a scooter. I was prepared to return from the go-along as soon as I felt any danger and to encourage the participant to talk to their family, friends or health professional. I did not expect this to occur with voluntary participants and I recognised the participant's right to take risks, and so this was more of an issue if I felt unsafe or if the participant appeared unaware of their risky behaviour.

The ethics committee asked that I also create audio files for my written documents, and that I address an exclusion criterion that I included in my original ethics application. I had stipulated that I would exclude a respondent who had a cognitive impairment based on the ethics committee recommendations for my pilot study. The committee asked how I would ascertain a cognitive impairment, and, so I decided to review my exclusion criteria and include respondents who had a cognitive impairment. My decision was based on the difficulty of using a cognitive assessment such as the mini-mental state examination without creating a clinical and judgemental tone, the ethics of what I would do with any discovery of a cognitive impairment, and my discomfort with the discrimination and misrepresentation of excluding a willing, voluntary participant because of a cognitive impairment. It was also assumed that if a respondent was using a scooter independently in the community and agreed to participate in the study, they were at a reasonable level of functioning and that their

cognitive impairment would not reduce their ability to give informed consent, which would be the original ethical concern. The ethics committee accepted my decision to include participants with potential cognitive impairments.

3.5 Recruitment method

Purposive sampling was used to ensure a sample of older adults with a variety of visual impairments who used a scooter:

Inclusion criteria for the study was:

- Diagnosed visual impairment
- 50 years of older
- Uses a scooter regularly in the community
- Lives in Otago, Southland, Canterbury, Nelson Bays or Marlborough.

Recruitment occurred through several avenues. Posters were not used because I was not able to reach the wide regions during recruitment. Instead the study was advertised through contacting scooter retailers, retirement villages, Age Concern, Grey Power, RSA, CCS Disability Action, optometrists, the Blind Foundation and a low vision clinic. Recruitment aimed to gather participants from a variety of settings including urban and rural, and so was recruitment was spread over most regions of the South Island (excluding the West Coast).

The recruitment process was interesting in that organisation and retailers in smaller localities were more forthcoming with potential participants. Organisations and retailers in larger localities did not seem to know which scooter users had a visual impairment or which visually impaired persons used scooters. Particularly interesting was the denial by several scooter retailers and retirement villages that their scooter users would have low vision, especially when scooter procurement often follows driving cessation due to vision loss. Denial could be due to a misunderstanding of what low vision is, individuals being private about their visual impairment and the assumption that low vision scooter use is risky. When calling retirement villages, I eventually stopped mentioning the low vision focus to the receptionists or managers so that potential respondents could let me know whether they had a visual impairment.

All 15 respondents were included in the study. Respondents were contacted at the earliest possible date in the recruitment process. Ten interviews took place in late

April, one interview in May and four interviews in mid-June, due to my availability to travel for the interviews at these times.

3.6 Data gathering

As was practiced in the pilot study, two data collection methods were combined to gain rich data in a timely manner. These methods were the go-along and a semi-structed interview. The structure of a meeting usually followed this sequence:

1. Short introduction: 5-15 minutes to set the scene and sign consent forms.
2. A go-along observation where the participant and I went for a short journey that they would normally take and is familiar to the participant (Kusenbach, 2003). This varied from 5-25 minutes. Conversations were recorded and observations were either noted or expressed conversationally.
3. A semi-structured interview which took between 20-60 minutes. Questions followed a question schedule (See Appendix F), and included a discussion of routes using a printed map of the participants area. This interview gave the bulk of discussion of each participant's practice of self-regulation including their particular needs, concerns and problem-solving. The interview also augmented and provided triangulation to the observation made during the go-along (Lysack, Luborsky, & Dillaway, 2006).

3.6.1 Go-along

I decided on the go-along method before I had searched for the specific terminology and theory, because as an occupational therapist, I am concerned with what people are doing. In my training, I learnt of activity analysis, of kitchen, dressing and shower assessments, and of the 'therapeutic benefit of doing' when engaging with a young person. It seemed obvious that if I were to be investigating community mobility then observing the activity would be integrated into the method. If I were studying low vision cooking, I would equally be interested in observing my participant cooking rather than describing a recipe or the kitchen environment. Thankfully, this method is well established, and I could draw on published accounts of how to conduct a go-along and associated challenges and opportunities (Carpiano, 2009; Kusenbach, 2003).

Originating in sociology, the go-along method aims to draw from the traditional research methods of participant observation and interviewing, allowing the researcher to observe a participant in their natural and familiar environment as they complete an outing which would have occurred without the researcher present (Kusenbach, 2003).

During the go-along, I walked alongside the participant and observed their interactions within the physical and social environments. Conversation was led by the participant and often related to physical features as these naturally occurred. This opportunity for observation of natural prompts, or "spatial practices", is a significant strength of the go-along method (Kusenbach, 2003, p. 463). Recalling small, seemingly insignificant details or understanding such reported details of an everyday activity out of context, such as during a sit-down interview, can be difficult for both the participant and the researcher (Kusenbach, 2003). Other opportunities afforded by a go-along method is to build a relaxed rapport with the participant. By engaging in an activity this could reduce the feeling of being studied and *"render visible some of the filters that shape individual environmental perception"* (Carpiano, 2009; Kusenbach, 2003, p. 478). I could also observe how the participant conducted themselves: their speed, their interactions with others and any unique strategies.

There are several challenges associated with the go-along method which Carpiano (2009) describes and these were addressed in the following manner:

- the weather and the physical health of the participant. To manage the weather and the health of the participant, the go-along was optional as I was unable to reschedule my interviews if the weather was poor.
- the time of the day. Participants were encouraged to choose a time of day that they would normally go out therefore managing any issues with the time of day.
- safety in the community. It was anticipated that if my participant was comfortable travelling in their neighbourhood then there unlikely to be any safety issues in terms of crime. However, as detailed under 'Ethics', there were safety issues considered associated with the potential to distract or stress participants.
- lastly, making a clear recording and including observed details into analysis. There was some difficulty with making a clear recording especially with the wind noise and writing details while walking. For this reason, I would verbally repeat important details that my participants said because I knew my own voice could be recorded clearly, and I would verbalise any observations so that they were also included in the transcription.

Because the go-along was optional, three participants declined to take part in this stage. Matilda explained that she wouldn't normally go out when it was cold like the morning of our interview, Leonard had recently stopped using his scooter and Susan was conserving her battery charge for an outing later that morning. These participants remained in the study but based purely on their semi-structured interview.

3.6.2 Semi-structured interview

Following the go-along, the main interview took place in a location of the participant's choice and provided most of the detailed discussion of each participant's practice of self-regulation (Lysack et al., 2006). Interview questions covered why the scooter was used, what could be challenging, what helped manage those challenges, what was the influence of their visual impairment when using the scooter, how they felt about regulations particularly assessment and training and more (see Appendix F for the question schedule). A semi-structured format allowed for clarification of questions and some spontaneity if the interview generated unanticipated material, while also providing some structure to ensure adequate and consistent questioning across each interview (Lysack et al., 2006). Questions were open-ended so that participants could provide their answers as they wished, and prompting questions supported finding more depth.

A printed map of the participant's area was also used and gave a prompt for discussing their physical environment, frequency of use and the routes they chose to or not to use. Participant often could not read the small details on the map but could talk to familiar street names. The interview also provided an opportunity to confirm and clarify observations from the go-along.

Lysack et al. (2006) detail components of an interview which influence the quality of the data collection:

- the comfort level of the participant. To encourage participant comfort, each participant chose the setting of the interview and was welcome to have a support person present.
- researcher interviewing skills. This was my third research project and so my skills were at a developing level.
- the strength of the questions and how participants understood them. My question schedule was presented to the post-graduate supervisors team before

being approved, and I presented examples of the questions prior to the interview so that participants could become familiar with them if they wished.

3.6.3 Vision reports

Participants were also asked to provide their most recent optometrist or ophthalmologist's report. Some participants had this available, however most signed a consent form which allowed access to the vision report from their optometrist or district health board. This report provided a diagnosis and measurement of the participant's vision. Some participants were unable to provide such a report or a complete report, and so only their personal description of their vision is provided.

3.6.4 Participant description

Table 4 provides basic demographic descriptions of each of the 15 participants.

Table 4: Participant descriptions

Participant (& support person)	Age	Gender	Eye condition (& duration if available)	Services	Vision Report	Comorbidities	Scooter use (years)	Living arrangement
Arthur (& Anna)	94	M	ARMD (10 years)	BF	VA R) 6/60 L)6/? "Poor central vision"	Hard of hearing, Arthritis in hips	6	Alone
Chiconne	88	F	R) Retinal tear	-	V/A 6/9-1 V/A 6/15+2	-	6	Alone Indep unit
Clint (& Evelyn)	81	M	Bilateral cataract, Bilateral ARMD, L retinal pigmentary epithelial detachment	LV clinic BF	R) 6/60 L) 4/60, pinholing to 6/60	Rheumatoid arthritis	33	With wife
Flo	96	F	Open angle-Glaucoma	-	Report does not provide useful measurements	Pain in legs and knees	1	Semi-indep unit
Francis	89	F	ARMD Hemianopia (congenital) Steriopsis	BF	L) VA: 6/60. VFI: 5 degrees approximately	Hard of hearing	24	Alone

Participant (& support person)	Age	Gender	Eye condition (& duration if available)	Services	Vision Report	Comorbidities	Scooter use (years)	Living arrangement
					R) VA: 6/24. VFI: 75 degrees (from optometrist report).			
Leonard	95	M	ARMD, cataract L	-	-	Unsteady on feet	-	Rest home
Matilda	95	F	R) Wet ARMD L) Dry ARMD	LV clinic	VA: R) 6/15 L) 6/12	Arthritis	5	Indep unit
Maurice (& Maeve)	86	M	Glaucoma	LV clinic	L) 6/9+2, N10, VFI: 35% R) 6/12, N10. Only some temporal field remain useful. VFI: 46%	Increased fatigue and difficulty carrying any weight	1	With wife
May	70	F	ARMD	-	VA: R) 6/12 L) 6/12	CVAx3, R side neglect, can't walk unaided	27	Alone
Mouse	82	M	Open-angle glaucoma. Diplopia.	-	Bilateral VA: 6/12.	"Can't walk far"	3	Rest home
Poppy	62	M	Dry ARMD, diplopia, L corneal scarring	-	Best corrected VA: R) V.A: 6/10 L) V.A: 6/11	CVA. Can walk about 100m.	2	Alone
Susan	64	F	Diabetic retinopathy	-	-	Diabetes	14	Alone
Thomas	91	M	Dry ARMD, L ocular surface disturbance	BF	VA: R) 6/30-2 L) count fingers only	Couldn't walk 100m, balance affected	0.5	Indep unit with wife

Participant (& support person)	Age	Gender	Eye condition (& duration if available)	Services	Vision Report	Comorbidities	Scooter use (years)	Living arrangement
Una	90	F	ARMD, 4 years	-	VA: R) hand movements only L) 6/30-2,	-	1	Alone Indep unit
William (& Rose)	85	M	ARMD	BF	R) unavailable L) VA 6/24-pigment ephithelial detachment, intraretinal oedema at macula	Lost nerves in legs, diabetes	2	Indep unit with wife.

Notes: **ARMD= Age-related macular degeneration**
BF= Blind Foundation
CVA= cerebrovascular accident
F= Female
Indep unit refers to an independent unit in a retirement village. Semi-indep refers to receiving some services from a retirement village. No reference to location means the participant lives in the community.
LV clinic= low vision clinic
M= Male
m= meters
R= right eye, L= left eye.
VA= Visual acuity

Table 4 provides key demographic details however this does not give an impression of who each participant was, how they conducted themselves on their scooter and what their vision really meant to them. The following descriptions introduce each participant in a more narrative way.

Arthur. Six years ago, Arthur no longer felt comfortable driving and decided to move to a house closer to a shopping centre and get a scooter. He was initially adventurous on the scooter but over the last year, given reduced confidence and increased family support, he used his scooter less. During the go-along he travelled at a fast-walking speed, was aware of pedestrians and chose designated road crossings. He felt his vision wasn't too bad for scooters but described his left vision as having "a curtain in the centre".

Chiconne. Chiconne never felt very confident driving and was pleased to get a scooter to manage outings at a fast-walking speed within 5-10 minutes from her retirement village. During our outing she showed me several physical barriers, many of which she identified through small accidents. Three barriers indicated reduced contrast sensitivity and depth perception which Chiconne confirmed in our interview, however has not been measured for by her optometrist.

Clint. As a very careful couple, Clint and Evelyn had acknowledged Clint's visual limitations and Evelyn got a scooter so that the two could travel together, with Evelyn as a sighted-guide. Clint showed me the one route which he will travel alone which was distinctive for the physical environmental facilitators such as new kerb ramps. Clint's patient nature meant that he travelled at walking pace and was prepared to stop at road crossings until he was certain to cross. He feels his vision affects 90% of his daily living.

Flo. Recently Flo stopped driving and moved to a scooter because of reduced mobility. Flo is practical and fastidiously careful. On her short route into town she stopped at every driveway, pointing to the 'worst offenders'. Flo doesn't feel that her vision affects her scooter use but is aware that she has a blind spot on her left side and her depth perception isn't great when navigating stairs.

Francis. Francis was diagnosed with congenital hemianopia in her 40s and, so she had adapted to the reduced vision on her left side without conscious awareness or rehabilitation. She acknowledged that this reduced vision could make seeing driveways or kerb edges difficult but was confident managing this and felt her ARMD was equally insignificant for her scooter use. She was familiar with her neighbourhood and confident to travel at jogging speed.

Leonard. Having moved into a rest-home five or six months ago, Leonard no longer had any need for outings nor knew where to go. He still owned his scooter but declined making an outing. He appeared frail, sedentary and bemused by the interview but happy to participate and recount how he used to use his scooter at top speed. He felt his vision only affected his reading.

Matilda. Despite having volunteered for the study, Matilda was unsure what she could contribute, feeling that her vision wasn't bad enough to affect the scooter use and declining an outing because it was too cold. Matilda was still happy to talk about her scooter use in her neighbourhood.

Maurice. Maurice was prepared for the interview with careful notes about his scooter use and neighbourhood. He was very aware of the physical barriers and recounted all his individual ways for managing these. During our outing it was clear that Maurice was familiar his physical neighbourhood and prepared to alter his behaviour to manage the terrain. He was sure that his vision affected the scooter use in the intermediate space but not sure how to articulate this.

May. Always an adventurer, May had travelled a lot of New Zealand on her scooter since a stroke 27 years ago. She was a strong advocate for scooter use given the autonomy and privacy it gave her, however her own use was reducing with decreased confidence due to her eyesight and other impairments. Her optometrist reported that she does not have low vision but May reports that she needs more lighting, uses a magnifier to read, and has trouble adjusting between light and dark spaces.

Mouse. Mouse lived in a rest home and so the scooter wasn't essential for his activities of daily living but provided essential autonomy and the ability for him to go a small distance and sit in a park when he needed privacy. During our outing, Mouse wanted to talk about all sorts of things except the scooter, showing his warmth and perhaps loneliness. The park, which he travelled to at walking pace, was important to him. He didn't feel his vision affected any of his daily living.

Poppy. Confident and bubbly, Poppy enjoyed showing me his local route where I had to run to keep up with his top speed at 15km/h. He travelled at this speed on the shared pathway but would travel very slowly in shopping areas. Poppy had worn an eyepatch for double-vision following a stroke but had recently stopped wearing it. His defensive scootering had mostly related to his lack of depth perception. When footpath terrain was poor, he would drive very slowly or on a quiet road.

Susan. Susan had an outing that afternoon and so declined going out because she needed to conserve her battery. Susan was thoughtful and patient, she carefully described her scooter use which she didn't think was too affected by her vision loss as she knew there was a loss of peripheral vision in the right eye. Susan was a strong advocate for scooters.

Thomas. The most visually-impaired of the sample, Thomas reported he could see about 4m in front of him on a good day with the right lighting and that he had trouble discerning food on his plate. He knew he couldn't see very well but only wanted his

scooter to travel around his retirement village and the adjourning shopping centre. He knew that cars were restricted to 5km/h and had learnt all the bumps in his route.

Una. Very aware of her health, Una only uses her scooter for distances she couldn't walk, and mostly this is with a friend for a pleasant outing on shared path beside the river. Una travelled at jogging speed and she was surprised by her speed. She was confident with her ability having received support from a friend and her brother, and being aware of difficult spots. She doesn't think her vision affects her scooter use because she doesn't need to see small details.

William. William sees about 5m in front of him and manages road-crossings by memory and hearing. He likes to get around at a fast-walking pace in his neighbourhood for small errands and is not concerned by a busy road crossing as he knows cars will wait for him and there is an underpass nearby. He does think he would stop using a scooter if his eyes were any worse.

3.7 Instruments

Each go-along and interview was recorded with two Dictaphones. Additional notes were made on paper and on the map. At the first opportunity recorded data was relocated to password protected storage and written material was scanned and then the original was destroyed.

3.8 Data analysis

Audio recordings were transcribed verbatim. The sit-down interviews were transcribed by a transcriber. I transcribed the go-along recordings as I could better incorporate any written notes and manage any poor recording quality.

Data analysis and coding then followed the Qualitative Analysis Guide of Leuven (QUAGOL) as described by Dierckx de Casterle, Gastmans, Bryon and Denier (2012). This guide provides a systematic yet non-rigid process with ten steps for analysing qualitative data.

The first five, iterative stages of analysis include:

1. Thorough rereading of interview transcripts
2. Writing a narrative report following the rereading
3. Translating the narrative interview into a conceptual interview scheme
4. Fitting-test of the conceptual interview scheme to the raw data
5. Constant comparison process (Dierckx de Casterle et al., 2012).

Following the initial stages, the coding process was undertaken using Quirkos, qualitative data software (see Appendix H for an example of Quirkos). The coding process included the next five stages:

6. A list of preliminary codes
7. Linking relevant data to the appropriate codes
8. Analysis of concepts
9. Extraction of the conceptual framework
10. Description of the results (Dierckx de Casterle et al., 2012).

Analysis was also conducted on whiteboards and through writing exercises (see Appendix H). Coding and analysis was conducted under the close supervision of Dr Mary Butler.

3.9 Rigor, Credibility and Trustworthiness.

Several steps were taken to ensure that findings and presentation of this study displayed rigour, credibility and trustworthiness.

Prior to the pilot study, I had spent time with the low vision community. This experience and relationships have grown over the last two years as I have become more involved in low vision research and attending further visual impairment meetings and events. Familiarity with the targeted population contributes toward the credibility of the research (Shenton, 2004).

Although multiple methods made the data collection potentially overly complicated, the combination of both a go-along and a sit-down interview bolstered credibility by augmenting and triangulating each set of data collection, and the benefit of this rich and credible multiple methods outweighed any risk of complication (Curtin & Fossey, 2007; Lysack et al., 2006; Shenton, 2004).

A vision report was provided by most participants with measurements of their vision so understanding could be gained about each participant's visual status and findings could be transferred to other settings/research (Curtin & Fossey, 2007; Shenton, 2004).

Steps were also made to ensure credible research through honest responses from participants (Shenton, 2004). These steps include allowing a familiar setting and timing dictated by the participant and emphasising that the study was aimed at providing

their perspective. It was understood that ensuring familiarity and comfort could empower the participant.

During transcription and analysis, further steps ensured credibility and trustworthiness. Participants were provided with a verbatim interview and the narrative report (a summary of my initial interpretations of the data) and encouraged to member-check either both or one of these documents. Member-checking allows the participant to confirm, edit and/or provide additional information (Shenton, 2004). My supervisor read transcripts and narrative reports, and closely supervised data analysis to create researcher triangulation and encourage research rigour (Curtin & Fossey, 2007).

Peer scrutiny of the study supported credibility and occurred through a conference presentation of the pilot study to New Zealand occupational therapy clinicians and academics, and an exercise within the post-graduate community. In this exercise I shared a narrative report which was analysed and roughly coded by several post-graduate students and teachers generating different perspectives, language and emphasising points of interest (see Appendix I) (Shenton, 2004).

Finally, I have provided clear indications of my background, qualifications, experiences and reflexivity of my influence on the study through my biases and values (Curtin & Fossey, 2007; Shenton, 2004). This reflection is detailed in both my introductory chapter under 'Personal interest' and my discussion chapter under 'Researcher insights'. Frequent supervision allowed for debriefing with my supervisor and further supported the credibility of the study.

3.10 Chapter summary

This chapter presented the research process and underlying influences on research design.

The research paradigm serves to be explicit with how the knowledge and understanding is structured. This study understands that knowledge is constructed through multiple realities and interpretations. Certain concepts and theories influence how this knowledge is interpreted, specifically ageism and ableism with critical disability perspectives. Further to the underlying epistemology, the methodology of interpretive description allows for the multiple realities of the study participants with further interpretation for clinical practice.

The practical steps of the research were presented from prior consultation undertaken through to analysis. The diverse data gathering methods produced a rich data set to present multiple practices of self-regulation from the 15 older adults with varying levels of visual impairment. Particularly, the go-along gave context and direct environmental knowledge for each participant whereas the interview ensured thorough discussion.

The use of the QUAGOL data analysis process and Quirkos software supported a systematic approach to manage a large volume of transcripts and generate appropriate themes.

Certain approaches were undertaken to bolster the study's rigor, credibility and trustworthiness which are the last details of the methodology chapter.

4 Findings

4.1 Chapter Overview

Fifteen interviews were completed with twelve go-alongs. The participants perspectives were recorded, transcribed and organised into the four themes presented in this chapter.

These themes aim to present several elements to self-regulatory practices relating to scooter use by older adults with low vision.

Given the depth of the interviews, it is not possible or desirable to present all the quotes which have formed the findings and the themes. In Appendix J, there are extensive quotations from participants to complement the findings presented in this chapter.

The following themes and subthemes were arrived at:

'Strategies used by scooters users' including the associated risks, the particular strategies, and management in relation to both environmental and personal factors.

'Finding the comfort-zone' including the balance of need versus risk and the benefits of scooters in relation to health maintenance.

'Life cycle of using scooters' covering the initial learning process, learning from mistakes and how adjustments are made over time.

Lastly, the theme of 'Influences on decision making' looks at different external factors including family and health professionals, alternative transport options, and opinions about training, assessment and regulation.

These themes are described in the sections below with the findings.

4.2 Strategies used by scooter users

The first theme deals with the ways that participants adjusted their behaviour to meet the conditions. A practical and straightforward interpretation of self-regulation is the adaptation of an individual's behaviour to meet with personal and environmental conditions to ensure effective engagement of an activity.

Firstly, it was important to identify why participants would need to practice self-regulation when using the scooter. The following lists provide an understanding of what they have identified as the conditions which are difficult and/or risky and require behaviour adaptation.

4.2.1 Risks associated with using a scooter

Across all the participants, there were many potential risks of scooter use identified.

- A breakdown
- Becoming ill from travelling in poor weather
- Being struck by a vehicle at a driveway
- Being struck by a vehicle during a road crossing due not being seen, not seeing or hearing an oncoming vehicle, or not being given right of way on a road crossing
- Collisions with pedestrians - especially children, those walking out of shops or distracted with mobile phones or wearing headphones
- Damaging the scooter in rough terrain or poor weather
- Experiencing aggression from pedestrians or vehicle drivers or being attacked
- Experiencing discomfort or pain due to rough terrain
- Not seeing terrain change: potholes, bumps or camber
- Tipping the scooter and falling, specifically when mounting kerbs.

Equally, participants described physical features which posed as barriers to effective scooter use. These included:

- a lack of designated crossings or kerb ramps
- a lack of interesting spaces
- a particular kerb design called ‘low profile kerb and channel’
- change in terrain with no contrast warning,
- deep cut driveways and gutters
- footpath clutter such as overgrown vegetation, rubbish bins, electricity boxes
- poor footpath condition
- road crossings at intersection corners with 3 or 4 directions of traffic to watch
- roadworks
- trees, power poles or parked cars which compromised the line of sight for road crossings.

To read supporting quotes for these details, see Appendix J, 7.10.1.1.

4.2.2 Strategies for managing associated risks

Many adaptive behaviours were used to manage identified risks, either by eliminating, isolating or minimising exposure to risk.

Some strategies for managing the identified risks and barriers were of a simple nature such as the decision to avoid certain situations, adjust speed accordingly, ensure familiarity and maximise the features of the scooter.

Avoidance was a common strategy for effective use, in particular, avoiding:

- bad weather
- busy times/crowds
- going into buildings on the scooter
- inaccessible or unsafe streets
- travelling on the road
- unfamiliar routes.

Speed management was commonly discussed. Many participants were happy to travel at a jogging speed when they could identify a clear space, but almost all the participants reported slowing down in busy areas or where there was poor terrain.

Participants reported learning their regular routes to become familiar with any risks Maurice explained, *"I now use it only on routes that I've surveyed and checked out. I would be very wary about going into strange places because it's so easy with this kerb to become stuck"* (150).

Participants also described ways that features of their scooter increase their safety:

- A strong preference for a four-wheeled scooter for stability.
- Flags and 'high-viz' to increase visibility.
- Mirrors were popular for increasing vision and compensating for restricted upper body movement.
- Some participants demonstrated using the governor (a dial for speed on the control console) to manage their speed, rather than relying on the throttle.
- William used his hazard lights when he was driving through a carpark.

To read supporting quotes for these details, see Appendix J, 7.10.1.2.

Some strategies were less tangible to capture or measure, but participants reported them as integral to effective scooter use. Particularly, discussion centred on the need for a culture of courtesy on footpaths and road crossings.

Courtesy was described as having a patient attitude to others. Poppy considered a courteous personality as a protective factor against risk: *"I don't believe I am [a risk to others], no… I do know some scooter users that I would consider a risk to other people. That is because their aggressive attitude when they're driving"* (352). Participants described courtesy from drivers and pedestrians who stopped and allowed the scooter right of way, Arthur further explained his appreciation, "*if they stop, I'll always acknowledge them and give them a wave*" (45).

Participants reported that they slowed down near pedestrians and behaved courteously, either not overtaking or calling out beforehand:

> *Well, there's two situations I think. One is you can be trailing along behind people walking along, and they're not necessarily aware that you're there, but if you wait long enough they usually do, and they'll make way for you. The other one, well if the place is crowded and so forth you just adjust your speed and stop if necessary. Yeah, I don't have a problem there really. Arthur (309)*

Participants spoke of the difficulty of sharing a footpath with pedestrians who were distracted either by their mobile phones, not looking, wearing headphones or exiting shops too quickly:

> *Occasionally you'll get people on cell phones, which would be my real downer, because they just don't take any notice. I've seen them not only walking into me, but walking into other pedestrians, which happens, and it just annoys me that people, I think cell phones should be banned for anyone walking. Poppy (363)*

As could be expected in a voluntary sample, none of the participants considered themselves a bad driver, and none of the observed go-alongs indicated risky

behaviour. However, participants identified risky behaviour amongst other scooter users. Many participants could recount stories of other scooter accidents:

> *People that are in touch with me from back home, and one lady, she's tipped hers over four times up to yet, and we've never heard of that, have we?... I said, well they must be using them wrongly. Clint (Evelyn) (530)*

A common judgement of other risky scooter users was that they lacked courtesy and went too fast especially at road crossings or in town:

> *A lot of people buy scooters, some scooter riders, you sit in town and you watch them and you think, oh my goodness. They seem to think they own the road, and they don't know the road any more than [anyone else]. May (49)*

4.2.3 Environmental factors

Many self-regulation strategies that participants described related to how they managed external influences such as the physical environment or the movement and attitudes of other people.

All participants lived in flat areas of their town or city however footpath maintenance, materials, kerb edges and the presence of traffic lights differed across the sample. Participants described many physical environmental features which supported effective scooter use therefore participants would plan routes according to these features. Features included:

- designated crossings: traffic lights, zebra crossings or road crossings with an island halfway across.
- flat terrain and gentle slopes
- having pleasant areas to visit such as a park
- kerbs with manageable ramps for street access
- parking space for a scooter
- shared pathways with few or no road crossings
- underpasses for busy roads

To read supporting quotes for these details, see Appendix J, 7.10.1.3.

Participants noted a better time of day considering crowd or traffic flow, temperatures and better lighting. Travel at night was rare. Most of the participants reported no need to go out at night which means it wasn't a self-regulatory strategy. Poppy was aware of his poor night vision, and had organised his lifestyle to avoid night outings whereas Flo lamented the inability for night outings as she would not use her scooter and there were no taxis in their area:

> *There's a meeting with a woman about a book on Thursday night, and there's no way of getting to it. I can't go on the scooter at night; I don't feel safe enough on that. Do they have lights on them? (153)*

Weather featured heavily in the interviews, participants had to adjust their behaviour in poor weather and often meant complete avoidance. Reasons for avoiding bad weather spanned from general discomfort, inability to see or hear adequately, damage to the scooter, fear of an accident and not risking illness:

> *I don't use it when it's a very dark day. The dark days don't like me and I don't like them. And always sunglasses, because the glare's always bad. Because [this region is] known for the glare, strong sunshine. Una (270)*

A variety of social environmental factors were also involved in self-regulatory approaches. Such as how Matilda avoided areas where other people felt intimidating and Una avoided being out after school hours when children used the footpaths.

Due to unpredictable traffic behaviour road crossings influenced travel and Arthur felt this qualified the pedestrian status of a scooter. Participants described extra caution at road crossings as they couldn't assume that traffic would stop:

> *I always stop and wait. If the cars stop, I'll cross, but if they don't stop, I don't. And now I, even if this side stops and the other side is still coming, I stop. I just wait. And this person usually gets angry with me, but then I think they realise that, "Oh, it's because of the other car that I haven't gone." Susan (132)*

4.2.4 Personal factors

Many self-regulatory strategies related to how participants managed their individual limitations or capabilities, especially vision. Strategies for vision arose alongside other personal features of hearing, confidence and health conditions, awareness of limitations, as well as the integration of the scooter into a healthy lifestyle and wider self-regulation.

When asked about their vision and scooter use, most participants felt that they were capable with their current level of vision. Participants felt that despite their vision not meeting the criteria for driving, it was adequate for scooter use:

> *If my vision deteriorated too much I'd find [a particular] track there difficult. I might then have to go right around on the footpath. I could cope on the footpath as long as I had a little bit of vision... But my vision would have to be pretty bad before I had to stop using the footpath. Frances (262)*

Perhaps the most explicit examples of self-regulation and vision were by the participants who were also Blind Foundation members (William, Thomas, Frances, Clint and Arthur), indicating the more visually impaired participants of the sample.

Clint and Evelyn had the most prominent strategy for managing his vision loss whereby Evelyn guided Clint while travelling on her own scooter. An interesting observation about this couple is that Evelyn, who doesn't have a visual impairment, uses her scooter in a similar manner to all the other users, suggesting that the strategies are not unique to the visually impaired:

> ***EVELYN:*** *One thing you can't do on a scooter, and that's put a hood up if it's raining, because there's no, and Clint particularly of course, he just wears a cap, but even I wouldn't put a hood up and I've got wonderful eyes. Clint (384)*

William, who can see about 5 metres ahead, worked within his limitations. He knew by memory where the kerb ramps were, he listened for traffic and pedestrians, and he drove blindly through a tunnel. Thomas, who can see about 4 metres ahead, had chosen to restrict his scooter use to his retirement village where his was confident and

familiar. Thomas had little need to go any further yet values the small amount of independent movement the scooter allows him. Frances, with hemianopia, identified the lack of vision on her left:

> *One of the things I've got to watch is people coming out of drives, and it depends which side of the road I'm on. If I'm next to the houses [on the right], that's no problem, but if I'm on this side of the road and I'm not seeing the drive, I've got to watch carefully. But my macular degeneration, the fact that I don't see very well in front is a minor detail as far as the scooter's use is concerned, because, you see, I can see big things. Frances (149)*

Arthur had difficulty articulating how their vision affected their scooter use but was aware that he had begun to restrict his movement in line with reducing confidence:

> *[My vision] makes it a little bit more awkward, but that's about all. I can't do the things that I used to be able to do. I was always a busy bloke and I always did all my own repairs and things like that, and now I find I can't do anything like that. And of course, age is got a factor there too I suppose. But I cope all right…. Makes me a lot more careful, yeah. I don't get on it like a schoolboy anymore. As I say, if I'm in doubt I'll just simply stop and wait. Arthur (253)*

A further interesting finding of vision and self-regulation were that Chiconne and Poppy, who were not Blind Foundation members, described the impact of a lack of depth perception and contrast sensitivity.

Chiconne reported incidents which seemed to be related to low contrast sensitivity and depth perception however these types of vision hadn't been measured by her optometrist. This lack of contrast sensitivity appeared to significantly affect her scooter use. Chiconne described collisions with street furniture and changes in terrain which were not marked by contrast changes. Following those incidents, she had identified the danger spots and avoided these areas. She could still encounter issues due to low

contrast sensitivity, for example during the go-along she did not see a silver car against the grey road:

> *[Chiconne crosses the road after a motorbike has passed us however there is a grey car travelling 300m behind the motorbike which Chiconne had not noticed. The car has time to see Chiconne and there is no danger however it is a shock to her]. (Notes)*

Poppy was acutely aware of his visual limitations with a lack of depth perception. For this reason, he travelled defensively by either traveling on the road where there were fewer potholes and bumps, avoiding poor terrain or he would travel slowly and look for cues about depth changes:

> *When I had [an eye] patch on, everything is what I would call two-dimensional, so I knew there was gutters and things like that, but everything was dead flat to me. Now it's a wee bit different. But my brain could work out that when you saw a change of colour or a change of texture, you knew that there was probably going to be a drop there, so it's just a matter of getting used to that. And a lot of the footpaths are in very, very bad repair, so it does put some streets out altogether. Poppy (382)*

Hearing was often mentioned as an important sense for safe mobilising and perhaps compensating for vision loss. Modern cars were noted for being quieter and therefore more hazardous, however Chiconne had found one environmental feature to counter this, *"They just resealed [this] street last week so it's actually noisier than usual"* (102). May explained hearing was reduced by the wind.

Some participants mentioned other types of physical functioning which influenced their scooter use. May's scooter use reduced as she waited for an operation on her thumb, Susan relied on her mirrors because of back pain when turning, and Thomas and Mouse mentioned not using their scooters when they felt 'out of sorts'.

Participants also felt that confidence contributed to scooter use, regardless of their functional vision. Chiconne recognised this need for confidence in herself, *"I did go*

down to the library a couple of Sundays when I was feeling quite good, but didn't like it really… it's not something I'd do from choice" (211). Whereas other participants saw the lack of confidence in others who could benefit from scooter use:

> *I do know some of the people here say, "Oh, I couldn't drive a scooter," and they won't even try. So I suppose it's a matter of having a bit of confidence, I don't know. And yet they've all driven cars. They're just silly, they won't try. Matilda (330)*

Participants described their awareness of and compensation for personal limitations (ability to turn, blind spots, no night vision) and anticipated disruptions by carrying a mobile phone, wet weather gear and walking aides, *"I usually carry my walking stick and telephone, in case I'm knocked down"* William (65).

To read more complementary quotes about personal factors see Appendix J, 7.10.1.4.

4.3 Finding the comfort-zone

The discussion of behaviours: avoidance, adaptation, risk-taking and confidence implies that a certain level of acceptable comfort (or discomfort) must be met for the individual participants to assess whether the goals of an outing or using a particular route is worthwhile. This comfort-zone may refer to the level of physical, cognitive or psychological demands. The meaning of the outing can dictate whether any discomfort is acceptable.

While the lists above of identified risks and barriers, and corresponding self-management strategies provide a good overview of how scooter self-regulation might be practiced, there are evidently diverse comfort-zones, needs and capabilities within the sample of 15 participants. Risks and management strategies which were acceptable for some users were not considered by others.

The following are examples of difference. Some will not use their scooters inside shops and declare this as a strategy for keeping themselves safe, whereas others are comfortable driving the scooter indoors. Clint would only travel one route without his wife, Evelyn, whereas all the other participants travel independently. Frances was unable to use listening as a compensatory technique due to her hearing loss whereas William relied on hearing for crossing the road.

Poppy, a confident scooter user, would happily go for journeys of 50 minutes each way and at 15km/h. Thomas would travel at walking speed in a very restricted and small area due to his vision loss, mostly within his retirement village where the speed limit is 5km/h.

Leonard was potentially a speedy user. He was not observed using his scooter as he had ceased to use it but reported that he had liked to travel at the top speed, 16km/h. Matilda also declined the go-along as wouldn't normally have gone out on such a morning. She was unaware of her speed but she didn't think it was fast enough:

> ***Q:*** *And how did you first find using the scooter?*
>
> ***A:*** *Rather boring.*
>
> ***Q:*** *Why's that?*
>
> ***A:*** *Slow. (14)*
>
> ***A:*** *I go the fastest it will go.*
>
> ***Q:*** *Do you know how fast that is?*
>
> ***A:*** *No. Not fast enough. (192)*

For others, speed was a risk. Maurice was very attentive to speed, stopping before difficult areas to turn the governor down.

Susan was the only participant who regularly used a scooter at night:

> *[The route I take is] safer because you've got crossings and things like that, that you can use. At night I do that route, because I go to the Clubs on a Monday and Tuesday night to play cards, and so I'm coming home at home quarter-to-ten, 10'o clock by the time I get home. Susan (159)*

May demonstrates her own risk assessment which goes against general recommendations but suits her own needs:

I don't want to [have a flag]. I want to blend in and be nothing. I would hate to see cycle helmets come in. That's me personally. I just like to be anonymous on my scooter and just blend, so I don't like things that make you stand out. But I'm aware of those things, I just don't do them. (539)

Leonard seemed happy to cross the road without a designated crossing which many other participants clearly avoided. Both he and Poppy had assessed that a footpath in poor condition was riskier than travelling on the road:

But going down to church, the footpath weren't that wonderful… there would be quite good stretches on the road and they've got that white line on the road and between there and the footpath I could go in there and so I did… [driving on the road] was good… [I felt] quite confident, it didn't worry me. Leonard (66)

Maurice had also noted that the recommendation that scooters stick to footpaths was not always to everyone's benefit in his local shopping area where he would prefer to drive in the car park rather than a narrow footpath where pedestrians often entered or exited shops:

[in carparks] I find it's far better to use it as a car, as if I was driving a car. I keep within, with the speed limit of all the other cars. I suppose with that, sometimes the pavements are quite narrow and you're more of a nuisance to people and the danger of them stepping out. (107)

Some participants felt that their risks weren't any greater than the risks that cyclists and pedestrians experience, and that scooter users are mostly responsible for risk management:

[There are risks] if you don't care, I mean you are harder to see than a vehicle, probably not as hard to see as a bike, but I think that the risk is the fact that if you are aggressive or just not taking care of your

surroundings, I mean if a car hits you, you haven't got a lot of protection. Same as a pedestrian or a cyclist. And that's why I try and keep off the roads as much as I possibly can. Poppy (347)

Chiconne reflected honestly on her potential to be a hazard:

Well, I do wonder if I'm a little bit of a hazard sometimes. I blotted my copy book this morning. I crossed the street up there, but I think the time will come when I won't be able to ride it. (275)

4.3.1 Need versus risks

Risk assessment and self-monitoring also hinged on need. For some participants, the scooter catered solely for their independent values as there were alternative methods for community mobility. These participants predominately used their scooter for simply getting out of the house and going for pleasure rides.

Q: So, if there are some risks of injury, either to you or to others, why do you continue using the scooter?

A: Because I love it. I need it. It just gives me independence. My daughter and my family would do my grocery shopping for me, but I don't want to lose that. I want to still be able to choose what I want. Chiconne (382)

For other participants, the scooter was their sole mode of transport, with limited alternatives. It was noted that Poppy, Susan, Clint and May were more prepared to experience what others felt was uncomfortable.

4.3.2 The benefits of using a scooter for health maintenance

Additionally, a goal may not only be to make a pragmatic, productive outing but the goal may be integrated into how an individual manages their overall wellbeing, suggesting the scooter can be a strategy for harm prevention. Una ensured that she continued to walk daily and described the benefits afforded by a scooter:

That's the big thing about scooters, you're out in the fresh air, you're not inside. You don't get bedsores and things like that. I said to my

cousin when she said she's not going out now, she's on a walker and she's got bedsores, and I said to her, "You should get yourself a scooter and get out in the fresh air". (185)

Evelyn and Clint described how the scooter connected them with their neighbourhood, *"He loves going around the town, just around the town where it's safe, and keeps me informed of any changes, because like [the city] it's being changed all the time, so it's good, we love [this town]"* (120).

Both Clint and Poppy used their scooter to access safe spaces for walking. Large department stores allowed them adequate space to walk in warmth and where they could ensure flat terrain, a clear path and good lighting:

I'll go in and have a cup of coffee, or I like sitting and watching people because there's not many people around here. And the [store], I can just go out there, and because of my eyesight I have problems walking on footpaths because they're too uneven, so I quite often will go to the likes of Mitre 10 or the Warehouse just for exercise… Because it's dead flat. Poppy (308)

Scooter use also supported emotional self-regulation as Mouse explained, *"[when I get upset] it makes me feel like I want to get on the bike and go for a ride"* (93). The scooter appeals to individual values of independent travel, allowing expressions of freedom, autonomous community engagement and doing so with privacy:

Scooters give me more privacy. If I go with a carer, I can't, to do things, they know all your business like who comes, what you wear, what you eat. But if you go by yourself, you do your own business. I know that sounds silly. And sometimes I just like going around, I like being on my own. I would be housebound totally if I didn't have a scooter. May (72)

May particularly used her scooter to support her friendships, her adventurous personality and her relationship with her grandchildren:

I was going to do the… new cycle trail. I've got my grandson with me this week for the holidays so we're going to go out and do that. He came down and did the rail trail with me last year, he was only nine. So we're quite [compatible]. (156)

To read more quotes supporting the benefits of scooter on participants' health, see Appendix J, 7.10.2.1.

4.4 Life cycle of using scooters

As every occupation adapts over time, the discussion about management often highlighted that these interviews only occurred at one stage of the participant's current scooter use. Participants talked of their previous history with the scooter, many having used the scooter more prolifically but as their capabilities or needs reduce, their scooter usage and self-regulation practices adapt. This could mean more reliance on alternative transport, or fewer outings on more demanding routes.

The decision to get a scooter often occurred within a wider self-regulation in other aspects of participants' lives. Arthur explained that he relocated to a housing unit near shops where he could better manage with his declining capabilities and stop driving. Flo, Poppy, Chiconne, Susan and Una also spoke of their decision to voluntarily stop driving either due to feeling like a risk, or anticipating failing their driver licence renewal:

Basically, I hate to have of run into a child or something like that, that I had missed, because I had an eye patch over my left eye, I didn't have much in the way of peripheral vision on my left-hand side, and I'd hate to have run into somebody. So, I just made a decision not to drive anymore. Poppy (194)

To read more quotes which support the notion of wider self-regulation of scooter users, see Appendix J, 7.10.3.1.

4.4.1 Initial learning process

Firstly, for some participants procuring and learning to use a scooter was a simple and quick process, but for others, there was an extended period of gaining confidence, ability and proficiency on their scooter.

Some participants found the scooter very easy to use, relating the scooter to driving a car, tractor, or other vehicle. William explained, *"No, I just took off on it…No, I've been driving cars all my life, 1000's of miles"* (453). Other participants took longer, up to several months, to learn to use a scooter confidently and needed support to learn:

> *It took a wee while, because they're very different to drive than a car, but it was just a matter of taking my time, going into areas that there wasn't any traffic around on, like school tennis courts down here were great, and going in very, very uncluttered roads, and yes, it took probably a good six months to actually get used to it and feel confident, particularly with my vision… Basically the jiggling when you're moving along… I mean my brain isn't all that brilliant with a stroke either, and I find when you're moving along you haven't got the same suspension as you do in a car, therefore your head is moving rapidly, that took a wee bit getting used to. Also, the cold on your face. Just little things. Making sure I had to wear a sunhat all the time.*
>
> *Poppy (211)*

May described how practice and training helped her learn to use her scooter despite her initial incompetency:

> *When I first got the scooter? Hell, the OT thought I was going to kill half of [the town] or kill myself… I'd go flat out and I'd always go left. I didn't have a right side. Anyway, I'm still here. Poor old [OT], she had a few sleepless nights there… [She] came with me a few times, but used to just walk along shaking her head. I had no idea of anything. When I think back I thought, "Shouldn't have been on the road." … Mind you, I*

stuck to streets, well, [the OT] took me to streets there weren't many people. And I think a lot of its practice and you had to retrain your brain to do things. (480)

To read more quotes which detail the initial learning process, see Appendix J, 7.10.3.2.

4.4.2 Learning from mistakes

While not ideal, a significant and valuable learning experience could be having a near-miss or accident which revealed the extent of a risk or a new risk. Of the participants who had had accidents or near-misses, none were seriously harmed and they explained how they adjusted their behaviour following the accident:

- Mouse and Susan had both been struck by vehicles when they were crossing at pedestrian crossings. Since these incidents, they reported that they ensure cars have stopped in both lanes before proceeding to cross.
- Arthur, Leonard and Chiconne tipped their scooters when they misjudged a slope. They identified these slopes and approached or avoided the slope appropriately.
- Frances, Una and May had collisions when other footpath users didn't notice the scooter user. They reported this increased their awareness of travelling defensively in areas with pedestrians, ready to stop especially at shop doorways.
- May's scooter stopped working during a road crossing meaning she sat in the middle of the road at night until a passer-by come to her aide. She no longer goes out at night.
- Arthur had to scrape his way between a fence and car which was parked in a way that it reduced the space on the footpath. While Arthur may have misjudged the space, this accident was also caused by inconsiderate parking.
- Maurice accidently pulled on the throttle too much and drove into a window, breaking it. He learnt to adjust his speed using his governor rather than relying solely on the throttle.
- Flo witnessed an accident where a reversing car exited a driveway and hit another footpath user, so she stops at every driveway.

To read the detailed explanations of these accidents as told by the participants, see Appendix J, 7.10.3.3

4.4.3 Adjustments over time

Matilda acquired her scooter before ceasing to drive so her scooter use increased since she chose not to renew her driver's licence.

> *[Before ceasing to drive] I really only used the scooter if I wanted to go and have a peaceful time watching children feeding ducks or go to something in the park. Somewhere where I couldn't park, where there was difficult parking, I always took the scooter then. (240)*

Whereas many of the participants noted decreasing scooter use. Arthur had anticipated a decrease in scooter use prior to when his family intuitively increased their weekly transport support, whereas Clint and Evelyn's scooter use decreased directly due to poor health:

> ***CLINT:*** *Yeah, it's difficult since I had the [cancer].*
>
> ***EVELYN:*** *I hate it but it's just life now, and I'm longing for spring so that it may keep him after, now he's in remission we just want light nights and to be able to get out and look at the gardens and go on the park and sit and watch...the birds. (412)*

May observed significant changes in her scooter use over the 27 years:

> *I'm not as adventurous as I used to be. Whether that's age related or sight related or scooter related, because it's getting a bit hairy. But I definitely don't scoot at night now, or even in the dusk. It's just hopeless. (443)*

Frances noted that demand for outings had reduced with age and that the future of independent living was uncertain for her:

> *Well, at my age, I don't know how long I'm going to be living in my own home. So long as I'm living in my own home I think I'd be able to use the scooter. If I had to go into care, that would be because I'd deteriorated. (258)*

Most of the participants did recognise there were potential circumstances where they would need to stop using their scooter. Losing more sight would influence this decision while some also mentioned losing confidence, perhaps following an accident or feeling like they are a danger to others:

> *If I felt that I was a danger to anybody else I would stop. It's like going into the supermarket and things like that, if I felt I was a danger to the other shoppers and that, I would stop. How I would get my groceries then would be a good question. But I'd probably have to go online or just ring through and order or something if I could, and get it delivered… If my vision gets worse. That would be a big no-no. Because you've got to have your vision to ride your scooter safely for yourself, as well as for other people. You always have to consider the other people, not just yourself. Susan (329)*

While participants felt declining capabilities were likely with aging, the oldest participant, Flo, reminded that age alone was not a fair measure of inability:

> *But a lot of people drive until they're 100. I mean I looked after someone who died just before he was one hundred, and he drove from Dunedin to Christchurch and back in one day. So people do drive when they're older, but you've got to be sensible. (168)*

Leonard had recently stopped using his scooter after entering a rest home. Leonard still owned the scooter however stated that he hadn't gone out because he wasn't sure where the shops were, the weather had been bad and due to being in a rest home, *"I haven't really had any cause to go"* (46).

4.5 Influences on decision making

The term self-regulation is misleading as it implies an individual approach to decision making, whereas participants reported other influences in their decision-making such as factors including social supports, alternative transport and peer support.

Participants were also asked whether they thought regulation would support their scooter use.

4.5.1 Responses to 'nudges' from family, health professionals and others

Clint and Evelyn are a unique example of interdependence as Clint would seldom use his scooter without Evelyn. Additionally, Poppy, Una, Susan, Thomas, Matilda and Chiconne were encouraged by family or friends to become a scooter user:

> *It was because my husband and I agreed that when he died, and I mean it was inevitable at that stage… I wasn't happy driving, never was, so he suggested that I get a scooter while I could still manage it, and I've had it ever since. Chiconne (132)*

Whereas other participants might be going against their social support's wishes:

> *Anna: I just worry about [Dad's] eyesight, if [he] can't see something. But from what I saw this morning I thought he was pretty cool. But if he doesn't know, like there could be a time when his eyesight gets worse, but you'd know then, wouldn't you? Arthur (424)*

Guidance from either general practitioners or Blind Foundation staff varied. Either the scooter use had not been discussed, it had been endorsed, or it had been unofficially discouraged:

> *I know that the Blind Foundation are not happy with having people with low vision on them... But that was just a comment from one of the people there. I don't know if it's official. And my GP was just a little bit concerned I think when I got it. He considered them slightly dangerous I think. But any fears he had I don't think have been confirmed at all. Arthur (430)*

When May considered other people's reactions to her scooter as compared to her wheelchair, this influenced her choice of mobility device:

I would like to not have a scooter but people make some absolute crap comments. You get treated differently on a scooter than they do if you're in a wheelchair and someone is pushing you… You're a lot more patronised in the wheelchair, and they usually talk to the person pushing. But when you're on a scooter, they must think that you can do something… [In the wheelchair] they all patronise and they call you dear and darling, and I can't stand that, or they pat you on the shoulder and look right over you. (63)

Poppy sought more official guidance from the social environment, both researching online and asking the police about his scooter use:

It was actually on a [web]site I was reading… which said that these electric scooters were allowed to travel on cycle lanes and on the roads as long as they kept left in the parking areas… I spoke to the [police], at some stage about mid last year, and they said then that they were quite happy for me to be in the cycle lane as long as I was keeping an eye on what was around me. So, yea, there really is no regulations… I've looked in the road code and there's not really much in that… [The police] would prefer me to stay on the footpath but they realise the footpaths are bad, so if I can stay within the cycle lane they're quite happy for me to do that. (166; 400)

4.5.2 Alternative transport options

Self-regulation was influenced with the availability of acceptable, alternative transport. Alternative transport was predominately supplied by family members. Some participants could use a bus and most would use a taxi. In the smaller localities, buses were often non-existent, irrelevant and inaccessible as May explained, *"It's crap, there's only a bus during school hours… I couldn't get out to the bus stop myself anyway. So, it's not really an option for me"* (168).

Some participants were happy to use taxis or companion driving services however for others this posed significant financial barriers:

> *A taxi from here into town I think offhand is about $11.00, and I get half that price, but it's a $6.00 trip into town and then $6.00 back again, $12.00, that's half my food money for the week. So that's why it's been a lifesaver having the scooter. Poppy (523)*

Some smaller localities did not have a taxi service either, meaning participants were completely reliant on family, community voluntary drivers or other social supports if they did not have a scooter. In response to the lack of service, Maurice proposed a community shuttle for the older adults in his area to get to the supermarket:

> *So my plan at the moment is to see if there's any chance of community care organising a bit of a shuttle service for people similar to ourselves on a Thursday morning, where they pick us up at some time, drop us off at [the supermarket], and pick us up an hour later, having dealt with other people, and come back. And I think that is a service that would, I would imagine, could be very valuable to an increasing number of people. (380)*

Maurice had related the shuttle idea with the financial benefits of ageing in place:

> *If you can keep people in their own facilities, then there must be a considerable saving over having to provide financial incentives for the alternatives, because you can't really in this day and age expect people to exist just on… goodwill of people. (503)*

For Clint, a potential alternative to a scooter is a powered wheelchair, and he questioned the difference between the two mobility devices.

While there were alternatives, for many participants it was felt that not using a scooter would reduce their outings, potentially to the level of being housebound:

Well, if I go for a taxi I've got to have someone at the other end who can push me around. So, I really hardly ever take one. And usually if I do it's to pick someone else up. What else would I do apart from scooter? I can't walk, I can't hop, I can't skip. It's a really strange question…I grow wings and fly. So you suggest another way I can get from A to B. May (603)

To read more quotes about alternative transport options, see Appendix J, 7.10.4.1.

4.5.3 Opinions about assessment, training and regulation

Participants had a range of opinions about different approaches to encouraging safe, responsible and effective use of scooters.

4.5.3.1 Training

Some participants detailed the peer support they received or provided for learning the risks and skills of using a scooter, and self-regulatory approaches. May, Chiconne and Susan had participated in providing peer support for training other scooter users:

I've got a lady I'm meant to be taking a route to town to see what's safest for her. But no one ever does it, and I was quite happy to do it at one stage, to help people, I'm no expert but I've got the experience, just to find a safe route to go to town, especially with ups and downs. That's the worst parts. I think everyone should have at least half hour training when they get a new scooter, especially older people… If they have a scare the first couple of times they just put the scooter in the garage and that's it. May (647)

However, Chiconne found peer training a difficult task:

I'm a little bit worried, the lady next door has just sold her car and she's getting a scooter, and she said to me, "I'll get you to show me how to ride it," and I said, "Well, it's very difficult." Because how do you show somebody how to ride a scooter? It's all right for you, you

walked beside it this morning, but there's no way I'm - she said, "Oh, we could go up to the supermarket together," and I'm thinking, "Oh," I'm just fair cringing, because she's a little bit confused. But her family think it's all right. (432)

Chiconne's concerns suggests that formal training is welcome. May and Susan lived in an area where scooter training was available. Susan thought this training was a good opportunity for questions and answers whereas May felt that the training need an individualised practical component rather solely presentation and discussion:

[The council] do some things for scooters. They do it in a hall and you [talk] and it's all nice and it gives you stuff and the police come down and say - and I think it's important we have rules, don't get me wrong. They go home and they think they're an expert, they've heard it all. But you need to have some follow-up to actually do it practically. (742)

May recognised the expertise of scooter users and so suggested that training should be conducted with both a health professional and a scooter user:

I reckon people who are on scooters are more able to help other people on scooters, and health professionals who really don't have a clue. I get [health professionals] on scooters and let them drive around and some of the really - they don't like crossing roads or anything. They've got no idea what it's like, even with the height level you're working from. Like you can see over cars and that; we can't… So I think a combination of both, because they've both got something to offer. (669)

Participants were asked what they thought about formal training for new scooter users. Chiconne felt, *"I think just some familiarisation training would be a really good idea, but I'm sort of against too much regulation because I think it puts old people off"* (457) and Una felt:

Well just the basic training to start with… no I think it would be too cruel for them to give you an eyesight test there and then, because you'd never get on it. It would take away your confidence to start with, and if you don't have your confidence you can't go on a scooter. Be a lot of lonely people inside walls. (323)

Many participants felt it was simple to use a scooter, especially if someone had previous experience with driving a car, tractor or other vehicle and did not support mandatory training. However, they could see the potential benefit of training for other users:

The joker that sells them, he's retired now, and he said, "It's just criminal to see some of them." He used to take them out and teach them. He said they'd never been even on a pushbike, some of them. But once they'd got the hang of it they wouldn't be without one. Thomas (332)

Participants felt that the important aspects of training included sharing the knowledge of the self-regulatory behaviours which have been discussed under the theme of 'adjusting behaviour to meet conditions' and 'seeking an acceptable comfort-zone'. Specifically, including how to use the scooters controls and features, speed management, different terrains, road crossings, courteous behaviour, route planning, difficult manoeuvres, tipping risks and general road rules. Arthur felt the length of training would need to be individualised so that each learner had the opportunity to learn:

Otherwise mainly a matter of practice. Some people will probably get a scooter under control much quicker than others. If you've been a driver, obviously I think you'd catch on much quicker, but if you hadn't driven a car, you'd probably be quite apprehensive I think, so I think you'd need practice there. (483)

To read complementary opinions about training, see Appendix J, 7.10.4.2.

4.5.3.2 Assessment

Participants were also asked if assessment prior to procuring a scooter would support effective use. Some participants were wary of assessment due to the possibility of unnecessary restriction, Frances felt assessment *"might put some people off using one, and that would be a shame. I would think it should be as easy as possible to have had the experience"* (292). Indeed, William supported Frances' thoughts, "*Yeah, if you had to go through all that trouble [training and assessment] I don't think I'd worry about it*" (469).

Those who approved of assessment felt it could screen out risky behaviour. Assessment would include a practical test, a vision and hearing test, and a test of patience or courteous conduct:

> *People who sell scooters don't ask you any questions, it's just a sale. The only ones that get checked out are ones who do, or did, is through Lotteries and an OT does it. And otherwise anyone can walk in and buy a scooter. Sometimes it's like going out and buying a shotgun isn't it? Same difference. May (725)*

Frances felt that while assessment might be acceptable if potential scooter users are given the opportunity to train to meet any standards and the process is easy:

> *A: Well, provided [assessment] was sort of a one test and that was all, and if you didn't pass the test you had a bit of training perhaps. If you haven't ever used one and haven't ever driven, you take a bit of practice to learn how to… It's a bit like with a motorbike, you get a test before you, and then you do a second test when you've got proficient on your motorbike. But no, I don't see anything wrong with having to have a test. (284)*

May was wary of issue of the assessor's influence and the potential for unnecessary restrictions by a poor judge:

You get a good OT and you couldn't get anyone better. You get one who knows all the rules and is so narrow-minded, I'm just picking on OTs here, they can't see past the… And I've worked with some really fabulous ones and I've worked with some I could scrag and they could probably scrag me too. But they don't listen. Because how I work is quite different to how you work or anyone else works. And you get a whole lot of people on scooters, they all do it differently. (702)

To read more opinions about assessment, see Appendix J, 7.10.4.3.

4.5.3.3 Acceptability of regulation

When the participants were asked about regulatory approaches to supporting effective scooter use there were mixed responses. To some this was completely unnecessary and discriminative:

Well, [regulation] is more red tape. All right, they're going to penalise us. How about penalising a few pushbike riders around town? We spend millions a year on them, it doesn't even cost them $5.00. You've got me worked up… Yeah, but it's so ridiculous. It's aged people that get a little bit out of a scooter, for a lot of times it's only a year, when you get eighty or something, it might happen that you can't see like mine, you're stuck inside. But it cost you 2-3000, or 4000 for a scooter. And yet a pushbike, we spend 250 or 400 million a year nearly on pushbike tracks around the country and it doesn't cost the pushbike a cent. To me it's wrong, it gets right up my goat. Everything I had I had to pay for, but a pushbike, you can go anywhere in New Zealand on a pushbike and it doesn't cost you anything. And the beautiful pushbike lanes they got now, they're better than the main highways. Thomas (282)

In response to being asked about regulations, Chiconne asked, *"But how many people actually have accidents on mobility scooters?"* Implying that scooter regulation would need to be clearly justified and continued to warn how regulation can restrict access:

> *But you look at the cyclists, once they've made them wear crash helmets, the numbers went down didn't they, considerably, the number of people biking. And I just think the same thing, it's just another hurdle to jump for old people. Chiconne (426)*

Other participants viewed limitations of self-regulation and supported at least some regulation to encourage effective scooter practice, especially as numbers increased:

> ***CLINT:*** *Yeah, [regulation's] a good thing, I think.*
>
> ***EVELYN:*** *I'm all for that. I think that should be done. Because generally, not that I want any people we see now, Clint was one of the first here, because it's really only this past five years that people have really gone for scooters and there's an awful lot in [this town] now, and they shouldn't be driving, some of them. They really scare me.*
>
> ***Q:*** *What scares you about them?*
>
> ***CLINT:*** *Speed.*
>
> ***EVELYN:*** *They're going too fast… They shouldn't make scooters that go fast. They should keep them low. As long as we get there, what does it matter if we're going at snail pace? I try and tell them all this don't I? Oh, it's scary. Clint (464)*

May warned of the challenge with instating regulations as there's often an exception to any rule:

> *Yeah. I think they need to have some legislation for sure. But sometimes they go too far. But that's just me. I'm not a good one for rules and regulations. But I still work with them, don't get me wrong. But it's like a lot of things, they just go overboard lately. It's like flying*

or going on a bus or something like that, they're making it to the fact where it's just not worth going. And we still have to live. (748)

Although not specifically about regulation, Maurice would have liked clearer guidelines about the process of using a scooter once he got one. For example, he wanted clarity about how to use his scooter in car parks, whether to drive in the car lanes or on the narrow pedestrian areas:

As I said, the one unknown factor is the status of a car park… to relieve congestion on pavements … it is a nuisance for people to have to… step onto the grass in order to get past. I recognise that they are a nuisance to people. (433)

Poppy supported scooter regulation to the extent of having more power to identify specific users and intervene when self-regulation does fail to ensure safe scooter use. However, he also felt scooter regulation could be unfair in contrast to the lack of regulation for cyclists:

I mean you're not going to [regulate] cyclists, and I think cyclists are probably more of a danger on the road than scooters. I don't believe that you should have to have a license for them, and I also don't believe they should be registered. (418)

To read complementary quotes about the acceptability of regulation, see Appendix J, 7.10.4.4.

4.6 Chapter summary

The findings provided clear insights into the daily practices which allow each participant to achieve their goals which involved community mobility.

Participants detailed many of the conditions which affected their scooter behaviour and in turn how they adjusted their own behaviour to meet these conditions. Many of the behaviour adjustments were in response to either physical or social environmental factors and some adjustments were in response to individual limitations, in particular visual impairment.

The overall calculation of what behavioural adjustments each participant made related to a compromise between an acceptable level of comfort or discomfort in relation to the meaning of the behaviour or outing. So, some participants were comfortable travelling at a faster speed than others, one participant was comfortable travelling at night, and one did not accept the recommended use of high-visibility clothing and a flag. The meaning of the outing could dictate whether a trip was foregone in bad weather or whether a scooter was used only within a small area. The scooter also contributed to wider wellbeing goals.

The life-span of using the scooter was described with both reflections on the learning process and predictions of future use. Across the sample many were at different stages which demonstrated different levels of self-regulation corresponding to lifestyle demands and confidence levels.

Lastly, the wider context to self-regulation was described by the participants. Factors which influenced self-regulatory practices included support from the social environment, availability of acceptable alternative transport and the experience of any training. Participants also gave their thoughts of hypothetical formal scooter training and assessment, revealing a range of acceptability to regulatory approaches.

5 Discussion and conclusion

5.1 Chapter overview

This last chapter brings together all the important elements of a study. I introduce again the problem statement before relating the findings to the research question and existing literature.

Simply, participants practice a large variety of self-regulation strategies to achieve their personal goals and according to their individual circumstances. Of course, there is more depth to these practices which is what the discussion chapter presents.

The discussion chapter first focuses on self-regulation practices and how these are influenced by personal and environmental factors, introducing some ideas for further support of self-regulation among scooter users who have low vision.

I then look at why the study is needed and the implications of this study. The implications are wide-ranging; looking at ethics in relation to policy and intervention, the need to address social and physical environments, improve alternatives and technology, provide ongoing, optional training and specific implications for occupational therapy.

I review the methodology, state my own insights and then details limitations of this study. The last part of this chapter presents recommendations for further research before concluding the dissertation.

5.2 The problem statement

Research from the perspective of scooter users is needed to improve understanding of the abilities and needs of older adults with low vision. Acknowledgement and representation of their ability to self-regulate can inform policy makers, and the risks and strategies identified can be incorporated into potential scooter assessment, training and regulation.

Research question:

- How do older adults with low vision practice self-regulation when using a mobility scooter?

5.3 Self-regulation practices

As the findings chapter detailed, there are many barriers and risks to using a scooter effectively for older adults with low vision. In response there are also many self-

regulatory approaches to manage the identified barriers and risks. These findings are presented in two tables. The table format allows for a quick and clear reference to different factors which represent risk or barriers, and then the various strategies for managing effective scooter use and meeting goals of community mobility. Comparing the findings to those identified within the literature review has the benefit of quickly determining what is common, and highlighting new findings.

Table 5 lists the risks or barriers to effective scooter use identified by the participants in this study and compares this to the risks identified in the literature relating to powered-mobility devices, older pedestrians, visually impaired pedestrians and self-regulation of driving. Some of these barriers and risks are the responsibility of the individual whereas others originate in the environment and the device. The findings which were not present in the literature review are highlighted.

Table 5:

Findings of barriers and risks from this study also identified within the literature review

Barrier/ Source of risk	This study	Identified in the literature review
Individual responsibility	Illness from travelling in poor weather	✓
	Not seeing terrain change: potholes, bumps or camber.	✓
	Not seeing vehicles or pedestrians	✓
	Tipping the scooter and/or falling	✓
	Travelling too fast	✓
Social environment	Distracted pedestrians causing collision	✓
	Driver inattention causing a collision	✓
	Experiencing aggression or shaming from others	✓
	Inaccessible public transport	✓
Physical environment	A lack of designated crossings or kerb ramps	✓
	A lack of interesting spaces	
	Busy footpaths and roads	✓
	Challenging kerb design	✓
	Damaging the scooter	✓
	Deep cut driveways and gutters	✓
	Depth change with no contrast warning	✓
	Experiencing discomfort or pain due to rough terrain.	✓
	Footpath clutter	✓
	Narrow footpath	✓
	Objects which compromised the line of sight	✓
	Poor footpath condition	✓
	Poor lighting	✓
	Road crossings at intersection corners	
	Roadworks	✓
Scooter	A breakdown	✓

Therefore, what this study adds to the literature, is information about needing interesting spaces to engage our older adults in community mobility, and to design our road crossings so that older adults can cross where they only need to look for two directions of traffic, not the four required at intersection corners. These two new findings can inform how we design new spaces, and redesign existing infrastructure to support the community mobility of older adults with low vision who use scooters. It seems likely that creating spaces and moving road crossings from intersection corners would benefit a larger population than simply the participants in this study.

The findings of risks and barriers from this study which were already detailed in the literature, reinforce the importance of looking at these known details. The majority of the issues raised by the participants in this study affect a larger population of people who face social exclusion if they are unable to effectively engage in community mobility.

One point of interest is how few of these perceived risks originate with the individual. For example, there are five items listed where the participants felt it was their responsibility to manage their speed, identifying hazards, and adjusting their scooter use to meet conditions and personal health needs, otherwise participants spoke of risks in the environment or with the scooter. This could indicate that the participants lacked awareness into their own risks and limitations. However, as the participants reported on others who they felt poorly operated their scooter, I feel this weighting emphasises the environmental production of disability, which will be discussed further.

Following on from the description of risks and barriers, participants also detailed how they manage such features. These management strategies detail practical behaviours for ensuring effective scooter use and meeting goals. Table 6 lists the self-regulation practices identified by the participants in this study and compares these to the strategies for effective community mobility identified in the literature review from either powered-mobility device, visual impairment, older pedestrian or driving self-regulation literature. The table format reflects how self-regulation practices are understood in driving literature, organised by the strategic, tactical and life-goal practices. This table has the benefit of highlighting findings which were not detailed in the literature review.

Table 6:

Self-regulation practices for managing identified risks from this study and the literature review

Type of self-regulation	This study	Identified in the literature review
Strategic	Avoidance: activity	✓
	Avoidance: bad weather	✓
	Avoidance: busy times/crowds	✓
	Avoidance: inaccessible or unsafe streets	✓
	Avoidance: inside buildings	
	Avoidance: night travel	✓
	Avoidance: on the road	✓
	Avoidance: unfamiliar routes	✓
	Awareness of lost visual fields	
	Awareness of visual limitations	✓
	Carrying a mobile phone and walking aids	
	Courtesy	✓
	Decreasing use as confidence/capability reduces	✓
	Identifying accessible kerb ramps	✓
	Identifying flat terrain	
	Planning a route	✓
	Preference for shared pathways	
	Route familiarity	✓
	Travelling with a guide	✓
Tactical	Compensatory head movements	
	Extra caution/care at road crossing and difficult areas	✓
	Giving space to other footpath users	✓
	Listening	✓
	Speed management	✓
	Sunhat and sunglasses	✓
	Using designated road crossings	✓
	Using scooter safety features (mirrors etc.)	✓
	Using the road when the footpath is not suitable	✓
	Using underpasses	
Life goal	Ensuring confidence	
	Listening to social supports for guidance	✓
	Managing overall wellbeing (privacy, independence)	✓
	Ongoing self-assessment	✓
	Using alternative transport when available	✓
	Wider self-regulation: moving closer to amenities	✓

Therefore, this study adds to the literature knowledge of several new self-regulation practices of older adults with low vision when using their scooter. Strategic self-regulation includes avoiding using the scooter inside, awareness of lost visual fields, the need to carry a mobile phone and walking aids in case of an emergency, identifying flat terrain and preferring shared pathways which avoid contact with road traffic and

road crossings. New tactical strategies were to make extra head movements to compensate for lost visual fields and to use underpasses which avoided the need for a road crossing. Finally, the new life goal self-regulation practice highlights the importance of ensuring confidence. These new findings can be incorporated into any scooter training programme, letting new users know of specific strategies which are useful for some low vision scooter users.

These tables are not an exhaustive list. It is likely that many of the risks and management strategies that are highlighted as a new finding are already widely used by older pedestrians, low vision pedestrians, scooter users and older drivers, yet they have not been recorded in the literature reviewed. Such lists can expand, there are likely more risks and management strategies that are not detailed here as either the participants did not report or encounter them.

Another way to look at these findings would be to use one of the self-regulation and driving models presented in the literature review. For example, Laliberte Rudman et al. (2006) talks about achieving an acceptable level of comfort while acknowledging the influence of interpersonal, intrapersonal and environmental factors. Another model is the one proposed by Donorfio et al. (2009), who considered the four dimensions of driving skill and ability, life and society, self-worth, and the automobile (or the scooter).

I think these models provide good frameworks for understanding the different dimensions which influence a person's decision to undertake a potentially risky activity. However, some aspects which are important in a driving context did not relate with scooters. Under Laliberte Rudman et al.'s (2006) model, there was emphasis on interpersonal factors which did not come through as strongly with scooters. Certainly, some participants had family members or health professionals comment on their scooter use but others reported no feedback. My speculation is that driving is better known for perceived risks, whereas scooters can be perceived as harmless, and so feedback from interpersonal relationships may be less prominent than conversations about driving. Donorfio et al.'s (2009) model does well to describe the multi-dimensions of self-regulation however the physical environmental influences are not as explicitly prominent as the participants' discussion of the environment in this study. It might be that for driving, roads are better maintained, or vehicles are less sensitive to terrain changes. I conclude that these two models which present models of self-

regulation based on the perspectives of older drivers prompt aspects of self-regulation to consider, however with the understanding these might not translate completely to a model of self-regulation for scooter users.

Just as the driving self-regulation literature cannot state whether older drivers' self-regulation improves driving or reduces risk, these findings also cannot say how practices relate to improving overall safety (Molnar et al., 2015). These tables however, identify the problem-solving of the participants which indicates a thoughtful approach to the use of scooters. These personal practices can be incorporated into any education of new scooter users for supporting effective community mobility. The findings also demonstrate the influence of the environment and these influences can be further examined to guide interventions for increasing the accessibility of our physical and social environments.

In the following sections I present the influences on scooter self-regulation which are generated by the person and then by the environment.

5.3.1 Person

As my guiding research paradigm acknowledges, there are limitless constructions of reality, and this is clear across the sample of 15 participants who each presented their individualised approach to community mobility and to risk-taking.

5.3.1.1 Individual diversity

A strong finding across the sample is the diversity and individuality of each participant and their wide-ranging contextual factors which influenced how they decide to use their scooter. In seeking an acceptable comfort-zone which allowed for attaining their goals, each participant incorporated self-regulatory approaches.

This diversity and individuality in approaches and needs reflects the self-regulation and driving calculation that Donorfio et al. (2008) presented whereby many factors influence the decision of when, where, how and why to use a scooter.

Client-centred practice is a key tenet of occupational therapy recognising that every person and every situation is unique. The diversity of individual capabilities, needs and preferences remind us to remain open-minded to each individual. This diversity seems particularly apparent in a sample who are grouped because they are all scooter users with low vision, yet each participant differs in their sight, hearing, confidence, need and location, and adjusts their behaviour accordingly.

Unique adaptations to a visual impairment are likely to be a slow process as is the prognosis of age-related vision loss. Participants found it difficult to articulate the direct effect of their vision, indicating either that their vision does not affect them or that adaptations are an unconscious process. The findings chapter presented the experiences and unique adaptations in response to vision of the participants who would be deemed the most visually-impaired, those who were Blind Foundation members. This showed a variety of very different responses to manage community mobility with a visual impairment. The findings chapter also presented the experiences of Poppy and Chiconne who articulated the influence of low contrast sensitivity and a lack of depth perception. Thorslund and Strand's (2016) literature review found that vision measurements for driving should include measurements of acuity as well as contrast sensitivity, useful field of vision and glare sensitivity. Often only visual acuity and fields of vision are measured for driving eligibility. Chiconne and Poppy demonstrated that visual impairments beyond acuity and visual fields need to be explored and attended to. For example, individual awareness and education about issues such as depth perception and low contrast sensitivity may help an individual travel defensively. Chiconne seemed to learn about her visual limitations through accidents whereas Poppy was aware of his limitations and managed his scooter use to avoid accidents.

Several participants mentioned courtesy and patience as essential elements of using a scooter and sharing the footpath. This quality of being courteous is a commendable part of being a community member and seemed to have been general to all the participants in this study. Steyn and Chan's (2008) report found that scooter users supported the creation of a scooter 'code of courtesy' or etiquette which is included in the training of new scooter users to support footpath cohesion. The NZTA (2015a) 'Ready to Ride' scooter guideline booklet details how to ride considerately which is the most consistent form of scooter education currently available in New Zealand. It may be debated whether scooter courtesy is an inherent personality trait or whether it can be encouraged through training.

Intuitively, different personality traits must affect scooter conduct and the process of self-regulation. Several participants were careful and studious, appreciative of their learning process which increased their knowledge of scooter use or conducted their own research to ensure effective and legal scooter use. Whereas others seemed to be

relaxed about their learning process, seeing the scooter as simple and without any need for concern.

These attitudes might also reflect confidence levels and resilience. Both Ziegler and Schwanen (2011) and Laliberte Rudman et al. (2016a) found that mobility levels are affected by volition and resilience. As Thetford, Bennett, Hodge, Knox and Robinson (2015) found, resilience is complex with social, financial and personal circumstances influencing an individual's ability to manage and adapt to the adversity present with vision loss. A holistic view is needed in understanding an individual's behaviour and how to support effective self-regulation.

Several participants supported optional scooter training as an opportunity for encouraging courteous and effective scooter use by conveying key messages and strategies for managing scooter risks and barriers. The stipulation that this is optional came from the participants who either did not feel they personally needed training given their experience with vehicles, or because they had adequate support from family and peers. Mortenson, Hoag, Higgins, Emery and Joyce's (2016) study of scooter stakeholders also supported the idea of optional scooter training.

5.3.1.2 Risk-taking

There are undeniably some risks involved in using scooters. This risk may be to the individual user or members of the public. However, it is important to contextualise these risks and one way of doing this might be to examine the positive outcomes of taking risks. Positive risk-taking is another way of thinking of the compromises between an individual's comfort-zone and attaining their goals.

Critics of scooters, such as the RCAF (Newman, 2015) report or in the newspaper articles reviewed by Stowe and Mulley (2010), fail to give due weight to the benefits of scooters. We know that scooters promote wellbeing and participation. Participants talked of how the scooter was integrated into a healthy lifestyle enabling activity engagement, autonomy and connection within their community. Scooters strengthen relationships by reducing carer burden or giving an opportunity for a household member to leave the house independently. In the case of Poppy, the scooter manages a tight budget as reliance on discounted taxis would place a significant financial strain on making outings. Additionally, for people who value independence, the ability to mobilise autonomously is significant for maintaining self-worth by ensuring satisfaction through living in a way that aligns with one's values (Turner Goins et al., 2015).

The participants freely acknowledged elements of risk, often through referring to other scooter users in their community who did not abide by their own code of conduct. This showed a belief by participants in the ability to individually manage risk.

Situations of significant risk, such as accidents, were partly beneficial. The reports of accidents are interesting in that each participant who had experienced an accident or near miss, reported the incident without serious concern and with a positive outcome, often reporting their subsequent adapted behaviour. This 'redemptive' response was found in an examination of resilience and coping in old older adults, and was seen to equip the older adult with *"varying adaptive coping skills and instrumental skills and an awareness of personal capabilities"* (Browne-Yung, Walker, & Luszcz, 2017, p. 288). The cliché that 'we learn from our mistakes' is evident here, and any attempt to judge a scooter user on an accident is not fair when the incident may not have been their fault while also potentially triggering beneficial learning and building resilience. An accident may simply be a significant part of the self-regulation life cycle.

We do not keep consistent records of scooter accidents in New Zealand and instating a better recording system is a recommendation from the NZTA report (Lieswyn et al., 2017). Such records would allow an objective understanding of the particular risk of harm for a scooter user (low vision or not). Analysis of such data could compare the risk of harm on a scooter to other modes of transport for older adults, or even other modes of transport in general. This analysis would identify whether scooter risk is unique and justifies further intervention. A more comprehensive analysis would also consider potential harmful lifestyle outcomes that the scooter seemingly protects the user from including socially isolation, poverty and denial of valued autonomy.

The last point about participant decision-making is the need to respect individual's personal preferences and decisions about risk-taking. May's decision-making allowed her to express autonomy and manage what she perceives as risks. May preferred to use a three-wheeled scooter and chose not to wear a flag or high-visibility clothing. She knew that four-wheeled scooters were considered more stable, but she didn't like the feel. She wanted to blend in without declaring her presence, even if this reduced her visibility she didn't feel this put her at significant risk. Despite going against general recommendations, this risk-taking had positive meaning for May.

5.3.2 Environment

Another part of looking at self-regulation is to examine the environmental demands, infrastructure and specifically the social environment. This examination can then consider which self-regulatory practices would be necessary if the environment were better maintained or designed.

5.3.2.1 Environmental demands

From the records that we do have of scooter accidents, these tend to occur at road-crossings, on poor terrain or driveways (Gibson, Ozanne-Smith, Clapperton, Kitching, & Cassell, 2011). The reported accidents in this study also occurred at road-crossings, driveways, on changes in terrain and because of other footpath users not paying attention.

Under critical disability perspectives, the environmental production of disability is a crucial area for attention, rather than focusing solely on the individual's impairment/s (McGrath, Laliberte Rudman, Trentham, Polgar, & Spafford, 2016).

The following examples demonstrate an accessible environment based on some of the findings of this study. If the social norm was for drivers exiting driveways to stop at the entry point to the footpath, not the road, then scooter users would feel secure passing driveways. Scooter users would always drive on the footpath because it was the good condition meant it was comfortable. Scooter use could become less popular because adequate, accessible public transport was a desirable alternative. Lastly, increased shared pathways and underpasses would reduce the exposure to road crossings where scooters users are highly vulnerable to injury.

In a review of Dutch and German measures for improving safety for cyclists and pedestrians, many strategies looked not at the behaviour of the pedestrians and cyclists but the behaviour of traffic and how the physical environment facilitated safety (Pucher & Dijkstra, 2003). This focus on the wider factors demonstrates a more holistic approach to improving safety for footpath users and recognises pedestrians and cyclists as most vulnerable therefore deserving of safety priority. This model of investigation is similar to the York 'hierarchy of transport users'. The city of York's local transport plan details where priority should be given for different transport users. This hierarchy is: pedestrians with mobility problems, pedestrians, people with mobility problems, cyclists, public transport users, powered two wheelers, commercial and business users, car borne shoppers and visitors with car-borne commuters are the

lowest priority (City of York Council, 2011). These models for changing how we focus on and prioritise transport issues indicate the drastic change that Rose et al. (2009) called for to support those who are most vulnerable to social exclusion due to transport issues in New Zealand.

The influence of the environment was evident in this study regarding the restrictions imposed by poor environments and the inclusions allowed with accessible environments. We have known about the environmental production of disability at least since the emergence of the social model of disability in the 1970s. So it is disappointing that the RCAF report does not talk to the collective responsibilities for creating spaces accessible for scooters, and while Lieswyn et al. (2017) mention the influence of the environment, their recommendations merely state "consider further means of improving local transport infrastructure" (p.164).

5.3.2.2 Infrastructure

Infrastructure to support scooter use should include wide footpaths (or potentially scooter lanes), parking spaces for scooters, reduced footpath 'clutter' and adequate turning spaces. Infrastructure for road crossings includes accessible traffic islands in the centre of road crossings, road crossings which are further back from intersection corners, underpasses and ample kerb ramps which are even with a gentle access ramp. As was found in my pilot study, these design features also benefit all older pedestrians and so it is a matter of universal design rather than solely for low vision scooter users (Wilton & Davey, 2007).

I had naively assumed there were accessibility standards for new developments and indeed the guidelines for universal design exist. However, Figure 4 shows a recently created council endorsed footpath which, due to design aspirations, disregards the inconvenience for prams, scooter users or visually impaired pedestrians (Shand, 2017). Figure 5 also shows the footpath edge, called 'low profile kerb and channel', which Maurice identified as a restriction to effective mobility. Maurice not only had difficulty in recognising the change in depth from the top view but because this kerb is not cut for private driveways, his road access is only available at infrequent, designated kerb

ramps. When I talked to the council they were proud of the kerb design, consequently, I have asked a disability advocacy organisation to investigate the design accessibility.

Figure 4: **Poorly designed footpath in Tauranga. Source: Shand, 2017**

Figure 3: **Low profile kerb and channel design**

Although NZTA has standards for footpath designs (2009) and guidelines for accommodating visually impaired pedestrians (2015b), standards are often fulfilled to the minimum and guidelines are not always enforceable. The Auckland City Council (n.d.) has produced a universal design tool to encourage new developments to follow universal design goals, however this is voluntary. The Access Alliance (2017) is proposing the Access Alliance for the Accessibility for New Zealanders Act, which aims to create "enforceable and mandatory accessibility legislation" to improve all aspects of accessibility including within the built environment and accessible transport (p.3). Otherwise, issues of access must be argued under a Human Rights framework which is less specific to infrastructural accessibility. Until standards are updated to meet

emerging accessibility needs or legislation allows for enforcement of accessibility, footpath users with differences in mobility have no choice but to adapt their behaviour to meet the demands of the physical and institutional environments.

5.3.2.3 Social environment

Infrastructure design is measured for accessibility, however the social and cultural environments also influence effective use of the scooter. The social environment presents barriers in attitudes, poor consideration when sharing a footpath and systems which do not consider diverse mobility needs (Hamraie, 2013).

While the participants talked of their courtesy, they mentioned the distracted and even aggressive behaviour of other footpath users. Efforts could be aimed at improving our footpath culture and understanding the needs of everyone. Lieswyn et al.'s (2017) report supports education aimed at encouraging courtesy and etiquette for both scooter users and the general public.

May talked about how members of the public have judged her scooter use, deeming the scooter as optional. Due to the invisibility of many mobility impairments, onlookers may not understand a user's energy conservation needs or pain when mobilising long journeys or inability to walk independently, and instead judge the user to be lazy (Fomiatti et al., 2014; O'Connor, 2016). Public campaigns could emphasise the needs of scooter users and encourage understanding social environments.

Any public campaign requires sensitivity, focusing on empowering scooters user. May experienced more direct attention and fewer paternalistic attitudes when using a scooter than when she is pushed in a wheelchair. If scooters are relabelled as disability tool, rather than the intended goal of improving attitudes, the disabling attitudes which wheelchair users report could extend to scooters users (Ripat et al., 2017). While in an ideal scenario, the negative attitudes experienced by wheelchair users should be targeted and eliminated, in the meantime scooter users should be afforded the dignity that the scooter seems to allow. Any public campaign would need to approach the topic in a manner which promoted abilities and inclusive communities (Lieswyn et al., 2017).

Some New Zealand communities are already making changes to accommodate and celebrate scooters. In the Bay of Plenty, accessways and crossing points are being improved to accommodate scooters (Porter, 2017). In Blenheim, a recent event was held to bring scooter users together and attempt to break a world record for scooters

travelling in a circle (Vause, 2017). A British initiative, again from the city of York, exhibits poetry about older mobility on buses, demonstrating novel ways that education can be shared which are interesting and facilitate positive understanding (The University of York, 2017).

5.4 Why we need to do this study?

Throughout my last two years of studying low vision scooter use, I have often been questioned why I would focus on such a topic and what I would hope to achieve from doing so. While my initial interest was sparked by the unexpected need to defend the scooter use of two low vision clients, I have since attracted a lot of attention as many people seem to have an opinion of scooter users in their community. What I have been particularly pleased to provide the research and practice community is a study representing users' perspectives and insight into their capabilities.

5.4.1 Provides users' perspectives

Detailing users' perspectives and observation of daily routines is not only essential for representing a practice but also, under critical disability perspectives, for 'deconstructing normalcy' and "giving them an active voice in research" (McGrath et al., 2016, p. 5). McGrath et al. (2016) explain that providing an opportunity for older adults to participate in research encourages new discourses of what is "normal" therefore reducing the unhelpful binary or othering of individuals who experience disability as opposed to those who currently do not experience disability.

In the driving literature, Donorfio et al. (2009) found that self-regulation research tended to focus on functional decline with few studies including the perspectives of the driver. It is the driver who is the expert regarding their process therefore research which includes users' perspectives acknowledges their significant role as a stakeholder.

There were barriers and self-regulation practices which I could not have predicted. For example, I would not have intuitively noticed that a white electric box placed beside a white fence would be difficult for someone with low contrast sensitivity or that a kerb ramp was a bit too steep for comfort on a scooter. I also had not predicted that areas of town would be avoided due to harassment from younger people or that not having an interesting place to visit would discourage making an outing. I was surprised by strategies such as memorising where a kerb ramp is even though it's out of a participant's range of sight, having a guiding partner and the importance of privacy which the scooter afforded.

Including the scooter users' as the focus of data gathering gave an important element for understanding their unique perspectives. Deverell (2011) presented what the practitioners thought would be the low vision scooter users perspective of issues but acknowledged that this is not a fair representation, and research was needed which presented the scooter users' perspectives.

5.4.2 Self-regulation is current scooter 'practice'

Discussions of scooter regulation will continue with increasing numbers of scooter users, however there is little scooter research of detailing users' practice. Because there is little regulation around the scooter procurement, by default scooter use is self-regulated.

Detailing self-regulation gives understanding and insight into an activity which most researchers and clinicians do not have first-hand experience of. The examples of self-regulation present various approaches for managing, effective scooter use within different environments. Researchers are interested in self-regulation and driving because deciding not to drive is not a clear-cut decision but a process adjusting over time, experience and capabilities (Donorfio et al., 2009). Gaining an understanding of the self-regulation process provides insights into how to support the process, maintain independence and identify potential risk-factors (Donorfio et al., 2009; Molnar et al., 2015).

If there comes a time when more regulatory intervention is deemed necessary, these details of self-regulation are invaluable for supporting scooter user autonomy.

5.5 Implications of this study

This study has implications for clinicians, such as occupational therapists, as well as policymakers and communities wanting to make changes which affect scooter users.

The scooter situation should first be considered ethically and with sufficient justification, and the conversation should include the environmental production of disability, exploring alternatives and technology, and nuances in the provision of scooter training. Lastly, I do detail implications specific to occupational therapy practice.

5.5.1 Policy should be ethically-based and justified

The first implication of this study is to look through an ethical lens at how we support scooter users. This implication relates mostly to the proposed regulations presented in the introduction, whereby the RCAF (2005) made strong recommendations for

legislative approaches to allegedly increase scooter safety which was followed by a milder report for NZTA with recommended considerations for regulatory approaches to managing low-powered e-vehicles (Lieswyn et al., 2017). Although the NZTA report's recommendations are less extreme than the RCAF, I don't predict that the RCAF's arguments will dissipate from the ongoing conversation of scooters, thus deserving further analysis.

Scooter regulation would fall under NZTA and Ministry of Transport direction, however, the debate about regulation fits with a discussion of public health interventions as the primary goal is injury prevention. The three following pieces of literature introduce essential factors for implementing a public health intervention.

Firstly, Tengland (2016) presents the empowerment model as the ideal approach to facilitating health promotion. The empowerment model allows individuals to identify what their needs are and guide their own change process. The autonomy or self-determination allowed through the empowerment model enabled individuals to guide their own goals of health promotion. The professional's role is to facilitate this autonomy by providing key information. Tengland explains that empowered individuals are more likely to engage in healthy behaviour and that while some empowered individuals make choices which are not 'healthy', they still deserve respect (if they do not risk harm to others).

Secondly, Allen-Scott, Hatfield and McIntyre (2014) found five domains of unintended harm through public health interventions: physical, psychosocial (specifically increase stigma, victim-shaming and social discrimination), economic, cultural and environmental. These unanticipated consequences of public health intervention were associated with limited or poor-quality evidence, prevention of one extreme leads to another, lack of community engagement, ignoring root causes and when interventions from a higher income country are limited in lower income setting.

Finally, Upshur (2002) presented four principles for guiding ethics in public health intervention. These principles are applied here to ensure an ethical perspective within recommendations. The four principles cover harm, the least restriction, reciprocation and transparency. The harm principle outlines that individuals have a right to harm themselves and it is only when an individual may harm others that there is justification for intervention. The principle of the least restrictive or coercive means, stipulates that when a situation is identified for justifiable intervention, the intervention should be

the least restrictive manner such as education, facilitation and discussion before moving toward prohibition, regulation or incarceration. The principle of reciprocity stipulates that if an intervention burdens an individual or community, then compensation is necessary. Lastly the transparency principle states that the decision-making process must be transparent with all stakeholders included in deliberations (Upshur, 2002).

These articles on public health interventions reinforce that any regulatory approaches need to systematically use effective approaches with a holistic and ethical lens of wellbeing, health and injury. Regulations cannot be aimed merely at individualised scooter risk but rather include institutional roles in fostering community participation, and this should be guided by clear evidence including perspectives from scooter users as key stakeholders.

The RCAF recommendations certainly do not fit with ethical, empowering and effective guidelines for a public health intervention. The RCAF report included only two surveys with the perspectives of scooter users, giving an unbalanced view guided by policy and health professionals which provides little understanding for encouraging empowerment of the target audience. The RCAF report also dedicated large sections asserting the risk of harm of inactivity on a scooter and reporting the documented scooters accidents. The risk of harm remains unevaluated and inconclusive. Thoreau (2015) found inconclusive evidence supporting the risk of scooters encouraging inactivity, and studies have not compared the negative health outcomes of physical inactivity to those of social isolation.

A closer look at the cited report on scooter injuries reveals that over two years in Australia, the vast majority of incidents, 442 out of 713 estimated hospitalisations, were falls resulting in harm only to the scooter user and, while it's difficult to precisely extrapolate, many injuries were caused by other factors including reversing cars, heavy drinking and poor footpath/road condition (Gibson et al., 2011). A more recent report on the 77 deaths of Australian scooter users from 2000-2011 found that the deaths were predominantly either caused by being struck by a vehicle (n=39) or falling from the scooter (n=29) (Kitching, Ozanne-Smith, Gibson, Clapperton, & Cassell, 2016). The RCAF seemed to argue that the financial burden of hospitalised scooter accidents justifies intervention, rather than presenting the ethical principle to allow scooter users to take informed risks, and their reporting does not address the responsibility of

others and the physical environment in these accidents. The RCAF's case for assessment and training is based on these accident rates and unverified, potential risks for vulnerable pedestrians. The RCAF report did mention the limitations of the physical environment for scooters, but without recommendations for environmental improvement, the rest of the report seems to assume scooter user inability and ill-health. While Newman's (2015) literature review for the RCAF produces strong recommendations, this is grey literature with no peer review.

Mortenson et al. (2016) questioned whether such regulations including compulsory licensing and training would *"survive legal challenge"* (p.293), and certainly the NZTA report on low-powered e-vehicles has no recommendations for compulsory licensing and training (Lieswyn et al., 2017). The RCAF recommendations are to be understood as poorly informed, extreme regulatory approaches.

The NZTA report's concluding recommendations for further consideration of scooter regulations are listed in Appendix K. Most importantly, recommendations include improving infrastructure to accommodate scooters, scooter speed remaining restricted by the 1500W definition, not introducing registration, using education to promote courteous behaviour by all footpath users and considering limiting scooter use to individuals who have a mobility impairment. Lieswyn et al. (2017) also warned of a scooters ability to harm pedestrians but acknowledged there needs to better data collection kept on scooter incidents. Many of their recommendations seem to be based on recognising the difficulty of instating, enforcing and administering heavier approaches such as registration.

An ethical, regulatory approach to scooter safety would first gather sufficient data to justify an intervention, then start with the least coercive approaches, such as education, which are well designed and do not risk any unintended harm. Simultaneously acceptable alternative transport options would be introduced. Any interventions would respect an individual's choice to take risks which may result in personal harm but provide sufficient opportunities for the individual to make an informed decision about these risks.

The participant responses to the notion of scooter regulation indicate that any regulatory approach will need to be carefully planned to ensure acceptability and not pose unnecessary barriers to using a scooter.

5.5.2 Address social and physical environment production of disability

The second implication of this study is to look beyond the individual's practice. As the self-regulatory practices revealed, many of the risks and barriers are produced by environmental features, and so further efforts are needed to support accessibility.

Environments which emphasise accessibility invite the inclusion of all the diverse individuals who make a community. By encouraging accessibility for all through universal design, we encourage our communities to thrive and for diversity to be acknowledged through the physical presence of all our community members. Accessibility in the physical environment is the responsibility of councils, central government and building code. As mentioned earlier, legislation such as the proposed Access Alliance for the Accessibility for New Zealanders Act would allow better accountability around issues of access.

For improving the social environment and under Upshur's (2002) guidelines, education with public campaigns should be one of the first approaches in implementing a public health intervention. Organisations like Age Concern, Grey Power, Living Streets Aotearoa or any disability advocacy services might be encouraged to campaign on scooter inclusion including how to interact with other footpath users, fostering an inclusive culture where the needs and rights of scooter users are understood and respected. Campaigns can be creative and interesting such as poetry campaigns or organised outings with scooter users.

5.5.2.1 Ageism and ableism

A particular social environmental barrier which was not significantly emphasised by participants, but I see as an essential part of the discussion is the attitudinal barriers created by ageism and ableism.

Several participants compared the topic of scooter regulation to cycling. Cyclists are similarly at significant risk of harm from road traffic and pose a risk to pedestrians however cyclists are respected and assumed to be competent in their self-regulation while we improve their physical environment. Cyclists travel faster than a scooter so while a cyclist is significantly lighter than a scooter, basic force calculations (see Appendix A) suggest that a cyclist travelling at 15 km/h can produce a comparable level of force as a scooter travelling at 5km/h. This calculation means that cyclists using shared pathways pose an equivalent risk, in fact, high speed (15km/h) scooters are equally comparable in force risk as high speed (35km/h) cyclists.

In comparing the discussion between cyclists and scooter users I see inherent, underlying ableism and ageism. This comparison does not aim to chastise cyclists but simply illustrate interesting parallels and differences in approach to the two transport users. Cyclists tend to be young and fit, scooter users tend to be older and disabled. Thomas referred to the substantial investment given to cycling infrastructure (the Ministry of Transport has dedicated $100 million to urban cycleways) which is not reciprocated for other non-driving travellers. Dr Lynley Hood's activism points to a complete lack of investment in New Zealand's footpaths despite overrepresentation of older adults in pedestrian fatalities, and the increased importance of walking for older adults (Harwood, 2017). Lastly, if the RCAF's arguments are to be followed, cycling injury costs amounted to almost $38 million in the past year, however there are no efforts to regulate cycling (ACC, 2017).

Ageism and ableism are rife in policy, research, health professionals and community cultures. In the literature review, Siren and Haustein (2015) demonstrated the systematic ageism with the lack of evidence supporting globally accepted age-based driving screening policy, and Egan et al. (2017) called for reflecting on and removing the ageism and ableism that is widely accepted in low vision rehabilitation settings. Layton (2014) explains that, at least in Australia, there are significant challenges for bringing disability issues into the policy context. These challenges include that problem formulation of policy is often framed with cost-effective models which may not consider essential aspects for quality of life. Additionally, to enact any policy change there needs to be the right conditions with both political will and policy windows (Layton, 2014). The UN Convention on the Rights of Persons with Disabilities promises a more effective avenue for advocating on disability issues in the legislative and policy realm (Watchorn & Layton, 2011).

Older adults with or without impairments, are disabled by paternalistic or uneducated social, cultural and institutional perspectives which judge them incapable of making their own informed, risk assessments (Rush, Murphy, & Kozak, 2012). Deverell's (2011) thesis found that some O&M and occupational therapists practicing with low vision clients on scooters were more risk-averse, actively discouraging scooter use. It seems that some professionals are not adequately trained to make informed decisions, work in safety-focused settings or fear litigation in the event of a client coming to harm, thus this can eschew practice to risk-aversion rather than facilitating positive risk-taking. These issues apply for all professionals working with scooter assessment and training,

not just specific to low vision clients (Maywald & Stanley, 2015). Cordes et al. (2017a) also took issue with the potential for scooter screening to focus on fitness-to-drive rather than driving ability and driving behaviour. Additionally, when fitness-to-drive is assessed on qualities such as functional ability, this assumes that impairment alone is a fair measure of ability/disability, which is clearly ableist. Service provision needs to work toward embodying critical disabilities perspectives by dismantling attitudes and procedures built on ageist and ableist assumptions (Egan et al., 2017; McGrath et al., 2016).

Perhaps due to some understanding of the unacceptability of discriminating against people with disabilities, it's an interesting observation that the RCAF (2015) report does not mention powered-wheelchairs. While uncommon, powered-wheelchairs can be purchased privately without prescription, assessment and training. Powered-wheelchairs and scooters often only differ regarding the controls and configuration, otherwise, they are similar devices in terms of weight, speed and force. Powered-wheelchair users also have similar rates of accidents as scooter users (Edwards & McCluskey, 2010). As wheelchairs are more closely associated with disability than scooters, I believe they are unlikely to face arguments for regulations. The disassociation of scooters with disability appears to be a reason why scooters are favoured by those who have a choice between the devices. By identifying the similarities of the two devices, there is a chance that by identifying a scooter as a disability tool, scooter users will be treated with the similar disabling attitudes and stigma that wheelchair users experience. This challenge of not labelling all scooter users as disabled, warrants further thought when Lieswyn et al. (2017) recommend considering that scooters be restricted only to those with "bona fide" mobility impairments (p.165).

There are undoubtedly scooter users who behave in a manner which risks harm to others and as such, interventions should be aimed at individual behaviour, rather than viewing the device or stereotyping based on the demographics of users as the problem (Litman & Blair, 2004).

Policy and intervention which was not ageist or ableist would start with evaluating our physical environments, our systems of support, and an ethical view of risk, and how risk-taking is acceptable in non-disabled populations, before looking at individual's driving ability (and capacity for training). This policy would also involve scooter users as

key stakeholders in the design process, and would not consider fitness-to-drive assessments which focus on factors like age and vision.

5.5.3 Developing alternatives

Rather than solely focusing on scooter user behaviour and environments for improving scooter safety and older adults' community mobility, there are other factors which should be considered. One factor is to look at improving alternative transport options and the other is to look at improving the technology of the scooter itself to compensate for any user limitations.

5.5.3.1 Public transport options

The participants in this study tended to live in smaller townships where public transport (namely buses and taxis) was minimal or non-existent. Even when buses were available, barriers could include an impossible distance to the bus stop, or issues with mounting the bus, or issues with how to mobilise on arrival at the destination. It would be difficult to provide public transport which satisfactorily met the participants' needs and was affordable.

Taxis were often used as a back up to the scooter for longer trips, bad weather or night travel. However, for Poppy, a taxi posed a significant cost which was unsuitable for regular travel, and for May, taxi travel meant that she would require a support person to push her at the other end, reducing her privacy and independence. For others, although not noted, the trips were of such a small distance that despite the participant not being able to walk this distance it's assumed a taxi would be excessive, such as Thomas who travels to his retirement village office and back.

Under Upshur's (2002) reciprocity principle, there is a responsibility to provide adequate alternatives in any situation where an individual is barred from engaging in a valued activity. For some participants, discounted taxis and public transport are not adequate, and as even larger centres in New Zealand struggle to provide quality public transport, this is unlikely to improve in smaller communities (Rose et al., 2009). Therefore, alternative transport for reciprocity may be either costly or unattainable. Maurice's proposal of a shuttle is worthy of further investigation and is already available in some areas such as Dunedin, where a low-cost shuttle supports grocery shopping and other small errands (Weka: Disability Information, 2016). This shuttle service is also limited as it occurs in a larger centre with more demand and seemingly

does not cater for aspects of community mobility which are equally as important as productivity, for example, leisure outings, autonomy or privacy.

5.5.3.2 Technology

Developments in technology may overtake the discussion of how to ensure scooters are safe by compensating for vision loss with additional feedback, autonomous operation or eliminating the need for transport.

Sensors which provide audio cues, such as those which beep faster when reversing a car, could be used for navigating the physical environment and would be a simple modification (Lieswyn et al., 2017). This modification might provide useful sensory information by giving audio cues about objects within blind spots. I met with a representative of a company which distributes OrCam glasses: specialised glasses with a camera which then reads aloud any text, and can learn and identify faces. The representative said that the camera technology could be applied to road crossings and for identifying vehicles, however the challenge for such technology is the risk of the equipment failing which could result in serious harm or fatality (R. Drummond, personal communication, April 11, 2017).

A step further in technology, it's hardly surprising that an autonomous scooter has been developed. Developers from Singapore and MIT have produced this scooter which operates autonomously even in busy corridors and only requiring destination directions (Andersen et al., 2016). Sensors and software avoid obstacles. The scooter was trialled with 99 participants. Before their 'ride', the participants rated the safety at 3.5/5 however following their use rated the safety at 4.6/5. The scooter appeared comfortable and acceptable to the participants.

Also, Ziegler and Schwanen's (2011) suggested that technology can also provide an alternative to physical mobility, as people increasingly connect through the internet and the rates of digital access and literacy increase. Digital connection might offer a meaningful option for 'mobilising' for older adults with low vision who have a mobility impairment, as they can connect with their community and conduct online shopping.

5.5.4 Training

This study implies that optional training is acceptable. Non-mandatory scooter training is increasingly occurring throughout New Zealand, provided with support from councils, Age Concern, the police and scooter retailers (Schroeter, 2016). These

sessions usually involve watching a video and a talk about scooter use from the various stakeholders' perspectives but may not include any practical components.

Most of the participants in this study did not attend any organised training, which could be because the training only recently becoming available and the sample included mainly established scooter users. May felt that the training needed a practical component whereas Susan was satisfied in the opportunity to share information and ask questions. Maurice had questions beyond what was available to him in the NZTA scooter guidelines booklet, and training opportunities could provide a forum for more complicated issues.

May had received training from an occupational therapist as her need for the scooter was related to a stroke. Her report of this training was that it was valuable and although the therapist had doubts over her ability, she managed to gain the necessary skills. May's example demonstrates how some users may require in-depth training and indeed, Cordes et al. (2017a) found that driving-ability could be taught to those who initially appeared incapable of using a scooter effectively. If a scooter user is identified by their community as a rogue or unsafe user, then efforts should be made to provide this individual with training rather than solely punitive approaches such as charging them with reckless driving or taking their scooter away.

Mortenson et al., (2017b) are in the process of evaluating the feasibility of a one-to-one scooter training programme in Canada and the results from that can inform future training practice. Certainly, in Mortenson et al.'s (2016) survey of scooter stakeholders, stakeholders felt that one-on-one training was preferable over group training, although some elements might be deliverable in a group format.

5.5.4.1 Peer support training

Several of the participants had either received training from family or friends who use scooters, or had even provided support to new scooter users. May and Una saw the strength in the peer training, as experienced users could give first-hand guidance, especially if both users are from the same area where the peer-trainer can advise of specific difficult terrain and useful corresponding techniques. Chiconne saw the difficulties in peer training as she was not confident in teaching others and was restricted from the viewpoint of sitting on another scooter. Mortenson et al. (2016) found that scooter users and retailers agreed with the idea of peer mentors. Peer

mentoring occurs in some area of New Zealand through scooter clubs (Schroeter, 2016).

Encouraging peer-support through initiatives like scooter clubs is a cost-effective way of sharing and monitoring skills without the perceived hierarchy of working with a professional. Clubs also encourage social contact, enhances rapport through shared experiences and language, and lastly provides authentic role models (Peel & Warburton, 2009). An organisation like Age Concern could provide support and monitoring to help with the logistics of supporting a scooter club and group leaders.

5.5.5 The role of occupational therapy

As I explained in the introduction, New Zealand occupational therapists rarely have a role with scooter users, but this role could develop. Australian occupational therapists work with scooter clients when they receive government funding and may work alongside an O&M specialist with a low vision scooter client. Dutch occupational therapists will also assess new clients in the case of government funding. Occupational therapists are likely to come across clients who use a scooter and have low vision through other well-established occupational therapy services including older persons physical rehabilitation, older persons mental health and stroke rehabilitation.

What this study provides is increased understanding of the risks and barriers to effective scooter use, and correspondingly how scooter users manage these obstacles to ensure community mobility. An occupational therapist working with a client using a scooter, especially those with low vision, can refer to the discussion of self-regulation to gain an understanding of what strategies the client may need to try if they are poorly managing a risk or barrier.

5.5.5.1 Reflections for ensuring effective practice

When a service or role is in infancy, this is an opportunity to develop foundations which are mitigated against existing known challenges in delivering effective and client-centred occupational therapy practice.

Firstly, a service's policy or parameters may not meet the client's needs and so the assessor would be unable to deliver adequate client-centred services (Barbara & Curtin, 2008; Gupta & Taff, 2015; Whalley Hammell, 2007). Whalley Hammell (2007) warned that service policy can position the assessor precariously where advocating for a client could risk a therapist's employment. Whalley Hammell (2007) and others found that the role of the assessing therapist is particularly compromised when service

provision is funding limited: clients are assessed against each other by prioritising 'need' and 'deservingness' and therapists can act in the interest of their service providers (Barbara & Curtin, 2008; Gupta & Taff, 2015; Jörg, Boeije, & Schrijvers, 2005; Whalley Hammell, 2007). Other institutional limitations to meeting clients' needs include insufficient time, staff, support and knowledge, power imbalances and waiting lists (Bushby, Chan, Druif, Ho, & Kinsella, 2015; Mortenson, Clarke, & Best, 2013).

Jörg, Boeije and Schrijvers (2005) describe the role of the Dutch scooter assessors. The therapists used an objective tool to assess eligibility for a government-funded scooter. This tool aims to make the needs assessment free of any therapist bias, however, as these eight assessors demonstrated, details can be manipulated for the client to be eligible or ineligible as the assessor deems appropriate. The assessor then becomes either a client's advocate or a gatekeeper. Assessors in this study demonstrated that they could be influenced by the rapport and the demeanour of the client or make unsubstantiated assumptions, for example, an assessor assumed a client would be unable to become socially active after two years of being housebound (Jörg et al., 2005).

Within the discussion of the assessor's influence is how they judge safety, and many of these issues were explained under the discussion of addressing ageism and ableism. An assessor is charged with deciding both the safety of the client and the safety of others and, at least overseas, they must consider their own professional safety with issues of legal liability (Maywald & Stanley, 2015; Mortenson et al., 2013). An assessor may perceive scooter use to be too risky by someone with low vision when they are inexperienced in the field or due to a risk-averse institutional culture (Deverell, 2011). An assessor may also be fearful that if a client does cause harm to themselves or others, the assessor will be held accountable (Maywald & Stanley, 2015). An assessor may hold paternalistic values which do not allow for letting an older person to take risks (Rush et al., 2012). Dilemmas of client safety occur on a spectrum of risk aversion to encouraging positive risk-taking (Bushby et al., 2015).

Objective measures may be assumed as the answer for ensuring equal access free of bias from the assessor or the service providers. But as Cordes et al. (2017a) demonstrated, measures of impairment do not always relate to levels of performance and disability.

Mortenson et al. (2017a) indicate that the Wheelchair Skills Test is a feasible, objective scooter assessment, despite being designed for wheelchairs. Whereas Deverell (2011) suggests that assessment could be embedded within training so that the client does not feel under pressure and would allow for accruing assessment criteria. Such an approach would address participant concerns about whether an assessment would occur before or after training but does not deliver monitoring assessments later in the scooter users' scooter life cycle. The participant's in this study demonstrated the capacity for ongoing self-regulation as capabilities and needs change.

Detailing which assessment or what should be involved in assessment is beyond this study's parameters, however some participants felt that awareness of the risks they detailed, the skills they demonstrated as well as personal factors such as courtesy, sight, hearing and cognition should be considered in assessment and training. Townsend and Watson (2013) detail the Australian occupational therapist's role for assessment and training of scooter users. Deverell's (2011) protocol for professional practice (see Appendix C) provides a thorough guide to the tasks, procedures and professional decisions needed in scooter assessment and training for a client with low vision. Deverell (2011) also called for professional development to support practitioners working with clients using scooters.

Occupational therapists should be able to provide vital training and support for an older adult with low vision to maintain their community mobility on a scooter. Any emerging occupational therapy role with scooters needs to be sufficiently resourced, supported with evidence and professional development and encourage positive risk-taking and client autonomy.

5.6 Review of the methodology

Overall the methodology flowed well to gather users' perspectives richly and to analyse the data. The diverse methods of using both a go-along and an interview served to generate different elements of scooter use and set the scene of each participant. The optional nature of the go-along allowed for the inclusion of participants who were unable to make the outing at the time of the interview. The go-along served particularly well for demonstrating dynamic interactions between the user and their social and physical environments. Additionally, many features of their journey were highlighted during the journey and reflected on further during the sit-down interview. Many participants seemed to enjoy making me jog or even run

alongside them, and this facilitated laughter and a relaxed feeling, lessening the tone that they were being examined. Participants identified trees or cafes which they enjoyed just as they identified difficult kerbs or road crossings.

However, as the go-along is dynamic, in-depth conversation is difficult. The sit-down interview complemented the go-along with a more productive discussion of the overall practice of self-regulation. Details from the go-along were repeated in this interview, but equally many new concepts arose at this time.

The methodology of interpretive description allowed me to step beyond solely presenting the participants' findings, to apply the findings to practice. The participants would have limited comments on practice and policy, yet this side of the study is especially pertinent for application of the study.

As I mentioned in the methodology chapter, the recruitment process proved more interesting than anticipated with the denial from either scooter retailers or retirement villages that their scooter users would have low vision. From the beginning of my recruitment process, it would have been better to simply say that I was researching scooter users, and explain the inclusion criteria of a visual impairment directly to respondents. This experience could indicate a lack of understanding of low vision or that scooter users don't mention their visual impairment.

Using Quirkos for preliminary coding allowed seamless organising of a large data set. The ability to move codes or 'quirks' easily allowed for playing with larger groupings into themes. The themes were still organised through iterative writing and drawing diagram exercises, as I enjoy the tactile feeling of assembling data, or would think of a grouping when a computer was unavailable.

There are some details of the methodology which require further review: the method purity of the 'go-along', reflection on the use of the map and the use of the vision reports for a description of each participant.

Kusenbach (2003) stated that a go-along follows *"informants into their familiar environments and track outings they would on anyway as closely as possible, for instance with respect to the particular day, the time of the day, and the routes of the regular trip"* (p.463). Each participant was encouraged to complete an activity involving community mobility that they would typically be doing at that time, however, many of the participants made the trip solely for the data collection. The trip would be on a route that they would regularly complete yet often the participant had no

purpose for the trip and would not have made the outing without my request. This detail could mean that my method more closely aligned with a ' participatory walking interview' however on closer inspection of this method, there is less emphasis on the observation than the interview component (Clark & Emmel, 2010). Besides, Carpiano (2009), who also provided guidelines on how to conduct a go-along, did not mention the need for complete authenticity in the purpose for the outing.

The use of the map was thought to prompt conversation about the range of movement, the frequency and why a participant might choose a particular route. On inspection of the coding of these sections of the interview, very few quotes were useful for understanding the participant's self-regulation. The map exercise seemed to have generated information that I could have gathered solely through questions and discussion. It could be that using the map and discussing the life-space of the participant gave an overall sense rather than specific details. Other potential benefits of the map would be a very quick visual representation of the distances that the participant would travel and having a concrete subject to talk to early in the interview. One question which was very revealing when using the map was asking where a participant would purposefully avoid.

The vision report is further reported on under 'limitations'. However briefly, there were more challenges than anticipated in using vision reports as a method for describing each participant's visual status. In the pilot study, without any prompting, all four participants readily offered their reports from their optometrist or eye clinic. I felt that perhaps using their reports was less time consuming and a more accurate measurement for transferability of the study. However, in this study only a few had the reports on hand, many were gained through their optometrist or patient records, however, some were incomplete, old or did not contain easily understood information, and two reports were unavailable. A more consistent and readily available measure of functional vision conducted by the researcher would have allowed a more comparable description of each participant. Some potential tools include the Vision-Related Outcomes in Orientation and Mobility (VROOM) or the Visual Function Questionnaire-25 (VFQ-25).

5.7 Researcher's insights

As I heard someone explain recently, when attempting to take someone else's perspective, this information is still filtered through your personal lens which is

‘literally stuck to your eyes’. I don’t believe that research can ever be free of personal influence, especially as there are so many ways our perspectives are trained without any awareness. This understanding of knowledge is reflected under my research paradigm.

I aimed to present the perspectives of my participants as experts under critical disability perspectives of research however my bias is still apparent in the final presentation. I had participants who were supportive of mandatory scooter assessment and training, yet I have presented arguments against such measures. The ‘interpretive’ side of this qualitative study allows for presentation of my interpretations. I would hope that in the findings, I have still provided the perspectives of my participants which do not align with my views so that others can interpret their original words.

I also reflect on my expert opinion as this is purely based on academic expertise and I am yet to work in occupational therapy practice. My experience with scooters and low vision mobility extends to some fieldwork practice. I have had practitioners approach me who are supportive of mandatory assessment and training; they argue that this would support the empowerment of all scooter users and encourage safe footpaths. I remained suspicious of their view of disability and institutionalised view of safety, however, I admit that they work in practice and perhaps have a more informed perspective gained through experience. If my view is too removed from practice and the realities of some footpath communities, I hope that at least my view invites reflection about client strengths and unnecessary risk-averse practice.

My conclusion is that that low vision had very little influence on scooter conduct however it may be that my limited experience in low vision, community mobility means that I did not observe cues which my participants did not verbally express. The list of strategies does not attempt to be complete and further research with an experienced observer may gain additional understandings of low vision scooter use.

My final insight was that there is a lot more to be researched in this space and I could have happily turned the project into a PhD. I was particularly taken by the apparent discrimination of scooter users due to stereotypes and would like to have explored this further.

5.8 Limitations

5.8.1 Sample size

The sample size of 15 was chosen as this was achievable within the parameters of the research project. The size might limit the ability to generalise to all low vision mobility scooter users, however, such a goal is unattainable without a census of all users. The advantage of the sample size is that depth was attainable moreover findings were not presented in a manner attempting to give a universal experience.

5.8.2 Sample demographics

Due to the recruitment process, eight of the participants came from retirement villages because this was a way to access older adults. Many organisations likely to generate participants were also approached however with little success: Age Concern, CCS Disability Action, Grey Power, the RSA, optometrists and scooter retailers. Although five of these participants lived in independent units, people who live in retirement villages may differ from community-dwelling older adults. Ascertaining this difference is difficult, especially as independent units count as community-dwelling under the 2013 census definitions (Statistics New Zealand, 2015).

All of the participants were European (including New Zealand European). This lack of ethnic diversity isn't surprising given that 87.8% of older adults in New Zealand identify as European (Statistics New Zealand, 2015). Additionally, across the regions of the South Island, 86.9%-93.1% of people identify as European (Statistics New Zealand, n.d.).

5.8.3 Researcher limitations

Although this is my third study as a primary investigator in two years, I am an emerging researcher with much to learn about conducting research. I have gained patience and flexibility in my interviewing style and better organisational skills, yet, I am still developing these skills, along with coding and analysing. Under 'Researcher's insights' I speak of my inexperience as a clinician and explicitly in low vision community mobility, these limitations are acceptable as the research presented does not attempt to claim expertise in practice.

5.8.4 Instrument limitations: Vision report

The difficulty of describing low vision either through objective vision measures such as acuity, or functional vision assessments. In my pilot study, I was generously offered the use of the VROOM measure. Dr Deverell, the creator of this measure had guarded me against the issues of vision assessment. The VROOM measure is a collaborative

approach to provide a numerical value and corresponding category with a generic description of an individual's functional vision (Deverell, 2016). This measure is particularly useful for understanding the relationship between vision, function and mobility, and the numerical value allowed for the easy comparison between participants with different pathologies such as central vision loss versus peripheral vision loss. As this measure is new to the field and lacks use in practice and research, I felt the measurement did not lend itself to generalisable description of what level of vision my participants had, and so for this study, I decided to use optometrist or ophthalmologist reports and use the standard measurements available.

Unfortunately, the reports I received were often inconsistent (such as some only giving best corrected or uncorrected vision measurements), a glaucoma report was seemingly indecipherable (even with advice from an optometrist), participants' description of their vision did not match with their optometrist reports and three participants were unable to produce a report recent enough to consider.

There are many acknowledged issues with optometrist measurements. Firstly, the assessment occurs in a well-lit, unfamiliar and static environment which may not be replicated in the individual's own environment (Bhorade et al., 2013). Secondly, optometrist measurements for driving often only report on an individual's visual acuity and visual fields (Thorslund & Strand, 2016). These measurements are limited when, many factors influence vision including fatigue, glare sensitivity, contrast sensitivity and depth perception. Thirdly, such an assessment does not account for the individual's adaptations and functional vision (Colenbrander, 2010).

Particularly striking was that both May and Chiconne's optometrists reported to me that these participants did not have low vision. However, May clearly described how she need to use a magnifier, she had difficulty with moving between brightly lit and dark spaces, and felt that she couldn't see as much as she used to. Chiconne reported two collisions due to lack of depth perception and contrast sensitivity, indeed she did not see a grey car against the grey street during the go-along. When I talked to her optometrist, she conceded that contrast sensitivity and depth perception were not measured, yet these elements contribute to functional vision. Thorslund and Strand's (2016) literature review found that for necessary vision for driving, vision measurements should include measurements of contrast sensitivity, Useful Field of Vision and glare sensitivity.

Although the vision report was a flawed method for gaining a descriptive measure of each participant's vision, this does not mean that the study is invalid. Each participant met the study's inclusion criteria by having a diagnosed visual impairment and fits with the NEI's definition of low vision. The lack of consistent visual descriptions merely affects the transferability of the study.

5.9 Recommendations for further research

This study generated further questions about scooter safety, the wider landscape of the footpath, the feasibility of scooter training and about details which this study design missed. I recommend that further research looks at the following topics.

5.9.1 Reliable risk evaluation of scooters

Jancey et al. (2013) claimed that scooters at high risk of injury to either the scooter user or others are due to the declining abilities associated with older adults and challenging physical environments. This risk is difficult to judge as reliable scooter crash statistics are not kept in New Zealand. Scooters are also believed to be risky to other footpath users. To qualify these claims and to adequately evaluate scooter risk, research is needed which accurately measures scooter numbers and accidents. Such research could compare scooter accidents to the rates of other footpath users including targeted populations such as older pedestrians, younger mobility scooter users and perhaps cyclists. A comprehensive evaluation would then compare scooter risk to the risk of harm from social isolation, poverty or other harmful states which the scooter can compensate. Such an evaluation of risk would determine whether public health intervention is justified through assessing the risk of harm to others, not only individual risk (Upshur, 2002).

5.9.2 Footpath landscape

Studies have referred to scooters as deterrents for other footpath users without citing any study determining this. Research into the attitudes and feelings of the wider community would better qualify the effect of scooters in the footpath landscape. It would be useful to compare any perceived risk of scooters to actual risk of scooters. Comparing communities where scooters are celebrated to communities where scooters are viewed as a concern would be particularly interesting.

5.9.3 Feasibility of training and regulation

As I suggest that optional scooter training would be the best initial intervention, there needs to be a study into the feasibility of a national programme, and as Edwards and

McCluskey (2010) recommended this training needs to be evaluated for its impact on accident rates. Mortenson et al. (2017b) are conducting the feasibility of one-to-one training in Canada which might be promising, however, the current community-led training programmes might be adequate.

Any further design of regulation requires in-depth consultation with the scooter community in New Zealand to determine what the specifics issues are, and what supports are needed and acceptable. Lieswyn et al.'s (2017) report surveyed scooter manufacturers, importers and retailers, transport researchers, older adult advocacy groups, Disabled Persons Assembly, pedestrian and cycling advocacy group, government agency staff and transport writers. In specific relation to scooters, they interviewed an Older Person's Council member, a scooter researcher (Thoreau), a Living Streets Aotearoa representative and myself. There were also 43 workshop attendants, but the demographics and findings from these workshops are not explicit. While the surveys, workshops and the interviews attempted to include many stakeholders, when designing regulatory approaches further research is needed which explicitly includes the voice of scooter users.

5.9.4 Longitudinal study

The practice of self-regulation appeared to adapt over time as needs changed. A longitudinal study would better capture different stages of scooter use and scooter self-regulation. As participants in this cross-sectional study demonstrated various degrees of self-regulation according to their physical and lifestyle needs, a longitudinal study could better show relationships between factors like progressive vision loss, decreasing mobility or transitions with driving cessation. It would also capture the life cycle of scooter use, from start to finish.

5.9.5 Personality traits for effective scooter use

I felt that there might be a common personality trait to the participants of this study. Many seemed to have a patient, careful yet practical nature and perhaps these qualities were of significant influence for their effective scooter use and practice of self-regulation. It would be expected that a voluntary sample is friendly and forthcoming, but I felt that I could not comment on their personality traits and how this affected their scooter use because my questioning and methods were not aimed at capturing this. Future research could look for any correlations between personality and scooter conduct.

5.10 Conclusion

Is the risk of a person not seeing a reversing car greater than the risks associated with social isolation? Does a scooter user need to see fine details or is the blur of a moving object adequate for navigating footpaths? Do we trust our clients to make extra, compensatory head movements to increase their field of vision? Is our client sufficiently informed about the known risks of scooter use? These questions demonstrate the complexity of the nuances of working with clients with low vision in community mobility. This study has aimed to reveal practices of self-regulation by older adults with low vision to inform occupational therapy practice, researchers and policymakers.

Scooters are gaining attention as availability, popularity and demand grows. This attention includes concern over risks associated with scooters triggering calls for regulatory approaches for managing scooter safety. Research into scooters is slowly accruing, improving our knowledge of this device and this study contributes a unique self-regulated perspective, that of low vision, in a currently unregulated context.

The demonstration and discussion of self-regulation provided a long list of the various manners in which current low vision scooter users are effectively managing and monitoring their needs. Compiling the self-regulatory practices allows understanding of personal capabilities and needs so that future scooter users may be empowered through knowledge of a various approaches and different barriers/risks. The identification of environmental demands also allows for better infrastructure planning for creating inclusive communities.

The competence demonstrated by the participants raises questions about the need for any regulatory approaches, however it seems unlikely that the question of regulation will diminish. Scooters are unfairly condemned due to the majority demographic who use them; the old and disabled. Media reports focus on negative aspects of scooter use and lobby groups will continue to focus on high-profile scooter accidents as fuel for the regulation debate. Despite the recent mild recommendations for regulatory approaches to scooter safety, I predict that calls for regulation will continue, at least until technology finds solutions for eliminating risks or more acceptable approaches for autonomous transport.

Importantly, the focus of this study on older adults with low vision serves to recognise the capabilities of populations who do not meet “normal” standards. The risks that these participants identified, and the strategies that they employed for effective

scooter use, were hardly distinct from scooter users who are not visually impaired and from visually impaired pedestrians. This lack of distinction demonstrates that measurable impairment is less important than a focus on individual capability, the ability to adapt behaviour and the goals of scooter use.

The participants in this study had varying views of acceptable regulatory approaches but there was agreement that some scooter users might benefit from training, and that assessment might identify who needs further training. Some participants reported an extended learning period, so training needs to be flexible to accommodate different learning needs.

Justification of assessment and training remains unclear with little data to accurately measure the risks posed by a scooter. A heavy machine can cause damage but the assumption that an older operator is incapable of safe conduct is rooted in ageism and ableism, with a similarly unfounded assumption found against older drivers. More research is needed to objectively clarify and evaluate the risks posed by scooters and to contextualise this risk with comparisons to risks of other activities or inactivity, and to other populations.

Other approaches for ensuring effective scooter use lie in technological and environmental improvements. Particularly, councils and building developers are responsible for creating or maintaining accessibility of footpaths and accessways. Communities also need to find realistic solutions for providing quality, alternative transport options. Social and cultural environmental solutions lie in improving understanding of scooter users' needs and capabilities, and facilitating healthy, dynamic footpath landscapes.

New Zealand has committed to a positive ageing strategy therefore policy and health professionals need to ensure a wider context to any intervention. Health professionals need to reflect on their responsibilities and attitudes to ensure client empowerment. Public health interventions need to be ethically justified and well planned. Educational approaches, such as voluntary scooter training and public education campaigns, need to be explored before more coercive approaches such as mandatory assessment and licensing, and realistic alternative transport systems need to available in situations where someone is deemed unable to use a scooter. Scooter training is already organically occurring in many communities and the rise of scooter clubs can facilitate peer mentoring.

As we consider the wellbeing of our footpath landscapes, we must recognise the intricacy implicit in a simple trip to the shops and the multidimensional factors to be considered when creating ethical, supportive legislation and practice. Our community members who use scooters can guide us on this trip, even if they don’t see very well.

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7 Appendices

7.1 Appendix A: Force calculations

Force calculations (listed in order of least force to most force)

Force = mass x acceleration (measured in metres per second (m/s))

Adult running at 12km/h:	65kg x 3.33m/s=	216.45 F
Scooter travelling at 5km/h:	201kg x 1.39m/s=	279.73 F
Adult cycling at 15km/h:	75kg x 4.12m/s=	309 F
Scooter travelling at 15km/h:	201kg x 4.12m/s=	828.12 F
Adult cycling at 35km/h:	75kg x 11.11m/s=	833.25 F

These calculations are based on the following weight assumptions.

Empty Scooter weight: 136kg

Bicycle weight: 10kg

Adult weight: 65kg

7.2 Appendix B: Literature search table

Literature search process: search terms, databases and results[3]

Search terms	CINAHL	Cochrane Library	Google Scholar[4]
"low vision" OR "visual impairment"	2,735	28	61,500 OR 333,000
"low vision" OR "visual impairment". Since 2016	472	-	6,830 OR 22,300
"low vision" OR "visual impairment" AND "occupational therapy"	857	-	3,970 OR 10,100
"low vision" OR "visual impairment" AND "occupational therapy". Since 2016	115	-	543 OR 1,340
"low vision" AND "older adults" OR elderly OR seniors OR geriatrics	113	-	7,540 OR 13,700 OR 2,660 OR 14,700
"low vision" AND "older adults" OR elderly OR seniors OR geriatrics. Since 2016	17	-	1,170 OR 1,590 OR 358 OR 1,750
"low vision" AND "older adults" OR elderly OR seniors OR geriatrics AND "occupational therapy"	30	-	1,450 OR 1,850 OR 2,200 OR 2,040
"low vision" AND "older adults" OR elderly OR seniors OR geriatrics AND "occupational therapy". Since 2016.	3	-	247 OR 246 OR 293 OR 284
"mobility scooter" OR "powered mobility device".	23	2	1,440 OR 376
"mobility scooter" OR "powered mobility device". Since 2016	-	-	273 OR 51
"mobility scooter" AND "low vision" or "visual impairment"	-	-	19 OR 73
"mobility scooter" OR "powered mobility device" AND "occupational therapy"	-		157 OR 171
"mobility scooter" OR "powered mobility device" AND "occupational therapy" since 2016			38 OR 23
"older adults" AND self-regulation	130	14	29,400
"occupational therapy" AND self-regulation	82	3	2,110
ageism OR ableism	2102	12	57,000 OR 14,700
ageism AND ableism	4		3,200
ageism OR ableism AND "occupational therapy"	2,064		93

[3] Last search undertaken October 2017

[4] Google Scholar has limited success with the OR command so search results are displayed with each alternative search term.

7.3 Appendix C: Protocol for professional practice

The following protocol in Deverell's (2011) thesis and presents a protocol for professionals when assessing and/or training low vision client's scooter use.

Protocol for professional practice – tasks, procedures and decisions

Task	Procedure	Professional decisions
1. Gather information	Talk with the client: interest in scooters, driving history, mobility goals Request reports: health, vision, cognition, hearing and consider factors which impact on crash risk Assess functional mobility, including vision & hearing Assess cognition, insight, decision making, alertness, response time Support client to test-drive a scooter	Will scooter travel enhance or inhibit lifestyle? What concerns are apparent regarding scooter use? Who is best equipped to address these concerns?
2. If necessary, facilitate independent travel skills	Visual efficiency skills Listening skills Road crossing strategies Orientation skills and route selection Decision making and problem solving skills Social skills	Is the client receptive to learning? Can the client multi-task?
3. Support scooter selection	Product features in relation to user Use in relation to other mobility aids Funding	Is this device a good match for the client's build, mobility goals and budget?
4. Deliver information	Road rules, responsibilities, safety and insurance Maintenance, storage and recharging Attitudes, courtesy and self-regulation Self-advocacy and public image Supports available	Is scooter information in an accessible format for the client? Do concerns arise about any aspects of the information?
5. Conduct skills training - continuous assessment	Basic skills, off-road Managing the scooter en route Multi-tasking challenges, including other aids	Does the client manage the device competently? Is the client self-monitoring and self-regulating scooter use? Is the client placing self or others at risk? Can safety concerns be resolved through further training or referral?
6. Assess safety	Managing the device itself Responding to the environment Attitude/insight/decision-making/consistency	Are scooter skills sufficiently safe to meet mobility goals? Do travel restrictions need to be recommended? Have I communicated my recommendations well?

Task	Procedure	Professional decisions
7. Follow-up/review skills	Discussion Functional review of skills	Has anything changed since the client's last assessment? Would the client benefit from further scooter training? Are scooter skills sufficiently safe to meet mobility goals? Do travel restrictions need to be recommended? Have I communicated my recommendations?

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7.4 Appendix D: Communication with te Kaitohutohu office

Re: Research consultation

Kia ora Keri,
Thank you for your submission which is well thought through.
We are happy to support your application for ethics approval and appreciate your effort. Good luck for your research.
Richard
On behalf of the Office of the Kaitohutohu
021427865

From: "Keri McMullan (04002390)" <MCMULK1@student.op.ac.nz>
Date: Wednesday, 1 February 2017 at 12:41 PM
To: Kaitohutohu <Kaitohutohu@op.ac.nz>

Subject: Research consultaion
Kia ora Kaitohutohu,
I am an occupational therapy masters student intending to continue my research of older adults with low vision who use mobility scooters. I completed a similar research project at honours' level in 2016. This email is to give the team a brief idea of what my research entails and to begin my relationship and consultation with the Kaitohutohu office.
My research question is: How do older adults with low vision practice self-regulation when using a mobility scooter?
I wish to conduct interviews with 12-15 older adults who have a visual impairment and who use mobility scooters within the South Island region. At this point, I do not know if any of my participants or their family are Māori. Both my supervisor (Dr Mary Butler) and I are pākehā.
I want my research to contribute towards any low vision services who work with clients, to be able to support clients who want to use a mobility scooter safely and independently. There is international movement to introduce regulations for mobility scooters. I wish to provide a user's perspective to the research that informs potential policy. I recognise that people with visual impairments are experts in their own risk and safety needs, by doing this research, I provide a forum for participants to share their experiences and their expertise. My research may alsoinform health professionals who work with someone who has a visual impairment and uses a mobility scooter. There is often misunderstanding of the abilities of people with visual impairments, and an uneducated opinion may assume that someone with a visual impairment is unsafe on a mobility scooter. A scooter can be an essential transport device for people to use to connect with their community and be independent in their daily living. I recognise that connection to place, other people and meaningful occupation is key to wellbeing.
The implications of this research for Māori that I am aware of is that Māori have a higher rate of visual impairments than non-Māori. Mobility scooter use tends to be due to other health conditions such as diabetes or osteoarthritis. So I imagine that there will be individuals who identify as Māori, and have both a visual impairment and a mobility impairment. In that case, I see my research as beneficial to Māori who fit this criteria and wish to be independent in their community engagement. For my honours project I was in contact with Ngāti Kāpo who
explained their specialist understanding of both Te Ao Māori and being low vision or blind. Ngāti Kāpo were interested in my project and encouraged me to understand the participant in a holistic manner, considering not only their impairments but other stories they needed to share, especially if any participants were Māori.

When conducting my research last year, I asked each recruited participant if they were Māori. None were however I was prepared to contact Kaitohutohu if a participant was Māori for further advice and support. Participants were encouraged to have support persons present when conducting the data collection. The date, time and location of data collection were chosen by the participant to ensure their comfort. Participants were provided with information
sheets, informed consent forms and a list of potential questions prior to the data collection. This will be my approach in my research this year.
I look forward to further discussion with Kaitohutohu about my proposed research. I can also provide a copy of my honour's dissertation if this will provide a better understanding of my research topic.
Ngā mihi,
Keri McMullan

7.5 Appendix E: Ethics

12 April 2017

Keri McMullan
c/- School of
Occupational Therapy
Otago Polytechnic
Private Bag 1910
Forth Street
Dunedin

Dear Keri

Re: Application for Ethics Consent
Reference Number: 718
Application Title: *Low vision and mobility scooters*

Thank you for your application for ethics approval for this project.

The review panel has considered your revised application including responses to questions and issues raised. We are pleased to inform you that we are satisfied with the revisions made and confirm ethical approval for the project.

Many thanks for your careful responses to our recommendations.

We wish you well with your work and remind you that at the conclusion of your research you should send a brief report with findings and/or conclusions to the Ethics Committee. All correspondence regarding this application should include the reference number assigned to it.

Regards

Richard Humphrey
Chair, Ethics Committee
Otago Polytechnic

7.6 Appendix F: Questions schedule

Question Schedule

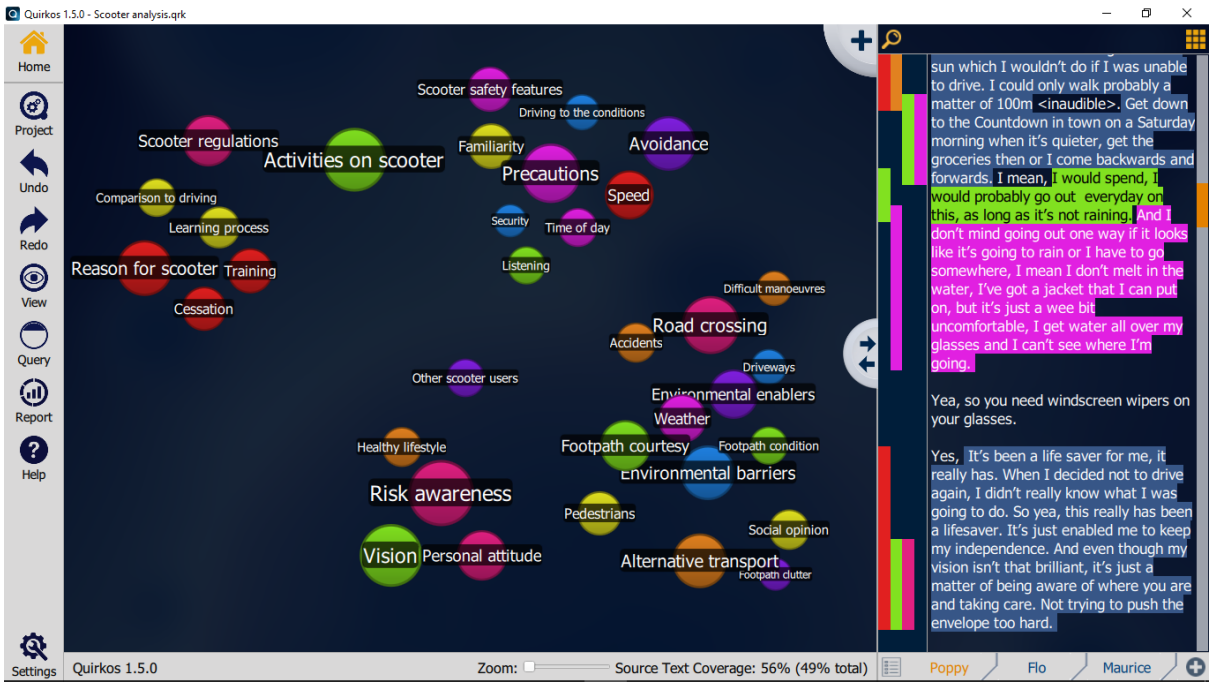
Main question	Possible follow up probing questions
Can you please tell me about your mobility scooter?	Why do you use it, when do you use, how long have you used it, what do you use it for, who do you encounter when you're on your scooter?
Can you please tell me about your visual impairment?	Diagnosis? How does it influence daily living? How do certain situations or time of day influence your vision? What sight do you have?
How does your low vision influence your operation of the mobility scooter?	Have you made any adjustments to your scooter to increase vision? Do you have any blind spots? Can you move around to increase how much you can see? What speed do you go at? What do you do around other pedestrians? What do you see/do at road crossings? How do you manage reversing your scooter?
Can you please tell me about a typical outing on your scooter?	Where do you go? Why? Who do you see there? Can you tell me about the pathways/ pavements? How do you share the footpath with others? Do you belong to a scooter club or group?
What does the scooter allow you to do independently?	If you didn't have a scooter how would you manage outings? How many people are available to give you a ride?
Can you please tell me about the process of when you first got your scooter?	What apprehensions did you have when you first decided whether or not to get a scooter? Did you consult with other people? Friends? Family? Do you think that there are any risks associated with using a mobility scooter for you? What are these? Do you drive more or less since when you first got your scooter?
Tell me about your comfort on the scooter?	What do you do to maximise safety? What makes you feel comfortable using a mobility scooter? How do other people in your community feel about your scooter use? How do you feel about riding on the road? Do you discuss your scooter use with anyone (family, friends, GP, optometrist, district nurse)? Is there any member of your family/friends who was/is concerned with your use of the scooter?
What makes you feel uncomfortable on the scooter?	How do you manage this? Can you give me some examples of when you have felt uncomfortable or unsafe on your scooter?
When do you choose not to use your mobility scooter?	Time of day? Weather conditions? Roads without designated crossing? Roundabouts? Unfamiliar areas? Busy roads? When there is a better transport option?
Why would you stop using a mobility scooter?	Suggestions: Decline in health/eyesight? Close call or minor crash? Increased difficulty in scooter operation/situations? Friends/family raising concerns? Feeling responsible for others safety? Doctor advice? Loss of confidence? Maintenance costs? Why do you continue to use the scooter if you may be at risk of injury to yourself or others? Do you think that you would have benefited from training when you got your mobility scooter? Do you think that people with low vision should be trained to use mobility scooters? What are the risks for people with low vision of using a mobility scooter? How do you balance these risks in your own case?
What do you think about possible mobility scooters regulations?	Regulations could include prior assessment, the need for registration or a licence, what do you think about that?

What do you think about mobility scooter training?	What would you like included in mobility scooter training?
Are there any other comments you would like to make?	

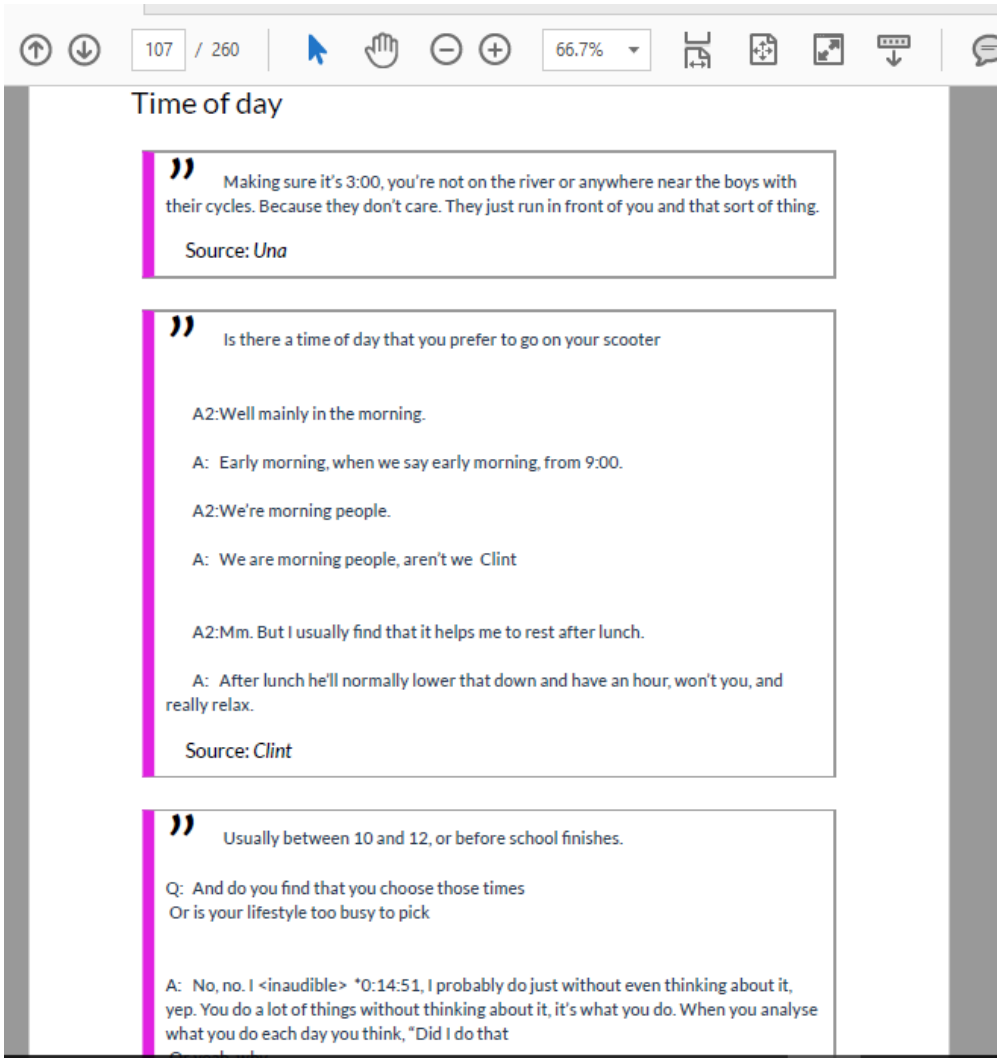
Note. Questions do not primarily use the words 'safety', 'risk', and 'autonomy'. This is intentional as I feel the word 'risk' may create a defensive tone. Instead the words comfort and discomfort will be used as I build trust with the participant. Questions referring to autonomy will ask about 'independence', as independence is understood more clearly than autonomy. I am confident that the questions will generate data relating to autonomy rather than solely independence.

7.7 Appendix G: Quirkos

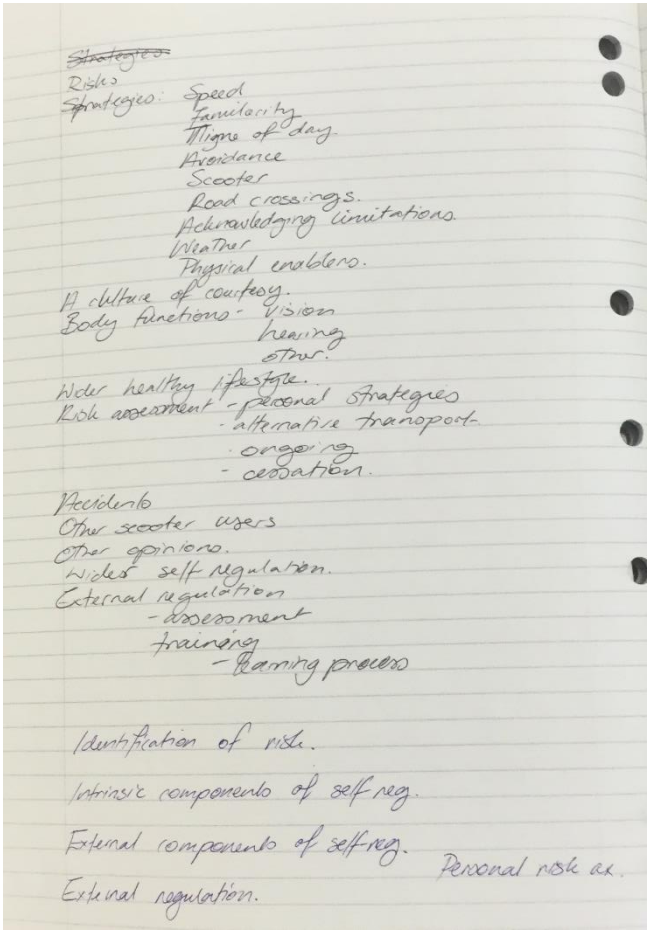
Example of Quirkos working platform:

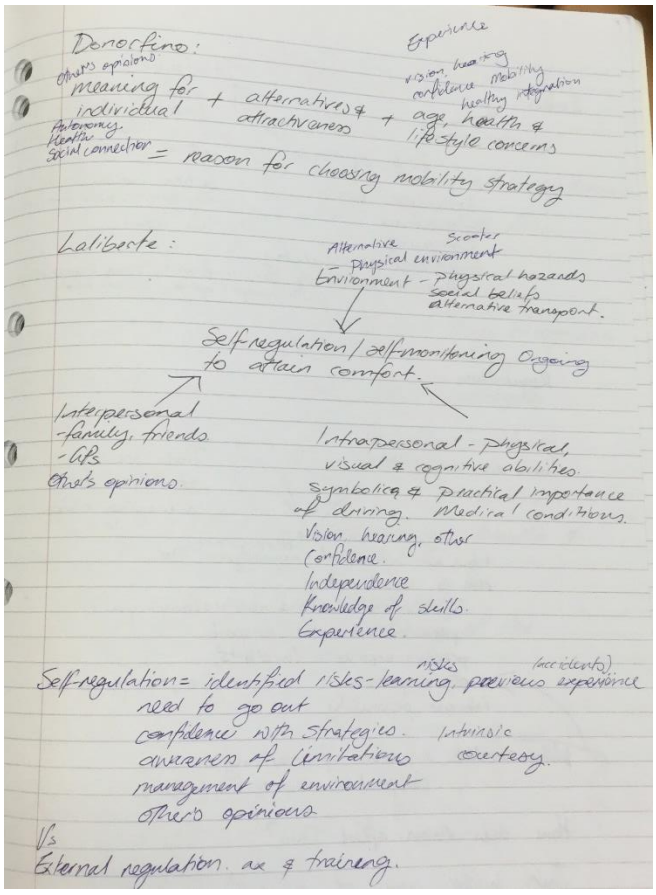


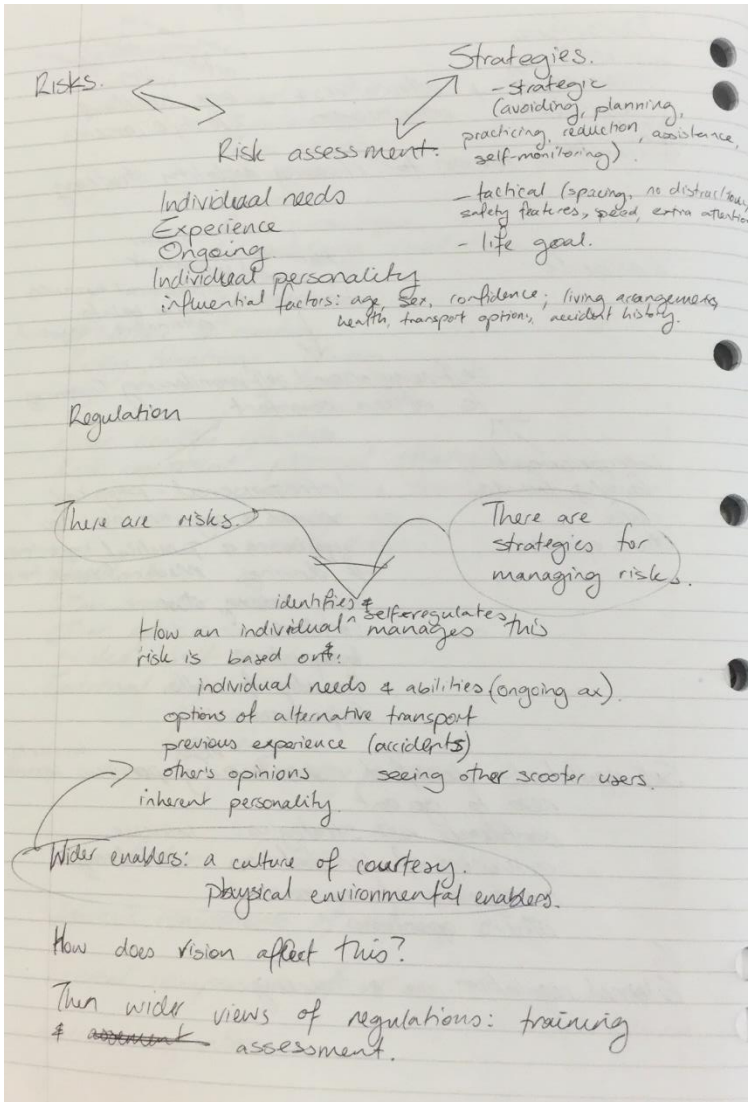
Example of Quirkos report: compilation of coded quotes

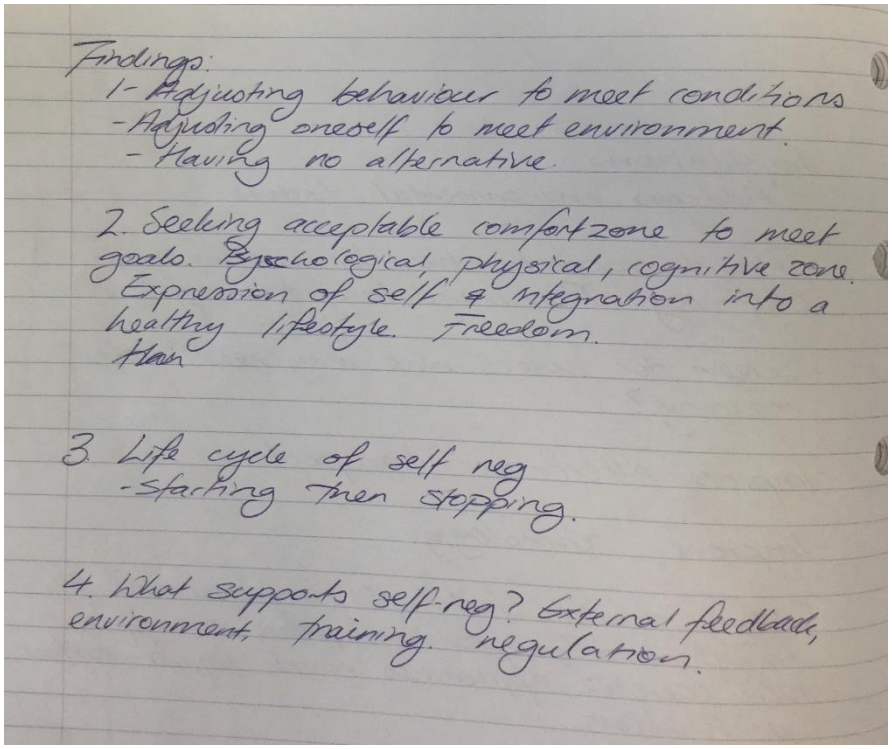


7.8 Appendix H: Pen and paper analysis exercises



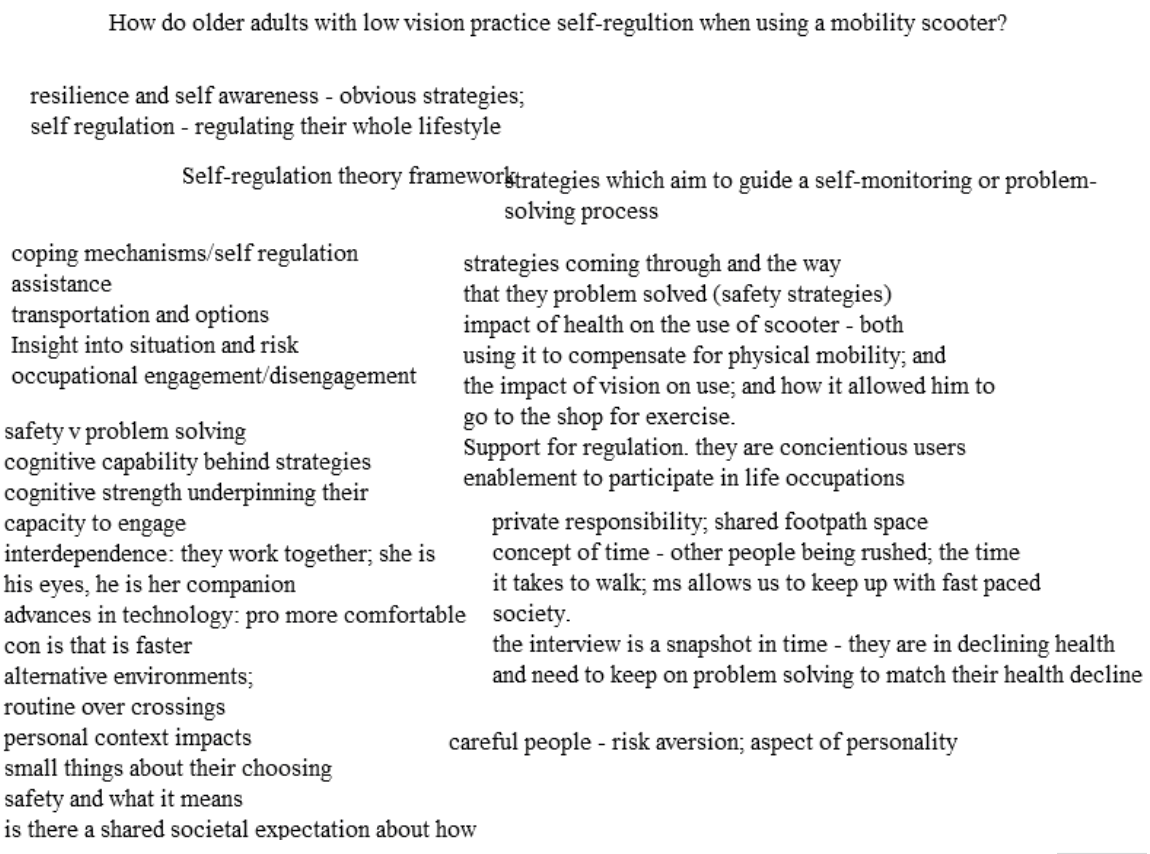



Risks.
Strategies.
- strategic (avoiding, planning, practicing, reduction, assistance, self-monitoring)
- tactical (spacing, no distractions, safety features, speed, extra attention)
- life goal.
Risk assessment.
Individual needs
Experience
Ongoing
Individual personality
influential factors: age, sex, confidence, living arrangements, health, transport options, accident history.
Regulation
There are risks.
There are strategies for managing risks.
identifies & self-regulates
How an individual manages this risk is based on:
individual needs & abilities (ongoing ax).
options of alternative transport
previous experience (accidents)
other's opinions
seeing other scooter users.
inherent personality.
Wider enablers: a culture of courtesy.
physical environmental enablers.
How does vision affect this?
Then wider views of regulations: training & assessment.

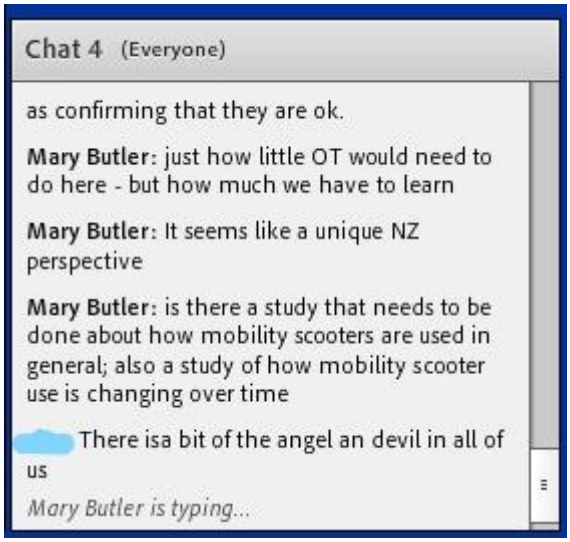

Findings:
1- Adjusting behaviour to meet conditions
- Adjusting oneself to meet environment.
- Having no alternative.
2. Seeking acceptable comfortzone to meet goals. Psychological, physical, cognitive zone.
Expression of self & integration into a healthy lifestyle. Freedom.
Flow
3. Life cycle of self reg
- starting then stopping.
4. What supports self-reg? External feedback, environment, training. regulation.

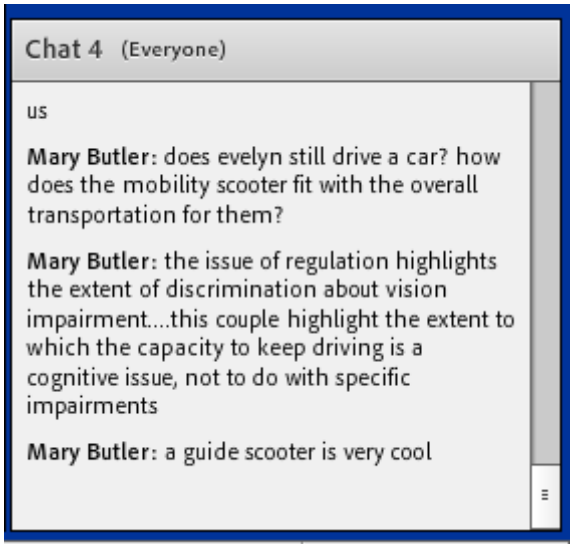
7.9 Appendix I: Peer reflexivity feedback

Screenshot of online "white board". Key concepts identified by other postgraduate students and supervisors:



Examples of written feedback in chat box during peer reflexivity session:





7.10 Appendix J: Complementary quotes

Presented here are complementary quotes from participants which further support each theme in the findings chapter.

7.10.1 Theme: Adjusting behaviour to meet conditions

7.10.1.1Subtheme: 4.2.1 Risks associated with using a scooter

Detail	Complementary quote/s
A breakdown	I came back one night from something down at the clubs, it was raining and it was dark and I got a flat tyre about 100 yards from home. I stayed there for over an hour before someone came past. And that's just what you do. Because I didn't have my cell phone with me, did I? You've got to really remember to take your cell phone with you. May, 524 Yeah, because I was on the road. I was just crossing it on a corner, yeah, that was a bit scary. I couldn't get off, I couldn't do anything. I kept my lights on. Then they had an incident down the riverbed a while ago, some kids tipped an old fellow and his scooter into the river. You're pretty vulnerable. May, 584
Being struck by a vehicle at a driveway	Yes, people coming out of drives. Because they don't expect someone so close on the footpath. They're looking more for somebody coming along the street, and they often shoot out onto the [footpath]. Flo, 338
Being struck by a vehicle during a road crossing	There are no [traffic] lights anywhere in [this town]. Actually, that first big crossing down there should have lights. It's blimmin dangerous. I often sit there for ages waiting to make sure that I can see, because cars come off the main street and they come around and go up that side street, and if you're halfway across, they don't see you until they're right on the thing because it's right beside it. I think it's a mad place to have a crossing. It should be further away from the thing to give people who are turning either way time to stop. Because there's not much room for them to stop before they're on the pedestrian crossing. And that's what I don't like. I wait there until things look a bit clear and then at least I shoot across the first half before I get skittled. Because I've seen cars whizz around there and just stop in time. It's really quite dangerous, but they keep saying that they're going to change it but they never do. Flo, 252
Collisions with pedestrians	The only thing is regarding driving in town, you've got to be aware of people walking straight out of the shop without looking. You know, they'll walk out but not right or left. You've got to be aware of people suddenly coming out. I've been lucky so far, there's a number of shops. Being aware of people, knowing that you've got limited sight, you've got to react quick, you've got to think ahead all the while. Clint, 21
Experiencing aggression or being attacked	Yeah. A couple of times I've had carloads of kids hassle me, and one, when I lived at the other house, a guy used to follow me home a few feet behind and sort of the hairs on the back of your neck would stick up a bit, and I

Detail	Complementary quote/s
	went fast, he'd walk fast and go slow. That was pretty unpleasant, yeah. May, 577
Tipping the scooter and falling	One of the main things with them is you don't turn sharp around a corner… because it tips over. Thomas, 324.
A lack of designated crossings or kerb cuts	I had a problem one time at one of the crossings. Sometimes you've got to go a little bit further along the street to get a decent crossing. It's the crossings that are a problem. The cut away piece, like down here there's a path with a big drop that I could have gone on if it had had a crossing, but I had to come out on that drive there to get the crossing. Frances, 196
A lack of interesting spaces	[My journey is] very bumpy with the earthquake, and very boring with fences. Matilda, 42
A particular kerb design called 'low profile kerb and channel'	The whole township now has got this kerb and I think it's quite dangerous angling over. The first time I walked on it, I went over it with my ankle because with my eyes I saw that it was white and concrete but it wasn't flat. Maurice, 36
Change in terrain with no contrast warning,	I've collided with the box here before. [referring to a white utilities box which is painted white and is against a white fence and the concrete footpath is very pale too]. Chiconne, 78 A: I tipped off another time too because up here further past the gate way, the concrete is sloped down. Q: So from the fence, it looks like the footpath doesn't it. [The lawn and fence from the property is approximately 15cm higher than the footpath and so instead of having an abrupt retaining wall, the concrete slopes sharply from fence line to meet the footpath. The concrete colours of the slope and the footpath are the same]. A: I've gone along there to speak to somebody and I went to do a wheelie and it threw me. Chiconne, 104 Especially down in [town] when you come along by Warehouse Stationary and the back of the Farmers there, it's a trap because it looks, to people with impaired sight, it looks as if there's different colours of tiles on the ground, but always along the side is the concrete kerb and that's always grey and you can't see it. You can't see it's there and then the road is there, but it's up higher. And so you learn all those sort of things….. But I think you've got to be sensible. Right from the start you've got to do your homework first. Una, 252
Deep cut driveways and gutters	Some streets are really, really rough, and some are really good. The worst ones are up around the hospital I think, because they've dug out driveways, they've just redone the street, and they've dug out driveways, but when

Detail	Complementary quote/s
	you're on a scooter you go along and then you go down onto this driveway and across and up the other side, and they're just not scooter friendly. Chiconne, 150
Footpath clutter	Before I trooped onto [the overgrown plants over the footpath], I took the skin off my legs on one of them just as I drove past. Chiconne, 25 I just make sure that I'm looking and not just riding along daydreaming or anything like that, because there are power poles, gates, and things like that. Some people leave their gates wide open across the footpath and that, so I just drive up to them and push them and carry on past. But that's about it. Some hedges, they're a nuisance at times. Susan, 283
Poor footpath condition	**A:** Rough ground's our biggest worry. Anybody with a scooter will tell you that, rough ground, that's our worry. **Q:** And how do you manage it when you come to rough ground? **A:** Well you just slow up and you go very slow, that's the point. Sometimes I bump because I can't see it, but all the way around here we sort of know now where the rough ground is. Thomas, 236
Road works	**EVELYN**: When the road's finished, you've come along it today, from Mitre 10, I don't know whether you even a saw a Mitre 10, we've gone there but we haven't been for six months because it's chaos. **CLINT:** They're doing major works. Clint, 211
Road crossings at intersection corners with 3 or 4 directions of traffic	I'll stop off here. I've got to, to get across there, there's no option, no footpath, so you have to cross and you have to look 3 ways: one way that way, one way that way, and also anything behind you. So I always do the full treatment, and traffic comes very fast around that corner, so I'm asking for an island in the middle. Maurice, 48 Well [going] into town I really avoid because of all the pedestrian crossings. The pedestrian crossings are all right on the intersections. I'd like them if they're set back a bit so you've only got one lot of traffic to worry about. Chiconne, 207
Compromised the line of sight for road crossings	Because of that post there, you can't see what's coming, you have to really you use your hearing. May, 111 This crossing, not too bad today but sometimes there's a lot of traffic. There's a tree there that's right in my line of vision. Chiconne, 50

7.10.1.2 Subtheme: 4.2.2 Strategies for managing associated risks

Detail	Complementary quote/s
Avoidance	I choose not to use the scooter when you're going around school areas when school's coming out, when it's raining, or when it's dark, are really about the only times I choose not to. Poppy, 373

Detail	Complementary quote/s
Avoidance: Bad weather	And I don't mind going out one way if it looks like it's going to rain or I have to go somewhere, I mean I don't melt in the water, I've got a jacket that I can put on, but it's just a wee bit uncomfortable, I get water all over my glasses and I can't see where I'm going. Poppy, 111 The hardest time is when it's really windy… you can't hear cars coming out of drives… since I've been doing this I realise I use my hearing for a lot of things, you're not sure if you see a car coming up so you listen. May, 78 Don't go out [in bad weather]. If it's teeming I won't go down the school, even. Because I'm pretty prone to chest infections and I just don't scoot. May, 447 I also hit a black ice. So it was just a twitch and I thought, "Oh," and I was actually going slow for both times, but you still can slide on them. So I learned that, so I try to avoid going out, not until the sun has been on the footpath for a while. Susan, 275
Avoidance: Busy times/crowds	Lots of people, lots of crowds. Don't like being in big crowds. Or lots of people are out. I hate going to town near Christmas. One; you can't get in the shops and two; there's too many people. May, 564 No, I always go to the supermarket, probably between half-past-twelve and one is a good time, because there's hardly any traffic on [a normally busy] road. And then half-past-nine, between nine and half-past in the morning is a good time to, if I'm free… if I can, I make an appointment straight after lunch, last thing before lunch or straight afterwards, because it suits me. Chiconne, 352
Avoidance: going into buildings on the scooter	Well, I don't take it into the shops. I don't need to take it into shops. And I'd feel a bit of a fool if I took it into a shop and then hopped up every now and then to get something off the shelf. I leave the scooter at the door and I'm aware that if I got to the stage where I couldn't get off the scooter and walk around the shop, I might have to use it. But I'm happy that I don't have to use it in the shop at the present. Frances. 137 I don't go into [town] with it, into the shopping centre. Only down here with the supermarket, and I leave it at the door and just walk up the aisle. I don't travel very far out of it, because I normally have this with both hands on. But in the supermarket, there's not really the room in this one down here for a scooter, or the chemists, I just pull up close to the door and they know me now, and one of the girls just pop over, it's good. Thomas, 160
Avoidance: Inaccessible or unsafe streets	It's not a very particularly nice area. In fact I don't really like it…. I've had children, teenagers, sort of not doing anything but standing around me giggling and sniggering, and I've also been asked for money, and it's just a bad area. Matilda, 89 There was no footpaths, and so I found out that by going along [another road] and going in it that way, I could get a footpath all the way. And so I avoid places that don't have footpaths. Frances, 216

Detail	Complementary quote/s
Avoidance: Travelling on the road	No, I just think it's, I like my life too much to go on the road. I know some people do and they're just a nuisance, and how they haven't been hit, I don't know. But that's their choices. No, I prefer to keep off roads. May, 568
Avoidance: Unfamiliar routes	A: I used to go and sit over where that old boat is and breaks down, you know where that old boat is in the sea? Well, I used to go in the car and sit there a lot and read, and I haven't done that on the scooter and we were just talking about it yesterday and they were saying that I should go along and go through the golf course road and down that way. It just seems such a long way. I never know whether you're supposed to, I mean can you go on the side of the road on them? **Q:** It's preferable if there's a footpath crossing you should go on the footpath. **A:** Yes. But if there's no footpath, can you go on the side of the road? Flo, 218
Speed management	Depending on the circumstances, in the rain I go slower, if it's frosty I go slower. But otherwise I usually go fairly quickly and just keep my wits about me and that. I'm fortunate that I've still got the brains to do it at a decent speed, but when I'm in town I always go slow, because you don't know, there's children, there's other people in wheelchairs and other people on scooters that run into you. When I'm in the shops I go slow through the shops and I find I'm well liked in the shops that I do ride in, so quite fortunate that way. Susan, 102 No I don't go, I'm not one for speed. I've driven too many tractors for speed, for driving fast. Thomas, 50 Now, I go on the low power until here. And here, I would stop off to check the traffic, I would go to the upper range and turn [the governor] up about halfway around, three quarters of the way around. Maurice, 16 You've got to remember when you get along on your scooter and you want to go across the pavement, you've got to make sure there's another way of getting up the other side. It's no good leaving this side if you can't get up the other side. And that's a trick for young players if you haven't sorted that out. I found out once myself. How do you get up the other side if there's no ramp? Una, 133 It's important that I stick to the same route because you know where all the bumps and that are, and where the up and downs are because a lot of them, if they're too deep, the back wheels will get stuck in, and you're stuck in there, and I've had to get pulled out of them a couple of times. May, 88 I liked [the scooter] because, it's that the one I got, that was good because it went at 17km/h and I liked it because it was fairly fast. Leonard, 35
Scooter safety features	**CLINT:** They've always been a four-wheel one because they're more stable. **EVELYN:** We'd never have the three would we, ever?... They're not safe.

Detail	Complementary quote/s
	CLINT: You do feel safer in a four-wheeler. The three-wheeler, fine for getting about, but it's a different way of driving them, between a three-wheeler and a four. **EVELYN:** They soon tip over. Clint, 102 **EVELYN:** But Clint knows when they brought this one, we sat with him and I said, set it, as long as you can feel that knob where it's coming to, or button, he knows that he can't go. And I look, don't I, whenever we go out to make sure we're keeping low, because I keep a tortoise, mine's got a tortoise on it. Clint, 506 I've got two mirrors. I use my mirrors, because turning around is hard to do because of my back injuries. Susan, 138 Yes, I've got a flag on it… And I've got a yellow thing hanging down the back of it, a bright yellow jackety thing that came with it, and I just hang that. I make sure it's outside and hanging over the bag at the back all the time. Flo, 355 Oh, that's why my flag's for. Hoping that, because with these walls that everybody has, garden walls, we're down below the wall, and they can't see us either. I mean I'm aware of that. Chiconne, 287 I have high-vis tops, and in winter I have a high-vis hat, bright as. And so I make sure that I'm seeable, but there are people, even sitting at a crossing people say they don't see you. And I sort of go, "Well, what if I was just a kid standing there?" Susan, 252
Courtesy	[Around pedestrians] well you just go slow, and you stay on one side of the street, don't go like that. And people are very courteous and I try to be courteous too, but I've found that just going around to the library, which is a favourite place for me to go, and you just go slow and stay in the line and let everybody move past you, not try to get in and out. Una, 285 Well, I don't take risks. I consider everybody else, and pedestrians have a right of way just the same as I do, and I would rather give way to a pedestrian than try and push my luck and make them have to get out of my way. It's not right, it's their footpath, and I've got a privilege of using it. Susan, 244 The one thing I do find, people in cars on the like of the safe zones and that sort of thing, where they're not actually a pedestrian crossing, but a lot of people are very, very good, a lot of people aren't, and what I find is you'll get someone that will stop for you to go across your side, but what that does is hangs you out in the middle because the people coming the other way don't stop. So you've just got to be a wee bit careful about what you're doing. But if you're going on to a pedestrian crossing, you don't just barrel across it. It's not a magic zone, it doesn't stop cars magically. So you just slow down and wait, and if you can see that the car is going to have time to stop, you carry on then. Poppy, 287 **CLINT:** [I overtake pedestrians] but I'm aware of what might happen.

Detail	Complementary quote/s
	EVELYN: And he'll usually speak like I do. I go, "I'm trying to get by you," but I don't want to pip my hooter at them because they got the weirdest little hoot. **CLINT:** But mine is quite loud. Clint, 324 Well if there's a grass verge, I usually go on the grass verge because it doesn't worry me and most of them go past, they're always older than me. Occasionally you get some that are really - you just smile at them. Most people are pretty good. And you try and get over as far as you can on the left hand side. It's sort of the same as the road rules isn't it? I try not to irritate people. May, 461 Look, people are normally very, very good. You strike the occasional one who isn't. But 99% of the time, people are very good. Normally, if somebody is in front of me, I will just give a short beep on the horn to let them know that I'm here. And they're normally very, very good. I've had the occasional one turn around and abuse me for being impatient. But you've just got to work out the fact that I mean, it's not my right to be on here but it is a choice that I've made. It's great to be able to be accepted to be on here. If I started getting really obnoxious with it, I could understand people getting grumpy and trying to get us off the railway reserve or off the cycle lanes but you just got to be nice and treat everybody the same. Poppy, 52 if they're children on skateboards I stop, let them have a go. Because they don't care about you. And I'm bigger, so I stop… But the other thing I find difficult is if I'm on a narrow path and they're walking along with these things in their ears, they don't hear me, and you give them a fright. So I call out, go, "oh-oh," and call out… it's very tricky, because they don't hear with these blessed things they have in. Matilda, 180 [Driving around pedestrians is] fine so long as they're watching, not reading, looking at their phones, or just stepping out of a shop and not watching. Or stepping out of a shop and talking to someone behind them. I have had three ladies land on top of me by doing that. Susan, 85 [Pedestrians who have stepped into Susan's scooter have said] "Oh heck, sorry. I didn't see you coming." And I said, "You weren't really looking." So I just said to them, "You've got to be aware that there are people like me," I said, "as well as wheelchairs and people on walkers." I said, "You've just got to be more careful now." And they said, "Oh, we never even gave it a thought." So it's educating the others as well. Susan, 96 The biggest problem I have is not on the railway reserve but in town and that sort of thing, people on cell phones. They're an absolute shocker. I have been stopped and have been walked into many times by people coming out of shop doorways, texting and whatever. I've been abused a couple of times. But any time I've been walked into, I've actually stopped because I've seen people coming out, you know, talking on their phones so I've stopped. I know very well that they haven't seen me. A couple of women, I've had abuse me about not watching where I was going <laughs>. Which, I just giggle and carry on. No point getting involved in it. The last one, I had a guy

Detail	Complementary quote/s
	that was standing behind me actually stood up for me, he said to this woman 'now hang on a minute, this guy was stopped when you walked into him', so she got stuck into him as well. so yea, it happens but cell phones are probably one of the biggest problems that we have. Poppy, 70 If [pedestrians are] walking in front of me, I hang back. Because it's so quiet, you can give them a real scare. So I just hang back and let them, wait until they've got to wherever they're going…I've got nothing else to do all day so. Chiconne, 74

7.10.1.3Subtheme: 4.2.3 Environmental factors

Detail	Complementary quote/s
Designated crossings	There's [traffic] lights at that corner and there's lights down there. And there's two or three islands there and when the cars come through lights, they come in bunches, and there's a gap. You've got to be patient. I do find if I'm, especially sitting in the middle waiting for the traffic to clear, the cars will stop for me. Frances, 243
Flat terrain and gentle slopes	This is the old rail way line that used to go into town… it is very gentle with slope. A lot of people use is for walking. Poppy
Having pleasant areas to visit	Well before I lived here I used to go around the park in it, but there's nowhere to go here. There's only streets, so I don't go joyriding. Because I used to go just see the children feeding the ducks and things like that, which was great, but there's not the opportunities here now. Matilda, 24
Parking space for a scooter	when they were building the new Countdown I rang the management, the builder, and asked them if they'd consider putting in scooter parks up there. And he said, "Oh yes, no, we'll look at that, I'll talk to Countdown about it, oh yes," and he took my name and address and everything. There's no scooter parks. Chiconne, 393
Shared pathways	So it's just a shared pathway. So it is very, very good to be able to just sit, you know, sit here and go without having to go anywhere near the roads. Which I find really good. I can actually go from my place to [the next town] and that's the only piece of road I have to go. Poppy, 40 And it's a safer to go to the river because you don't have to stop and start for streets and that. May, 128
Underpasses	Yeah. There's an underground track there too to get under the traffic. William, 329

7.10.1.4 Subtheme: 4.2.4 Personal factors

Detail	Complementary quote/s
Vision	Well I think that I could manage with my scooter longer than I could ever drive because I'm close to the ground and I can get up to the corners and see the signs, whereas in a car it's too dangerous to look there and try and drive at the same time. It's safer. Una, 304 **Q:** And you said before the interview you don't think your visual impairment affects your scooter use. **A:** No. **Q:** So when you're out and about you feel like you can see everything you need to see? **A:** Yes. Because you don't need to see too far ahead. Matilda, 174 Well I'm sure you're more cautious, much more cautious [because of the low vision]. The fastest we were going to start with is the fastest I would go, and that would only be on a clear [run] and a road that I see that's very familiar, that one. But if I was going on a new road I'd be going half that speed. Una, 103 Just making me very aware of my surroundings… if I see someone coming that's obviously not paying attention, I'll stop. It's just a matter of, you've just got to take care, be aware of your surroundings, very much aware of your surroundings, and expect people to do the unexpected. And I mean I know that my vision isn't good, so if somebody is coming towards me doing something that I'm not happy with, I'll stop. Poppy, 262 Q: He was waving his finger to say go across. A: Yes, this again is a problem for me because I can't see… No but I always acknowledge for letting me across. I have in the past, at some crossings where people have shouted at me to move but I haven't seen, I can't make out the gestures but luckily, that's only happened once. It happened when [Evelyn] was with me and [Evelyn] said that you're ok to go ahead. But he got frustrated because I didn't make a move. I wasn't sure whether or not he was allowing me across or not. It is a problem really. This is why I always hesitate and make sure that they are allowing me across. Clint, 58 Well in some ways you know you can't see as well as you did an hour or so ago, so you just don't go out or you don't go where any vehicles will be, like up a footpath… I've had one or two close calls, sure, especially in the evening going over for the paper, they'll be wearing dark clothes and they'll come out from one of the buildings, let out a yell. But no, see when I put these drops in I'm virtually only quarter of my eyesight, what I had before, because it just puts a film over them for about five minutes, 10 minutes. Well you just don't go out. But sometimes I can see that clock over there sometimes quite clearly... Other times I can't see anything at all. Thomas, 168 I didn't see those [slightly raised speed bumps, very small increase and made of a lighter coloured material] just after I got it and I went for a drive around

Detail	Complementary quote/s
	the footpath. I hit one of those footpaths and it cost me $350 to fix it. Thomas, 70 Yea. I can't see to the end of this tunnel so I've just got to get there. William, 136 [My vision] hasn't affected [my scooter use] that much so far. The odd now and again I get close up to a pedestrian, but I haven't run them over yet… I only see so far, and go by ear, sound. If I hear [traffic] coming I just wait until the noise shuts down and I shoot across the road into the middle of the road or something like that one down there. William, 261
Confidence	I tried to get my mother onto a scooter last year, but now she's got really bad impaired vision, she's blind in one eye and can hardly see out the other now, but when I tried to get her on it she had partial vision in both eyes but she was still scared of actually doing it. But she'd driven up until then, and she said it just seemed safer in a car. So I thought that was a bit crazy, because she was dangerous. But she felt safer in a car. I suppose it's the total covering, not being exposed like you are with a scooter. Susan, 367 My friend across the road, she's got dry macular and so she can't drive and she'll just go blind if she doesn't get any help. Well, she won't go on a scooter, she's too frightened. She feels insecure, whereas I don't feel insecure because I'm having the injections and having the help with my family. Una, 330

7.10.2 Theme: Finding the comfort-zone

7.10.2.1Subtheme: 4.3.2 The benefits of using a scooter for health maintenance

Complementary quote/s
I do walk, and every time I use my scooter I walk double, because I do not want to lose the use of my legs. Una, 72 Probably people say, "Well don't get bored," but you do, but we're grateful that we can just go down, everybody knows us now and they go, when they pass us they say, "Where are you going?" Clint, 243 Well, because my New Year's resolution is always "circulate so you don't stagnate," and that's what I was doing. I joined the Newcomers and joined the library and these things, so I had to get to them. Because there's no transport here, which is very bad. There's not a taxi or anything. Flo, 150 At the moment, I like to go down the riverbed, it's nice down there, just think about things… But not many people on scooters go down the riverbed, which is such a shame, they just don't like that steep slope going up or down. May, 98 Yea, yea, I enjoy it when it's a day like this, it's gorgeous. I really enjoy the time out. It enables me to get into the sun which I wouldn't do if I was unable to drive. I could only walk probably a matter of 100m. Poppy, 106 Being able to get out and mix with people too and not be sort of shut in your home. It's just a way of getting out when you can't drive. Arthur, 500

7.10.3 Theme: Life cycle of using scooters

7.10.3.1Subtheme: Wider self-regulation practices

Complementary quote/s
[I stopped driving] mainly I think because you get to the stage where you slow down, to a certain extent, your reactions become a bit slower, but even the normal things that you do in driving, you also become slower, and especially, I found I think the main problem was pulling out from a parking place. You'd be so busy looking to make sure it was clear that you'd be slow doing it, whereas a normal driver would probably out and away, and when you get to that stage you find other people sort of react to you and start giving you the finger. Arthur, 316
I've only just stopped driving because my license ran out when I was ninety-six and two or three weeks before that I didn't bother renewing it" Flo, 146
That was one reason I got it, was that I could [walk] but I was finding myself increasingly tired, and I knew that it would be hopeless to, say, carry a couple of big bottles of milk or any food stuff back, so it was in anticipation of later problems. Maurice, 232

7.10.3.2 Subtheme: 4.4.1 Initial learning process

Complementary quote/s
No, well as I say, I've had machinery and motorbikes and cars. I had eight licenses from steamrollers, omnibuses, and the lot, so [training] never came into my head, no. Thomas, 231
Probably [no apprehensions] at all, because I've been driving a car from about the age of eleven or twelve, so I was quite confident in traffic and on the road and so forth, and the scooter was a bit like going back to childhood really. But I did discover that even though it's got limited speed, very low speed, it's still fast enough to get you into trouble if you're not careful. **Q:** What kind of trouble? **A:** Probably running into something. There's one or two cracks in the roadway. Arthur, 357
Trial and error... And I just rode it around the crescent that we lived in and then I went to the supermarket on it, and I've never had any problem with it. I've learned a few things, but I was pretty cautious for a start. Chiconne, 144
I just borrowed the scooter every so often and just take it for a wee ride and that. And I'd go up the drive and then I'd go around the block and things like that, and just got used to it. And then I went to the shop and asked for any rules and things like that, and so they had a list of things that I was allowed to do, not allowed to do, and that. So that sort of thing. Susan, 61
A: Terrifying. I thought I'd never be able to - it was like, after the next day I felt as if it was like driving a car when you hadn't driven it for 10 years and it then suddenly comes back to you. But it was, to start with, completely different. **Q:** So what did you do so it wasn't so terrifying?
A: Just practice…. [my brother] took me around. And then the girl along here, she had got one first and then she got one for her husband and they both go out together. And she took me around… But my brother, because he's had one for about four or five years, he knows

Complementary quote/s
all the tricks of the trade, so he told me about the mirrors, for instance, and about my hearing aids, and always avoid driveways. That's why we have the flag, so that when people are coming out the driveways they can see your flag. And you make sure you don't drive too fast past places where you know there's traffic inside. Una, 229

7.10.3.3 Subtheme: learning from mistakes

Detail	Complementary quote/s
Accident: caused by oncoming traffic	We've got raised walkovers in town, and I got collected on one, one day. The lady was actually fixing her radio while she was driving and didn't see me, and car on my side had stopped and I sort of hesitated but then I just quietly was going over but she just, yeah, didn't stop… So she collected me but I'd swerved so she just came down the side of me… Oh, I saw the car, yeah, well she was a good distance away. She was within stopping distance, she was, what? About 200 yards away. 200 yards; 200 feet away. So she was in stopping distance, and because this car had stopped I thought, well I should be safe enough. But then I sort of looked at her and looked at her again and realised she was fiddling down with her radio and that's what she told me, she was changing a station on her radio, I said, "Well don't do that in town." I said, "I could have been a child." And she was all apologetic, but at the same time I just said to her, I said, "Look, don't do that, it's just too dangerous." Susan, 114 The only time I was unsafe, when I was crossing up by the supermarket. By the library. That was a bad, bad, bad pedestrian crossing. I was going across that one day and a couple of ladies behind me and there was a truck coming down the way, a red ute, red truck. And I thought he's gotta give way, and I passed the two ladies and I could see this truck still coming, and I thought, I've got right of way I'm not giving up on, I just sit and steered and I'm waiting for the crash. Yea there was a ping. When I looked up the front of my scooter was behind a front wheel of this ute, it was one of those high end ones where they've got a lot room between the front tyre and the back tyre, and I was jammed in behind there. Anyway, I thought about how lucky I was. Mouse, 62
Accident: caused by misjudgement	It might have been early on, I was crossing the road at a crossing but when I got to the other side, I missed the, where it went up onto the footpath and it tipped over. But there were people there that set me upright and I was fine…. Um, I just didn't look where I was going. Leonard, 60
Accident: caused by other footpath users not noticing the scooter	My friend and I were out one day and we were just stopping to go through two of these rungs on the pathway down the river, and you'll notice all the pathways, and they're really absolutely iconic, it's lovely. And this boy came whirling down the road and he realised when he got right down that we were between two bars like that and he came down that way, and I was here, [my friend] was there, and then he came around the corner and almost collected her, rocked her scooter, and then I thought, "He's going to hit me," and I just [stopped] like that, but he collected the side of my

Detail	Complementary quote/s
	scooter and tumbled off his bike and looked at me as if I was going to kill him, the look on his face. And I said, "Are you all right?" And he just got on his bike and went for his life. But she called out to him and told him off. She said, "You don't do that sort of thing." And that's the only experience I've had but I can see what could happen. So I try to get home before 3:00, always. Una, 237 I run over a kid at school the other day, because he run out and put his foot under my scooter, I didn't have time to stop. But his big blue eyes all full of tears and, "You hurt me." But I just think you'd just adjust to what suits you. I know it's hard to get the actual concept of it, but I know what I can and I know my limitations, so you keep within those. May, 364 I've only once had a real accident with anyone, and I ran into a woman. And we were both going into the shop there, and I was going that way, she was going that way, and I hadn't seen her and I ran into her. But apart from the fact that it knocked her shoe off, I had to shift the scooter for her to get her shoe, she didn't fall or anything, she just stumbled a bit. Me and my scooter was bigger than her, she should have seen me. So that's the only real problem I've had. Frances, 143
Accident: caused by the scooter user	One other time that I found very difficult, it wasn't scary or anything, but it was difficult, was I was going up to lodge, one of the few times I've been to lodge on the scooter, and crossed over on Princess Street and up Manor Street on the footpath, and there's angle parking on that side of the road up there, and most of the cars, okay, they park with not much overhang, but they all seem to want to go up until their tyres hit the edge of the kerb, with the result that some of them virtually bar the footpath altogether. And it's a busy place, so you dodge the roadway if you can, obviously, and I found, I looked and I thought, "Oh yes, I can get through there all right," with one particular vehicle, and I found when I actually got there, that I had very little space. I did get through but…Well, was a bit of a scrape, yeah. But I couldn't really go back either, you see. I couldn't go back or forward… But the cars, or this particular car anyway was illegibly parked really. I haven't had too much problem. Arthur, 373 I did have an accident, I very foolishly, I was trying to get my hair cut, and I tried to climb a kerb, I didn't switch the power down this time, well it was early on and I just hadn't learnt to be so careful. And the danger is that when you drive, try to go up the kerb where there are bumps and that, you tend to hold tight and you involuntarily put the power on full by holding it down like that. I lurched forward and hit the shop window in front. It was replaced by the shop's insurance, it didn't cost me anything. It was a very unfortunate experience and it's made me much more careful than I was before. Maurice, 175
Accident: witness of another accident	Yeah, oh yes, I have to [stop at every driveway], because people do shoot out. There was a woman came out and the back of the car was full of kids, and she just shot straight out, and if I hadn't been further back I couldn't have got out of the road in time. So that made me very cautious. That

Detail	Complementary quote/s
	happened the first time I went. And that did make me very careful about all the entrances. And I suppose it's understandable people don't always think, I suppose. There's some of those entrances, are quiet long from the back of the house to the street. Flo, 344

7.10.4 Theme: Influences on decision making

7.10.4.1Subtheme: 4.5.2 Alternative transport options

Complementary quote/s
But I can't use the bus. We've got a bus service that goes around the town. My closest stop is Countdown, and it would mean I'd have to ride down there, leave my scooter, go on the bus. But I find it hard to get on, on all buses anyway, so I just don't bother. Susan, 229
I think it's awful that there's no taxi here. Because there are times when it's wet and you can't go on the scooter, and you want to go to something, and also like tomorrow night this woman is giving this talk on her third book about Alaska, and I'd like to go to that, but, you see, you can't get a taxi to bring you home after. So I don't know. But that doesn't worry me so much, but I mean it is awkward not having a taxi when it's wet. Flo, 303
I would have to wait for friends to be able to take me anywhere, which is a bit of a problem at my age because all my friends are still working… so they're doing their thing during the week so they haven't got time to do it, and then in the weekend they've got families of their own and that sort of thing. So I did find it very difficult for the first few months before I got the scooter, and having to depend on other people… [Public transport] is shocking. I mean I can catch a bus into town directly in front of my house, which is wonderful, but I can't get back, because the same bus when it comes back does a loop and it drops them off up the Waimea Road here and I can't walk from there down here. So the bus services here are shocking. Poppy

7.10.4.2Subtheme: 4.5.3.1 Training

Complementary quote/s
[In the training] they cover every aspect that, if anybody has had a problem, they ask and you let them know and they cover that as well. But yeah, I think it's really good. It's a good idea. Because there's a lot of people out there are really scared when they get on the, because it's different to a car, but not. You've got the movement, but it's right there. Whereas with a car you've got a car around you. With a scooter you've just got the little bit around you. You're more or less sitting on the engine, sort of thing. But yeah, I think training people is a good idea, so it's safety, caution. Susan, 356
I've taught other people and taken other people around and helped them learn the scooters and that, and now the town's full of us. So that's cool. Susan, 71
A: Well if they've never driven, they've got to learn all the road rules and everything haven't they? **Q:** What are those? **A:** Well don't ask me now, I've forgotten. But things you just do when you're driving, looking to the right, looking to the left, and giving way around corners and things, that sort of thing. It's just really like driving a car, only you're on the footpath. Matilda, 315

7.10.4.3Subtheme: 4.5.3.2 Assessment

Complementary quote/s
I don't think I'd have too much objection to that. It depends what standard they set, of course… Well as long as it didn't stop somebody using the scooter that was capable of using it. I think you get down to a stage then, it's a bit like telling somebody that they shouldn't walk. It's an aid, so I think they should have it available if possible. I think I'd have to wait and see what it is. Arthur, 471
EVELYN: Patience and awareness I think would be one of the things you need, and you do have to be patient don't you? I think you do as a car driver, and a lot aren't, and they're not aware of what's going on, and they can't do much about that. But I do think with scooters it would be the answer to any of us having a scooter. It wouldn't have bothered us if they'd have said, "You've got to have a test before you go on that pavement." Clint, 478
Because I think everyone should be able to see, everyone should be able to hear, and have that quickness to stop if you need to in a hurry, and have some training up and down some rough stuff and along some roads and be aware there's other people on the footpath they've got to consider as well. May, 713

7.10.4.4Subtheme: 4.5.3.3 Acceptability of regulation

Complementary quote/s
Waste of money, completely unnecessary. Especially for people who've had a driving license. Maybe if they've never driven or never been on anything they might need it, but if you can drive a car you can ride a scooter. Matilda, 308
Well, they're moving, they've got power, so it's understandable that they would think about [regulations]. Because you can go fairly fast on them, and people would maybe, I don't know, bit more careful on them. I think that would be the reason for why I'd be okay with that. Susan, 343
I think they should be regulated, yes, yeah, to a certain extent, because there are a lot of very rough ones on the road, and I do see people being very aggressive with them. And I believe that the police should have the right to order them off the road. Poppy, 409

7.11 Appendix K: NZTA recommendations

Lieswyn et al.'s (2017) report which was conducted on behalf of NZTA and provided the following recommendations for consideration on how to approach low-powered e-vehicles including scooters.

Concluding recommendations were for further consideration of:

- Classifications to be based on speed capability.
- Inclusion of a factor code to record collisions which involve scooters.
- Maximum limits for speed and size for footpath use.
- Compulsory helmet use based on speed capability (this would not apply to scooters travelling at 6 km/h).
- Promoting courteous behaviour with other path users through education targeted both at scooter users and the general public.

More specifically recommendations include:

- improve infrastructure to accommodate scooters.
- consult with Australian authorities as they explore issues of vehicle classification.
- restrict speed to 15km/h (running speed). The report found that mobility scooters generally cannot travel beyond 15km/h due to the 1500W restriction however there are challenges in further limiting the device's speed capacity as these are manufactured overseas for a global market and there are limited resources for police enforcement of external speed limits, and that speed limits do not account for the scooter users who must use the road.
- there is no need for registration. Although registration would provide a means of data collection and the ability to identify specific users the disadvantages are that of administrative burden, increased cost for the user and this being perceived as a barrier to acquiring a scooter.
- potential for low-powered vehicles to be restricted to individuals with a mobility impairment who may require a 'permit'.
- a driver's licence would be required for devices which are permitted on the road and can travel over 45 km/h.

Low vision and mobility scooters

Participant information.

I wish to research and present the voices of people with low vision who use mobility scooters.

Participants in this research will:

- have a diagnosed visual impairment
- use a mobility scooter at least once a week in their local community
- be over the age of 50

Should you agree to participate in this project, you will take part in two steps of research.

1. I will interview you about your experiences of using a mobility scooter. My questions are likely to be about how the scooter allows you to be independent in your community and how your low vision influences your scooter use. A list of questions will be provided to you prior to interview. Interviews will be 30-90 minutes long, as is required. This can be in your own home, at Otago Polytechnic or another location of your choice.

[5] Note that the format and layout of these forms may have changed due to different margin sizes

2. I will observe you using your mobility scooter on a route you use regularly. Observation will take 5-10 minutes or as long as needed to get to a location that you regularly visit (e.g. café, library, public park).

You are welcome to have support person with you during this research.

I will also take notes from your most recent optometrist report.

Once your data has been collected and transcribed, you will have the opportunity to confirm or clarify the data transcription. This is called ‘member-checking’. This will occur approximately 2 weeks after the interview and in a location and at a time of your choice.

This project is for my master’s dissertation. The dissertation will be available for the public to read. The research may be published, to inform health professionals, research and policy. All of your information will be made anonymous and confidential.

All data will be collected with a Dictaphone. Your data will be kept secure and only accessible to my

supervisor, Dr Mary Butler and a transcription service under a confidentiality agreement.

You are free to withdraw anytime up until you have read/ been read the data transcription. Any information given prior to this date can be amended/ vetoed or withdrawn. Withdrawal from research will not affect your relationship with me. You do not need to give any reason for withdrawal.

You can refuse to answer any particular question, and ask for the recording devices to be turned off at any stage.

If you have any questions about the project, either now or in the future, please feel free to contact:
Keri McMullan; mcmulk1@student.op.ac.nz, 0274679550
Dr Mary Butler: mbutler@op.ac.nz, 03 4796111 or 0273077667.
Any additional information given or conditions agreed to will be noted on the consent form.

Low vision and mobility scooters

Consent form.

I have read the information sheet concerning this project and understand what it is about. All my questions have been answered to my satisfaction. I understand that I am free to request further information at any stage.

I know that:

- my participation in the project is entirely voluntary and I am free to refuse to answer any particular question.
- I will be seen with the researcher in my local community.
- I will provide my most recent optometrist report for the researcher to read and take notes from.
- I am free to stop participating at any time.
- I can choose to withdraw information provided without giving reasons and without any disadvantage. I am free to make changes or withdraw any or all of the data, up until I have given approval through 'member-checking'.
- my data will be destroyed at the conclusion of the project but any raw data on which the results of the project depend will be retained in secure storage for five years after which it will be

destroyed. If it is to be kept longer than five years my permission will be sought.

- the results of the project may be published but my anonymity / confidentiality will be preserved
- I can request a report of the completed dissertation.

Additional information given or conditions agreed to

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I agree to take part in this project under the conditions set out in the Information Sheet.

Signed: ……

Signature of support person……

Date: ……..…

Signature of researcher……

This project has been reviewed and approved by the Otago Polytechnic Research Ethics Committee