

# Environmental Support for Outdoor Activities and Older People's Quality of Life

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**SUMMARY.** The outdoor environment provides older people with opportunities to be active, have contact with nature and meet friends and neighbours. Research has shown that such outdoor activities have substantial benefits for older people's well-being. However, going outdoors is often difficult for them due to increasing frailty and environmental barriers. This study argues that a neighbourhood environment facilitating older people's outdoor activities has a positive effect on their well-being. Small-scale studies were conducted to explore the concept

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of “environmental support” for outdoor activities and its effect on people’s Quality of Life (QOL). Two methods were employed to identify the degree of environmental support. One was based on the assessment of neighbourhood environments and the other focused on outdoor activities people undertake. Analysis found highly significant correlations between environmental support and participants’ QOL in both measurements even after controlling for participants’ functional capability. The results suggest that outdoor environments adjacent to where one resides play a significant role in older people’s QOL. [Article copies available for a fee from The Haworth Document Delivery Service: 1-800-HAWORTH. E-mail address: <docdelivery@haworthpress.com> Website: <<http://www.HaworthPress.com>> © 2005 by The Haworth Press, Inc. All rights reserved.]

**KEYWORDS.** Older people, outdoor environment, outdoor activity, quality of life, neighbourhood

### **INTRODUCTION**

The outdoor environment offers great opportunities for older people to be physically active, to have contact with nature and to meet with friends and neighbours. However, it also presents various barriers that prevent them from going out. Due to the combination of increasing frailty in late life and barriers in the environment, going outdoors is often the first set of activities that older people find too hard to perform (Shumway-Cook et al., 2003). The sedentary life style that often results is considered a serious health risk for older people (WHO, 2003). Thus, it can be argued that an outdoor environment that makes going out easy for older people plays an important role in maintaining and enhancing Quality of Life (QOL) in late life. Environmental factors in people’s participation in physical activity have started to capture the attention of researchers in public health (e.g., Booth et al., 2000; Giles-Corti & Donovan, 2002; Humpel et al., 2004; Li et al., 2005; Saelens, Sallis, Black & Chen, 2003; Satariano & McAuley, 2003). Older people’s “mobility” in the outdoor environment and its implications on their well-being have also been discussed in some studies (e.g., Metz, 2000; Mollenkopf et al., 2004). However, little research effort has been directed at understanding the role of the outdoor environment in older people’s QOL (Wahl & Weisman, 2003).

As an initial attempt to explore the concept of environmental support, the present study briefly reviews the benefits of outdoor environment on

older people's well-being. Then it proposes environmental support for outdoor activities as a key concept to understand the effects of the outdoor environment on older people's activity and well-being. After discussing its theoretical background and measurement methods, the paper presents the results of small scale pilot studies that examined the association between environmental support and older people's QOL.

### ***BENEFITS OF OUTDOOR ENVIRONMENTS FOR OLDER PEOPLE***

The literature suggests that the benefits of outdoor environments on older people are obtained from three different types of engagement with outdoor environments. They are (1) participation in outdoor physical activity, (2) exposure to outdoor natural elements and (3) social interaction with friends and neighbours in outdoor places (Bowling et al., 2003; de Vries, Verhaji, Groenewegen & Spreeuwenberg, 2003; Nezelek, Richardson, Green, & Schatten-Jones, 2002). The following section briefly reviews in what way outdoor environments contribute to QOL in late life.

*Benefits from physical activity.* Abundant evidence indicates that regular participation in moderate physical activities has substantial benefits for the health of older people. A physically active lifestyle is found to minimise the physiological changes associated with ageing and help delay or prevent the onset of common chronic diseases (Singh, 2002). Keysor and Jette (2001) have also shown in their review that participation in physical activity improves older people's physical condition, including muscle strength, aerobic capacity, balance and flexibility. Such enhancement is known to help reduce the possibility of falling, which is a major cause of disabilities for older people (Skelton, 2001). Research has also demonstrated that participation in physical activity has protective effects against insomnia (e.g., Morgan, 2003). Studies addressing this topic do not normally differentiate indoor and outdoor activity. However, since walking is considered one of the most common and accessible activities (e.g., Department of Health, 2004), it can be argued that the benefits discussed here are applicable to outdoor activities.

In addition to the health benefits, regular physical activity provides older people with psychological benefits. Silverstein and Parker (2002) found that older Swedes who increased activity participation in a 9-year period showed an increase in life satisfaction. Another line of research examines the effect of physical activity on depression. A prospective

study has identified that physical activity such as a long walk can reduce the risk of subsequent depression (Strawbridge, Delger, Roberts & Kaplan, 2002). The benefits of physical activity on cognitive functioning have also been demonstrated. Weuve et al. (2004) have shown that a higher level of physical activity (walking for more than 1.5 hours per week) is associated with better cognitive performance and memory in older women.

*Benefits from contact with nature.* Extensive research has shown the restorative effects of the natural environment (Kaplan, 1995). A classic study by Ulrich et al. (1991) showed that exposure to a 10-minute video of natural settings (after viewing a stressful film) brought faster and more complete stress recovery in comparison to the same length video of urban settings. Recent research has also found that the amount of time people spend in open green spaces is associated with a reduced risk of developing stress-related illnesses (Grahn & Stigdotter, 2003). Similarly, Hartig et al. (2003) indicated that those who walked in a natural setting exhibited increase in positive affect and decreased anger compared with those who walked in a built-up urban environment.

Several studies have explored the effects of neighbourhood green spaces on health. A longitudinal study in Japan investigated the association between older people's longevity and the existence of green areas that are nearby and easy to walk to (Takano, Nakamura & Watanabe, 2002). The authors found that the five-year survival percentage of older people who live in an area with such green spaces is significantly higher than those living in an area without such spaces. Another study in the Netherlands has shown that the amount of green in a neighbourhood is positively associated with health status of older people measured as the number of recent illnesses (de Vries et al., 2003). The authors have reported that the effect of green spaces on health is stronger for older people, whose outdoor exposure is more likely to be limited to neighbourhood environments.

*Benefits from social interaction.* Outdoor open spaces can serve as a place for social interaction among neighbours. It has been shown that the "greenness" of an open space invites more frequent use of the space by neighbours, and thus fosters stronger social ties among them (Kuo, Sullivan, Coley & Brunson, 1998). A study in Ireland has also found that people living in mixed-use, pedestrian-oriented neighbourhoods, which offer a greater chance to meet each other outdoors, tend to engage in social activities more often than those living in car-dependent neighbourhoods (Leyden, 2003). Since the planning and design of neighbourhood environments influence the way people interact informally in outdoor spaces, environ-

mental factors have a considerable impact on the quantity/quality of informal social contacts among neighbours (Kuo et al., 1998).

The benefits of social interaction on older people are well documented. Bennett (2002) showed that a low level of social engagement in late life is correlated with a decline in physical health and high risk of mortality. Diversity in social relations and frequent social participation have been found to serve as protection against the onset of mobility disability (Avlund, Lund, Holstein & Due, 2004). Furthermore, a longitudinal study has found that frequent participation (daily-weekly) in social activities is associated with a decreased risk of dementia (Wang, Karp, Winblad & Fratiglioni, 2002). These studies did not specifically address the social interaction among neighbours. However, this type of locally-based social interaction can be particularly important for older people, because they are likely to spend more time around their house. In fact, a UK study found that older people consider having good relationships with their neighbours as an important constituent of their QOL (Bowling et al., 2003).

*The definition of outdoor activity.* The above overview illustrates that activities taking place in outdoor environments can enhance older people's well-being in several ways. The activity discussed here is not necessarily physically vigorous. To enjoy the benefits from contact with nature and social interaction, one only needs to go out and stay outside for a while. In relation to this point, McAuley et al. (2000) have demonstrated that both aerobic and nonaerobic activities have positive effects on older people's psychological well-being. Thus, the current study defines outdoor activity simply as "being outdoors," to encompass all the types of engagement with outdoor environments. With regard to the environment, a focus is placed on a neighbourhood environment, which is likely to be the most immediately accessible outdoor environment for older people. It is known that a poor quality environment may be one of the factors that deter older people from being active (e.g., Humpel, Owen & Leslie, 2002; Schutzer & Graves, 2004; Trost et al., 2002). Thus it can be argued that a neighbourhood environment that makes being outdoors easy and enjoyable is likely to encourage more outdoor activities, which in turn is conducive to a better QOL.

### ***ENVIRONMENTAL SUPPORT FOR OUTDOOR ACTIVITY***

The support function of the environment is obviously important for older people to remain active and independent. According to Lawton

(1986), this is one of the three vital functions the environment has to offer the older population: maintenance, stimulation and support. Past studies have explored the support function of the environment based on the idea of person-environment (P-E) fit, which refers to the congruence between the demand of the environment (“environmental press”) and people’s competence (Lawton & Nahemow, 1973). Kahana et al. (2003), for instance, discussed the significance of the P-E fit in the context of older people’s residential satisfaction. Iwarsson (2005) has found that the P-E incongruence in housing is associated with residents’ ADL (activities of daily living) dependence. However, environmental support for outdoor activities and its effect on older people’s QOL remain to be explored (Wahl & Weisman, 2003).

One way of assessing environmental support draws on the appraisal of environmental characteristics. Research has documented scores of environmental factors that influence people’s participation in activities (e.g., Booth et al., 2000; Giles-Corti & Donovan, 2002; Humpel et al., 2004). A number of instruments to assess supportiveness of the environment have been developed and reported based on the findings from existing empirical studies. This type of instrument can employ either objective measures (e.g., Pikora et al., 2002) or self-reported and subjective measures (e.g., Saelens et al., 2003). An advantage of this type of measurement is its direct connection with the environment. Findings obtained from studies employing such an instrument may be directly translated into design guidelines and policy recommendations. The measurements in this category may also work well in a neighbourhood level analysis. A drawback of this measurement method is that salient environmental attributes are assumed constant across people. Environmental attributes that influence the pattern of outdoor activities may differ between people who have different lifestyles and different functional capabilities. Some items in such scales may have little relevance to particular individuals or groups of people.

An alternative way of measuring environmental support uses people’s activity as a unit of analysis. The degree of environmental support depends not only on environmental factors but also on personal factors such as the type of activity engaged in and a person’s functional capability. It seems advantageous to focus on an individual’s activity in addressing environmental support, because (1) older people are likely to be diverse in their choice of outdoor activities, and (2) activity carries both personal and environmental dimensions. The idea of making use of activities as an interactional unit of analysis originates from the concept of “personal projects” developed by Little (1983). Personal projects are

a set of goal-oriented, self-generated activities that reflect an individual's construal of self and the context within which activities take place (Little, 2000). They are relevant to an individual's well-being, for project pursuit can be deemed as a process in which a person strives for his or her personal goals (Little & Chambers, 2004). Being engaged in meaningful projects and approaching personal goals through such projects are an important aspect in one's life (Omodei & Wearing, 1990). Since older people's activities are more likely to be subject to contextual constraints, this concept seems adequate to explore the relationship between the environment and older people.

### **RESEARCH AIM AND METHOD**

Small-scale pilot studies were carried out to develop instruments to measure environmental support and to identify to what extent environmental support accounts for an individual's QOL. The study also examined the effects of an individual's functional capability on the relationship between the two constructs. It was anticipated that people's functional status may be associated with the way they perceive their surroundings and their well-being. Thus, it may confound the relationship between environmental support and QOL. In addition, since 'younger old' and 'older old' people are known to have different psychological profiles (e.g., Smith & Baltes, 1997), the study explored whether the effects of environmental support on QOL vary between different age groups. It was postulated that environmental support has a larger bearing on QOL for the older group, because a decrease in competence as a result of ageing calls for more supportive environments in order that daily activities may be performed.

Fifty-eight people aged 65 and older were recruited through colleagues and acquaintances in Edinburgh, Glasgow, Stockport (a suburb of Manchester) and Cornwall. Table 1 shows the age and gender distribution of the participants. They were asked to complete a questionnaire, which included questions on environmental support, QOL, functional capability and sociodemographic data. Since the instruments were developed in an incremental and iterative process, the questionnaire was slightly different at different stages. The later version of the questionnaire, for example, included questions on participants' general health status and outdoor activity pattern. The results shown below only deal with the common elements among different versions of the questionnaire.

TABLE 1. Age and Gender Distribution of the Participants

	Female	Male	Total
65-74	14	10	24
75-84	20	5	25
85+	3	0	3
Unknown	1	5	6
Total	38	20	58

Environmental support was measured in two ways. One measure was perceptual evaluation of neighbourhood environments. An 18-item scale was developed based on the focus group interviews conducted earlier, the instruments produced by Saelens et al. (2003) and Humpel et al. (2004), and various relevant design guidelines (e.g., Civic Trust, 2004; DTLR, 2002). Of 18 items in this scale, 3 items are relevant to outdoor spaces around one's house (e.g., "There is a pleasant place to sit outside the home where I live."), 11 of them are concerned with a local open space such as a park and routes to reach such a space (e.g., "The local open space is clean and well maintained." "The paths to get to the local open space are easy to walk on."), and 4 items ask about the larger neighbourhood area (e.g., "Steep hills and steps in my neighbourhood make it difficult to get around."). The scale focuses on natural or green environments because of the distinctive benefits (restorative and social) they possess for older people. The reliability (internal consistency) of the entire scale was 0.73.

The other way of identifying environmental support was based on personal projects. The original version of the personal projects questionnaire, which can be complex and lengthy for older people, was simplified for this study. The participants were asked to list outdoor activities they do regularly, have decided to undertake, or are thinking about doing (free description). Some examples such as "make my garden beautiful," "walk the dog everyday," and "play bowls" were given to suggest that it is "everyday" activity that is in question. They were then asked to evaluate each activity in terms of the extent to which the environment makes it difficult/easy to carry out, and its personal importance on a 5-point scale. In addition to the listed volitional activities, they were asked to rate "just go for a walk" on the same basis. Overall environmental support for a participant was calculated as a weighted



means of support (difficulty/easiness) for the listed activities using the importance as a weight (Wallenius, 1999).

The outcome variable of the study was participants' QOL. Their life satisfaction was used as an indicator of QOL in this study. A 5-item Satisfaction With Life Scale (SWLS) developed by Diener and his colleagues (1985) was employed for this purpose. The reliability of the scale was 0.87. To assess the functional capability of participants, they were asked to indicate the ease with which they could perform six instrumental activities of daily living (IADLs) (Jette et al., 1986). The IADLs employed were mostly concerned with mobility such as walking a certain distance, climbing stairs and using public transportation. In addition, the number of outdoor activities (personal projects) the participants listed was also included in the analysis.

## RESULTS

Table 2 shows the mean and standard deviation of the five variables for two age groups: people aged 65-74 and people over 75. LS (life satisfaction) is the mean of the responses to the five items in SWLS. The variable ranges from 1 (least satisfied) to 5 (most satisfied). ESP and ESN are environmental support based on personal projects and neighbourhood environments respectively. In both variables, the score ranges from 1 (least supportive) to 5 (most supportive). FC (functional capability) is the average degree of ease in performing the IADLs, which also ranges from 1 (lowest in functional capability) to 5 (highest in functional capability). NOA is the number of outdoor activities the participants listed voluntarily in response to the questions on ESP. The *t*-tests

TABLE 2. Means and Standard Deviations of the Variables by Age Group

	65-74	75+	T test
Life Satisfaction (LS)	3.84 (0.69)	3.89 (0.97)	<i>ns</i>
Environmental Support Projects (ESP)	4.28 (0.73)	3.71 (1.10)	<i>p</i> < .05
Environmental Support N'hood (ESN)	3.70 (0.76)	3.67 (0.94)	<i>ns</i>
Functional Capability (FC)	4.52 (0.85)	3.51 (1.37)	<i>p</i> < .01
Number of Outdoor Activities (NOA)	4.32 (1.49)	4.04 (1.15)	<i>ns</i>

(Note: standard deviations are shown in brackets)

showed that LS, ESN and NOA did not differ significantly between the age groups, but ESP and FC were significantly different between them. No significant differences were found in these variables according to sex of participants.

Table 3 shows bivariate correlation coefficients between the five variables. As can be seen, all the variables were highly correlated with each other except for two coefficients involving NOA. The analysis found high correlation coefficients between LS and ESP ( $r = .55, p < .001$ ) and ESN ( $r = .57, p < .001$ ). This means that environmental support accounts for about 30% of the total variance in life satisfaction. A significant correlation was found between ESP and ESN ( $r = .48, p < .001$ ). This signifies that they share a certain amount of common variance, suggesting that they measure different facets of the same overall construct. Table 3 also shows that participant's FC was strongly correlated with ESP ( $r = .63, p < .001$ ). This means that those who have difficulty in performing the IADLs tend to perceive their surroundings less supportive. The study posited that ESP is an interactional variable embracing both environmental and individual dimensions. The results shown here corroborated the interactional nature of ESP. In the case of ESN, however, the involvement of functional capability was smaller ( $r = .39, p < .01$ ). ESN measures supportiveness focusing on neighbourhood natural environments, which is less dependent on individual level factors.

The number of activities participants listed (NOA), which indicates the diversity of activities a person conducts outdoors, can be envisaged as a surrogate of activeness of the person. NOA was found to be correlated with life satisfaction ( $r = .43, p < .01$ ) and with ESN ( $r = .48, p < .001$ ). This indicates that respondents who have a wider range of out-

TABLE 3. Bivariate Correlation Between the Variables

	LS	ESP	ESN	FC	NOA
Life Satisfaction (LS)	1				
Environmental Support Projects (ESP)	.55***	1			
Environmental Support N'hood (ESN)	.57***	.48***	1		
Functional Capability (FC)	.40**	.63***	.39**	1	
Number of Outdoor Activities (NOA)	.43**	.26	.48***	.22	1

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

door activities tend to be more satisfied with life, and live in more supportive neighbourhood environments. However, the correlation between NOA and ESP was not significant ( $r = .26$ ). A later section discusses possible reasons for this result.

Functional capability (FC) was correlated significantly with LS, ESP and ESN as shown in Table 3. This means that participants who have a better functional capability are likely to perceive their surroundings more supportive, and also likely to be more satisfied with life. Thus it is possible that the relationship between life satisfaction and environmental support is confounded by FC. To examine whether the relationship is spurious, partial correlation between LS, ESP and ESN controlling for FC was examined. Table 4 shows the results. Although the partial correlation coefficients were slightly smaller than the bivariate correlation, the significant correlation in the bivariate analysis remained significant in the corresponding partial correlation. The findings demonstrate that the relationship of environmental support with life satisfaction held even when the effects of participants' functional capability were removed.

As Table 2 indicates, the younger and older groups of participants differed in their functional capability. Difficulties in mobility and functioning as a result of ageing may alter the extent to which environmental support and well-being are associated. To explore how age modifies the relationship between the two, bivariate correlation was calculated separately for the two age groups. Tables 5 and 6 show the correlation coefficients for these groups.

Table 5 and 6 illustrate that the strong association between ESP and LS was constant across the younger ( $r = .62, p < .01$ ) and older age groups ( $r = .61, p < .01$ ). A slightly lower correlation was found between ESN and LS for people over 75 ( $r = .53, p < .01$ ) in comparison to

TABLE 4. Partial Correlation Controlling for FC

	LS	ESP	ESN	NOA
Life Satisfaction (LS)	1			
Environmental Support Projects (ESP)	.44**	1		
Environmental Support N'hood (ESN)	.50***	.35*	1	
Number of Outdoor Activities (NOA)	.40**	.17	.43**	1

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

TABLE 5. Bivariate Correlation for People Aged 65-74 (n = 24)

	LS	ESP	ESN	FC	NOA
Life Satisfaction (LS)	1				
Environmental Support Projects (ESP)	.62**	1			
Environmental Support N'hood (ESN)	.64**	.26	1		
Functional Capability (FC)	.13	.30	.43*	1	
Number of Outdoor Activities (NOA)	.43*	.45*	.49*	.46*	1

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

TABLE 6. Bivariate Correlation for People Over 75 (n = 28)

	LS	ESP	ESN	FC	NOA
Life Satisfaction (LS)	1				
Environmental Support Projects (ESP)	.61**	1			
Environmental Support N'hood (ESN)	.53**	.54**	1		
Functional Capability (FC)	.51**	.68***	.37	1	
Number of Outdoor Activities (NOA)	.46*	.12	.45*	.16	1

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

that in the younger group ( $r = .64, p < .01$ ). Unlike the initial expectation, the finding suggests that neighbourhood natural environments are less relevant to the life satisfaction of people in the older group. The difference between the two groups was also found in the correlation between ESP and ESN. The older group showed a relatively large correlation coefficient ( $r = .54, p < .01$ ), whereas it was non-significant in the younger group ( $r = .26$ ). The difference of one's area of activity between the age groups may account for the difference. Namely, outdoor activities (a basis for ESP) listed by the younger group may predominantly take place in a wider area than immediate neighbourhood environments. The age groups also differed in the correlation involving functional capability. For the older group, a significant correlation was found between LS and FC ( $r = .51, p < .01$ ), while the same correlation for the younger group was non-significant ( $r = .13$ ). The correlation between FC and ESP was also different between the two groups: highly significant for the older group ( $r = .68, p < .001$ ) and non-significant for

the younger group ( $r = .30$ ). These results can be understood as the growing importance of functional capability in life satisfaction and in perceptions of the supportiveness of the environment as one becomes very old.

### **DISCUSSION**

The main objective of the pilot studies was to examine whether the concept of environmental support is relevant to older people's QOL. Although the small sample size makes it difficult to draw firm conclusions, the results show that environmental support for outdoor activities explains about 30% of the variance in participants' life satisfaction. This indicates that the supportiveness of the outdoor environment plays a highly important role in older people's well-being. The results are consistent with a previous study conducted in Finland, which employed middle-age people as participants and the general environment (indoor and outdoor) as its scope of study (Wallenius, 1999). However, in comparison to the current study, environmental support accounted for much smaller variance in participant's life satisfaction in the Finnish study. It can be argued that the stronger association between environmental support and life satisfaction was obtained in this study, because older people are more vulnerable to environmental barriers, especially in outdoor environments.

The findings of the study provided evidence in favour of environmental support as a concept linking the environment and people's QOL. Firstly, environment support measured through two different instruments, which have different theoretical origins, was similarly correlated with life satisfaction. The fact that two different approaches produced significant association suggests a level of robustness in this conceptualisation. Secondly, partial correlation analysis excluded the likelihood that the relationship between environmental support and well-being was confounded by a participant's functional capability. The analysis eliminated a major plausible cause of spurious correlation. Thirdly, the strong correlation between the two variables was observed in both the younger and older age groups. Despite some age-related differences found in the analysis, environmental support was consistently correlated with participants' life satisfaction in both age groups. Fourthly, the findings indicated significant correlations between environmental support (ESN) and the number of outdoor activities. Since more outdoor activities mean more benefits, the association between them is

likely to reinforce the link between environmental support and well-being. Lastly, environmental support was more closely associated with life satisfaction compared to functional status, particularly in the younger old people, which further substantiates the significance of the environmental dimension in their QOL. These findings appear to demonstrate that the concept of environmental support is highly effective in capturing aspects of the outdoor environment that are relevant to older people's QOL.

The comparison of the two age groups generated interesting findings. As shown above, the younger group showed a higher correlation between ESN and LS than the older group. Initially, it was expected that environmental support would matter more to people in the older group, who are more vulnerable to barriers imposed by the environment. Less frequent use of neighbourhood natural environments by the older participants might be a reason for this, but people's attitudes towards outdoor activity may also play a part in the results. Explaining the "environmental proactivity hypothesis," Lawton (1989) showed that the greater the functional competence of the person, the more likely the person actively seeks environmental resources that enable him or her to meet personal needs and wants. It can be argued that the younger participants may be more proactive and accordingly place a higher value on the quality of neighbourhood environments. Another notable difference between the groups is the relationship between ESP and NOA. The correlation was significant for the younger group ( $r = .45, p < .05$ ), but not significant for the older group ( $r = .12$ ). The small correlation in the older group can be considered as a reason for the non-significant correlation in the data overall between ESP and NOA. It is possible to assume that the participants in the older group have a certain number of basic activities that have to be done regardless of the degree of environmental support for these activities. (As shown in Table 2, the variance of NOA of the older group is smaller than that of the younger group.) On the other hand, the younger participants may be more varied with regard to the choice of outdoor activities, in which the supportiveness of the environment plays a relatively larger role.

A few theoretical and methodological issues in this study deserve further discussion. In this article, environmental support was considered to be a correlate (rather than cause) of an individual's QOL. There are two arguments against a causal relationship. First, older people who have a high level of well-being may be healthy and mobile and thus likely to perceive outdoor environments as easier to move around in. In this case, so long as the environment remains constant, it is QOL that in-

fluences environmental support. Second, it is probable that people whose QOL is higher (healthier, more active and possibly more affluent) choose to live in a more activity-friendly neighbourhood, which may involve a move later in life especially after retirement. Methodological limitations of this study include the small size of the sample, which is mostly urban, reliance on self-report data in measuring environmental support and other variables, and the omission of potentially important variables such as health status and the pattern of outdoor activity, which may be related both to environmental support and well-being. A large-scale study addressing these points is currently under way to substantiate the findings of this study.

Future studies may explore the concept of environmental support further to gain a richer understanding as to how outdoor environments are involved in older people's quality of life. Our review identified three types of engagement with outdoor environments that confer various benefits on older people: participation in physical activity, exposure to natural elements and social interaction with friends and neighbours. Each seems to have a unique contribution to make to a person's well-being. It would be worthwhile to study which type of engagement is more influential in the well-being of older people. Findings from such research would offer practical insights to inform policy making and planning of the outdoor environment. Another important future research focus is the identification of specific environmental attributes that are relevant to environmental support. This process requires identifying patterns of activities taking place in a setting and environmental attributes in the setting that affect those activities, then finding out which attributes have higher leverage in facilitating or hindering the activities. Information obtained from such investigation is obviously relevant to the design and management of environmental interventions that aim to encourage and enhance older people's outdoor activity. The role of proactive attitudes in the relationship between environmental support, QOL, and functional capabilities also merits further research. The findings imply that participants' proactive attitudes may have a bearing on the salience of environmental support. Potential research topics in this regard include whether supportive neighbourhood environments encourage more proactive attitudes among residents. Finally, it would be useful to investigate how environmental support for outdoor activities can contribute to the idea of "ageing-in-place." This concept normally refers to the home environment and is often discussed in association with interior spaces, e.g., home modification or assisted living (e.g., Ball et al., 2004). However, the outdoor environment is an important

component for older people to remain independent. The instruments developed here offer valuable ways to explore the role of outdoor environments in ageing-in-place, and thus may contribute to the development of a better environmental policy for older people.

### CONCLUSIONS

The concept of environmental support was proposed in the present study in order to make it possible to examine the effects of the environment on people's well-being. The literature review suggested that being outdoors can confer psychological and physiological benefits on older people. Thus, it was postulated that the environment that facilitates being outdoors would enhance QOL in late life. The results obtained in the pilot studies, i.e., the highly significant correlations between environmental support and participants' life satisfaction, can be interpreted as evidence that sustains this hypothesis. It can be inferred from this exploratory study that outdoor environments adjacent to where one resides play a significant role in one's quality of life. The findings of this research As far as the authors are aware, is the first attempt to assess the direct influence of the outdoor environment on an individual's QOL. The results from this research indicate a need for larger and more comprehensive studies to investigate the significance of the outdoor environment for the older population.

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