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The why and how of redesigning retirement communities for aging in place

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ABSTRACT

Continuing care retirement communities (CCRCs) typically offer three levels of care – independent living (IL), assisted living (AL), and nursing care. As resident health and abilities decline, relocation is required to obtain the next level of care. This is a cause for concern due to the numerous documented ill effects associated with relocating the elderly. These negative outcomes are due, in part, to social relationships being severed because of the relocation. This is relevant to designers because building design can go beyond supporting physical functioning and address social needs. This study explores how facility design might reduce need-based relocations by supporting aging in place. To support social needs for residents of varying capabilities, one design strategy is designing for walkability, that is, the ease of experiencing space on foot. With advancing age, decreased mobility commonly makes trips to interact with others more difficult, resulting in isolation. Thus, facilitating walkability is essential when designing for the entire life span. To identify design strategies to support residents aging in place, this paper examines evidence from a mixed-methods, correlational study (IL, $n = 179$ and AL, $n = 28$) of a Southeastern region CCRC. Data sources include resident surveys and site analyses. Phase 1 of this study indicated social space proximity to residents' living units, and daily paths of travel predicted how well social spaces were liked and used. Phase 2, which is the focus of this paper, expanded upon those findings by establishing travel distances to fulfill a need have both a fixed magnitude (actual distance) and perceived magnitude which varies according to user group capabilities. These findings advance the discussion of reconsidering CCRC design and indicate CCRC plan configurations must be carefully organized and scaled to support aging in place.

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Continuing care retirement communities; facility design; social space design; environment and behavior; walkability

Background

The gap in the CCRC continuum of care

Continuing care retirement communities (CCRCs) typically contain at least three levels of care – independent living (IL), assisted living (AL), and nursing care. Outwardly, it appears CCRCs offer housing types to fit elders of any ability level. The Executive

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Director of the CCRC investigated in this research expressed concern about the traditional stepped care model not fitting a subgroup of IL residents, who need more support than what IL housing provides but whose limitations do not require the more comprehensive and expensive AL level care (Antonucci, J. personal communication, 16 January 2012). Thus, this director was interested in seeking a housing solution to fill this gap, prompting the question: what is the optimal housing solution to address the needs of residents whose needs fall between AL and IL level care?

Currently in CCRCs, the intention is for aging residents experiencing physiological and/or other declines to relocate to a residence in the continuum's next level of care. This means, the youngest and healthiest residents typically live inIL, while those needing more care such as help with dressing, assistance with daily medications, or other activities of daily living move into AL, and those requiring more complex medical supervision transfer into nursing care. As some illnesses require only temporary care, moves back and forth along the continuum of care can occur many times. This means residents challenged most with illness and decline will be those most often relocated within the CCRC. Research has documented numerous ill effects associated with elderly resident relocation, which suggest this sequence of relocations inherent in the current care model may be detrimental.

Relocation of the frail and ill is much studied, with research findings showing a link between relocations and negative health and well-being consequences (Bernard, Hayward, Rosevear, Chun, & McMahon, 1996; Gordon & Rosenthal, 1996). In addition to being characterized by increased confusion in older adults, other outcomes resulting from relocation include anxiety and depression as well as apprehension and loneliness (Mallick & Whipple, 2000). A study of older adults in New Zealand provided some insight into why relocation causes such emotional upheaval indicating older people, in particular, draw meaning and security from the places they live, and the sense of belonging this generates which "…help maintain an individual's sense of identity, well-being, and facilitates successful adjustments in old age" (Wiles et al., 2009, p. 664). As this attachment and sense of belonging is strengthened over time, logic suggests rebuilding this to regain emotional equilibrium is important yet takes time to develop. Since CCRC's are based on a stepped care model necessitating relocations for declining residents, it appears prudent to consider other models for CCRC's if we are to promote optimum resident health and well-being.

In CCRCs, stepping through the continuum (i.e., moving from independent to AL when more care is required) is expected and a common practice. While part of the current model's appeal for older adults is the security of knowing AL and nursing services are readily available, should they be needed, and does this knowledge mediate the negative effects of relocation for CCRC residents? While the current model is largely unquestioned, existing research shows even relocating within a CCRC can be expected to have adverse effects similar to what an older adult is likely to experience moving from one facility to another. For example, Shippee (2009) studied three CCRCs to examine resident experiences in the transition from IL to AL and found resident transfers within a CCRC were '…disruptive to their sense of home, their social interaction, and sense of autonomy' for those residents (p. 10). Additionally, this study reported residents had not anticipated the 'disempowerment and social dearth' associated with AL or nursing care (Shippee, 2009, p. 10). This suggests that while a CCRC resident may, in theory, value the security CCRC's levels of care offer, the reality is unexpectedly challenging.

As evidenced by the success of CCRCs in general, CCRC residents have accepted this stepped care model to some degree. With that, it could be argued that relocating to get needs met is what these older adults want – suggesting there is a market drive to continue the current CCRC model. With research establishing a case for the need to reduce relocations and even indicating moves within a CCRC are problematic, there is a need to at least examine whether CCRCs' IL residents prefer to transition into AL when more care is needed. By comparison, the vast majority (90%) of older adults living in traditional housing report preferring to age in place even if they experience health and ability changes that necessitate more assistance or monitoring (Farber, Shinkle, Lynott, Fox-Grage, & Harrell, 2011). Given relocation from IL to AL within a CCRC brings many of the same challenges as moving from traditional housing to a CCRC, including downsizing belongings, learning new staff, routines, and surroundings, plus forming new friendships and perhaps losing old ones, perhaps IL residents also prefer to age in place.

Exploring aging in place in IL

For aging in place to be possible, living environments must be designed to support resident needs over the full course of the life span. Designers' training and experience with universal design and application of accessibility guidelines have guided design of CCRCs with regard to providing for resident physical and safety needs. For example, CCRCs offer accessibility features such as handrails in corridors, grab bars and nonslip surfaces in bathrooms, no-step entries between spaces, non-glare surfaces, and higher levels of non-glare lighting to support residents' physical needs for competent and safe functioning within the retirement community facility. Beyond addressing physical needs in the built environment, research points to the importance of meeting social needs by consistently supporting quality social interaction as it has been shown to strongly impact life satisfaction, particularly in old age (Aquino, Russell, Cutrona, & Altmaier, 1996; Jang, Mortimer, Haley, & Borenstein-Graves, 2004). More recent research further emphasized the magnitude of this problem by indicating higher life satisfaction was a significant predictor of lower mortality risk (Collins, Glei, & Goldman, 2009). Not only does this establish the magnitude of relocation-related ramifications and the social challenges they present, but also emphasizes the importance of addressing social needs through supportively designing facilities for older adults. In designing to address seniors' needs, designers have plentiful ergonomic and anthropometric data to guide designing for people's various physical needs and capabilities. Yet there is much less data about design attributes supporting social interaction for CCRC residents.

One environmental design attribute that has been found to support social needs in traditional housing is neighborhood walkability. Walkability refers to how easily an area can be experienced on foot. Burton and Mitchell (2006) found walkable neighborhood communities contributed positively to mental health by providing opportunities for informal interaction with neighbors and shopkeepers in the community in addition to other benefits, such as supporting feelings of autonomy, dignity, and self-worth. Research also indicates that the interactions with neighbors, friends, and acquaintances that walkable communities provide are important in meeting social needs. For instance, Lund (2002) found a positive relationship between walkability and sense of community and belonging. Since increasing age is commonly accompanied by decreases in strength

and stamina which reduce physical mobility, this makes meeting the goal of providing walkable retirement communities more complicated. Physiological changes many older adults experience can make traveling to communal social spaces difficult, often resulting in increased social isolation. Thus, walkability in CCRC designs is a key component to supporting successful aging.

In a study of social spaces within a Midwestern CCRC (Campbell, 2014), IL residents were surveyed about how much they liked and used selected social spaces within their retirement facility. Those results supported Lund's (2002) findings by indicating that residents liked and used social spaces more when they were located along their daily paths of travel and judged to be in close proximity to their residences. Replication of the Midwestern U.S. study was conducted as the first phase in a larger study of a U.S. Southeastern region CCRC to confirm earlier findings (Campbell, 2015).

Building on those findings, this paper examines the second phase of the Southeastern region CCRC study examining the link between the variables comprising "walkability" (the home range variable) and how well social spaces were liked and used. Using data gathered by IL and AL resident surveys, this portion of the research compared IL and AL residents' perceptions of CCRC social space distances to their residences for the purpose of quantifying what distance residents of varying ability levels judged to be conveniently located. It was expected that perceived distances may be influenced by resident ability levels. These data were intended to lead to more concrete guidelines for designers, as they develop CCRC plan configurations and spatial relationships.

A theoretical framework for understanding how to design to support CCRC residents' social needs

From the Midwestern and Southeastern CCRC studies, a theoretical framework, called the "Successful Social Space Attribute Model", (Campbell, 2014, 2015) was proposed, then tested which defined factors predicting how well CCRC social spaces were liked and used. Figure 1 illustrates the Successful Social Space Attribute Model and the components proposed to influence the social lives of retirement community residents.

While discussion of the theoretical framework in full is outside the scope of this article, the research being reported here is guided by the framework's *factors unique to the individual* (FUI) component. This component considers factors that are singular by nature, but can be planned for as a group such as proximity of social spaces to each resident's apartment, and factors related to an individual's experience in a facility such as residents' daily paths of travel.

The Midwestern study and phase 1 of the Southeastern CCRC study identified only two consistent factors unique to the individual that predicted how well social spaces were liked and used. One was active engagement opportunities which include informal ways to comfortably engage with one another and the built environment. Whether engaging in a game of Bridge with friends or conversation with an acquaintance over a pastry, people tend to interact more comfortably when there is a reason to be in a space, which also can provide a topic for conversation. The other significant predictor, known as home range, is a combined variable made up of perceived proximity of social spaces to resident daily paths of travel and perceived proximity of social spaces from resident apartments. These two proximity variables

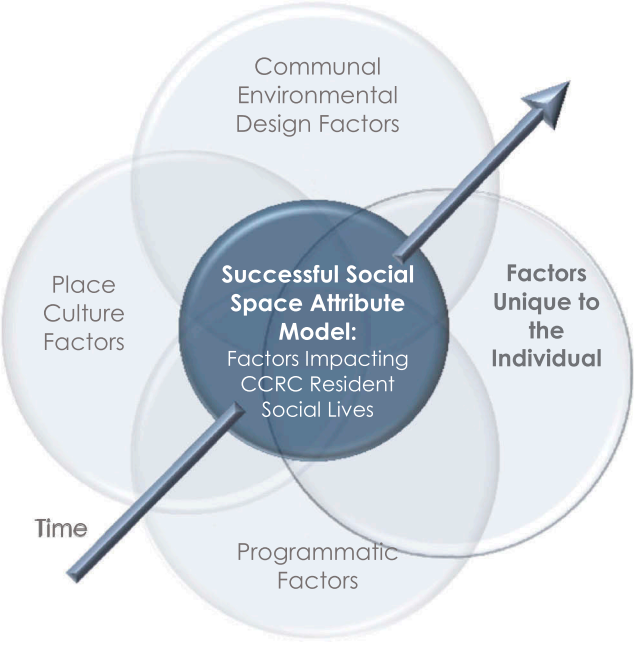

Figure 1. The successful social space attribute model illustrating the proposed components influencing the social lives of retirement community residents. Factors unique to the individual (in bold) was the focus of this study.

were so highly correlated that they needed to be combined to form a single variable. (These needed to be combined for the phase 1 multiple regression analysis to avoid problems with multicollinearity.) This home range finding suggested social spaces within convenient, walkable distances within the retirement community were more well liked and used than less conveniently located spaces.

To further the usefulness of these findings, phase 2 of the Southeastern CCRC study, which is the focus of this paper, sought to develop a deeper understanding of the perceptions of walkability, the home range factor, and the relationships with social connectedness. These factors were addressed by including a survey of AL residents, collecting distance measurements in IL and AL, and expanding the analysis of the IL data. Specifically, it compared IL and AL perceptions of social space proximity to understand how these two group perceptions varied. Since AL residents need more daily living assistance, it was assumed this group was less physically capable than IL residents who were able to live independently without such assistance. Based on these differing ability levels, it was anticipated the two groups' perceptions would vary from one another.

To illustrate the portion of the Successful Social Space Attribute Model that is relevant to this discussion regarding the phase 2 portion of the study, Figure 2 calls out the factors unique to the individual category as well as the two specific predictor factors, active engagement opportunities and home range, which were shown in earlier research, to predict how well social spaces were liked and used.

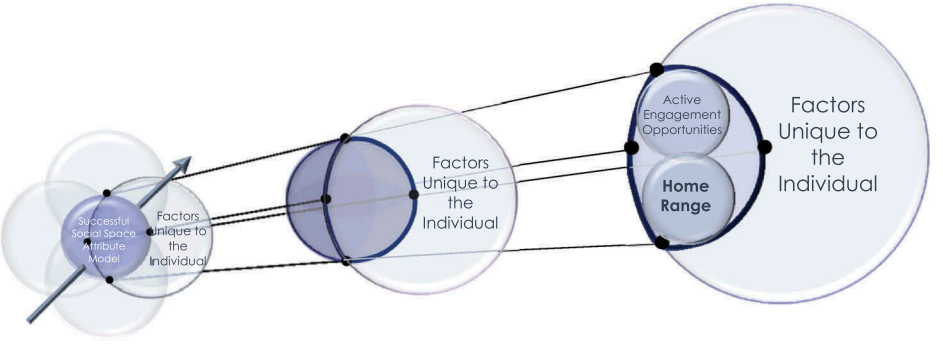

Figure 2. The factors unique to the individual as they relate to the successful social space attribute model as a whole.

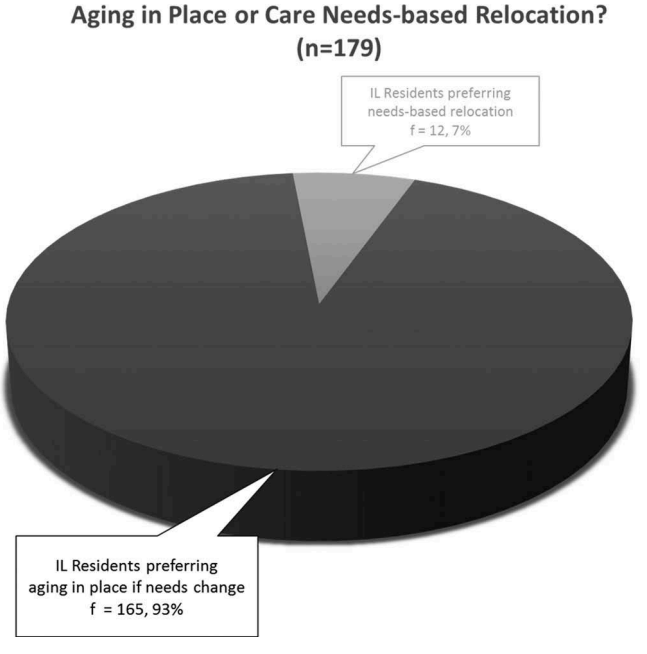

Figure 3. Frequencies for independent living resident reported housing preferences for meeting care needs if capabilities change.

To consider whether aging in place may be a desired model for CCRCs rather than the current stepped CCRC model, the research first needed to address the housing and care preferences of older adults. With this, the research also surveyed IL residents regarding the desirability of aging in place advancing through the continuum of care as needs change. As older adults experience many of the same stressors associated with relocation, whether within a CCRC or from one facility to another, it was expected residents would, like their cohorts in traditional housing, prefer to age in place with needed services brought to them. Results from this question are illustrated in Figure 3. This study question focuses on whether there may be a market push for aging in place within CCRCs just as there is for the elderly living in the larger community.

Methods

Participants and procedure

The study presented here was the second phase of a larger study focused on a Southeastern Region CCRC. Residents studied were predominantly upper middle class, Caucasians. While this CCRC offered IL, AL, and Alzheimer's care, only IL and non-Alzheimer AL residents served as survey data sources. Of the 40 AL residents, 28 participated, reflecting a 70% participation rate. Ages of the 7 male and 21 female AL participants ranged from 70 to 100+, with the majority (52%) between the ages of 80 and 89. Of the 445 eligible IL residents, 179 residents (40%) completed surveys. The IL participants included 58 men and 121 women ranging in age from 56 to 100 years with the majority (64%) between the ages of 80 and 89 years.

Like most planned retirement communities, this CCRC's resident population has limited racial diversity, a narrow socioeconomic status range, plus other sociodemographic qualities. Consequently, this study's findings may only be relevant to CCRCs with similar resident populations and would require replications with different populations to be more generalizable.

Announcements and notices were posted around the CCRC to make IL and AL residents aware of the study and invite them to participate in the survey. Since some AL residents have mild memory issues, retirement community staff also reminded the AL residents about the study on the day of the survey event. The data reported here were collected as part of the larger study's survey. The survey instrument was administered in person, one-on-one using Survey Monkey and a computer tablet.

The aging in place preference issue was addressed very directly with a survey question asked only of the IL residents. Specifically, it asked: if their needs should change, would they find it more desirable to continue to live in their current residence with additional services available to them there, move into the CCRC's AL facilities, or move into some other housing option? The remainder of each survey instrument addressed questions aimed at how CCRC designs might need to be restructured to better support resident social needs to meet varying abilities across the life span, either in a traditional model CCRC or one set up for aging in place. The overall resident surveys for the IL and AL resident groups were modeled after those used in the earlier study of a Midwestern CCRC (Campbell, 2014). In that research, residents were asked about their use and liking of selected social spaces within their CCRC. Also like that earlier study, the social spaces asked about in the survey were those selected via focus groups comprised of residents and staff members. By consensus, these focus groups identified the three most and three least successful settings within their CCRC community (IL or AL) for the groups they represented. During survey administration, subjects were shown images of these selected spaces to assure they answered questions with reference to the correct social space. In addition to modeling the survey treatments used in the earlier study, the surveys for IL and AL subjects were pilot tested and revised to ensure that questions were clearly understood and to further support construct validity.

Both IL and AL resident subjects were asked to rate how much they liked and used each of the social spaces selected for the study. See Table 1. Like and use served as the dependent variables and were rated by subjects using 5-point Likert scales, with 1 representing not liked and never used, and 5 representing most liked and very often

Table 1. The dependent variables and corresponding survey questions.

Dependent variable	Questions	Rating scale
Like	"How well do you like each space?"	(1) Don't like it – (5) Love it
Use (combined variable):		
Visit frequency	"For reasons other than to participate in The Village staff scheduled activities, how much do you visit each space?"	(1) Never – (5) Very often
Visit length	"During casual visits (not including visits to attend The Village staff scheduled activities) how would you characterize the amount of time you usually spend in each space during your visits?"	(1) None – (5) Very much

Table 2. The independent variables and corresponding survey questions.

Independent variable	Questions	Rating scale
Home range (combined variable):		
Proximity to home*	"How close is each space to your apartment home?"	(1) Very far – (5) Very near
Proximity to daily travel path*	"How conveniently located is each space in relationship to other places you go on a daily basis within The Village (e.g., mailboxes, parking, etc.)?"	(1) Not convenient – (5) Very Convenient

*For the multiple regression portion of the analysis, the proximity to home and proximity to other places visited daily variables were summed to make a single variable, called home range. This was to avoid problems with multi-collinearity. For the descriptive statistical analysis, these variables were kept separate.

used. Additionally, residents used a 5-point Likert scale ranging from none to very much to indicate the length of their visits to each space.

To address the goal of replicating key findings from the previously mentioned Midwestern CCRC study, the first phase of this Southeastern CCRC study necessitated the study's survey instruments include questions that might reveal similar relationships between the like and use ratings of both IL and AL to (a) their ratings of social space distance from their individual residential living units, and (b) the proximity of social spaces to their daily paths of travel. As in the Midwestern study, phase 1 of the Southeastern CCRC study combined these same two highly correlated distance variables. See these combined variables and their corresponding questions in Table 2. These were on the same metric and were summed to make a single variable, called home range, for use in the multiple regression analysis to predict variance for how well social spaces were liked and used. Further discussion of the phase 1 analysis is outside the scope of this paper and is addressed fully in the article reporting that portion of the Southeastern CCRC study (Campbell, 2015).

Specifically for phase 2 of the Southeastern CCRC study, additional measurements of the actual distance between social spaces and individual residences were made so the issue of whether perceptions of distances varied with respect to a residents' abilities, distinguished by being an IL or AL resident, could be examined. For the purpose of analysis, these measurements were categorized into a 7-point Likert scale, as shown in Table 3. For phase 2, the main goal was to extend understanding of the issue of home range and the potential spatial design implications. This could be used to inform

Table 3. Distance measurements and corresponding Likert scale.

Range in miles	Range in feet	Likert scale
0-1/64	0-82.5′	7
>1/64-1/32	82.6-165′	6
>1/32-1/16	166-330′	5
>1/16-1/8	331-660′	4
>1/8-1/4	661-1320′	3
>1/4-1/2	1321-2640′	2
>1/2-1	2641-5280′	1

support guidelines for design which encourages social interaction for individuals aging in place. Consequently, this is the central focus here.

Data analysis

To answer the straight-forward question of whether IL residents preferred to age in place, resident responses were simply defined by a frequency distribution. Understanding of other issues of interest in this study required more in-depth analyses. In addition to multiple regression analyses of the IL data which took place in phase 1, data from both the IL and AL residents' surveys were further analyzed using descriptive statistics. In these analyses, missing data were managed with multiple imputation. While no outcomes were imputed, SPSS utilized all data in order to predict what the missing other data were likely to be in the imputation of the missing values. Due to the sheer number of variables which produced more opportunities for missing data, multiple imputation was more appropriate here than a simpler method such as listwise deletion.

In the first phase of this study, a multiple regression analysis calculated with SPSS software R version 2.15 was used to identify statistical predictors of how well social spaces were liked and used by IL residents. This statistical procedure could only be used with data from the larger group of IL residents (n = 179), and could not be applied to data from the AL group due its smaller number of participants (n = 28). This phase of data analysis confirmed the earlier Midwestern study's finding that home range was one of two key predictors of how well social spaces were liked and used by IL residents (n = 179). Further discussion of the regression analysis is outside the scope of this paper but is fully addressed in depth in a separate article reporting phase 1 of the Southeastern CCRC study (Campbell, 2015).

Both the IL and AL data sets included self-reported resident perceptions of how far or near social spaces seemed to their individual residence and their daily paths of travel within the retirement community. Descriptive statistics were used to discern whether actual social space distances were similarly perceived by the two resident groups. This was intended to show if perceived proximity differed by capability level, assuming the AL residents to be less able than IL residents.

Results

With regard to the question of how best to meet older adults' housing needs in CCRCs, this study's findings suggest IL residents, like their cohorts in traditional housing situations, prefer to age in place. Of the 179 IL survey participants, 165 (or 93%) reported

preferring to continue living in their current residence with additional services available there should their needs change.

The first phase of the Southeastern Region CCRC study (Campbell, 2015) confirmed the Midwestern CCRC study's (Campbell, 2014) finding that home range was one of two significant variables predicting how well social spaces were liked and used. In addition to home range, the other significant predictor was active engagement opportunities. While the home range variable was formed by summing the two highly correlated distance variables, these variables were analyzed as individual measures in phase 2 of the Southeastern Region CCRC study. This was done so that differences between perceptions of IL and AL residents for each distance variable could be revealed. Data for both groups indicated a positive relationship between how well social spaces were liked and used with both how near the social spaces were perceived as being to the residents' homes and to their daily paths of travel. More specifically, the IL residents' (starting sample size was n = 179, though the total number for each space varies because residents who did not go to those spaces were not counted) data showed the perceived proximity of social spaces from their residence was positively related with how well spaces were liked and used (see Table 4). The IL data also showed a positive correlation between resident daily path of travel with and how well spaces were liked and used. Similarly, the AL resident (n = 28) data for the six social spaces indicated the perceived proximity of social spaces from their residence was positively related with how well spaces were liked and used. Further, data from AL residents also showed a positive correlation between resident daily path of travel with and how well spaces were liked and used.

To further the usefulness of these findings, an analysis comparing perceived proximity of social spaces to residence to actual measured distances between residences and social spaces was done. Distance perception ratings of IL and AL residents were examined to determine if the difference in their ability levels impacted what is perceived as near or far from their residences. Comparison of actual distances of social spaces from residents' living units to residents' perceptions of distances showed actual distances were perceived as farther away by AL residents than IL residents. IL residents considered social spaces far when located 1/4–1/2 of a mile (1320–2640 ft) away from their residences and considered spaces 1/16–1/8 miles (330–660 ft) nearby. In contrast, AL

Table 4. Correlation summary of relationship ranges between perceived proximity variables with how well spaces were liked and used.

	Independent living n = 179*		Assisted living n = 28*	
	Liked How well social spaces were liked	Used How well social spaces were used	Liked How well social spaces were liked	Used How well social spaces were used
Perceived proximity of social space from resident home	.04–.44	.17–.51	.08–.75	.03–.60
Perceived proximity of social space in relationship to other places in the CCRC visited daily	.01–.45	.22–.55	.07–.94	.03–.75

* The n reported is the starting sample size. The n for each space varied because residents who did not go to those spaces were not counted.

residents considered spaces located 1/16–1/8 miles (330–660 ft) from their residences as far, and considered spaces 1/64–1/32 miles (82–165 ft) away to be close.

Discussion and conclusions

Continuing care retirement communities (CCRCs) have the intended purpose of providing appropriate housing for a wide range of resident ability levels. They do this using a three-stepped care model, which provides housing in IL, AL, and skilled nursing care units, depending on the resident's needs and abilities. Even with the variety of care levels, CCRCs do not always provide an ideal option for all residents. As pointed out by the Executive Director of the Southeastern region CCRC examined in this study, there is often a gap in accommodating a subgroup of residents who require more services than are available in IL, but do not need the full scope of care services provided in the AL unit (Antonucci, J. personal communication, 16 January 2012). To fill this gap in the continuum, IL residents' health and well-being must be considered as well as the preferences of this group. With these priorities, this research sought to understand how to optimally meet this CCRC's resident group's housing and care needs. More specifically, this study investigated one aspect of the challenge to meeting seniors housing and care needs – supporting the residents' critical need for social interaction through the physical environment.

One potential way to meet this group's care needs would be to add a fourth level of care into the continuum. Since this option would introduce another residential relocation into this care model, it is important to understand the ramifications associated with relocations for increasingly frail older adults. Numerous existing studies indicate relocation, especially when sudden and unexpected, is associated with negative outcomes such as increased depression, serious illness, and elevated mortality risk (Bernard et al., 1996; Gordon & Rosenthal, 1996). Other reported outcomes of relocations include anxiety, apprehension, and loneliness (Mallick & Whipple, 2000). Additionally, research indicates relocation causes emotional upheaval, disrupting an older individual's well-being and ability to adjust successfully (Wiles et al., 2009). These consequences are due in part to the break with existing social ties and the need for the lost social connections that were displaced by the residential relocation. Since CCRC's stepped model already requires numerous relocations, it stands to reason that even without adding a fourth level of care and correspondingly another resident relocation, the current care model may not optimally support health and well-being.

While disrupting the social network of any aged person would be a cause for stress, maintaining social relationships in later life is especially important for older adults. This is because the influence social interaction has on older adults' health has been found to be greater than it is on the health of younger adults (Lee, Jang, Lee, Cho, & Park, 2008). The literature also shows that social interaction, particularly in later life, strongly impacts life satisfaction and overall quality of life (Aquino et al., 1996; Jang et al., 2004). The importance of meeting these needs is reinforced by further research conducted by Collins et al. (2009) which identified higher life satisfaction as a significant predictor of lower mortality risk. This indicates the magnitude of this issue and further underscores the need to understand how to support CCRC resident social relationships and the interaction they provide for seniors.

Since addressing older adults' social needs have been shown to be particularly important in retirement community contexts, this is an important topic for study. For instance, research of an AL facility found "contact with friends and family outside the facility did not significantly impact life satisfaction, but positive internal social relationships were associated with significantly higher life satisfaction" (Street, Burge, Quadagno, & Barrett, 2007, p.133). In other words, there is much value in promoting relationships within a retirement community since these relationships come to hold greater value over time than relationships outside the community. It is likely that awareness of the substantial impact social interaction has for older adults is one reason that designing communities to support older adults' abilities to interact socially has become an increasingly discussed strategic issue. For instance, the Active Aging Initiative of the World Health Organization (WHO, 2002) highlights the importance of this topic by stating the goal of supporting the older adult population with "…housing in communities that encourage daily social interaction."

In addition to a supportive, vibrant retirement community social scene offering benefits for residents, there are benefits for the retirement community organization as well. Research on naturally occurring retirement communities (Hunt & Ross, 1990) found enriching and enlivening retirement community social scenes both increased the desirability of the retirement community as a housing option and helped maintain resident satisfaction with their retirement housing choice. This means the quality of a retirement community social scene has crucial implications for the overall financial success of the organization. All these positive benefits of social interaction point to the importance and value of those aspects of this study that focused on understanding how design of a retirement community can better support social interaction.

Beyond these health and well-being reasons for reducing relocations, this study's findings suggest a market demand exists for the option of aging in place within IL. Despite residents choosing to reside within a stepped residential continuing care structure, it appears we cannot assume CCRC residents are more accepting of need-based relocations. In fact, 93% of IL survey respondents (n = 179) preferred the aging in place option rather than moving to either AL or some other housing option. This is slightly higher than the 90% of traditionally housed older adults reporting the same preference – to be able to age in place (Farber et al., 2011). This market demand alone may be the impetus for a shift in how CCRCs are structured and designed. With findings indicating that IL residents prefer to remain in the IL unit should their needs change, this study's findings suggest that a CCRC model that permits aging in place might be a desirable solution to the problem identified by the Southeastern CCRC Executive Director.

As this study addressed meeting social needs for retirement community residents, the theoretical framework driving this research was the Successful Social Space Attribute Model (Campbell, 2014) which considers groups of key factors that influence the social lives or retirement community residents. To confirm and build upon the Midwestern study's findings, a two-phase study of a Southeastern CCRC was conducted. In addition to findings further supporting the usefulness of the theoretical framework proposed and tested previously, this study supported Lund's (2002) finding that walkable neighborhoods contribute to residents experiencing a greater sense of community and belonging, and more specifically showed that social spaces nearer to IL residents' home ranges

were better liked and used than those at greater distances. As previously stated, home range was a combined variable consisting of two highly correlated variables: perceived distance of social space to one's residence and perceived proximity of the social space to one's daily path of travel.

In a related study, Kaczynski and Glover (2012) found a positive relationship between the perceptions of walkability and social connectedness. This 2012 finding is important as it suggests actual distances are not the only factor influencing walkability and social connectedness, but additionally the perceptions of walkability are important as well. Building on this body of earlier research, the Southeastern CCRC phase 2 research extended understanding of the perceptions of walkability, the home range factor, and the connections with social connectedness. These factors were addressed by including a survey of AL residents, collecting distance measurements in IL and AL, and expanding the analysis of the IL data. Specifically, it examined perceptions of social space proximity of both independent and AL residents, and through comparison showed how perceptions of the two groups differed. It was assumed that those living in AL, and thus needing more daily living aid, were of lesser ability than residents able to live more independently. Comparing home range perceptions of the two groups indicate how home range findings may be useful to take into consideration in the planning and design of CCRCs using an aging in place model. Further, phase 2 of this study quantified those perceptions via comparison to actual distance measurements, making findings more meaningful to facility designers.

As expected, this study's phase 2 findings indicated AL residents perceived social spaces as being located further away from their residences than the IL residents who, as a group, are more physically able. While IL residents considered social spaces located no further than 1/161/8 mile (331660 ft) from their residences as close, AL residents considered spaces at that distance to be far away. AL residents did not consider social spaces to be nearby until they were within 1/641/32 miles (82.5165 ft). This difference in perceptions likely reflects the mobility and strength declines often characteristic of AL residents, and thus the greater challenge of getting about in the CCRC.

Oswald et al.'s research (2007) pointed out the substantial impact of the magnitude of accessibility challenges in supporting healthy aging. The quantitative component of this research builds on that finding by showing the environmental obstacle of distance to travel to fulfill a need has both a fixed magnitude (actual distance to social space) and a perceived magnitude. To plan effective social spaces, CCRC designers must be able to relate the two and accommodate how the perceived magnitude changes as residents' capabilities decline with advancing age.

In concrete terms, this research's findings indicate location of CCRC social spaces within the facility layouts play a vital role in their successful usage and in turn the community's overall social atmosphere. While specific distance parameters cannot be used prescriptively, and must be confirmed through replication of this research in other settings, these findings do imply important points regarding CCRC facility design. For instance, management and designers should understand that situating social spaces to accommodate the home range variability based on residents' ability level may likely contribute to the success of the retirement community's social scene. This would apply whether designing a traditional CCRC with a stepped care model including independent, assisted, or nursing care units with their own home range and social spaces, or whether

designing a CCRC planned for aging in place, where residents' abilities, and in turn extent of home ranges, will change over time.

Since this study focused on a single retirement community, with a very specific population profile, additional research is needed to confirm the desire for aging in place by IL residents in the broader CCRC market. Knowledge of a market push to age in place is important to developers, owners, and CCRC management, as well as to agencies setting housing and healthcare policies. It should spur actions to identify and plan for a wide range of requirements and ramifications for bringing needed care services to residents remaining in CCRC IL longer. One important issue to explore is how to design facilities for a new retirement community model. To allow aging in place within a CCRC, designers of IL housing will need to understand how to accommodate and support residents with changing and more varied ability levels rather than creating residential units segregated exclusively by need.

Based on this research, also one could infer buildings intended for residents aging in place would likely be more supportive if floor plans are compact and centrally organized versus expansive and linearly organized. More compact plan configurations would make distances to communal social spaces shorter and more comfortably walkable by residents, even as residents become increasingly frail. To further support walkability for residents of varying ability levels, it may be helpful to have the social spaces located nearest to residential units serve multiple purposes and host the most desirable amenities and space types. This puts key social spaces within a convenient distance or home range for more frail residents. For instance, a dining room, which residents already use multiple times per day, could also be used in the hours between meal times as a coffee/snack café. Since single-purposed spaces like dining rooms tend to sit empty except for meal times, this multipurpose approach helps these spaces make a bigger contribution to the social scene by remaining active throughout more hours of the day.

While the potential for design implications to be drawn from this research is exciting, findings need to be confirmed by future work. Studies should examine CCRCs in different locales reflecting different cultures and subcultures, and with populations of different socioeconomic profiles. Additionally, veracity of findings should be augmented with data other than self-reported perceptions of volunteer subjects. For instance, this augmentation could be accomplished with replication which includes observational data of resident behavior in addition to the surveys. It would also be useful to confirm results with larger groups of AL residents. Future research should also expand the scope of inquiry to include exploration of design characteristics beyond the home range concept and its implications for spatial organization and relationships. It should also seek to identify other design characteristics that impact liking and use of social spaces. As with perceptions of distances and the extent of one's home range, it could be expected that characteristics that make a social space desirable and manageable by a resident may change as their abilities change, so these aspects should be considered with regard to difference in resident needs and preferences across the life span as well.

From a theory development standpoint, the findings from this study flesh out the *factors unique to the individual* component of the Successful Social Space Attribute Model. In addition to further exploration of this portion of the framework, there is much room for study and development of the other components forming the Successful Social Space Attribute Model and considering how these other factors relate

to what we now understand about the factors unique to the individual, such as the relevance and importance of home range.

In conclusion, this research adds to the conversation exploring aging in place within CCRCs. It also shows one way the CCRC plan layout impacts social interaction, and suggests concrete direction for how to design in ways that encourage and facilitate resident use of social spaces, now and in the event aging in place becomes a new model for CCRCs.

Disclosure statement

No potential conflict of interest was reported by the author.

Notes on contributor

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