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Environmental Factors Associated with Active Living in Retirement Village Residents:
Findings from an Exploratory Qualitative Enquiry

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Biographical Statements

Andrea Nathan, BHLthSc (Hons), is a PhD Candidate in the School of Population Health at The University of Western Australia. Her dissertation is focused on built and social environment influences on active living in retirement village residents.

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Billie Giles-Corti, PhD, is Director of the McCaughey Centre: VicHealth Centre for the Promotion of Mental Health and Community Wellbeing, and former Director of the Centre for the Built Environment and Health. Her key research interests are urban design and health behaviors (physical activity) and health outcomes (mental health, obesity), and social determinants of health.

Abstract

This exploratory enquiry employs qualitative methods to advance knowledge and understanding of physical environmental attributes related to active living among residents of Australian retirement villages. Six focus groups ($n=51$ residents) were held and participants described how their current, and subsequently ideal, retirement village and neighborhood supported active lifestyles. Thematic analysis revealed three key environmental factors associated with active living: a positive social environment within the village; services and facilities provided in the village and wider neighborhood; and the presence of suitable pedestrian infrastructure. The unique discovery that environmental factors of both the retirement village and surrounding neighborhood were both associated with residents' active living raises many questions for study. Findings informed the development of a survey instrument, and further understanding in this area has the potential to contribute to the design and siting practices of senior housing complexes within neighborhoods.

Keywords: older adults, physical activity, neighborhood context, built environment, focus groups

Environmental Factors Associated with Active Living in Retirement Village Residents:

Findings from an Exploratory Qualitative Enquiry

To support the independence and activity of older adults, suitable housing alternatives are required. Retirement village living is a popular housing choice for some seniors. It is plausible that living in close proximity to other older adults, and having access to services and facilities within the retirement village, provides residents with a supportive environment facilitating an active lifestyle. However, residents often leave the village vicinity and traverse the surrounding neighborhood environment. It appears that no studies to date have considered the joint influence of retirement village and neighborhood environments, and impact on active living in residents. The purpose of this paper was to explore village and neighborhood environmental factors related to active living among retirement village residents.

Background

Active Living

Active living is a way of life that integrates any form of physical activity into daily routine; it incorporates exercise, recreational activities, household and occupational activities, and active transportation (Sallis, Cervero, Ascher, Henderson, Kraft, & Kerr, 2006). Regular physical activity at any age, but particularly in later life, has a wealth of established health benefits. These include reducing the risk of cardiovascular disease, type II diabetes, osteoporosis, obesity, anxiety, and depression (Nelson et al., 2007). Furthermore, active lifestyles reduce the risk of falls (Chang et al., 2004), and delay functional limitations and mobility disability, allowing older adults to continue living independently for longer (Paterson & Warburton, 2010).

But despite the health benefits, participation in sufficient amounts of physical activity declines with age (Chodzko-Zajko et al., 2009; Prohaska et al., 2006). In Western Australia, rates of sufficient physical activity decrease from 58% in adults aged 45-49 years to just 30% in those aged 80 years or more (Saarloos, Nathan, Almeida, & Giles-Corti, 2008). Similar trends have been observed in other countries (Aresu et al., 2009; Centers for Disease Control and Prevention, 2007). Therefore, encouraging more physical activity is important for maintaining health and independence, and is a critical issue facing the older adult population at present.

Environmental Influences on Active Living

In public health, attention is turning towards social-ecological models to encourage active living at the population level (Sallis et al., 2006). Rather than focus solely on individual influences, social-ecological models point to the complex and dynamic interactions of individual, social, physical, and policy environmental factors on healthy behaviors such as active living (Stokols, 1992). Considering environmental factors that influence individual behavior is the distinguishing feature of social-ecological approaches, and because physical activity is a behavior occurring in specific locations, this framework is particularly amenable to studying physical activity correlates (Sallis et al., 2006). By understanding the role that environmental attributes play, interventions that support and enable older adults to lead more active lifestyles can be implemented (McLeroy, Bibeau, Steckler, & Glanz, 1988).

A growing body of evidence from the public health, urban planning, and transportation field's show built environment features to be associated with active living among older adults (Cunningham & Michael, 2004; Saelens & Papadopoulos, 2008; Van Cauwenberg et al., 2011). Neighborhood walkability indices composed of street

connectivity, residential density, and land-use mix measures, show higher walkability to be positively related to total physical activity and walking for transport (Carlson et al., 2012; Frank, Kerr, Rosenberg, & King, 2010; King et al., 2011). Presence and proximity to retail destinations also influences walking behavior (Cao, Mokhtarian, & Handy, 2010; Nagel, Carlson, Bosworth, & Michael, 2008; Rodriguez, Evenson, Roux, & Brines, 2009). Moreover, walking is associated with amount of traffic within the neighborhood (Nagel et al., 2008) and positive perceptions of safety from traffic (Gomez et al., 2010). But findings to date are inconsistent (Van Cauwenberg et al., 2011). Therefore, more research is needed to better understand how environmental characteristics relate to older adults' active living.

Retirement Village Context

Within neighborhoods, alternative housing options and living contexts exist, and for older adults, one example is retirement village living. Though not for everyone, a small but increasing number of older adults are moving into retirement villages (Stimson & McCrea, 2004). There is no 'standard' design of a retirement village globally or even within a country. However, in Australia, most provide independent living units, communal facilities, and support services within a defined area segregated from the wider neighborhood.

Some research has examined the influence of built and social environmental factors within retirement villages on residents' physical activity. For example, Joseph and colleagues (2005) found the presence of physical activity facilities within retirement communities to positively influence physical activity levels, findings replicated by Kerr et al. (2011). Furthermore, it appears that residents' use of retirement community walking paths relates to longer, well connected paths, with specific destinations along the route (Joseph & Zimring, 2007). Nevertheless, we are not aware of any research that has concurrently considered both retirement village and neighborhood environments, and associations with

active living among residents. Thus, our understanding of neighborhood and village environmental impacts for those living in retirement villages and other senior housing complexes is limited.

Unraveling environmental influences on active living for residents of retirement villages is not simply of academic interest, but also has the potential to contribute to urban design and planning practices. Unlike older adults living in more intensive residential care facilities, village residents live independently, care for themselves, and remain relatively mobile in terms of their ability to travel outside the retirement village. It is plausible that active living is influenced by built environments within and immediately surrounding the retirement village (i.e., the local neighborhood), and if true, would highlight the importance of considering both environments. Given the paucity of evidence considering village and neighborhood environments, employing qualitative research methods can be an important first step in exploring a phenomenon and informing the development of survey instruments for subsequent quantification (Tashakkori & Teddlie, 2003).

Research Objectives

In order to make a meaningful contribution to understanding and further research, our purpose was to explore, in greater depth, environmental factors influencing active living among retirement village residents. More specifically, we explored the significance and relative influence of both retirement village and surrounding neighborhood environments. In addition, the purpose of the enquiry was to inform the development of a survey instrument for quantifying environmental factors related to residents' active living.

Methods

This exploratory qualitative enquiry was the first component of a mixed-methods study – one in which qualitative and quantitative data are collected and integrated during the

research process (Tashakkori & Teddlie, 2003). A phenomenological, grounded theory approach underpinned the enquiry (Liamputtong & Ezzy, 2005). Focus groups – semi-structured discussion groups exploring a specific set of issues – were chosen for data collection, to capitalize on interactions between participants and shared perspectives among residents (Kitzinger, 1994).

Recruitment Procedures

As this was a qualitative study, purposive sampling was used to identify ten diverse retirement villages based on age of village (in years), neighborhood socio-economic status (Australian Bureau of Statistics, 2008), and objective neighborhood walkability. Walkability scores were the sum of three objective measures (residential density, street connectivity, and land-use mix) within 400 meter street network service areas (Christian et al., 2011; Frank, Sallis, et al., 2010). These were selected from the list of member villages of the Western Australian Retirement Village Association, and all were located in the Perth metropolitan region. Village managers were first contacted by mail and then by telephone, and asked for permission to hold a focus group with residents. Six village managers agreed. In cooperation with the first author, participant recruitment was carried out by the village manager, or in some cases, delegated to a member of the residents' committee. Information sheets explaining the nature of the study and who the researchers were and consent forms were provided for distribution to interested participants. The only inclusion criterion for participation was being a resident of the retirement village. Ethics approval for the study was provided by The University of Western Australia Human Research Ethics Committee (RA/4/1/2151).

Data Collection

Six focus groups were held from January to March 2009, involving a total of 51 participants (range six to ten residents). Though focus groups met in a common area within the retirement village, only the researchers (focus group moderator and research assistant) and participants were present during discussions. Participants provided written and verbal consent allowing for focus group discussions to be audio recorded. Discussions usually lasted 60 to 90 minutes, and refreshments were provided. The first author, who attended all six focus groups, observed that no new concepts were discussed during the final two focus groups, thus data saturation was reached.

The second author, who has many years of experience in focus group facilitation, trained the first author in how to effectively facilitate discussions. The first focus group was moderated by the second author and subsequent groups by the first. Both moderators followed a semi-structured discussion guide developed for the study (available from www.sph.uwa.edu.au/research/cbeh). The discussion guide included open ended questions asking participants to describe 'active living', their retirement village, and their neighborhood. Discussions were also facilitated through vignettes, a projective technique whereby participants imagined they were responsible for designing a new retirement village, and were asked: what infrastructure would be provided to ensure the village encouraged active living; and where the village would be located to facilitate walking. In addition, participants completed a brief activity sheet that included socio-demographic questions and an activity-oriented question requiring the listing of activities regularly done within the neighborhood. Activity lists were collated by the research assistant and used by the moderator to generate further discussion with participants collectively.

Data Analysis

Responses to the activity-oriented question from the brief activity sheet were content analyzed to examine activities regularly done within the neighborhood. All focus group discussions were transcribed verbatim by the first author. Based on an inductive approach, transcripts were collectively examined and coded for themes emerging as key environmental factors associated with active living (Braun & Clarke, 2006). QSR International's NVivo 8 qualitative analysis software was used to assist coding. At first, concepts derived from the data were given an initial code by the first author. Initial codes were collated into tentative categories and sub-categories, and as analysis continued, categories were modified several times over. Associations and connections between categories were then explored, and a thematic map of the analysis was generated, with main themes identified and suitably named. To ensure credibility and trustworthiness, interpretation of data were checked and verified throughout coding by sharing sample transcripts and emerging codes, categories, and themes with co-authors.

Findings

Table 1 presents characteristics of the retirement villages selected for study, and Table 2 shows focus group participant characteristics. Of the six villages holding focus groups, village operation time ranged from five to 28 years, and most had lower neighborhood walkability. Participants were mostly female (58.8%), aged 65 to 74 years (36.6%), and had lived in their retirement village for two to four years (37.3%). More than half usually travelled outside of their retirement village a few times a week (56.1%), with a further 41.5% leaving the village on a daily basis. The most popular neighborhood activities or destinations that participants reported were (in decreasing order): visit family and friends; shops; post office; undertake physical activity; use eating or entertainment facilities; and visit the park.

[Insert Table 1 and Table 2 about here]

Three major environmental influences on active living emerged from the focus group data: a positive social environment within the retirement village; the availability of services and facilities within the village and in the wider neighborhood environment; and the presence of suitable pedestrian infrastructure. Each theme will be outlined using direct quotations from participants to illustrate, and discussed in light of what is currently known from the evidence-base.

Social Environment within Retirement Village

Participants consistently identified aspects of the social environment within the retirement village as being important facilitators of physical activity. Living in close proximity to other residents encouraged physical activity through the increased social contact opportunities: “I like walking just around the village, there’s always somebody to talk to (Participant [P]2)”. Some participants even made light of the fact that walking to complete simple errands within the village, such as taking out the rubbish or walking the dog, took such a long time to complete because they would always see or hear from other residents. The presence of other people has been found to support physical activity in other qualitative studies of community-dwelling older adults (Gallagher, Gretebeck, Robinson, Torres, Murphy, & Martyn, 2010; Strath, Isaacs, & Greenwald, 2007). Moreover, Bertera (2003) showed that older adults’ participation in leisure-time physical activity was positively associated with the number of social network contacts they had.

In addition to resident social contact, participants also mentioned that being surrounded by people of a similar age and situation in life facilitated physical activity. Because of the verbal encouragement and peer support received from fellow residents, retirement villages were thought to be ‘safe’ and comfortable environments in which to try new and different types of physical activities. While participants had some reservations for

certain physical activity modes in the past (i.e., before moving into the village), such activities were now done within the retirement village, because participants preferred the company of people their own age:

We are all with our own peer group; we're not in a place with young ones and that sort of thing, which is always a fear. We are within this village environment and they don't waste their time coming here. We are here by ourselves so we've got no worries about turning up and doing things. (P37)

Furthermore, participants were more willing to join in and try new activities, because residents had similar fitness levels and physical abilities:

When we are exercising or whatever we are all at the same fitness level, and we've all got achy knees and achy this and that; we're not standing next to slim, trim younger people. (P38)

Social support for physical activity is an important correlate of active living among community-dwelling older adults (Booth, Owen, Bauman, Clavisi, & Leslie, 2000; Eyster, Brownson, Donatelle, King, Brown, & Sallis, 1999; Wilcox, Castro, King, Housemann, & Brownson, 2000), findings supported by our participants. Only in this study, it was the importance of social support received from other retirement village residents, and not from family and friends, which emerged as a key facilitator of physical activity.

Village and Neighborhood Services and Facilities

The presence of services and facilities within retirement villages facilitated active living among residents. Because residents were not dependent on available transport options or their driving ability, salient support services and general facilities could still be accessed. Participants not able to drive or those uncomfortable with driving at night recalled that access to village amenity impacted physical activity levels through increased walking opportunities:

You actually do things in here that you wouldn't do outside, because to do it you don't have to drive anywhere. (P37)

I think having activities here when you are unable, as we've got some here who won't drive at night, they can walk down here and there is something. So when you are not able to go out there is still something. (P12)

In general, older adults drive less and are more likely to use alternative travel modes (e.g., walking) compared with younger adults (Cao et al., 2010; Rosenbloom & Morris, 1998).

One qualitative study found that the presence of diverse services within walkable distances allowed community-dwelling older adults to walk, instead of drive, to daily activities (Michael, Green, & Farquhar, 2006). Within the senior housing context, path use for utilitarian walking related to path segments having specific destinations along the route (Joseph & Zimring, 2007). Overall, this supports our finding that having services and facilities within the retirement village is important for active living, and especially for walking behavior.

In terms of specific services and facilities available within the retirement village, no clear consensus emerged on the importance of recreational facilities for residents' physical activity. On the one hand, the presence of recreational facilities was seen as an important facilitator of physical activity, with some participants declaring that if absent within the village, such recreational facilities would not be utilized even if they were available outside the village: "Yes I use the gym every now and then but if that wasn't there (i.e., in the village), I'd never go to a gym outside (P49)". When explored further, it was the convenience of having recreational facilities on their doorstep, in close proximity to their homes, which made it easier for participants to access them and be physically active.

However, participants with a preference for village recreational facilities also wanted the same facilities available in the wider community, thus having more options:

I'd say the village has its own bowling green, but you don't want to be too far from others. Like we're quite near the (name) bowling club, so you've got the sports available to you, as well as your own communal activities. (P9)

On the other hand, one focus group reported village recreational facilities, particularly swimming pools or Bowling Greens, as unimportant for residents' physical activity. This was because access to village recreational facilities did not equate to residents using such facilities. Despite this, the additional costs for maintenance and upkeep of facilities were still required from residents. Participants voiced this as being an unnecessary expense afforded to them, and suggested that a lack of recreational facilities could potentially reduce the sometimes considerable costs of retirement village living:

I was in another retirement village with my husband before I came here, and they had lawn bowls and everything. And in the end, no one was using them. (P33)

And they add a lot of expense to the initial outlay and therefore the cost of the units.

You have to pay for all those things whether you use them or not. (P30)

In a study of continuing care retirement community residents (who receive care varying from independent living to assisted living to nursing care), the presence and quantity of physical activity facilities within the retirement community was significantly correlated with residents' physical activity (Joseph et al., 2005). At the same time, another study reported that only 20% of retirement village residents had used village infrastructure and facilities for leisure-time physical activity, with most using recreational facilities outside the retirement village (Miller & Buys, 2007). A clear understanding on the importance of village recreational facilities for residents' physical activity remains elusive.

Beyond the retirement village, access to services and facilities in the wider neighborhood environment emerged as a strong, positive environmental factor associated with active living among residents. In particular, having access to public transport was mentioned most often as being a key factor influencing active lifestyles. Participants recognized that the significance of public transport increased as they aged, and was especially desirable for residents unable to drive or those lacking confidence:

I think if you've got the transport, you are home and hosed really. Because you are needing the medical contact for health issues. I think transport is one of the most important things because you're not always going to be able to drive. (P41)

The presence of parks and public open space in the local neighborhood was also mentioned as being a salient environmental factor facilitating active living. Parks were cited as an important destination to walk to; a location for physical activity engagement; and a place to connect with people of different ages and feel part of the wider community. In addition, participants enjoyed taking their grandchildren to the park, and a number suggested that retirement villages should ideally be located in close proximity to neighborhood parks with playgrounds. Other important neighborhood amenities facilitating active living included shops (for grocery shopping in particular), post boxes or offices, and health services (particularly pharmacies). The literature identifies access to similar destinations as correlates of physical activity in community-dwelling older adults (Inoue et al., 2011; King, Brach, Belle, Killingsworth, Fenton, & Kriska, 2003; Michael, Beard, Choi, Farquhar, & Carlson, 2006; Nagel et al., 2008; Wang & Lee, 2010).

While access to neighborhood services and facilities was important in facilitating active living, the distance to these destinations was consistently raised as a key barrier.

Neighborhood amenities were considered proximate when travelling by car, but not within walking distance:

The shopping centers are not that close really. I mean in a car they are really close, but those sorts of things aren't in walking distance. For most things, those routine things, the post office and the errands. (P45)

Many participants felt capable of walking to neighborhood services and facilities, yet increasing physical limitations meant they were becoming much more sensitive to distance. When neighborhood services and facilities were located 'too far' (i.e., not within walking distance), residents were unable to continuously walk for the period required:

When we were talking about public transport and you mentioned that it's a short walk to the bus station - that's ok for people who can still walk longer distances. It doesn't mean you can't walk, but longer distances. And the distances to either that bus stop or the other are a bit far from where I live. I wouldn't even dream of walking that. Because by the time I got back, I'd be out of energy, I would need more than a seat. That's why most of us have a car. (P15)

When we explored this barrier further, it often emerged that the return part of the journey (i.e., walking back home from neighborhood services and facilities) was hard. For example, participants said it was sometimes difficult or impractical to carry shopping back when walking:

If you're shopping and you buy things, then you have to bring them back and it's not always convenient on public transport, and certainly not to carry them while you are walking that distance. (P50)

Despite an apparent willingness to walk to neighborhood services and facilities, residents relied on cars to overcome the perceived walking distance barrier. Other studies have found

that travel mode choice is strongly linked with trip length; Rosenbloom and Morris (1998) showed that among older Australians, 80% of trips less than 500m were made by walking, but this decreased to 55% when trip distance was between 500m and 1000m. Furthermore, older adults' walking is negatively associated with increased distance to the nearest park (Nagel et al., 2008) and grocery store (Cao et al., 2010). Indeed, at the population level, Cao and colleagues (2010) showed that the impact of distance on walking frequency was more pronounced among older adults than younger adults, suggesting that proximity to destinations plays a more important role in influencing older adults' walking.

Suitable Pedestrian Infrastructure

Having suitable pedestrian infrastructure within the retirement village was important in facilitating active living among residents. Participants mentioned that village walking paths need to be appropriate for the needs and abilities of older adults specifically. For example, walking paths should have curb cuts to allow wheelchair access and should be well maintained to eliminate or minimize walking obstructions. Walking paths that are poorly maintained become hazards for falls and fall-related injuries: "I find that the root of the tree is lifting the path up, that's going to be fixed within the village (P32)" and "Yes, it's very easy to fall – the paths aren't really suitable because the sand on it, it doesn't get blown or swept, it just moves underneath you (P2)".

In addition, having sidewalks present in the surrounding neighborhood also facilitated physical activity. Participants said adequate infrastructure suitable for walking was important, but also appropriate for other commonly used transport modes:

There are some really good walking paths around here suitable for gophers, bikes, wheelchairs, whatever. There is a good network through this area, which is great.

(P12)

Neighborhood traffic hazards discouraged active living among retirement village residents. In particular, participants recalled busy and congested road networks as a barrier to physical activity, because traffic volume made it difficult to cross the road. Crossing the road at designated traffic signals also proved tricky, because often traffic signals did not provide enough time for residents to safely cross the road: “No I don’t like using the lights either; I mean you get caught half way (P23)”. Subsequently, overall distance to destination increased because residents needed to walk further in order to safely cross the road and not be stranded in the middle of heavy, oncoming traffic:

The only trouble with that is crossing the main road to get to (name). I mean you can go from here to the shops on this side of (name), that’s the main road. But then if you want to go to (name), which is just past the shops, you got to cross and it’s quite a busy road. There is a traffic segment where you can cross, but you have to walk further. (P44)

To safely cross the road, some residents chose to cross at particular segments that allowed them to concentrate on one direction of traffic at a time. This was facilitated by the presence of median strips, which also allowed residents to take a short pause or break in the middle of the road:

There is a walkway there where you can do half the road and the traffic is going one way, and then the other half when it goes the other way. So I find that easy, but not at the lights - I find that very difficult, but this walkway is not far from the lights. (P25)

Our findings were consistent with previous research among community-dwelling older adults, showing the presence and condition of sidewalks and traffic safety issues to be key environmental factors influencing active living (Gallagher et al., 2010; Michael, Green, et al., 2006; Saelens & Papadopoulos, 2008; Strath et al., 2007; Wang & Lee, 2010).

Discussion

This exploratory enquiry found salient environmental factors associated with active living in retirement village residents to include: a positive social environment within the retirement village; the availability of village and neighborhood services and facilities; and the presence of suitable pedestrian infrastructure within and outside the village. Our findings were consistent with those reported in the literature for community-dwelling older adults; however they also provide unique insights that should form the basis for future research. In particular, aspects of the environment within retirement villages and that of the surrounding neighborhood are both important for active living and should be considered in tandem. Further knowledge and understanding in this area has possible future implications for the design and siting of senior housing complexes within neighborhoods.

As expected with research of an exploratory nature, our findings raise a number of issues for future study. First, the provision and importance of recreational facilities within retirement villages, and how it relates to residents' physical activity warrants further investigation. Retirement village residents vary greatly in age; though individuals are eligible to enter senior housing when aged 55 years, average age when relocating tends to be closer to mid-70s in Australia (Stimson & McCrea, 2004). It is highly possible that the importance of village recreational facilities differs for residents according to their age when first entering the retirement village setting, and their current age. This relates more specifically to age-associated changes in physiology (e.g., changes in muscular function, cardiovascular function, pulmonary function, physical functioning capacities, body composition and metabolism) (Chodzko-Zajko et al., 2009). Such changes limit high levels of activity, thus older adults tend to participate in low or moderate-intensity physical activities (Nelson et al., 2007). Recreational facilities provided within villages should match the types of moderate

activities in which older adults are likely to participate. Future research should consider socio-demographic characteristics such as age when quantifying the importance of village recreational facilities for physical activity.

Second, our findings highlight the importance of considering not only the design and layout of retirement villages, but also the significance of where the village is located.

Though retirement villages appear to be segregated from the wider neighborhood, environmental factors outside the village setting were continuously cited as facilitators of active living. Stimson and McCrea (2004) used a push-pull framework to identify three pull factors for older adults deciding to move into a retirement village: the built environment and affordability; characteristics of the location area the retirement village is in; and desire to maintain current lifestyle. None were associated with specific services and facilities within the village, suggesting that the location of the retirement village site, rather than the village services and facilities, was most relevant. In order to ensure that senior housing options are located in accessible neighborhoods with proximate services and facilities, government planning policies need to consider the siting of future retirement villages. In Western Australia, the government's operational policy for the design and approval of urban development states:

“Retirement complexes should be located close to town and neighborhood centers, and incorporate multi-story denser components to achieve sufficient yield on relatively small sites. In some cases, they may be designed so that their facilities can be shared by the broader community and be located to form the core of the neighborhood center” (Western Australian Planning Commission, 2007).

The extent to which local planning policies across the world consider the siting of senior housing complexes is unknown. This knowledge, and working alongside policy makers and

practitioners to ensure it occurs would assist in the planning and siting of retirement housing that facilitates and encourages active living.

Related to this more specifically is the question of what a proximate distance is for older adults. This is important given that residents were unanimous in stressing the significance of accessible and proximate neighborhood destinations to encourage active living. It is generally accepted that a $\frac{1}{4}$ mile, which corresponds to a five minute walk in able-bodied adults, is a walkable distance (Atash, 1994; Aultman-Hall, Roorda, & Baetz, 1997; Pikora, Bull, Jamrozik, Knuiman, Giles-Corti, & Donovan, 2002). A qualitative study of older adults near retirement age suggested a willingness to walk between 20 and 45 minutes to a destination (Strath et al., 2007), yet actual distance would be dependent upon walking speed and physical functioning. Wang and Lee (2010) showed that active older adults were able and willing to walk up to a $\frac{1}{2}$ mile to routine destinations, but most destinations in their study setting were located further than this. In addition, proximity to certain destination types may be more important for walking than others (Moudon et al., 2006). Moreover, perceived and objective distances to destinations generally show low agreement, thus these may both independently affect walking (Boehmer, Hoehner, Wyrwich, Brennan Ramirez, & Brownson, 2006; Michael, Beard, et al., 2006). More research is needed to determine what distances are considered walkable by older adults and how this differs from children and adults. Examining whether perceptions of a walkable distance change over time, according to life stage (i.e., the onset of retirement) and mobility limitations is necessary. Better understandings of how far older adults are prepared (or are able) to walk, how older adults perceive distance, and whether considerations of walkable distances are influenced by ability to drive, are needed. More knowledge of this sort can contribute to informing practices that ensure proximate destinations are located within

walking distance for all older adults, irrespective of living within the retirement village setting.

Study Limitations

Naturally, this study was not without its limitations and findings must be considered in light of these. Though retirement villages were selected by purposive sampling, an acceptable selection method given the qualitative nature of the research, residents within villages were selected using convenience sampling. Furthermore, resident selection was conducted by the village manager or a member of the village resident committee, and so we cannot be certain of the specific method of approach employed, the number of residents who refused to participate, nor reasons for non-participation. Though convenience sampling may fail to capture vastly different opinions and perspectives, in this study, participants were all well acquainted with each other and their fellow village residents, so much so that issues specific to non-participants would be raised at times, with discussion verified by other focus group participants. Thus, the concern was reduced because of the retirement village context and the interactions and dynamics created by choosing focus groups to collect data, compared with other qualitative research methods. The fact that both moderators were of a different generation to focus group participants, and completely 'new' to understanding the intricacies of the retirement village setting, also warrants consideration. It is possible this may have influenced participants' responses, in that positive environmental influences were over-emphasized at the expense of other features in order for the context to be seen in a more positive light. That is to say, social desirability effects, whereby favorable responses are given, may have been at work. For example, physical activity is a socially desirable behavior that is often overestimated when self-reported (Adams et al., 2005). To overcome this, trained peer leaders familiar with the setting and of a similar age and physical activity level to

participants (e.g., retirement village resident committee members) may have been more suitable focus group facilitators. Finally, additional factors such as resident income and self-rated health, and the possible influence of self-selection into retirement villages, all need to be considered when interpreting the findings of this enquiry.

Conclusion

With the global demographic shift in aging and the importance of remaining physically active, a deeper understanding of environmental influences on active living is needed. Moreover, consideration needs to be given to the living contexts of older adults, including retirement villages and senior housing complexes located within neighborhoods, and how these environments impact active living. Concurrently studying the influence of physical, social, and policy environmental factors on healthy behaviors is consistent with a social-ecological approach. Knowledge of this sort will inform environmental and other interventions, designed to encourage older adults to remain as active as possible, for as long as possible. This exploratory qualitative enquiry found environmental attributes of the retirement village and surrounding neighborhood environment to both be significant in facilitating active living among residents. Our findings will be used to develop a quantitative survey instrument, which will attempt to answer some of the above research questions and further unpack environmental influences on residents' active living. More research in this area is needed given the potential for contributing to the planning and public policy practices impacting seniors and their living environments.

References

- Adams, S. A., Matthews, C. E., Ebbeling, C. B., Moore, C. G., Cunningham, J. E., Fulton, J., et al. (2005). The Effect of Social Desirability and Social Approval on Self-Reports of Physical Activity. *American Journal of Epidemiology*, *161*(4), 389-398.
- Aresu, M., Becares, L., Brage, S., Chaudhury, M., Doyle-Francis, M., Esliger, D. W., et al. (2009). *Health Survey for England 2008: Physical activity and fitness*. Leeds: The NHS Information Centre for Health and Social Care.
- Atash, F. (1994). Redesigning Suburbia for Walking and Transit: Emerging Concepts. *Journal of Urban Planning and Development*, *120*(1), 48-57.
- Aultman-Hall, L., Roorda, M., & Baetz, B. (1997). Using GIS for evaluation of neighbourhoods pedestrian accessibility. *Journal of Urban Planning and Development*, *123*, 10-17.
- Australian Bureau of Statistics. (2008). 2006 Census: SEIFA Product Brief. Retrieved March 30, 2010, from <http://www.abs.gov.au/websitedbs/d3310114.nsf/4a256353001af3ed4b2562bb00121564/cbc195deddc8d84eca25740f0010e378!OpenDocument>.
- Bertera, E. (2003). Physical Activity and Social Network Contacts in Community Dwelling Older Adults. *Activities, Adaptation & Aging*, *27*(3/4), 113-127.
- Boehmer, T. K., Hoehner, C. M., Wyrwich, K. W., Brennan Ramirez, L. K., & Brownson, R. C. (2006). Correspondence Between Perceived and Observed Measures of Neighborhood Environmental Supports for Physical Activity. *Journal of Physical Activity & Health*, *3*(1), 22-36.

- Booth, M. L., Owen, N., Bauman, A., Clavisi, O., & Leslie, E. (2000). Social-Cognitive and Perceived Environment Influences Associated with Physical Activity in Older Australians. *Preventive Medicine, 31*(1), 15-22.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101.
- Cao, X. Y., Mokhtarian, P. L., & Handy, S. L. (2010). Neighborhood Design and the Accessibility of the Elderly: An Empirical Analysis in Northern California. *International Journal of Sustainable Transportation, 4*(6), 347-371.
- Carlson, J. A., Sallis, J. F., Conway, T. L., Saelens, B. E., Frank, L. D., Kerr, J., et al. (2012). Interactions between psychosocial and built environment factors in explaining older adults' physical activity. *Preventive Medicine, 54*(1), 68-73.
- Centers for Disease Control and Prevention. (2007). U.S. Physical Activity Statistics. Retrieved 8 February 2011, from <http://www.cdc.gov/nccdphp/dnpa/physical/stats/index.htm>.
- Chang, J. T., Morton, S. C., Rubenstein, L. Z., Mojica, W. A., Maglione, M., Suttorp, M. J., et al. (2004). Interventions for the prevention of falls in older adults: systematic review and meta-analysis of randomised clinical trials. *British Medical Journal, 328*(7441), 680-687.
- Chodzko-Zajko, W. J., Proctor, D. N., Singh, M. A. F., Minson, C. T., Nigg, C. R., Salem, G. J., et al. (2009). Exercise and Physical Activity for Older Adults. *Medicine and Science in Sports and Exercise, 41*(7), 1510-1530.
- Christian, H. E., Bull, F. C., Middleton, N. J., Knuiaman, M. W., Divitini, M. L., Hooper, P., et al. (2011). How important is the land use mix measure in understanding walking

- behaviour? Results from the RESIDE study. *International Journal of Behavioral Nutrition and Physical Activity*, 8,
- Cunningham, G. O., & Michael, Y. L. (2004). Concepts Guiding the Study of the Impact of the Built Environment on Physical Activity for Older Adults: A Review of the Literature. *American Journal of Health Promotion*, 18(6), 435-443.
- Eyler, A. A., Brownson, R. C., Donatelle, R. J., King, A. C., Brown, D., & Sallis, J. F. (1999). Physical activity social support and middle- and older-aged minority women: results from a US survey. *Social Science and Medicine*, 49(6), 781-789.
- Frank, L., Kerr, J., Rosenberg, D., & King, A. (2010). Healthy Aging and Where You Live: Community Design Relationships With Physical Activity and Body Weight in Older Americans. *Journal of Physical Activity & Health*, 7, S82-S90.
- Frank, L. D., Sallis, J. F., Saelens, B. E., Leary, L., Cain, K., Conway, T. L., et al. (2010). The development of a walkability index: application to the Neighborhood Quality of Life Study. *British Journal of Sports Medicine*, 44(13), 924-933.
- Gallagher, N. A., Gretebeck, K. A., Robinson, J. C., Torres, E. R., Murphy, S. L., & Martyn, K. K. (2010). Neighborhood Factors Relevant for Walking in Older, Urban, African American Adults. *Journal of Aging and Physical Activity*, 18(1), 99-115.
- Gomez, L. F., Parra, D. C., Buchner, D., Brownson, R. C., Sarmiento, O. L., Pinzon, J. D., et al. (2010). Built Environment Attributes and Walking Patterns Among the Elderly Population in Bogota. *American Journal of Preventive Medicine*, 38(6), 592-599.
- Inoue, S., Ohya, Y., Odagiri, Y., Takamiya, T., Kamada, M., Okada, S., et al. (2011). Perceived Neighborhood Environment and Walking for Specific Purposes Among Elderly Japanese. *Journal of Epidemiology*, 21(6), 481-490.

- Joseph, A., & Zimring, C. (2007). Where Active Older Adults Walk: Understanding the Factors Related to Path Choice for Walking Among Active Retirement Community Residents. *Environment and Behavior*, 39(1), 75-105.
- Joseph, A., Zimring, C., Harris-Kojetin, L., & Kiefer, K. (2005). Presence and Visibility of Outdoor and Indoor Physical Activity Features and Participation in Physical Activity Among Older Adults in Retirement Communities. *Journal of Housing for the Elderly*, 19(3/4), 141-165.
- Kerr, J., Carlson, J. A., Sallis, J. F., Rosenberg, D., Leak, C. R., Saelens, B. E., et al. (2011). Assessing health-related resources in senior living residences. *Journal of Aging Studies*, 25(3), 206-214.
- King, A. C., Sallis, J. F., Frank, L. D., Saelens, B. E., Cain, K., Conway, T. L., et al. (2011). Aging in Neighborhoods Differing in Walkability and Income: Associations with Physical Activity and Obesity in Older Adults. *Social Science and Medicine*, 73(10), 1525-1533.
- King, W., Brach, J., Belle, S., Killingsworth, R. E., Fenton, M., & Kriska, A. (2003). The relationship between convenience of destinations and walking levels in older women. *American Journal of Health Promotion*, 18(1), 74-82.
- Kitzinger, J. (1994). The methodology of Focus Groups: the importance of interaction between research participants. *Sociology of Health and Illness*, 16(1), 103-121.
- Liamputtong, P., & Ezzy, D. (2005). *Qualitative Research Methods*. Melbourne: Oxford University Press.
- McLeroy, K. R., Bibeau, D., Steckler, A., & Glanz, K. (1988). An Ecological Perspective on Health Promotion Programs. *Health Education and Behavior*, 15(4), 351-377.

- Michael, Y. L., Beard, T., Choi, D., Farquhar, S. A., & Carlson, N. (2006). Measuring the Influence of Built Neighborhood Environments on Walking in Older Adults. *Journal of Aging and Physical Activity, 14*(3), 302-312.
- Michael, Y. L., Green, M. K., & Farquhar, S. A. (2006). Neighborhood design and active aging. *Health & Place, 12*(4), 734-740.
- Miller, E., & Buys, L. (2007). Predicting older Australians leisure-time physical activity: Impact of residence, retirement village vs. community, on walking, swimming, dancing and lawn bowls. *Activities, Adaptation & Aging, 31*(3), 13-30.
- Moudon, A. V., Lee, C., Cheadle, A., Garvin, C., Johnson, D., Schmid, T. L., et al. (2006). Operational Definitions of Walkable Neighbourhood: Theoretical and Empirical Insights. *Journal of Physical Activity & Health, 3*(Suppl 1), S99-S117.
- Nagel, C. L., Carlson, N. E., Bosworth, M., & Michael, Y. L. (2008). The Relation between Neighborhood Built Environment and Walking Activity among Older Adults. *American Journal of Epidemiology, 168*(4), 461-468.
- Nelson, M., Rejeski, W. J., Blair, S., Duncan, P., Judge, J., King, A. C., et al. (2007). Physical Activity and Public Health in Older Adults: Recommendation From the American College of Sports Medicine and the American Heart Association. *Circulation, 116*(9), 1094-1105.
- Paterson, D. H., & Warburton, D. E. R. (2010). Physical activity and functional limitations in older adults: a systematic review related to Canada's Physical Activity Guidelines. *International Journal of Behavioral Nutrition and Physical Activity, 7*, 38-60.
- Pikora, T. J., Bull, F. C. L., Jamrozik, K., Knuiaman, M., Giles-Corti, B., & Donovan, R. J. (2002). Developing a reliable audit instrument to measure the physical environment for physical activity. *American Journal of Preventive Medicine, 23*(3), 187-194.

- Prohaska, T., Belansky, E., Belza, B., Buchner, D., Marshall, V., McTigue, K., et al. (2006). Physical Activity, Public Health and Aging: Critical Issues and Research Priorities. *Journals of Gerontology Series B-Psychological Sciences and Social Sciences*, 61(5), S267-S273.
- Rodriguez, D. A., Evenson, K. R., Roux, A. V. D., & Brines, S. J. (2009). Land Use, Residential Density, and Walking The Multi-Ethnic Study of Atherosclerosis. *American Journal of Preventive Medicine*, 37(5), 397-404.
- Rosenbloom, S., & Morris, J. (1998). Travel Patterns of Older Australians in an International Context: Policy Implications and Options. *Transportation Research Record: Journal of the Transportation Research Board*, 1617(-1), 189-193.
- Saarloos, D., Nathan, A., Almeida, O., & Giles-Corti, B. (2008). *The Baby Boomers and Beyond Report: Physical Activity Levels of Older Western Australians 2006*. Perth: Western Australian Government. Retrieved 2 April 2012.
- Saelens, B. E., & Papadopoulos, C. (2008). The Importance of the Built Environment in Older Adults' Physical Activity: A Review of the Literature. *Washington State Journal of Public Health Practice*, 1(1), 13-21.
- Sallis, J., Cervero, R. B., Ascher, W., Henderson, K. A., Kraft, M. K., & Kerr, J. (2006). An Ecological Approach to Creating Active Living Communities. *Annual Review of Public Health*, 27(1), 297-322.
- Stimson, R., & McCrea, R. (2004). A push-pull framework for modelling the relocation of retirees to a retirement village: the Australian experience. *Environment and Planning A*, 36, 1451-1470.
- Stokols, D. (1992). Establishing and Maintaining Healthy Environments. *American Psychologist*, 47(1), 6-22.

- Strath, S., Isaacs, R., & Greenwald, M. (2007). Operationalizing environmental indicators for physical activity in older adults. *Journal of Aging and Physical Activity, 15*(4), 412-424.
- Tashakkori, A., & Teddlie, C. (2003). *Handbook of Mixed Methods in Social and Behavioral Research*. Thousand Oaks: Sage Publications.
- Van Cauwenberg, J., De Bourdeaudhuij, I., De Meester, F., Van Dyck, D., Salmon, J., Clarys, P., et al. (2011). Relationship between the physical environment and physical activity in older adults: A systematic review. *Health & Place, 17*(2), 458-469.
- Wang, Z., & Lee, C. (2010). Site and neighborhood environments for walking among older adults. *Health & Place, 16*(6), 1268-1279.
- Western Australian Planning Commission. (2007). Liveable Neighbourhoods: a Western Australian Government sustainable cities initiative. Retrieved April 4, 2011, from <http://www.planning.wa.gov.au/Plans+and+policies/Publications/1594.aspx>.
- Wilcox, S., Castro, C., King, A. C., Housemann, R., & Brownson, R. C. (2000). Determinants of leisure time physical activity in rural compared with urban older and ethnically diverse women in the United States. *Journal of Epidemiology and Community Health, 54*(9), 667-672.

Table 1

Characteristics of Identified Retirement Villages ($n=10$)

<i>Operation Time (years)</i>	<i>Living Units (count)</i>	<i>Neighborhood Socio-economic Status (decile)^a</i>	<i>Neighborhood walkability (z-score)^b</i>	<i>Focus Group Participants (count)</i>	
A	28	69	7	-1.55	6
B	25	29	3	-1.32	0
C	13	227	10	-1.11	10
D	12	70	9	2.23	0
E	10	99	10	-1.93	8
F	8	159	9	7.78	0
G	8	98	9	1.54	7
H	7	121	7	-0.23	10
I	5	167	8	-0.84	10
J	3	150	10	0.82	0

^aSocio-economic status defined as the Australian Bureau of Statistics Socioeconomic Indices for Areas Index of Relative Socio-economic Advantage and Disadvantage; a higher decile indicates a suburb with a relative lack of disadvantage and greater advantage in general. ^bWalkability score consists of objective measures for residential density, street connectivity, and land-use mix; a higher score indicates a neighborhood more conducive to walking (i.e., higher walkability).

Table 2

Characteristics of Focus Group Participants ($n=51$)

<i>Characteristic</i>	<i>%</i>
Gender	
Male	41.2
Female	58.8
Age group	
<65 years	17.1
65 to 74 years	36.6
75 to 84 years	31.7
≥ 85 years	14.6
Duration of retirement village residency	
<2 years	15.7
2 to 4 years	37.3
5 to 7 years	27.4
≥ 8 years	19.6
Frequency of traveling outside or leaving retirement village	
Once a week or less	2.4
Few times a week	56.1
Daily	41.5