

# Perceived Accessibility to Services and Sites Among Israeli Older Adults

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## Abstract

**Objective:** To explore the direct and indirect effects of settlement type (rural-kibbutz vs. urban mid-size cities) on perceived accessibility by sociospatial factors: (a) connection to the living area, (b) familiarity with the living area, (c) social participation, and (d) perceived safety of the living area. **Method:** A convenience sample of 279 older adults aged 65 and older was interviewed. Using bootstrapping, we tested the strength and significance of the conditional indirect effects of four simultaneous mediators of the relationship between settlement type and perceived accessibility. **Main Findings:** The relationship between settlement type and perceived accessibility was mediated by social participation and perceived safety of the living area. **Conclusion:** Policy makers should pay attention to the enhancement of sociospatial dimensions to improve the perceived accessibility of older adults.

## Keywords

settlement type, sociospatial integration, safety, subjective accessibility

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## Introduction

Over the last decade, many organizations and governments have encouraged the development of age-friendly social and physical environments to promote elder health, well-being, and ultimately the ability to age in place (Lehning, Smith, & Dunkle, 2015). Aging in place is defined as “remaining to live in the community, with some level of independence (e.g., receiving help from family members or caregiver, but without the need to move away from the community; Davey, de, Joux, Ganesh, & Arcus, 2004), rather than in residential care” (Davey et al., 2004). Most people prefer to “age in place” because it is seen as allowing older adults to maintain independence and autonomy, and as enabling them to stay connected to social support, including friends and family (Rantz et al., 2005).

One of the most important foundations in the ability of older adults to “age in place” is the satisfaction with and the perceived accessibility of services and sites in their living environment. Researchers have found that, often-times, older adults are less active than they want to be because the environment does not provide sufficient accessibility and poses obstacles. For instance, when the pavements are cracked and the area is not well-lit (Turel, Yigit, & Altug, 2007; Valdemarsson, Jernryd, & Iwarsson, 2005), older adults perceive their environment as inaccessible, and avoid going outside and using services in their living areas. This, in turn, prevents them from aging with dignity in their home settlements.

Research has shown that there is often a mismatch between objective and perceived distances and between objective and perceived accessibility (Ball et al., 2008; Boehmer, Hoehner, Wyrwich, Brennan Ramirez, & Brownson, 2006; Jones, Hillsdon, & Coombes, 2009; Scott, Evenson, Cohen, & Cox, 2007). The mismatch with regard to objective accessibility versus perceived accessibility might result from variations in how accessibility is conceptualized and measured, suggesting that knowledge about perceived accessibility is incomplete, especially at the individual-perceptual level (Wang, Brown, & Liu, 2015). Whereas objective accessibility commonly refers to the ease with which a site, location, or service can be reached, perceived accessibility refers to one’s subjective perception (e.g., a psychological perspective). Hence, perceived accessibility is based on the individual’s assessment of accessibility (which can be influenced by various preconditions, rather than on objective estimates; Lättman, Friman, & Olsson, 2016). For instance, fear of crime has detrimental psychological effects, it restricts personal freedoms by limiting how freely people move about their neighborhoods (Lotfi & Koohsari, 2009), and contributes to dissatisfaction with the neighborhood, the community, and overall life (Sirgy & Cornwell, 2002). Indeed, feelings of

safety were found as predictor of perceived accessibility (Lättman et al., 2016). Perceived accessibility may also be associated with a variety of social-spatial dimensions, such as (a) connection to the living area, (b) familiarity with the living area, (c) social participation, and (d) perceived safety of the living area.

The current study examines, “What factors and mechanisms contribute to the variations in perceived accessibility of older adults?” The article explores the relationship between settlement type and perceived accessibility to services and sites among older adults, and examines the mechanisms by which the social-spatial dimensions detailed above may relate to perceived accessibility. This is important because perceived accessibility has been associated with whether or not older adults leave their homes and take part in activities outside their home (e.g., neighborhood, settlements, etc.; Richard, Gauvin, Gosselin, & Laforest, 2008).

### *Objective Versus Perceived Accessibility*

Accessibility provides a measure that evaluates the relative opportunity for contact or use of services (Gregory, Johnston, Pratt, Watts, & Whatmore, 2009). Traditionally, accessibility has referred to the physical distance or proximity to a service with the goal of making it as short as possible (Gregory, Johnston, & Smith, 1986; Hass, 2009). Another definition, used in environment and planning architecture, concerns the simplicity with which activities in society can be reached, including trading areas, industries, and public services. This definition measures accessibility primarily in terms of distance and time (Pirie, 1979).

However, distance or time-based analyses do not take into account the multidimensional nature of accessibility. Conceptually, accessibility was developed as a construct, composed of both physical and nonphysical dimensions (Ferreira & Batey, 2007; Gregory et al., 2009; Wang, Brown, Mateo-Babiano, 2013). Aday and Andersen (1974) were pioneers who argued that perceived accessibility has connection to the social and geographic aspects of one’s surroundings, so that nonspatial attributes (social accessibility) influence people’s ability to obtain services. Similarly, Gregory et al.’s (2009) definition of accessibility takes into account the subjective aspect, and emphasizes the sociopersonal aspects of the concept, including potential language and cultural barriers, gender ideologies, skills, information, and other socioeconomic barriers (Wang et al., 2015).

Actual and perceived accessibility of the outdoor environment and the ability to act outside the home are fundamental to older adults, and provide many benefits that contribute to life satisfaction and feelings of well-being

(Rantakokko et al., 2010; Sugiyama & Thompson, 2007). According to the environmental gerontology theory (Lawton & Nahemow, 1973), good compatibility, namely, an adequate match between older adults and their surroundings (starting with the home, but also the living area) results in psychological well-being and better physical activity.

An accessible environment is very important to older adults to get out of the house. There are many reasons to leave the home, including enjoyment of sunlight, opportunities to obtain new information, physical exercise, and access to services such as older adult day clubs, clinics, or the gym, including meetings with friends, and recreational activities, such as shopping or coffee (Kweon, Sullivan, & Wiley, 1998; Sugiyama & Thompson, 2007). It seems that in many cases, older adults' physical and functional problems do not conform to the environmental characteristics (Valdemarsson et al., 2005). This is because oftentimes, advanced age is accompanied by physical disability. Hence, many older adults tend to stay at home and disengage from outdoor activities, because outdoor activities in unsuitable environments (e.g., no pavements, no street lighting, no benches, etc.) might cause them harm. In these cases, older adults might find themselves socially isolated (Lawton, 1990).

On the other hand, one of the main outcomes of an accessible or perceived accessible environment is the opportunity to take part in social interactions, which have been shown to be important to good health and even reduce mortality among older adults (World Health Organization [WHO], 2007). Although interactions and social activities can occur anywhere, social connections between neighbors tend to develop mostly as a result of short repeated everyday meetings, greetings, and short conversations. It seems that this kind of meeting occurs mostly outside the home (Chiu, Chen, Huangm, & Mau, 2005; Evans, 2009; Sugiyama & Thompson, 2007). People tend to get out of their houses if they have a positive image of their environment as being walkable and accessible (Richard et al., 2008).

Research concerning objective accessibility of older adults has identified accessibility problems that influence both rural and urban older adults (e.g., obstacles on the surface, uneven pavements, absence of benches, poor lighting, etc.; Valdemarsson et al., 2005). Despite this similarity, there are accessibility issues that differ between urban and rural settlements. Urban accessibility is better, when considering walkability, and the spread of and proximity to services and sites (Leyden, 2003). However, it is problematic with regard to safety issues (e.g., people's rudeness, heavy traffic, shared areas for walking, biking and driving and use of public transport, which is generally difficult for older adults because of service design and provision) and personal mobility difficulties (Broome, Worrall, McKenna, & Boldy, 2010). Rural settlements are characterized not only by fewer services and

sites and higher distance to reach them but also by greater safety from traffic and crime, and by greater walking opportunities (Maisel, 2016). The present study does not deal with objective accessibility but with perceived accessibility and its connection to sociospatial variables because people tend to leave their homes if they have a positive image of their environment as being a walkable-accessible environment (Richard et al., 2008).

Perceived accessibility represents subjective feelings, satisfaction, expectations, and perceptions. Past research has shown that objective accessibility, which is usually measured in traveling distance or time, often does not match with subjectively measured accessibility (perceived accessibility; Ball et al., 2008; Boehmer et al., 2006; Scott et al., 2007). For example, an empirical study in Melbourne, Australia, has shown that lower income urban residents were more likely to have mismatches between the perceived accessibility of the physical environment and its objective measures (Ball et al., 2008). In another U.K. study, residents of deprived neighborhoods, who lived closer to parks, tended to report less perceived accessibility to the parks and less frequent use of the parks compared with wealthier, but distant neighborhoods (Jones et al., 2009).

The mismatch may derive from several reasons. Perceived accessibility is influenced by the individual's socioeconomic (e.g., education) and sociodemographic (e.g., age, gender) characteristics (Byrne & Wolch, 2009). Other user-based variables associated with perceived accessibility include neighborhood characteristics, a personal sense of belonging to the community, and perception of safety (Chen & Jim, 2010; Chiesura, 2004). These findings indicate that people mismatch between objective and subjective distance and accessibility to certain facilities. The mismatch may result from variations in how accessibility is conceptualized and measured, suggesting that knowledge about accessibility is incomplete, especially at the individual-perceptual level (Wang et al., 2015). Possibly, researchers and older adults do not necessarily define accessibility using the same parameters. Perceived accessibility, sometimes even more than objective accessibility, is connected to variables concerning the sociospatial aspects of the home settlements. Sociospatial integration is a term used in reference to the overall integration, including sense of belonging, connection to the place, and social integration (Vitman Schorr, Iecovich, Alfasi, & Shamai, 2016).

### *Sociospatial Factors: Living in Places Where People Feel a high “Sense of Place”*

“Sense of place” is defined as the emotional bonds between people and places (Burholt, 2006). Different measures such as connection to the living area, familiarity with the living area, and in many cases, social participation reflect

a “sense of place” or “place attachment,” which encapsulates both spatial and social entities. *Connection to the living area* (or attachment to the living area) is expressed by close acquaintance with the physical environment together with strong feelings of belonging to a place, and being part of its social and cultural fabric for many years. These feelings develop in most cases after many years of residence (Shamai, 1991). According to Rowles’s (1983) theory of insideness, there are three dimensions of attachment to place (physical insideness, social insideness, and autobiographical insideness). Each dimension gives different aspects of connection to the place. The physical insideness refers to the intimate recognition and familiarity with the living area and awareness of every detail in the physical area (Rowles, 1983). Hence, part of being connected to a place is familiarity with the physical environment (Rowles, 1983). High connection and a sense of belonging to the living area have been found in some rural areas (Husband, 2001) but also in urban areas (Vitman Schorr et al., 2016). *Familiarity with the living area* means close acquaintance with the physical place. That kind of intimate familiarity with spaces comes from years of navigating in the same place and walking the same paths. It is more likely to occur in rural places (Husband, 2001).

A sense of place is also reflected in *social participation*, which is expressed in relationships with friends and family and in participation in social activities in the living area (Cavalli, Bickel, & Lalive d’Epinay, 2007; Toepoel, 2011). According to Rowles (1986), rural environments provide a supportive context for older adults, partly because of the availability of “indigenous social support networks” and a sense of identification as an “insider” and as “being known” that stems from residence in a low density environment. The stronger community bonds in rural settings can also stimulate volunteering, and civic participation (Rowles, 1986).

With regard to *perceived safety of the living area*, researchers have found that older adults who perceived their surroundings as being unsafe experienced their environment as not accessible, especially at nighttime (Risser, Haindl, & Stahl, 2010). Wennberg, Hyden, and Stahl (2010) have found that older Adults avoid places where they feel unsafe or are afraid to walk. Fear of crime and an unsafe environment make people immobile or cause them to choose the long way around (so that they feel the environment is less accessible; Lotfi & Koohsari, 2009).

The sociospatial variables that define the “sense of place” also have influence on the ability of older adults to age in place and on their quality of life. An environmental gerontology theory (Lawton & Nahemow, 1973) asserts that an interaction between personal competences and social and physical environmental conditions determine the extent to which a person will be able to age-in-place. For aging in place to work well, the living environment has

to facilitate the older adult's independence, well-being, and quality of life. Research by Liu, Everingham, Warburton, Cuthill, and Bartlett (2009) suggests that well-being and quality of life in later life are closely related to the physical environment, which is an important mediator of aging experiences and opportunities. The physical character of the living environment has a significant impact on the mobility, independence, and quality of life of older people living in the local community (Burton, Mitchell, & Stride, 2011). Long-term emotional attachments to environmental surroundings have also been shown to contribute to well-being in old age (Taylor, 2001).

Given their relationship with perceived accessibility and with settlement type, the above variables may be mediators of the possible connection between settlement type and perceived accessibility.

*Demographic, economic, and residential characteristics:* Finally, perceived accessibility is associated with the individual's demographic (e.g., gender, age, and marital status), economic (e.g., education; Byrne & Wolch, 2009), and residential characteristics (length of residence, living arrangements). Gender is included as a covariate, because men and women experience journey time and perceived accessibility differently (Curl, Nelson, & Anable, 2015). The literature also indicates that with increasing age, many older adults lose some of their abilities, become less mobile, and need help or devices to overcome their limitations (Lawton, 1990), so that perceived accessibility of the living environment decreases (Musselwhite & Haddad, 2010). Formal education is also associated with people's access to services (Johnston, Gregory, Pratt, Watts, & Whatmore, 2009). In addition, different studies have reported that residential characteristics might be associated with perceived accessibility; living alone is a risk factor for fear of falling (Austin, Devine, Dick, Prince, & Bruce, 2007). Length of residence (in a home or settlement) is associated with the connection and identification with the place (Rowles, Oswald, & Hunter, 2004). This, in turn, can relate to the perceived accessibility of that place. One study has shown that high familiarity and connection to the living place are strengthened by the length of residence (Husband, 2001).

### **Study objectives**

The aim of this study was to examine perceived accessibility to services and sites in the home settlements by comparing perceived accessibility of older adults living in rural (kibbutzim; plural form of the word Kibbutz) versus urban mid-size cities. Such a comparison is important because the home settlement (in its wider context) has multiple implications for the lives of older adults (Vitman Schorr, Iecovich, & Alfasi, 2013; Vitman Schorr et al., 2016;

Fitzgerald & Caro, 2014; Rowles, 1986; WHO, 2007). Perceived accessibility is essential for ensuring high quality of life in later life (Lotfi & Koohsari, 2009; Richard et al., 2008).

### *Hypothesis*

Controlling for background characteristics, settlement type relates to perceived accessibility directly and indirectly via four possible mediators: (a) connection to the living area, (b) familiarity with the living area, (c) social participation, and (d) perceived safety of the living area (see Figure 1 for the multiple mediation model).

## **Research Design and Method**

### *Population and sample*

This study was conducted in the north of Israel in six rural (kibbutzim) and two urban mid-size cities. The different settlements reflect diverse residential environments in terms of lifestyles, population density and size, percentage of older inhabitants, geographic locations, number of services in each place, and distances to the services.

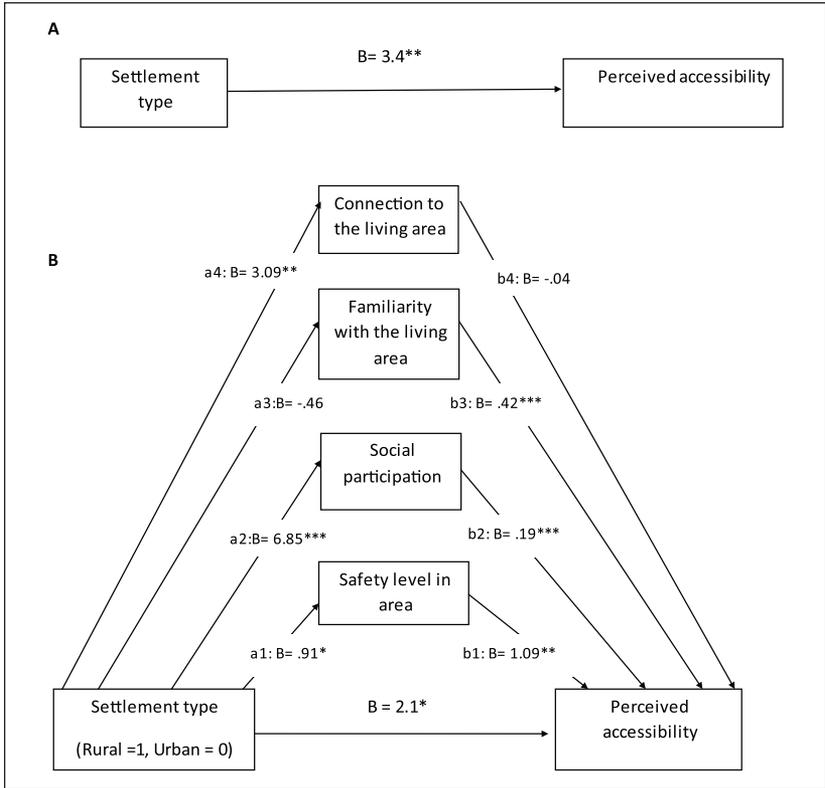
Inclusion criteria were age 65 and over, not having a disability that precluded walking, proficiency in Hebrew, and living in the place for at least 3 months.

A convenience sample of 279 participants aged 65 and over was recruited from different places in the north of Israel. It was composed of 110 participants from the six rural (kibbutzim) settlements and 169 participants from two urban mid-size cities.

### *Measures*

The questionnaire was based on previous studies (Vitman Schorr et al., 2013, 2016). Prior to data collection, a pre-test was conducted with 10 older adults who were asked to complete the questionnaire. The questionnaire was modified based on their feedback. Data collection was performed on different days of the week and at different hours of the day to capture as many diverse respondents as possible. Data collection lasted from December 2012 to April 2013.

*Dependent variable. Perceived accessibility to services and sites:* In order to measure perceived accessibility, we used the “neighborhood environment walk-ability scale” (NEWS; Saelens, Sallis, Black, & Chen, 2003). The scale



**Figure 1.** Multiple mediator model depicting direct and indirect effects of settlement type on perceived accessibility, controlling for background variables. Note. Graphic A depicts the total effect of settlement type on perceived accessibility. Graphic B depicts the direct effect of settlement type on perceived accessibility after including mediators and controlling for all background variables. Values represent unstandardized regression coefficients.

was composed of eight items concerning satisfaction with the ability to reach services and sites in the living area. Three items were taken from the original tool”: Are you satisfied with your ability to reach (a) mass transportation, (b) shopping centers, (c) entertainment opportunities?” Five additional items concerning ability to reach (a) family clinics, (b) professional health care clinics, (c) hospitals, (d) senior leisure activities, and (e) leisure activities were included because of their importance in evaluating perceived accessibility of the living area (Witten, Exeter, & Field, 2003). Likert-type scores for each item ranged between 1 (*strongly disagree*) and 5 (*strongly agree*), with

higher scores indicating greater satisfaction with accessibility to services and sites in one's living environment. A composite score for the total perceived accessibility scale was calculated based on the sum of scores for the eight items; scores ranged between 8 and 40. Internal consistency for the scale (Cronbach's alpha) was  $\alpha = .74$ .

*Independent variables.* *Settlement type* was elicited by asking respondents to indicate the name of their settlement. This was coded as (rural/kibbutz = 1 or urban/mid-size city = 0).

### Mediators

1. *Connection to the living area* was evaluated by five items taken from a tool by Young, Russell, and Powers (2004). The items were "I have a lot in common with people in my neighborhood," "I am good friends with many people in this neighborhood," "I like living where I live," "My neighbors treat me with respect," "People in my neighborhood are willing to help each other out." Likert-type scores ranged between 1 (*strongly disagree*) and 5 (*strongly agree*) with higher scores indicating greater connection to the living area. Scores ranged between 5 and 25. Internal consistency for the whole measure (Cronbach's alpha) was  $\alpha = .92$ .
2. *Familiarity with the living area*: This scale measured one's familiarity with the streets and location of services. One item was taken from Townshend's (1996) questionnaire ("Without looking at a street map how easy would it be for you to locate the nearest bus stop"). This was followed by five additional items: "locate: a) the nearest cinema or theater, b) houses of people you usually visit, c) different health services, d) nearest community center, e) nearest older adults club." Likert-type scores for each item ranged between 1 (*very hard*) and 5 (*very easy*), with higher scores indicating greater familiarity with the living area. Scores ranged between 6 and 30. Internal consistency for the whole measure was  $\alpha = .89$ .
3. *Social participation*: Taking part in social events, using social services, and meeting with friends and family. This variable was composed of 13 items, four from Townshend's (1996) questionnaire, and eight were added by the researcher according to the availability of services in the area ("When was the last time you took an educational course/visited the gym/adult club etc.?"), and one question concerning social activity in the previous month ("How many times in the last month have you participated in a social activity?"). Likert-type scores for each item ranged between 1 (*never*) and 5 (*more than once*).

a week) with higher scores indicating greater social participation in the living area. Scores ranged between 13 and 65. Internal consistency (Cronbach's alpha) was  $\alpha = .72$ .

4. *Perceived safety of the living area*: The variable is composed of one item taken from Townshend's (1996) questionnaire ("I feel safe walking alone in my neighborhood after dark"). Likert-type scores ranged between 1 (*strongly disagree*) and 5 (*strongly agree*), with higher scores indicating greater feelings of safety in the living settlement. Scores ranged between 1 and 5.

*Background variables* included gender, age, education level, marital status, living arrangement, and length of residence. *Education level* was measured in years, and dichotomized to 12 years or less = "0"; or more than 12 years = "1." *Marital status* was coded as with partner = "1"; or without partner (single, widowed, or divorced) = "0." Living arrangement was coded to living alone = "1"; or not alone = "0." Length of residence was measured by number of years living in the current place.

### Data Collection

Participants were recruited using two methods: In the rural (kibbutz) settlements, lists of all kibbutz members aged 65 and over were provided to the researchers by the kibbutz secretaries. A research assistant phoned each person on the lists, explaining the goals of the study and asked for their consent to complete a self-administered questionnaire. Appointments were made only with those who consented to participate in the study. In the urban mid-size cities, an experienced research assistant approached older adults on the streets and in public spaces (shopping centers, public gardens, etc.). They received explanations about the study goals and were asked for their age and their place of residence. If they were 65 or over and inhabitants of that particular place, they were asked to participate in the study (about 20 percent refused to participate, but no exact data were collected regarding refusal rate). It should be noted that the selection methods used in this study do not guarantee representativeness of the sample.

### Statistical Analysis

In the first stage, univariate analyses were performed to describe the sociodemographic characteristics of respondents and to examine the distribution of the study variables. Internal consistencies (Cronbach's alpha) of the measures were calculated. In the second stage, bivariate analyses were performed to

examine differences between different settlement types using an independent *t*-test or chi square test. Associations between two ranked variables were conducted using nonparametric tests—Spearman correlation test.

Multiple mediator analyses were then computed in which the four selected mediators—(a) connection to the living area, (b) familiarity with the living area, (c) social participation, and (d) perceived safety of the living area—were entered simultaneously to test the components of the mediation model, using the bootstrapping method to assess the indirect effects (Hayes, 2012; Preacher & Hayes, 2008). The multiple mediation model was examined by testing the significance of the indirect effect of the independent variable (IV; settlement type) on the dependent variable (perceived accessibility) through the four selected mediators described above. They were then quantified as the product of the effects of the independent variable on the mediators (*paths a*) and the effect of the mediators on the dependent variable. This partialled out the effect of the independent variable (*paths b*; see Figure 1), while controlling for background characteristics.

This method is based on regression analysis, calculating the direct effect (weight *c'*, with mediators), total effect (*c*, without mediators), and indirect effects ( $a \times b$  weights) of an independent variable on a dependent variable. The total and specific indirect effects were calculated through a bootstrapping set at 5,000 samples. Confidence intervals were calculated using this method by sorting the lowest to highest of these 5,000 samples of the original dataset, yielding a 95 percentile confidence interval (if the number 0 falls within the confidence intervals, the tested effect would be nonsignificant).

## Results

Table 1 shows that the majority of the participants were women; most had a partner (62%). Age ranged between 65 and 101 ( $M = 74.4$ ,  $SD = 6.9$ ). Years of education ranged between 0 and 23 ( $M = 12.9$ ,  $SD = 5.0$ ). About 61% lived in urban places, and the others in rural (kibbutzim). Most lived with a family member (65%). Length of residence in the neighborhood/settlement ranged between 1 and 87 years ( $M = 43.3$ ,  $SD = 21.2$ ).

Table 1 shows the characteristics of the entire sample and differences across settlement type. There were significant differences based on settlement type with regard to age, living arrangement, and length of residence. Age and length of residence were lower in the urban group, compared with the rural group. Living alone was more common in the urban group, compared with the rural group.

Table 1 also shows the descriptive statistics of mediators and dependent variable of the overall sample, and differences between urban and rural area.

**Table 1.** Descriptive Statistics of Study Variables in Total Sample and by Settlement Type Using Chi-Square Test and Independent T-Test (N = 279).

Background characteristics	Total sample	Settlement type		p value
		Urban (N = 169)	Rural (N = 110)	
Gender—n (%)				
Men	99 (35.5)	53 (31.4)	46 (41.8)	.08
Women	173 (62.0)	111 (65.7)	62 (56.4)	
Missing value	7 (2.5)	5 (2.9)	2 (1.8)	
Age—n (SD)	74.4 (6.9)	73.3 (6.5)	76.0 (7.2)	<.001
Education—n (%)	12.9 (5.0)	12.7 (5.7)	13.2 (3.9)	.45
Marital status—n (%)				
Without a partner	94 (33.7)	56 (33.1)	38 (34.5)	.93
With a partner	173 (62.0)	104 (61.5)	69 (62.7)	
Missing value	12 (4.3)	9 (5.4)	3 (2.6)	
Living characteristics				
Living arrangement—n (%)				
Alone	95 (34.1)	118 (69.8)	64 (58.2)	.04
Not alone	182 (65.2)	50 (29.6)	45 (40.9)	
Missing value	2 (0.7)	1 (0.6)	1 (0.9)	
Length of residence in the neighborhood—M (SD)	43.3 (21.2)	34.8 (2.3)	56.3 (15.1)	.001
Mediators—M (SD)				
Range				
Connection to the living area	17.3 (6.9) 5–25	16.9	18.0	.14
Familiarity with the living area	16.6 (6.5) 6–30	16.8	16.3	.49
Social participation	34.9 (11.5) 13–65	33.3	37.6	.002
Perceived safety level in area	4.0 (1.1) 1–5	3.9	4.2	.04
Dependent variable				
Perceived accessibility				
M (SD)	22.9 (7.9)	21.9 (8.0)	24.7 (7.5)	0.004
Median	24.0			
Range	8–40			

There were significant differences between settlement types in two potential mediators: social participation and perceived safety. Participants who live in the urban area reported lower level of social participation and lower level of safety, compared with those who live in the rural area.

The results also showed that participants had low to medium accessibility to services and sites ( $M = 22.9, SD = 7.9, \text{range} = 8\text{--}40$ ). Settlement type also was associated with perceived accessibility. Perceived accessibility was lower in the urban area, compared with the rural area (see Table 1).

**Table 2.** Bivariate Correlations of Background Variables and Mediators With Perceived Accessibility ( $N = 279$ ).

	Perceived accessibility	
	rho	p value
<b>Background characteristics</b>		
Gender (male = 0, female = 1)	-.08	.18
Age	-.17	.004
Education ( $\leq 12 = 0, >12 = 1$ )	.06	.36
Marital status (0 = without partner, 1 = with partner)	.04	.46
Living arrangement (0 = not alone, 1 = alone)	-.04	.51
Length of residence in neighborhood/settlement (years)	.09	.40
<b>Mediators</b>		
Connection to the living area	.22	.001
Familiarity with the living area	.43	.001
Social participation	.45	.001
Perceived Safety level in area	.30	.001

Note. Spearman correlations (rho) were conducted.

**Table 3.** Spearman Correlation Tests Between Mediators ( $N = 279$ ).

	1	2	3
Connection to the living area			
Familiarity with the living area	0.58 ( $p = .001$ )		
Social participation	0.59 ( $p = .001$ )	0.55 ( $p = .001$ )	
Perceived safety level in area	0.18 ( $p = .004$ )	0.12 ( $p = .06$ )	0.20 ( $p = .001$ )

The bivariate data in Table 2 shows the nonparametric–spearman correlation test between the background variables and mediators with perceived accessibility. The results show that among the background variables, only age was negatively associated with perceived accessibility.

Table 2 shows that perceived accessibility was positively associated with all four mediators: (a) connection to the living area, (b) familiarity with the living area, (c) social participation, and (d) perceived safety of the living area. The greater the connection to the living area, the familiarity with the living area, the social participation, and the perceived safety of the living area were, the higher the perceived accessibility was.

Table 3 presents the bivariate correlation matrix between mediators. An examination of the correlations reveals that the four sociospatial mediators were positively correlated with each other, except for perceived safety and

familiarity with the living area. There was no evidence for multicollinearity between mediators in the study, given the moderate to low size of correlations.

### Mediation analyses

Table 4 shows the results of the multiple mediation model (Figure 1) in which all four mediators—(a) connection to the living area, (b) familiarity with the living area, (c) social participation, and (d) perceived safety of the living area—were entered simultaneously, allowing the investigation of the indirect effects of each mediator, while controlling for the effect of other mediators and background variables (gender, age, education, marital status, living arrangement, and length of residence). Results indicated a significant total effect of settlement type on perceived accessibility (*path c*),  $B = 3.4$ ,  $t(279) = 3.6$ ,  $p = .008$ ;  $R^2 = 0.36$ .

The results revealed that living in a rural area was associated with greater feelings of perceived safety of the living area (*path a1*), and, in turn, feelings of perceived safety of the living area were positively associated with perceived accessibility (*path b1*). In addition, living in a rural area was associated with higher social participation (*path a2*), and social participation was positively correlated with perceived accessibility (*path b2*).

Settlement type was not associated with familiarity with the living area (*path a3*), but familiarity with the living area was positively associated with perceived accessibility (*path b3*). In addition, settlement type was not associated with connection to the living area (*path a4*), and connection to the living area was not associated with perceived accessibility (*path b4*).

The bootstrapping technique yielded a significant total indirect effect of two mediators. The results revealed significant indirect effects of settlement type on perceived accessibility through perceived safety of the living area ( $B = 0.99$ , 95% CI = 0.41, 1.6) and through social participation ( $B = 1.3$ , 95% CI = 0.46, 2.5). The indirect effects of settlement type on perceived accessibility through familiarity with the living area, and connection to the living area were not significant. Settlement type maintained a significant direct effect on perceived accessibility— $c' - B = 2.1$ ,  $t(279) = 2.8$ ,  $p = 0.04$ —even after controlling for all mediators and confounders, thus suggesting that feelings of perceived safety of the living area and social participation partially mediated the relations between settlement type and perceived accessibility.

As for background variables, age was negatively associated with perceived accessibility ( $B = -0.14$ ;  $p = .03$ ). No significant associations were found between gender, education, marital status, living arrangement, and length of residence with perceived accessibility.

**Table 4.** Summary of Multiple Mediator Model Analyses to Predict Perceived Accessibility (N = 279).

Background variables	Independent variable	Mediating variables	Dependent variable	Effects of background variables on DV		Effect of IV on Meds		Effects of Meds on DV		Direct effect (Path C) p value (95%CI)	Indirect effect (a x b)	Total effect (C) p value (95%CI)	Variance (R <sup>2</sup> ) p value
				(IV)	(Med)	(DV)	(Effects) p value	(Path a) p value	(Path b) p value				
Age	Settlement type	Connection to the living area	Perceived accessibility							(2.1) .04 [0.5, 3.8]	-0.12	-81, .41	(3.4) .008 [0.8, 5.4] (0.36) .001
Education		Familiarity with the living area									0.002	-88 - .96	
Gender		Social participation									1.3	.46 - 2.5	
Marital status		Perceived Safety of the living area									0.99	.41 - 1.6	
Living arrangement													
Length of residence													

Note. Value labels of categorical variables: settlement type (1 = rural, 0 = urban); education (1 = "> 12", 0 = "<= 12"); gender (1 = woman, 0 = man); marital status (1 = with partner, 0 = without partner); living arrangement (1 = alone, 0 = not alone).

ns = nonsignificant.

\*p < .05. \*\*p < .01. \*\*\*p < .001.

## Discussion

The purpose of this study was to explore the perceived accessibility of services and sites in the living area of older adults in two different settlement types (rural-kibbutz vs. urban mid-size cities) in the periphery of Israel. In other words, we examined whether older adults living in rural (kibbutz) settlements and in urban mid-size cities in the periphery of Israel perceived the accessibility of the environment differently. The current study did not address objective accessibility, because several studies have found that subjective accessibility, rather than objective accessibility has a strong association with the preference of old adults to leave their house and spend time outside (Ball et al., 2008; Jones et al., 2009).

The findings reveal that older adults in rural settlements perceive their living environment as more accessible compared with older adults in urban settlements. These results corroborate the hypothesis and are consistent with other studies that have found that settlement type is associated with perceived accessibility (Chen & Jim, 2010; Chiesura, 2004). Concerning the difference between objective and perceived accessibility in different settlement types, the present study is consistent with other studies that have found that rural inhabitants reported shorter journey times compared with urban settlements (Curl et al., 2015).

The relationship between settlement type and perceived accessibility was partially mediated by two mediators: social participation and perceived safety of the living area. Namely, the greater the social participation and perceived safety, the higher the perceived accessibility. Moreover, the results revealed that living in a rural area was associated with greater feelings of safety and greater social participation. The possible explanations of these results are derived from physical and social aspects of human and social geography concerning the living area.

The first, physical aspect deals with the settlement characteristics, namely, perceived safety of the living area. Rural areas and small places feel safer in comparison to urban settlements because of low density, less traffic, safer streets, and green open spaces, which promote social interaction and walking activity (Li, Fisher, Brownson, & Bosworth, 2005; Michael, Green, & Farquhar, 2006). These characteristics enable older adults to feel that the area is safer. This makes it possible for older adults to walk more and likely influences their perceived accessibility. Rural areas (like the kibbutz) are characterized by these same features, combined with mutual responsibility which adds to feelings of safety and well-being (WHO, 2007). Similarly, Fokkema, de Jong, and Nijkamp (1996) found that older adults in the Netherlands tended to migrate from big cities to rural areas and little towns mainly because

of a discrepancy between the characteristics of their neighborhoods and their needs, in terms of walkability, safety, and social bonds.

The second, social, aspect deals with social participation, which impacts satisfaction and connection to the home settlement and influences the perceived accessibility of the living environment. Rural settlements are characterized by strong social integration and social support. Smaller communities in rural areas facilitate a greater degree of interaction with friends and neighbors (Burholt, 2006) that happens outside the home, and positively influences the walking activity of older adults (Li et al., 2005; Michael et al., 2006). The fact that people go outside more, to walk and to participate in activities makes the area feel more accessible. This explanation is consistent with findings from previous studies (Chiu et al., 2005; Evans, 2009; Fokkema et al., 1996), which have indicated a greater quantity of coincidental meetings outside the home and a higher sense of well-being in the countryside compared with older adults in large urban areas (Mookherjee, 1998). Thus, older adults in rural settlements in a peripheral region maintain more social relations than those who live in central big urban environments. This leads to an increase in their sense of belonging to the place, recognition of neighbors, and overall satisfaction with the home settlement and, as a result, higher perceived accessibility.

The multiple mediator analysis has also shown that connection to the living area and familiarity with the living area did not serve as mediators, but did have positive associations with perceived accessibility—greater connection to the living area and greater familiarity with the living area were associated with higher levels of perceived accessibility. These two variables reflect the concepts of “sense of place” or “place attachment,” which encapsulate both spatial and social entities (Burholt, 2006). Sense of place is a multidimensional concept characterizing the connection and tight bonds between people and places (most often, the home). This connection develops after a long period of living in the same place, and results in greater familiarity with the physical environment and stronger feelings of belonging to the place (Jorgensen & Stedman, 2001; Rowles, 1983; Shamai, 1991). It is important to note, however, that people can feel a “sense of place” in both rural and urban settlements (Vitman Schorr et al., 2016; Burholt, 2006). Part of the concept “sense of place” relates to familiarity and connection with the home settlement. Familiarity and connection make the living area seem better than it is in reality. This is why people with a high sense of place tend to remain in their settlements even in periods of economic stress (MacKendrick & Parkins, 2004), or try to “negotiate” environmental deficits (a lack of health care services, accessibility problems, etc.) to stay in the same living environment (Husband, 2001). This also is why accessibility is perceived as better by people with a high sense of place.

## Conclusion

Perceived accessibility (which is subjective) cannot be measured by distance or time because there are many factors influencing it, among them, settlement type, connection to the living area, familiarity with the living area, social participation, and perceived safety of the living area; urban places, where objective accessibility is understood to be better due to shorter distances to services (walkable distances; Leyden, 2003), greater spread of services, and better public transportation, are characterized by low perceived accessibility, whereas in rural areas (kibbutz), where the distances are greater and public transportation is worse (Burholt & Dobbs, 2012), perceived accessibility is better. The explanation derived from the study is that in places where social participation and perceived safety of the living area are higher, the perceived accessibility is higher.

The results of the study stress the essential need for multidisciplinary collaborations to understand the complex mechanisms that are connected to perceived accessibility. For that reason, collaboration is needed between geographers, city planners, gerontologists, and sociologists. In addition, the study sheds light on the role played by small-rural communities and their special characteristics, on perceived accessibility and calls for more investigation in this regard, including the assessment of quality of life, well-being, and social interaction.

As for practice and policies, the research opens a venue for the study of sociospatial characteristics in the home settlement and the factors that influence it, to foster active aging and aging in place in urban communities (as most older adults live in cities); there is need to make them more similar to rural communities vis-a-vis social participation and feelings of safety. Active participation of older adults in the social life of the community, making them partners in decisions and participants in the social fabric should be promoted. It appears that rural (kibbutz) settlements have a unique lifestyle with a different sense of place. In these places, older adults participate in decision-making, have an active social life, and feel part of the place as a whole (Leviatan, 1999), all of which have bearing on their higher perceived accessibility.

## *Study Limitations*

There are significant limitations to this study: First, the study is cross-sectional, so that a causal relationship between environmental characteristics and perceived accessibility cannot be established. Further investigation and evaluation should be longitudinal and follow respondents over time. The use

of quasi-experimental designs could examine differences in levels of environmental characteristics and perceived accessibility. Studies should also identify and examine additional factors that can promote perceived and actual accessibility of older adults in their residential environments. Second, the generalization of the findings is limited because the sample and the sampling procedure do not guarantee representativeness of older inhabitants in the different settlement types. This is because the sample included people who were present in specific places outside their homes when data were collected. Those who were homebound due to severe mobility difficulties are not represented in this study. The percentage of women is significantly higher compared with men. All these may have biased the results.

Despite these limitations, the study provides new insights into the interaction between urban/rural characteristics and perceived accessibility of older adults in their communities. The study invites further research regarding geographic characteristics and their contribution to aging in place and active aging.

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### **Ethical Approval**

IRB application number: 2010-5 (the IRB is written in Hebrew. It says that the study meets the ethical requirements and is approved).

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