Priorities for an Age-Friendly Bus System*

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RÉSUMÉ

Cette étude a pour but d'identifier les facteurs inhibant et facilitant l'utilisation de l'autobus chez les personnes âgées de 60 ans et plus d'établir des priorités d'intervention. Deux méthodologies complémentaires, la technique du groupe nominal et l'ethnographie systémique, furent utilisées pour identifier les facteurs inhibiteurs et facilitants et en plus de les classer par ordre d'importance. Deux emplacements de Queensland en Australie etaient choisis: 227 personnes âgées ont participé à la technique du groupe nominal et 40 personnes agées ont participé à l'ethnographie systémique. Sept priorités d'intervention pour des systèmes d'autobus facilement accessibles pour les personnes âgées ont émergé des données obtenues: entrée et sortie du véhicule, amabilité et serviabilité du conducteur d'autobus, horaires des autobus, emplacement des arrêts d'autobus, infrastructure pour les piétons, information et formation pour des aînés et itinéraires et destinations des autobus. Ces résultats permettent aux chercheurs, aux preneurs de décisions et aux fournisseurs de transport de déterminer des directions stratégiques fondées sur des données probantes dans le but d'en arriver à des systèmes d'autobus facilement accessibles aux personnes âgées. Les deux méthodes génèrent des perspectives complémentaires concernant la convivialité de l'utilisation de l'autobus qui n'auraient pas été obtenues par chacune des méthodes utilisée seule.

ABSTRACT

This article presents the results of a study on the barriers and facilitators to bus use for people aged 60 or older. Two complementary methodologies, nominal group technique and focussed ethnography, were used to identify barriers and facilitators and rank their importance. Two sample sites from Queensland, Australia, were selected, with 227 people participating in the nominal group technique and 40 people participating in the focussed ethnography component. Seven priorities for age-friendly bus systems emerged from the data: vehicle entrance/exit; bus driver friendliness and helpfulness; timetables and scheduling of buses; bus stop locations; pedestrian infrastructure; information and training for older people; and bus routes and destinations. These findings will assist researchers, policy makers, and transport providers to set evidence-based strategic directions for creating age-friendly bus systems. Both methods provide complementary perspectives on bus usability, which could not be gained from either method alone.

Introduction

Transport is an important precursor to accessing the community. Older people (aged 60 and over) commonly experience transport disadvantage, including substantial problems with bus usability, which limits their participation in society and results in poorer health outcomes (Broome, McKenna, Fleming, & Worrall, 2008; Metz,

2003). Older people who do not drive are more likely to have difficulty using buses. In many regions, buses are an integral part of meeting the transport needs of older people, especially for those who do not drive or have access to rides from family or friends.

Age-friendliness is an approach that has developed in response to the need for community services that are

useable for older people. The assumptions of age-friendliness are, first, that older people have unique needs, characteristics, and preferences that are different from those of younger people, and second, by creating environments that cater for these needs we can improve older peoples' participation and functioning. These assumptions are supported by the premise of the International Classification of Functional, Disability & Health (ICF) that the dynamic interaction between persons and their environment may facilitate, or be a barrier to, their participation and functioning (World Health Organization [WHO], 2007b). The goal of age-friendliness is to identify and subsequently adapt important environmental factors to minimise barriers and maximise facilitators.

While there is a call for age-friendliness in all facets of society, relevant research and literature has predominantly been in the fields of health, supermarkets, recreational travel, and the Internet (Pettigrew, Mizerski, Donovan, Leutero, Lobo, & Carlsen, 2002). However, in October 2007, the World Health Organization (WHO, 2007a) released the *Global Age-Friendly Cities: A Guide* document, providing age-friendly guidelines for a variety of services and environments, including transportation. The WHO research reinforces the recognition of barriers to public transportation for older people documented in previous studies: barriers that included institutional, physical, social, and cultural components (Broome et al., 2008). Age-friendly features that were identified (WHO, 2007a) include (in no particular order of priority): availability; affordability; reliability; frequency; appropriate destinations; accessible vehicles; priority seating; supportive bus drivers; safety and comfort; bus stop proximity; availability of shelters; and effective and available information.

Although the WHO guide provides general guidelines that may be adopted by bus systems, the recommendations have practical limitations in that they do not set priorities for change. Both the establishment of a future research agenda to provide more-specific guidelines for age-friendly buses, as well as for evidence-based policy and practice development, require systematic prioritisation. Policy makers and transport providers often have limited resources and should be guided towards areas that are likely to have the greatest impact on age-friendliness.

The background study for the WHO guide relied on traditional focus groups with older people. Focus groups are a valuable method for eliciting user perspectives regarding a topic, but it is difficult to quantify which themes discussed by the groups are most important. Low-floor buses and concession fares are age-friendly interventions that have received the

most attention in the literature; however, it has not yet been established whether physical and economic usability are more important than other factors identified, such as information and bus driver sensitivity to the needs of older people. Focus groups also encounter a number of other methodological limitations. They could be affected by dominance of one or more participants, who may have individual agendas that do not reflect those of the group as a whole (Sim, 1998). Focus groups are also inherently biased towards subjective user perspectives usually elicited temporally outside of the phenomenon being studied, which may or may not be indicative of the objective, observed experience. For example, depending on sampling procedures, focus group participants may not have used a bus recently, and their experience – when they do use a bus – may differ from their preconceptions. Both objective and subjective perspectives should be considered in a critical understanding of a phenomenon.

The WHO study included only older people from lower- and middle-income areas; however, higher income older people are not immune to transport disadvantage. Additionally, by its very definition, the *Global Age-Friendly Cities: A Guide* (WHO, 2007a) establishes guidelines for cities, which may or may not be generalisable for regional and rural settings. In fact, a number of studies have identified living in a regional or rural setting as a risk factor in transport disadvantage for older people (Broome et al., 2008).

Consequently, to set strategic directions for age-friendliness, we must identify priorities for an age-friendly bus system. The study reported here is part of a larger project that aims first to establish age-friendly guidelines for a bus system, including priorities for intervention when barriers are encountered, then to evaluate the impact on older people of the guidelines' implementation. The current study was intended to expand upon previous work by using a nominal group technique rather than focus groups (WHO, 2007a), and focused ethnography (participant observation with stimulated recall) rather than critical incident technique (Carlsson, 2002) to explore barriers and facilitators to bus use for older people.

In contrast to focus groups and critical-incident technique, both the nominal group technique and focussed ethnography used in this study allowed us to rate barriers and facilitators and quantify their relative impact on bus usability. The combination of methods provided complementary information. Whereas the nominal group technique was less likely to detect common mundane barriers and facilitators, the observations were less likely to detect infrequent or abstract features. In our study, this process enabled us to both

identify and prioritise age-friendly factors, overcoming some limitations of previous studies, and also enabled us to develop a list of priorities as the study's primary outcome. The study also involved two sample sites, one metropolitan and one non-metropolitan, to cover a wider demographic than the WHO (2007a) research.

In order to provide a comprehensive approach to bus usability, our study used the *transport chain approach*. Bus use involves a seamless series of component tasks, each with different environmental demands. The transport chain approach posits that poor accessibility in any stage of the bus trip can generally be a barrier to a person's catching the bus. Elements of the transport chain that were considered included these: deciding to catch a bus, finding information, planning the trip, identifying the bus stop location, travelling to the bus stop, waiting at the bus stop, stopping the bus, boarding the bus, purchasing and validating a ticket, moving to the seat, taking the bus journey, indicating for the bus to stop, moving to the exit, disembarking, and travelling to the destination.

The present study had four aims: (a) identify barriers and facilitators to bus use for older people; (b) identify which environmental factors have the greatest impact on bus use; (c) compare the results of two complementary methodologies (nominal group technique and focussed ethnography); and (d) prioritise strategies to improve the age-friendliness of public buses.

Methodology

Here we explain how we applied the nominal group technique (NGT) and focussed ethnography as two comparative techniques for identifying and quantifying barriers and facilitators to bus use for older people.

Sampling

Participants were recruited to the nominal group sessions from two sites in Australia, using volunteer convenience sampling. The two sites were Hervey Bay (a regional town) and north Brisbane (an urban and suburban area). Representation from both regional and urban areas was crucial to our study, because transport disadvantage has been linked to living in a non-urban area (Glasgow, 2000; Glasgow & Blakely, 2000), and therefore some barriers may be unique to the non-urban setting. The population of both sample sites was primarily Australian-born or Australian citizens and English-speaking residents. Recruitment was conducted via community group newsletters, newspapers, radio interviews, and leaflets. Sampling continued until at least 100 participants were recruited at each site. Forty participants for focussed ethnography were selected from the NGT participants using maximum variance sampling to cover a variety of frequency and self-rated

difficulty of bus use, and a mix of metropolitan and non-metropolitan participants. All participants were required to be aged 60 or older.

Questionnaire

A questionnaire was completed by all NGT participants to collect information on basic demographics (e.g., age, gender, and length of time residing in current location) as well as information specific to the study (e.g., frequency of catching buses, driving status, and reliance on another driver). Participants were also asked to self-rate their difficulty using buses via a 10-cm visual analogue scale. The questionnaire was completed in person by participants prior to the NGT session.

Nominal group technique

NGT is a form of focus group methodology that has been used to facilitate consensus decision making (de Ruyter, 1996; Sim, 1998). In this study, participants were asked about facilitators and barriers to bus use via two questions: "What helps you, or would help you, use public buses?" and "What problems do you have using public buses, or what stops you from using public bus transport?" Participants were allowed approximately five minutes to write down their ideas. Each participant, in turn, was then asked by the facilitator to provide an answer. Answers were written on the whiteboard, and similar answers were grouped together and summarised). Rounds continued until no new ideas were presented. Participants were asked to place coloured markers next to their three top-rated answers summarised on the board (different colours for first, second, and third preference reflecting different weightings; 3, 2, and 1 respectively).

NGT has an advantage over traditional, more unstructured focus groups as it avoids possible dominance by an individual or subgroup of participants (all participants are encouraged to share ideas, all participants have equal ranking power). It provides a broad range of ideas, because participants are asked to write down their ideas prior to group discussion. It also provides more information than a simple consensus statement by providing quantifiable weightings of the importance of ideas and frequencies of idea occurrence between groups (Gaber & Gaber, 2002; Jones & Hunter, 1999; Sink, 1983).

Focussed ethnography

Focussed ethnography in this study involved a one-on-one assessment battery including a pre-trip interview, observation of actual bus use, and a stimulated recall interview. Observation and stimulated recall can be used to compare and contrast actual observed events and behaviours with the perceived and internal

experiences of participants. Stimulated recall has been used extensively in health and education research as a way of eliciting the participant perspective from actual life events (Bishop, Berryman, & Richardson, 2002; Davidson, Worrall, & Hickson, 2006; Hansebo & Kihlgren, 2001; Skovdahl, Kihlgren, & Kihlgren, 2004). The technique involves an interview to elicit participants' views about an actual life event or phenomenon (e.g., a conversation, or catching a bus). The stimulus may be verbal cuing ("Do you remember when …") or recorded data shown to participants (e.g., video footage of the event, audio recordings). The current study used only verbal cueing. Underlying feelings, cognitions, meanings, and subjective reactions towards discrete observed events can be elicited from the participant that could not be gleaned from the observer perspective alone (Hansebo & Kihlgren; Skovdahl et al.).

One of the strengths of this data collection method is that it enables comparison and contrast of the participants' intrinsic perspective with the extrinsic, observable perspective. In this study, comparison and contrast was important in overcoming the limitations of traditional methodologies in barrier research that have focussed on either the intrinsic perspective (e.g., traditional focus groups) or extrinsic perspectives (e.g., expert opinion based on observations). In this study, both participants and observers rated the same environmental factors.

A researcher accompanied the participant on an actual bus trip, which the participant planned prior to the interview. The researcher observed the barriers and facilitators during the trip and noted these in field notes. Following the return bus trip, the participant was asked to identify features that helped (*facilitators*) or made it difficult (*barriers*) to use public buses. Participants were "stimulated" using pre-identified phases of the bus trip (e.g., travelling from the origin to the bus stop, obtaining a ticket) and observed events ("Then the bus driver helped you on with your walker"). The stimulus did not include planning of the trip, as this was the subject of a more comprehensive investigation in another, related study. Participants (and the observer) were asked to rate the impact of the environmental factors from *impossible* to *complete help* on a 9-point scale modified from the ICF (WHO, 2001). After piloting the rating tool, the following client-friendly rating descriptions of environmental factors involving the bus trip were adopted: –4, impossible; –3, severe difficulty; –2, moderate difficulty; –1, mild difficulty; 0, no effect; +1, mild help; +2, moderate help; +3, substantial help; and +4, complete help.

Data analysis

Individual barriers and facilitators that were identified were then coded into aggregate themes to collect like ideas together (Graneheim & Lundman, 2004). Peer checking – with two researchers involved in the study coding individually, then negotiating consensus – was used to ensure that codes reflected individual barriers and facilitators. Statistical analysis was conducted by means of the Statistical Package for the Social Sciences (SPSS) Version 11, with which we used descriptive statistics (means and frequencies) to identify barriers and facilitators that had the greatest impact on bus usability. We then applied Pearson correlations, chi-square tests, Wilcoxon signed ranks, and Kruskal Wallis tests to infer associations within these data. Both severity and frequency (Carlsson, 2004) of the barriers and facilitators were considered.

Results

Nominal group technique

A total of 31 groups with 227 older people participated in the NGT process (54.2% from Brisbane, the remainder from Hervey Bay, a regional town). The mean age was 71.9 years ($SD = 7.6$ years) with a decreasing number of participants towards the older end of the spectrum. The majority were female (74.9%), current drivers (57.7% with 23.8% retired drivers and 18.5% who had never driven), did not rely on other drivers to get around (53.7%), and had lived at their residence for more than five years (70.2%). Current drivers were significantly younger ($\chi^2 = 18.399$, $df = 2$, $p < .001$) than non-drivers by an average of five years. More than a third used buses frequently (36.6%) with 33.9 per cent using the bus occasionally and 28.2 per cent never using buses. Not surprisingly, non-drivers were more frequent users of buses ($\chi^2 = 42.671$, $df = 4$, $p < .001$). On a 10-cm analogue scale representing ease of bus use (with higher scores representing greater ease), the mean score was 5.9 ($SD = 3.3$). Ease of use was significant related to frequency of use ($\chi^2 = 25.304$, $df = 2$, $p < .001$), with those who found it difficult more likely to never use the bus. Ease of use was not, however, significantly related to driving status or length of residence.

Perceived barriers that arose from the NGT data fell within a number of domains, including service design and provision, the built environment, vehicle accessibility, information, other people, and factors relating to the older person. Barriers in *service design* included (a) inappropriate timetabling and scheduling, (b) long distances to the bus stop, (c) inappropriate routes, (d) poor connections, (e) expensive and difficult to understand ticketing, or (f) having no service in the area. Barriers in *service provision* were (a) lack of punctuality, (b) poor reliability, (c) unexpected or unadvertised changes in the bus service, and (d) difficulty handling payment.

Barriers related to the *built environment* included (a) no or inappropriate pedestrian crossings, (b) absent or poorly designed bus stops and shelters, (c) absent or obstructed footpaths, (d) no parking available near the bus stop, and (e) poor visibility of oncoming buses. Barriers related to the *vehicle* included (a) steps or obstructions at the entry and exit, (b) poor signage of the bus number and route on the bus, (c) mobility device inaccessibility, (d) lack of air conditioning, (e) poorly accessible buttons to indicate for the bus to stop, (f) lack of handles or railings, (g) uncomfortable seats, and (h) an inappropriate bus size. Barriers relating to *information* included poor availability of and difficulty understanding (a) printed timetables, (b) telephone, (c) Internet, and (d) bus stop and on-board information as well as a poor promotion of services. Barriers related to *other people* included (a) rude and unhelpful bus drivers, (b) crowded buses, and (c) inconsiderate bus passengers (mobile phone use, non-disabled persons occupying disability seats, and persons leaving bags on seats or in the aisle). Specific shortcomings of bus driver behaviour included poor communication, driving off before the passenger was seated, and not pulling in close enough to the curb. Barriers related to the *older person* include (a) a lack of prior knowledge, (b) difficulty handling luggage, (c) feelings of inconvenience, (d) restrictions in time, and (e) concerns for personal safety. Some participants noted that the transition from being a driver to being a non-driver was difficult. Identified facilitators to bus use were generally the positive equivalents (the converse) of the barriers identified in all domains. The barriers and facilitators receiving the greatest number of votes in the NGT are listed in Table 1.

Focussed ethnography

Forty participants (20 each from Brisbane and Hervey Bay) were selected from the NGT participants to take part in the focussed ethnography component of the study. The ages of participants (mean = 72.4, *SD* = 6.5) and self-rated ease of bus use (mean = 5.8, *SD* = 3.3)

reflected the larger sample. Again, the majority of participants were female (72.5%), current drivers (61.5% with 23.1% retired drivers and 15.4% who had never driven), and had lived in their residence for over five years (55.0%). There was a variety of frequency of bus use, with 45 per cent frequent users, 30 per cent occasional users, and 25 per cent non-users.

Overall, we encountered 1,427 instances of facilitators and 399 instances of barriers. The scope of barriers and facilitators was similar to those identified in the NGT data, with some new factors arising. New facilitators observed included quiet roads, weather (breeze), trees for shade, wide bus aisles, and "intervention by the observer" (13 instances). Examples of observer intervention included (a) helping a participant at risk of falling, (b) stopping a participant's stepping out in front of a moving car, (c) calling out to the bus driver to avoid overshooting the bus stop during a bus journey, (d) helping a participant who was unable to understand the map, and (e) driving a participant home who was too fatigued to walk. Weather (heat, humidity, sun, and rain), narrow bus aisles, barking dogs, dirty shelters, lack of community signage, noisy buses, poor road design, traffic, and hills between home and the bus stop were observed as new barriers. A number of factors reported in the NGT were not observed in the focussed ethnography. Factors that were not observed included (a) inadequate bus connections, (b) inconvenience of using buses and time restraints, (c) inappropriate bus size, (d) older buses, (e) lack of a conductor on the service, (f) cleanliness of the buses, (g) impact on the natural environment, and (h) no hail-and-ride service in the area. Not-observed factors also included those that were infrequent enough or out of context so as to be unlikely to have occurred during the research trip such as (a) service not being available in the area, (b) lack of promotion of the service, (c) unexpected changes in the bus service, (d) the transition from being a driver to a non-driver, (e) problems with bus reliability, and (f) action against

Table 1: Top 10 barriers and facilitators to bus use reported by older people in the nominal group technique (NGT) data

Rank	Barriers	Votes	Facilitators	Votes
1	Limited scheduling of buses	207	Bus driver friendly and helpful	185
2	Long distance to the bus stop	141	Frequent and appropriate scheduling of buses	136
3	Poorly accessible entry and exit	114	Easy to get to bus stop	125
4	Inappropriate bus route	110	Accessible entry and exit	96
5	Poor connections	104	Good connections	77
6	Bus driver unfriendly and unhelpful	74	Appropriate bus route	61
7	Inadequate or no bus shelter	62	Affordable and easy to use ticketing	58
8	Inconvenience	57	Appropriate bus size	47
9	Lack of prior knowledge	51	Prior knowledge	40
10	No service in the area	48	Appropriate bus shelter available;	37
			Information easy to understand	37

vandalism. There were also factors not applicable to the sample of focussed ethnography participants such as assistive device (e.g., walkers, wheelchairs, scooters) accessibility. Table 2 indicates the most frequently arising environmental factors that were barriers and facilitators to bus use obtained through focussed ethnography.

Facilitators were rated by participants as having a significantly ($n = 1,744$, $Z = -16.194$, $p < .001$) greater impact (mean impact = 2.67, SD = 1.18) than barriers (mean impact = 1.41, SD = 1.25). The researchers tended to rate observed facilitators as having less impact, and observed barriers as being more severe, than did participant ratings, with smaller standard deviations for both facilitator and barrier scores. Participant and observer ratings were significantly correlated for both barriers ($n = 370$, $R = 0.49$, $p < .001$) and facilitators ($n = 1,301$, $R = 0.30$, $p < .001$).

Because participant and observer ratings were significantly correlated but participant ratings had greater variance and represented the users' perspective, we selected participant ratings for further analysis. The participants' ratings of facilitators were positively correlated with self-rated ease of bus use ($n = 1,352$, $R = 0.25$, $p < .001$), while participants' ratings of barriers were not correlated with self-rated ease of bus use. Facilitators rated as 3 or more (meaning that a component offered *substantial* or *complete help* to participants) and barriers rated as 3 or more (presenting participants with *severe difficulty* or making it *impossible* for them) represented the barriers and facilitators that have the greatest impact on bus use. Table 3 shows the barriers and facilitators obtained through focussed ethnography that were most frequently reported as having an impact of 3 or greater.

Discussion

Scope and importance of barriers and facilitators to bus use

Both the NGT and focussed ethnography approaches revealed a wide range of barriers and facilitators to bus use for older people. The scope of barriers and facilitators identified through the NGT was consistent with the results of previous research (Broome et al., 2008), especially the outcomes of the World Health Organization's Global Age-Friendly Cities project (2007a). The focussed ethnography approach offered a unique perspective by letting us investigate barriers and facilitators to bus use that arose during actual bus trips. This approach had only been used to a limited extent in previous research (Carlsson, 2002). The barriers and facilitators identified were very similar between the NGT and focussed ethnography data, although focussed ethnography identified some additional factors such as weather (heat, humidity, rain and breezes), hills between the home and bus stop, and the availability of trees for shade as barriers and facilitators to bus use. Some factors from the NGT data did not arise in the focussed ethnography data.

Both the NGT and the focussed ethnography approaches allowed for the measurement of the impact of barriers and facilitators on bus usability. We analysed the data in three different ways to prioritise the most important barriers and facilitators, including the NGT, the 10 most frequent barriers and facilitators noted in the focussed ethnography data, and the 10 most-frequent high-impact barriers and facilitators to bus use from the focussed ethnography data,. We compared the data from the NGT and focussed ethnography. The results of the NGT and focussed ethnography show a moderate similarity, with approximately half of the 10 most important and frequent barriers and facilitator from each method being shared. Inaccessible entry and exits, discourteous and unhelpful bus drivers, and long distances to the bus stop were consistently rated as very important barriers across both methodologies. Inappropriate or non-existent bus shelters were also rated as important in the NGT data, and they frequently arose in the focussed ethnography data. Interestingly, the most important facilitators that were shared in both the NGT and focussed ethnography data were the positive equivalents of the most important

Table 2: Ten most-frequent barriers and facilitators to bus use from focussed ethnography data

Rank	Barriers	Instances	Facilitators	Instances
1	Poorly accessible entry and exit	59	Accessible entry and exit	203
2	No footpath or footpath obstructed / poorly maintained	46	Bus driver friendly and helpful	192
3	Bus driver unfriendly and unhelpful	31	Footpath available and unobstructed	103
4	No or inappropriate pedestrian crossings	31	Handles and rails available on the bus	95
5	Long distance to the bus stop	28	Prior knowledge	78
6	Poor weather	22	Appropriate bus shelter available	68
7	Inadequate or no bus shelter	21	Pedestrian crossings available and appropriate	53
8	Poor usability of information	15	Frequent and appropriate scheduling of buses	52
9	No or inadequate signage on the bus	15	Wide aisle on the bus	45
10	Uncomfortable or inaccessible seats on the bus	2	Comfortable and accessible seats on the bus	44

Table 3: Ten most-frequent barriers and facilitators to bus use rated as 3 or greater (participant ratings) from focussed ethnography data

Rank	Barriers	Instances	Facilitators	Instances
1	No footpath or footpath obstructed / poorly maintained	15	Bus driver friendly and helpful	160
2	Poorly accessible entry and exit	10	Accessible entry and exit	127
3	Long distance to the bus stop	9	Footpath available and unobstructed	66
4	Bus driver unfriendly and unhelpful	9	Handles and rails available on the bus	51
5	No or inappropriate pedestrian crossings	6	Appropriate bus shelter available	39
6	Poor usability of information	4	Prior knowledge	39
7	No or inadequate signage on the bus	3	Pedestrian crossings available and appropriate	34
8	Poor availability of parking	3	Frequent and appropriate scheduling of buses	33
9	Poor weather	3	Easy to get to bus stop	29
10	Hills between home and bus stop	3	Information readily available	29

barriers: for example, helpful and courteous bus drivers. The importance of having prior knowledge and experience using buses was also identified as an important facilitator from both methodologies.

Some barriers and facilitators were within the 10 most important from the NGT data but not the focussed ethnography data, and vice versa. Considered very important in the NGT data were appropriateness and frequency of scheduling of buses (as both a barrier and facilitator). In the focussed ethnography data, good scheduling of buses was only in the 10 most important facilitators; poor scheduling was not identified in the 10 most important barriers. The appropriateness of the bus route (to places older people want to go) and good connections to other buses or transport were also considered important in the NGT data. In contrast, the focussed ethnography data highlighted physical aspects important to bus use such as (a) the availability and appropriateness of pedestrian crossings or footpaths, (b) weather, (c) signage on the buses, (d) handles and railings on the bus, and (e) usability of information. These differences emphasise that both the NGT and focussed ethnography methods offer distinct, but complementary, perspectives on bus usability. Since older people's perceptions of usability as well as their experiences of it may limit bus use, complementary methodologies are required to set effective priorities to create age-friendly bus systems. This requirement is consistent with the work of Larkins, Worrall, and Hickson (2004), who found that neither participant observations nor NGT alone captured the depth and breadth of data obtained when both methods were combined.

Priorities for age-friendly bus systems

Improving age-friendliness can be achieved through minimisation or remediation of barriers, and the maximisation or introduction of facilitators. Strategic and pragmatic policy making recognises that resources are rarely unlimited; therefore, policy and guidelines should prioritise approaches and interventions that are likely to have the greatest impact on outcomes. This prioritisation should be based on the best evidence available, in this case targeting the barriers and facilitators believed to have the greatest impact on bus usability.

Previous research (Broome et al., 2008) and accessibility guidelines (Department of Justice, 1994; ECOMO Foundation, 2001; Mercado, Paez, Newbold, Scott, & Kanaroglou, 2006; Mitchell, 2004; Williams, 2002) have historically shown a preoccupation with the physical accessibility of vehicles and bus stops. It is undeniable that these factors are among the highest priorities, as exhibited by the importance of accessibility of the exit and entry, and signage, on buses. Yet other considerations – such as (a) pedestrian infrastructure, (b) information availability and usability, (c) the conduct of bus drivers, (d) prior knowledge, (e) distance to the bus stop, and (f) timetabling and scheduling – were also ranked as having equal or greater importance than the vehicle or bus stops. Some guidelines have incorporated these factors (Burkhardt, McGavock, & Nelson, 2002; European Conference of Ministers of Transport, 2006; WHO, 2007a), although the factors' high relative importance was not highlighted within those guidelines. For example, the present study's data show that bus driver courteousness and helpfulness has almost equivalent impact on bus use as the accessibility of the entry or exit to the bus, yet bus driver behaviours rarely attract as much coverage in guidelines.

The most important facilitators and barriers overall are those that were consistently highly rated in all three of the study's analyses (represented by >Tables 1, 2, and 3), followed by those that were highly rated in one or two of the analyses, followed by those that were consistent across more than one of our analyses. Both barriers and facilitators should be considered by policy makers. Barriers are intuitively fundamental to usability. However, the significant correlation of focussed ethnography facilitator ratings with self-rated ease of bus use provides evidence that facilitators may be of

equal of greater importance. The most immediate priorities to create age-friendly bus systems, from most important to less important, should therefore be as follows:

1. all vehicles should have accessible entries with no steps, facilities to lower the floor closer to the curb, and no obstructions in the entrance or exit;
2. bus drivers should be friendly and helpful (specifically, they should have good communication skills, they should understand the needs of passengers with varying abilities, wait until passengers are seated before driving, and pull in close to the curb);
3. timetables and scheduling should provide frequent buses that are available in the morning, evening, and on weekends, and should connect well with other buses and transport;
4. bus stop locations should be close to homes and destinations with few hills along the route;
5. pedestrian infrastructure including footpaths and pedestrian crossings should be established and age-appropriate;
6. older people should be given appropriate and relevant training and information on how to use buses; and
7. bus routes and destinations should match the needs and interests of older people.

To achieve these priorities, policy makers should use interventions that are supported by evidence. Where evidence on the efficacy of interventions is lacking (such as for bus stop location changes and travel training for older people), further research should be conducted as a matter of priority. Possible interventions to achieve each priority should be compared across a variety of criteria including efficacy in increasing bus use and community activity, cost-benefit ratio, and economic and pragmatic feasibility.

Reflections on methodology

As we have discussed, NGT and focussed ethnography approaches offer unique but complementary perspectives. Previous research into age-friendliness, including areas other than public transport, has, through focus groups and surveys, tended to focus on the subjective perceptions of older people (Broome et al., 2008). This approach is not comprehensive, and in the future, age-friendliness studies should include an experiential or observational component. The combined NGT and focussed ethnography approach provides this, and it offers the additional benefit of quantifying the most important barriers and facilitators to bus use.

This study also offers insights into the relationship between barriers and facilitators. Generally, the most important facilitators are the positive equivalents of the most important barriers. This was consistent for both the NGT and focussed ethnography approaches. Previous research has tended to focus primarily on

barriers rather than facilitators to identify the most important constituents of usability. However, including facilitators provided us a richer source of data, especially for the focussed ethnography research, in which participants cited facilitators almost four times as frequently as barriers. The impact rating of facilitators in focussed ethnography was also correlated to self-rated ease of bus use, while the impact rating of barriers was not. The impact of facilitators, therefore, may have a greater influence than barriers on bus usability, although a causal relationship should be interpreted with caution.

Another important observation is that, despite the researcher's attempting to be merely an observer, there were 13 instances (six participants) where (s)he had to intervene during the focussed ethnography investigations to avoid negative consequences and possible injury of the participant. These instances illustrate the serious impediments that older people face when using buses in the current environment. Although these interventions reduced the rigour of the study, non-intervention in these cases would have constituted unethical research practice. Another limitation of the focussed ethnography method was the self-selection of the bus trip route by participants. Participants may have selected easier bus routes than normally encountered. This limits the generalisability of findings, as older people may typically need to use more difficult routes to meet their everyday transport needs. Information, knowledge, and experience factors may have featured more strongly for unfamiliar or difficult routes. Similarly, more variable factors such as distance to the destination and scheduling may have featured more strongly on more difficult routes. Since these were easier and more familiar routes to participants, the focussed ethnographic data is likely to be an underestimation of the severity of the barriers and facilitators to bus use for older people. It is anticipated, however, that the reported data in the NGT would in part compensate for this. Although a limitation, we chose to use route self-selection to maximise relevance for the participant and avoid the risk of the task becoming too difficult.

Conclusion

The barriers and facilitators to bus use for older people are varied, including aspects of the vehicle (e.g., entry and exit, handles and railings, signage, width of the aisle), scheduling, routes, connections, pedestrian and bus stop infrastructure, bus driver helpfulness and friendliness, information environments, and prior knowledge. Creating an age-friendly bus system involves overcoming these barriers and maximising facilitators, beginning with those that have the greatest impact on bus usability. The initial steps include ensuring that

all buses have accessible low-floor entrances and exits, ensuring that bus drivers are friendly and helpful, and providing bus services that are frequent and operate during mornings, evenings, and weekends. These evidence-based priorities should set the agenda for research, practice, and policy. Further qualification of these requirements is required – for example, identifying the specific behaviours that lead to the perception of a friendly and helpful driver and the time intervals between buses that constitutes "frequent" scheduling for older people.

Following this additional qualification, further research should aim to establish innovations, strategies, and technologies that can best achieve these outcomes. Where multiple recommendations exist, a comparative analysis of the viability and efficacy of these interventions should be made. Evaluative research should identify whether the implementation of these interventions achieves an age-friendly bus system that supports increased access to and use of buses by older people, and enables older people to readily participate in the society in which they live.

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