

# The Role of Housing in Community Health Promotion Among the Aged: A Case Study in New Orleans

Stephen Verderber

**ABSTRACT.** A total of 89 aged residents living independently in single and double occupancy housing in an historic, traditionally planned neighborhood in New Orleans were surveyed with respect to their engagement in the outdoor realm in their immediate neighborhood. An index was developed, comprised of variables spanning the scale of the private dwelling to neighborhood scale. Certain dwelling attributes, health status factors, lifestyle factors, and neighborhood factors were found to be associated with a disinclination to walk outdoors in the community. Among the findings, improperly designed porches and insufficient semi-private exterior space adjacent to the dwelling function as strong deterrents to health-promoting walking activity outdoors, closely followed by fear associated with being victimized by crime in one's immediate neighborhood. Such conditions were found to pose a barrier to full engagement with the community in what on the surface would otherwise appear to be an imminently pedestrian-scaled residential setting. Study limitations, and directions for future research within the

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Stephen Verderber, ArchD, is Professor, School of Architecture, and Adjunct Professor, Department of Public Health Sciences, 144 Lee Hall, Clemson University, Clemson, SC 29634 (E-mail: sverder@clemson.edu).

The author wishes to acknowledge the special contributions of Elyssa Small, Eleanor Kebebian, Kamu Aysola, Jessica Gramcko, and Zahiyah Hines.

This research evolved from an interdisciplinary graduate seminar, *Architecture and Human Health*, taught by the author in the Department of Health Systems Management, and the School of Architecture, at Tulane University.

Journal of Housing for the Elderly, Vol. 20(4) 2006  
Available online at <http://jhe.haworthpress.com>  
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doi:10.1300/J081v20n04\_08

environmental design disciplines are discussed for both historic neighborhood settings and in new development. doi:10.1300/J081v20n04\_08 [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>> © 2006 by The Haworth Press, Inc. All rights reserved.]

**KEYWORDS.** New Orleans, health promotion, community design, architecture, elderly residents

### INTRODUCTION

Architecture—specifically the design and configuration of the private dwelling—has been overlooked in research on the relationship between the built environment and community health promotion among the aged. This, despite an increasing acknowledgment in the medical and public health literature of the pervasive influence the built environment—and suburban sprawl in particular—on the promotion of inactivity among a growing segment of the U.S. population (Ralston, 1999; Cohn, 2006; Reach Community Development, 2006). Topics such as neighborhood-based differences in obesity rates are the subject of ongoing research (U.S. Centers for Disease Control and Prevention, 1996; Verna, 1999; Saelens et al., 2003; Loukaitou-Sideris, 2006). Recent research has linked obesity, heart disease, and diabetes to inactivity fostered by dysfunctional community planning and design principles and practices (Frank et al., 2003; Srinivasan et al., 2003). Poor nutrition has been associated with communities considered to be pedestrian-adverse (Rose and Richards, 2004). In the case of the aged, on the architectural side of this equation, however, the dwelling has not been examined in terms of its influence on occupant well-being nor in relation to health-promoting activity outdoors near to home. This gap is glaring, because for the aged, the private dwelling remains the main locus of one's universe—particularly in relationship to the perceived fear of crime (Lawton and Yaffe, 1980). Little is known of the extent to which the choice to engage with, or disengage from, one's neighborhood milieu emanates from house form alone or from a combination of house form and neighborhood factors, including, for example, crime. Among the aged, insufficient personal control over one's "home turf" has been associated with an avoidance of the outdoors, even in recent gated communities (Blakely, 1997; Wilson-Doenges, 2000).

At the scale of the dwelling, windows that are too small may negate a direct view of the street, thereby causing isolation from the daily flow and rhythms of streetlife. A set of stairs difficult to negotiate can function as a deterrent to

engagement. Among the aged, the compactness, negotiability, and sheer physical distance between any two or more destination points may influence an individual's density of perceived control within one's *dwelling turf*. At the neighborhood level, density of control has been defined as a component of its *walkability* (Burkhauser et al., 1995). With respect to the aged, the dwelling can exert an inhibiting influence on walking behavior outdoors in one's neighborhood (Ward et al., 1986).

Among all age groups, the elderly are perhaps the most susceptible to adverse conditions in their daily physical environment (Bynum, 2006). This, combined with the perception of fear among many elderly individuals with respect to venturing outdoors in general, warrants attention, particularly in light of the fact that elderly persons in the U.S. age 65 and older numbered 35.9 million in 2000. This group represented 12.8% of the total U.S. population, about one in every eight Americans. By 2030, there will be nearly 70 million older persons, more than twice their number in 1996. People 65+ are projected to represent 20% of the American population by that date. Meanwhile, a growing number of elderly residents strive to live independently for as long as possible prior to relocating to institutional care settings (Verderber and Fine, 2000; American Association of Retired Persons, 2000). For a variety of reasons, many aged persons either are forced, due to financial constraints, or elect on their own, to remain in the neighborhoods where they bought their first home, raised their family, and where a diminished network of social contacts may or may not remain (Isaacs, 1983; Hogle, 1997; Duany et al., 2001; Salingros, 2002). Others may simply opt to continue to reside in the house and neighborhood that is *familiar* versus relocation to unfamiliar surroundings elsewhere. Older, even historic, urban neighborhoods may possess housing preferred by the aged simply due to its familiarity quotient although, in reality, these places in fact may foster social alienation and stress due to a fear of crime (Krause, 1993). Fear of crime is a deterrent to a community's sense of cohesiveness (Newman, 1972; Katz, 1993; Kunstler, 1996). In a recent study of racially mixed neighborhoods, the perception of crime among elderly residents superceded the actual crime rate in these neighborhoods, as residents were more concerned with how "safe it felt" versus how safe it actually was (Chiricos et al., 2001). Perceptions such as this have been found to predict where elderly persons opt to reside within a given neighborhood (Espino et al., 2001).

Walking outdoors near to home can be a source of stimulation, sustenance, and reaffirmation (Jacobs, 1961; Calthorpe, 1993; Downs, 1995; Scharfenberg, 2006). Social contact, personal safety, and walking are closely intertwined (Alexander et al., 1977; Steele, 1981; Charles, Prince of Wales, 1989; Jacobs, 1993). Among the aged, social contact through walking outdoors can in some instances help compensate for the loss of a personal pet (Verderber, 1991). At

the other extreme, fear of crime is a key deterrent to walking, to the extent where an aged individual will not even opening a window for ventilation. This, combined with the unhealthful effect of excessively high summer temperatures for days on end resulted in the deaths of more than 700 elderly persons who perished in their non-air conditioned homes and apartments during a heat wave in Chicago in 1996 (Klinenberg, 2002).

With this said, such conditions of openness/closure, isolation/connectivity, negotiability/non-negotiability within the milieu of the dwelling and the neighborhood milieu have not been examined to date as a single continuum. Given that the aged need to be able to perceive and make sense of meaningful, useful information about their surroundings, at times one may opt to retreat in order to obtain respite. Such *prospect-refuge* behavior denotes seeking out meaningful information about the external world, whereas refuge denotes retreat and in this aspect it is a dimension of functionalist-evolutionary theory (Appleton, 1975; Kaplan and Kaplan, 1982). This construct is based on the premise that humans endeavor to “make sense” of their surroundings, up to a point. A fearful neighborhood is deemed unpredictable, as such conditions may be tantamount to a threat to well-being (Kaplan and Kaplan, 2003). Fear of crime may seriously threaten a neighborhood’s social cohesiveness (Frumkin, 2003). This, in light of the fact that mobility limitations, sensory losses, and relative frailty are already sources of stress among the aged (Zimring, 1982).

An empirical investigation is reported below. The objectives were twofold: To examine architecture (dwelling attributes) as a deterrent (or inducement) to health-promoting physical activity outdoors (walking behavior) among an elderly population who reside in an historic urban neighborhood. Second, to identify personal health status and urban infrastructural factors which function as deterrents (or inducements) to venturing outdoors and thereby fostering (or in turn inhibiting) health-promoting physical activity outdoors. It was hypothesized that aged persons who reside in overly “pressing” housing within a traditionally planned, walkable neighborhood tend to disengage from health-promoting activity outdoors. Specifically, walking activity outdoors is viewed, for purposes of this investigation, as an outcome.

An individual aged or otherwise, possesses physical capabilities (competencies) whereas the built environment poses physical limitations for the individual, which may be positive or negative, dependant on the level of challenge entailed in coping (press). This is a well-established construct in the field of environment and aging (Lawton and Nahemow, 1973; Lawton, 1985) For purposes of the present study, competence denotes transacting with the difficulty, or press, inherent in an excessively challenging or uncertain physical setting. Competence denotes cognitive ability, psychological adjustment, and physical health. Press is the sum of environmental forces that demand a response,

that is, high temperatures, heavy doors, steep stairs, being forced to walk along a busy street where sidewalks are absent, excessive sunlight, lack of protection from the elements while outdoors, or the fear of crime because there are no safe places to walk to near to one's dwelling. This dialectic is operationalized in the study reported below as a single *Prospect-Refuge Continuum* (PRC), defined by a set of variables which express the scale of the private dwelling, at one endpoint, and the scale of the neighborhood, at the other. The PRC construct consists of four categories of variables:

- *Environment:*  
Architectural Attributes of Dwelling and Immediate Environs  
Physical Attributes of Neighborhood
- *Behavior:*  
Use of Resources in Immediate Neighborhood  
Personal Lifestyle Factors

### ***The Setting***

An historic urban neighborhood in pre-Hurricane Katrina New Orleans served as the study area for a survey administered to 89 residents in the summer of 2005. This neighborhood, Carrollton, was established in the mid-nineteenth century six miles upriver from the French Quarter along the Mississippi River. Carrollton was founded as an autonomous suburb, connected with the city of New Orleans via the earliest commuter rail line in the U.S. The study area was a roughly nine by ten block triangular shaped footprint bounded by the Mississippi River levee, the Jefferson Parish line, and residential streets. The housing stock comprises principally single and two-family frame structures, with churches, schools, mom and pop-run corner grocery stores, and related retail establishments interspersed.

Hurricane Katrina devastated New Orleans on August 20, 2005. Katrina resulted in the loss of more than 1600 lives in New Orleans and the Gulf Coast and stands as the costliest natural disaster in U.S. history, inflicting more than \$230 billion in losses to date (December 2006). Over one hundred and twenty-five thousand homes were ruined by floodwaters that engulfed 80% of the city. More than one million residents of the metro area were forced to evacuate. The study area is located on high ground along the River's levee, within the 20% of the city that did not flood. The floodwaters ceased a mere few blocks from the edge of the study area although numerous structures sustained wind damage, and subsequent fires caused by gas explosions destroyed a number of historic structures. The housing stock in this neighborhood is 75 years of age and older. Most structures in the area are of frame construction, consisting mainly of single-level and two-level "shotgun" single or side-by-side double residences.

Prior to Katrina, based on 2000 U.S. Census Data, 56.1% of all residents in the study area had lived in the same residence at least since 1995. The total population of the census tract within which the study area is situated was 8,953, representing a total of 3,633 households. A total of 1,053 elderly persons resided in these households. African-Americans represented 75.5% of all residents in the study area. There were 4,129 housing units, with 88.4% occupied; of these, 41.8% were owner occupied, and 58.2% were renter-occupied. The average annual household income was \$32,016. The percentage of aged residents living at or below the federal poverty level was 53.4%. The overall population over age 65 with multiple disabilities totaled 43.4%. In terms of urban infrastructure, many streets and sidewalks were tattered and in need of replacement. Crime had been a persistent problem due to the presence of gangs in an adjacent neighborhood. The study area contained 14 churches and congregation group centers. The neighborhood possesses sidewalks, a Cartesian street grid, a main commercial artery, banks, schools, eating establishments, and related amenities typically found in late nineteenth and early twentieth-century residential neighborhoods. It appears, upon first impression, to be an imminently walkable neighborhood.

### *METHODS*

All 89 respondents resided within the study area. The survey was administered at two senior day centers in this neighborhood, at functions sponsored by local religious organizations, and at a neighborhood primary care clinic operated by the Daughters of Charity. Written informed consent was obtained prior to each interview. Respondents were guaranteed full confidentiality. Their residential settings differed in terms of size, condition, density, and height, and the number of floors, ranging from one to two floors in height. The age of residences, however, was similar across the respondent group. A four-page survey questionnaire was developed. The introductory questions focused on the type of dwelling one resides in, architecturally, the length it had been occupied by the respondent, and one's length of residency in the neighborhood. These items were followed by a question on the perceived sense of safety in one's home during various times and the day and at night, and on the aforementioned activities of daily living (ADL). The third set of survey items sought information on neighborhood infrastructure, and architectural attributes. Ten response items were evaluated, prefaced with "To what extent do these features of your residence keep you from going outside more often?" Next, 13 response items were similarly evaluated. The final set of items centered on activities, respondent background, and health status. Respondents were queried on the existence of

grocery stores nearby that one feels safe to walk to in order to purchase fresh vegetables. Similarly, two survey items on personal safety with respect to nearby convenience stores or restaurants were included. Following this, information was elicited on interventions that would perhaps make one feel safer about going outdoors as a means to engage in walking. Study participants were contacted individually, after initial contact had been established, in numerous instances, through liaison contacts, that is, senior day program administrators, residents themselves recommending their friends, and local ministers. Persons requiring home-based nursing care were not included. The acceptance rate was 67% among those invited to participate in the study.

Prior to the full-scale fieldwork phase, a pretest was conducted with ten aged persons at a neighboring senior daycare center in the same part of the city as a means to evaluate the format and content of the instrument and procedure. The pretest respondents were matched with the cohort of full-scale study respondents in terms of age, health, lifestyle, type of residence, and socioeconomic status. Numerous modifications to the research instrument were subsequently made with respect to the validity of the survey items, sequencing, and format. Modifications also included the counterbalancing of survey items.

The interview survey lasted approximately 25 minutes and occurred in private away from major areas of social activity at each interview site. Interviews were conducted between the hours of 9:00 A.M. and 5:00 P.M. The identities of respondents remained confidential. The surveying team consisted of three graduate students in public health and one in architecture. The team worked under the close direction of the project director (author). A training session was held to ensure consistency in the interviewing format and protocol. All key instructions and introductory statements were prepared *a priori* and read verbatim from the instructions provided on the first page of the survey. Interviewers were assigned in a balanced manner across data collection settings. Each gathered data gathered data at two or more settings to counter possible response bias stemming from the interviewer's age, gender, race, and so on. Each interviewer began by reciting the prepared introduction and instructions to the respondent; all respondents completed subsequent parts of the survey according to identical instructions. Interviewers recorded anecdotal information provided by respondents on a separate sheet of paper during the course of each interview.

## ANALYSIS

All individual characteristic information, activities of daily living, dwelling attributes, and neighborhood infrastructure variables were treated as independent for purposes of data analysis. Respondents' self-assessment of



their level of outdoor walking activity in their neighborhood was treated as the dependent variable. The hypothesis was tested from the standpoint of one's level of engagement in the neighborhood, with walking examined as a function of dwelling attributes and neighborhood infrastructural support. Data were analyzed via descriptive statistics (means and standard deviations), and multiple regression analyses with a stepwise procedure to explore causal relationships between independent and dependent variables (Horst, 1965). All scalar response data and background data were formatted as ordinal variables prior to analysis.

In the data reported in Table 1, the outcome variable, engagement in outdoor walking activity, was analyzed across all respondents, utilizing a sole composite mean computed across the 11 survey items that asked respondents how often one walked to a particular place or to engage in a given activity within the immediate neighborhood, on a five-point scale, "Never" (1.00) to "Once per day" (5.00). This variable was utilized in the regression analyses reported in these two tables. In Table 2, the mean responses are reported on the extent to which various aspects of the neighborhood infrastructure and particular aspects of one's dwelling inhibits, or deters, one from venturing outdoors. The five-point scale ranged from "Never" (1.00) to "Very often" (5.00). Next, these summary means were divided into two subgroups. This made it possible to examine Group 1 and Group 2 differences in respondents' engagement in outdoor activity. To achieve this, two summary, composite means were computed. Mean ratings of 1.00-2.50, denoting a low to moderate level of deterrence (L/M) were isolated from mean ratings of 2.51-5.00, denoting a moderate to high level of deterrence (M/H). In this manner, a low walk/moderate walk construct was created reflecting two distinct groups representing the degree of engagement in the outdoor realm. Standard deviations are reported (Table 2), as are predictive effects at or below .05 (Tables 1 and 2).

## RESULTS

The sample was relatively homogeneous in terms of socioeconomic background and formal education level attained. The sample was 30.4% Caucasian and 69.6% African-American. The mean age of respondents was 81.4 years. The group was 17.3% male and 82.7% female. Most were widowed (65.2%), married (17.3%) or divorced and living alone (10.9%). A series of questions queried respondents on their health status. Most (66.6%) considered themselves "a physically active person who likes to exercise outdoors," whereas 31.4% indicated "No" in response, and the remaining few indicated "unsure."



TABLE 1. Standardized Regression Coefficients for Respondent and Dwelling Attributes in Relation to Walking Activity Among the Aged (N = 89)

Characteristic	Percent with Condition (Yes/No)	With Activity Level <sup>a</sup>
<i>Lifestyle/dwelling/neighborhood amenities</i>		
Marital status <sup>b</sup>	–	–0.039
Lives alone	41.8/58.2	–0.127*
Use of auto on regular basis	35.9/64.1	–0.123*
Use of public transportation on regular basis	59.5/40.5	0.099
Hours of television viewed per typical day <sup>c</sup>	–	0.101
Television viewing—local news and weather <sup>d</sup>	93.7/6.3	0.123*
Propensity for outdoor activity	28.6/71.4	–0.101
Cares for personal pet(s)	36.7/63.3	0.034
Pet(s) provide sense of safety	56.0/44.0	0.077
Length of residency in this dwelling <sup>e</sup>	–	–0.104
Length of residency in neighborhood <sup>f</sup>	–	0.079*
Architectural type of dwelling <sup>g</sup>	–	0.141**
Owner occupied dwelling	38.0/62.0	0.035
Crime is a problem	70.9/29.1	0.074
Victim of crime in past five years	15.2/84.8	–0.067*
Grocery stores safe to walk to	27.8/72.2	0.117
Convenience stores safe to walk to	30.2/69.8	0.112

<sup>a</sup>Five-point frequency of engagement response scale: never (1.00), seldom (2.00), once per week (3.00), more than once per week (4.00), once per day (5.00), based upon respondents' indication of the extent to which one walks outdoors in the neighborhood.  $F = 5.64$ ;  $df = 17,84$ ;  $p < 0.05$ ; adjusted  $R^2 = 0.101$ .

<sup>b</sup>Married: 17.3%; Divorced: 10.9%; Widowed: 63.2%; Single (never married): 8.6%.

<sup>c</sup>Hours viewed per typical day: None: 6.3%; 1-4 hours: 32.9%; > 4 hours per typical day: 60.8%.

<sup>d</sup>News—Six PM newscast: 29.6%; 10:00 PM newscast: 44.2%; Both: 26.2%.

<sup>e</sup>Length of residency (dwelling): 27.4 years/months.

<sup>f</sup>Length of residency (neighborhood): 31.8 years/months.

<sup>g</sup>Single family dwelling: 31.6%; Two-unit single level "shotgun" dwelling, or two level "camelback shotgun": 37.5%; Residence on the second floor of an apartment building: 19.5%; Other (freestanding mobile home): 11.4%.

\* $p < .05$ ; \*\* $p < .01$ .

Heart attacks had been experienced by 14.6% of respondents, osteoporosis by 11.4%, hypertension by 62.7%, pre-diabetes diagnosis by 15.2%, cancer by 9.6%, stroke (13.0%), arthritis (44.7%), Type I diabetes (14.1%), Type II diabetes (21.4%), paralysis (1.6%), chronic back pain (24.7%), bone fractures (26.6%), serious hearing loss (4.95%), serious vision loss (16.9%). A cane, walker, or wheelchair was required by 13.4% of respondents. The average weight of respondents was 168.9 pounds, and average height was 64.9 inches.

TABLE 2. Assessment of Dwelling and Neighborhood Attributes (N = 89)

	X <sup>a</sup>	SD
<i>Architectural and Site Attributes of Dwelling<sup>b</sup></i>		
a. The floor level of one's residence <sup>c</sup>	4.09**	1.43
b. Feeling unsafe while on one's front porch <sup>d</sup>	3.98*	1.06
c. A small yard adjacent to one's dwelling	3.21	1.11
d. Exterior stairs considered unsafe for egress	3.09*	1.06
e. Adequacy of handrails on exterior egress stairs	2.97	1.13
f. Adequacy of views to outdoors from within dwelling	2.61	1.41
g. Adequacy of shaded places to sit or work <sup>d</sup>	2.51	1.21
h. Shape of yard <sup>d</sup>	2.48	1.08
i. Adequacy of lockable fences and gates	2.14	1.01
j. Ability to adequately secure the doors and windows	1.89**	0.98
k. Spatial distance between the neighboring houses	1.59	0.75
l. Age of dwelling	1.52	0.69
m. Exterior appearance of dwelling	1.44	0.73
<i>Neighborhood Attributes<sup>e</sup></i>		
a. High crime rate in the immediate community	3.59*	1.39
b. Excessive distances to destination points from home	2.96	1.28
c. Adequacy of street lighting	2.75**	1.30
d. People loitering near one's dwelling	2.22	0.91
e. Speeding traffic on one's street	2.09	1.21
f. Sidewalks in poor condition near one's dwelling	2.05*	1.09
g. Streets in poor condition near one's dwelling	1.82	0.74
h. Absence of sidewalks near one's dwelling	1.53	0.86
i. Loose dogs in the neighborhood	1.42	0.91
j. Absence of stop signs at street intersections	1.36	0.72

<sup>a</sup>Mean ratings across all respondents reported (N = 89), then reformatted to express a neighborhood outdoor activity engagement/disengagement construct. Students' two sample t-tests performed to compare Group 1 (L/M) and Group 2 (M/H) differences.

<sup>b</sup>Five-point response scale: never (1.00), seldom (2.00), sometimes (3.00), quite often (4.00), very often (5.00), or N/A (does not apply). Question phrased as follows: "To what extent do these things in your neighborhood keep you from going outside?"

<sup>c</sup>If respondent did not reside on ground level, floor level of one's residence was provided.

<sup>d</sup>If applicable.

<sup>e</sup>Five-point response scale: never (1.00), seldom (2.00), sometimes (3.00), quite often (4.00), very often (5.00), or N/A (does not apply). Question phrased as follows: "To what extent do any of these features of your residence keep you from going outside?"

\* $p < 0.05$ ; \*\* $p < 0.01$ .

With regards to respondents means of transportation, 64.6% did not own their own auto nor had access to an auto on a regular basis, and 59.5% indicated that they used public transportation on a regular basis (the neighborhood is served by three bus routes). The survey also contained a series of items intended to render a typological and spatial profile of one's residential milieu. Most (62.0%) rented, the average length of residency in the neighborhood was 43.8 years, and the average length of residency in their current dwelling was 27.4 years. As for architectural typology, most resided in a single level double (2 unit) shotgun house (Table 1).

The majority of respondents (70.9%) indicated that crime had been a problem in the past 5 years (Table 1). For those answering "Yes", 15.2% had been a victim of crime within the neighborhood within the past 5 years, and 41.8% lived alone at the time of the survey. Among respondents who did not live alone, 58.7% lived with children, 19.6% lived with their spouse, and 21.7% lived with one or more other relatives. With regards to activities of daily living, 60.8% watched more than four hours per day of television, 32.9% watched between 1-4 hours per typical day, and 6.3% indicated they did not watch any television during a typical day. Nearly all respondents (93.7%) indicated they watched television to learn about local news and weather (Table 1).

The stepwise regression analyses yielded a number of significant predictive relationships between the independent variables and the outcome variable. The total number of significant effects reported in Tables 1 and 2 were greater than those attributable to random effects. With respect to the background data gathered on respondents' self-assessments of their own health in relation to their walking outdoors, it was found that four aspects of personal health status had a predictive influence on walking behavior in the neighborhood: weight, vision, physical mobility limitations, and arthritis (not reported in tables). These four aspects of respondent overall well-being, as measured in relation to the other twelve health status indices included in the survey, were associated with people who preferred disengagement in walking outdoors. First, persons who weighed the most tended to not engage in walking activity outdoors in their neighborhood. Second, persons with the impaired eyesight tended to not engage in walking activity outdoors. More than three quarters of respondents reported some loss in visual acuity. Third, persons with a restrictive range of physical mobility tended to not engage in walking behavior outdoors. Over two-thirds of respondents reported some loss in physical mobility. Fourth, persons with arthritis tended to not walk in their neighborhood. However, as previously mentioned, less than half of respondents reported having an arthritic condition.

The next facet of the research hypothesis examined the predictive influence of lifestyle, neighborhood infrastructure, and certain aspects of the dwelling's architectural attributes in relation to walking activity (outcome). Here, the

focus was the effect (if any) of such factors as marital status, whether one lives alone, certain activities of daily living, length of residency in the neighborhood, architectural attributes of one's dwelling, and certain aspects of the neighborhood, in causing one to engage (or disengage) in outdoor walking activity. Six variables had a predictive influence on engagement: whether one lived alone or with others, whether one had use of an auto on a regular basis, the extent that one watched television to specifically learn about local news and weather, the length of residency, the type of dwelling one resided in, and whether one had been a victim of crime within the past 5 years (Table 1). In summary, six factors (out of 17 indices included in this part of the survey) were associated with significantly less walking activity.

Persons who lived alone tended to not engage in walking outdoors. This was also the case for persons who had access to an auto for their private use, although nearly two-thirds of the sample did not have access to an auto. A similar pattern was identified among respondents who watched television with a particular focus upon learning about local news and weather. Fourth, persons who resided the longest in the neighborhood tended to not engage in walking, and the average length of residency among respondents was over 30 years. By contrast, those who were relative newcomers engaged more in walking in their neighborhood. Fifth, with respect to the predictive influence of the dwelling on outcome, respondents who resided on the second floor of a multilevel building tended to not engage in walking outdoors, although this group represented less than one quarter of all respondents. Finally, persons who had been a victim of an act of crime within the past 5 years tended to not engage in walking activity outdoors near their dwelling.

Next, the dwelling itself and its exterior site environs were assessed by respondents (Table 2). First, the floor level of one's dwelling was considered the strongest deterrent to venturing outdoors, followed by sense of vulnerability to being victimized by crime while on one's front porch. Next, a small yard next to the house, and exterior stairs considered unsafe were considered key deterrents to going outdoors more often. In descending priority, a number of other factors were rated: The adequacy of handrails along stairs posed a danger, if inadequate views overlooking the street had a deterring influence on engagement, and whether there was adequate shade outdoors. A third subset had the least influence as deterrents to engagement with the outdoor realm. Here, the shape of one's yard, adequacy of lockable fences and gates, whether doors and windows are difficult to secure, the physical distance between neighboring houses, the age of the dwelling, and its exterior appearance were of least influence as deterrents.

Next, respondents' assessment of the neighborhood's infrastructure was identified, together with attributes of their dwelling and dwelling site environs

(Table 2), and pertains to the mean ratings for each of the 23 response items on the survey. Again, crime emerged as an inhibiting factor: respondents were found to be most deterred from walking due to a fear of crime, the walking distances to neighborhood destination points from home, an inadequate level of street lighting near home, the presence of persons loitering near home, and speeding auto traffic in the area. Respondents reported being somewhat less deterred to walk by the condition of sidewalks, streets, the presence of loose dogs, and the status of traffic control signage at intersections. Viewed comparatively, the architectural attributes were considered to be more important than neighborhood attributes per se. Specifically, the floor level of one's residence ( $X = 4.09$ ) and if one felt unsafe when on one's front porch ( $X = 3.98$ ) was of somewhat greater concern than crime in the neighborhood ( $X = 3.59$ ) travel distances to destination points ( $X = 3.59$ ), and street lighting ( $X = 2.75$ ).

Next, these summary means across all 89 respondents were reformatted into two subgroups for purposes of comparative analysis. These categories are referred to as Group 1: low to moderate engagement (L/M), and Group 2: moderate to high engagement (M/H), and are viewed as an expression of engagement/disengagement with the outdoor realm of the neighborhood (Table 2). The thirteen architectural and site attributes were comparatively analyzed between subgroups 1 and 2, with four significant group differences identified ( $p < .05$  or greater): the floor level of one's dwelling, the lack of feeling of safety while on one's front porch (in applicable cases), whether one's stairs were a safe/unsafe means of egress, and the ability/inability to adequately secure the doors and windows of the dwelling (Table 2). Once again, the floor level of the dwelling was identified as influencing outcome (walking) although nine other architectural-site survey items were found to have no significant influence on outcome. At the scale of the neighborhood, only three survey items were found to have a predictive influence on outcome ( $p < .05$  or greater): the neighborhood's crime rate, the adequacy of the local street lighting, and the influence of the condition of the sidewalks near to one's home: pervasive crime, a low level of street lighting, and sidewalks in poor condition near to one's home. However, seven neighborhood scale factors were not assessed differently, statistically, between Group 1 and Group 2 (Table 2).

Finally, in addition to the data reported above, perceptions of personal safety were elicited in the survey. These data are not reported in tabular form: the times perceived as safest were the afternoon, from noon to 6:00 P.M. ( $X = 3.99$ ), mid-morning from 9:00 A.M. to noon ( $X = 3.83$ ), and early morning from 6:00 to 9:00 A.M. ( $X = 3.44$ ). Not surprisingly, early evening ( $X = 2.62$ ) and just prior to dawn ( $X = 2.34$ ) were viewed as the least safe hours to be outdoors. With regard to the rating of interventions that would make one feel safer outdoors adjacent to their dwelling, it was found that improved door and

window locks ( $X = 2.56$ ) and security bars installed on the windows ( $X = 1.96$ ) were less preferred compared with an electronic surveillance system ( $X = 3.63$ ). Finally, improved community police surveillance was considered to be of greatest importance to increasing physical activity outdoors ( $X = 3.40$ ).

### DISCUSSION AND CONCLUSION

An architecturally supportive dwelling milieu was found to be of high importance in relation to the promotion of healthful walking activity outdoors. By contrast, housing attributes considered to be too pressing in nature tend to inhibit one's engagement in healthful walking activity outdoors. The effect of crime in the neighborhood is of quite close, but secondary, importance in this relationship. It was hypothesized at the outset that a traditionally planned, historic urban neighborhood and its architecture might in fact present significant barriers to walking activity outdoors. This was found to occur as a combination of personal health status, dwelling attributes, and neighborhood infrastructural attributes. The press inherent in a dysfunctional dwelling can pose a significant challenge to competency levels among the aged. It was assumed from the outset that elderly persons in relatively good health, residing in supportive residential settings, engage in health-promoting activity outdoors. By contrast, persons less functionally capable due to health problems experience a subsequent loss of personal autonomy, and engage less in health-promoting activity outdoors. It was found that traditionally planned, compact, pedestrian-scaled neighborhoods do not guarantee this type of activity. In fact, disengagement can occur when the exterior realm is deemed as too pressing in nature, even in settings that would on the surface appear to be highly pedestrian-attuned. While a supportive/functional home setting was identified to be of highest importance, having safe places to walk to was found to be of nearly equal importance. As for health status, impaired visual acuity and physical mobility limitations are additional deterrents to walking activity outdoors.<sup>1</sup>

The Prospect-Refuge Continuum (PRC), it is hoped, will help to overcome needless disciplinary boundaries. This construct makes it possible to study housing attributes and neighborhood attributes as factors in consort with one another. Density of control is a pertinent concept at both the architectural and the community level and is not dissimilar to the notion of *home range*. In terms of territoriality, one begets the other: those who had lived longest in the neighborhood walked the least outdoors. Also, mobility limitations and sensory deficits among these persons had a bearing on outcome. Many of the 89 respondents had witnessed their neighborhood go from "good" to "bad"

over the past 30 years. Additionally, their friends and neighbors had diminished in number over the years. Also, there were now simply fewer safe places to walk to near home compared with many years ago. Regardless, the findings suggest that walking outdoors is equally rooted in the home itself as much as in the neighborhood context. A dysfunctional residence poses a formidable barrier to walking outdoors, with those who resided above the street level finding this to be a more formidable barrier to their walking than a fear of crime alone. For those who lived on the first level, dwelling egress-ingress was a critical factor. Ironically, an upper level residence at first may appear a safer refuge yet may pose formidable barriers, thereby exerting considerable *press* from a health promotion perspective. A long flight of steps poses a serious risk to persons with limited physical competency. Victims of crime in the past 5 years, while only representing 15.2% of those surveyed, were nonetheless least inclined to walk outdoors, even in this relative dense, historic, traditionally planned neighborhood.

This study suggests that architectural and neighborhood infrastructure attributes of a given community should be conceptualized in future research as an unbroken, seamless continuum. In this way, health promotion outcomes can be examined concurrently at multiple levels of inquiry. Interdisciplinary tools such as the PRC are needed to link architectural with community level influences with respect to walking behaviors and other health-related outdoor activities. In terms of policy implications:

*For architects and landscape architects*—historic housing alone does not guarantee that meaningful or sustainable affordances exist with the outdoors, that is, porches, windows, yards, fences and gates, courtyards. Examine their size, configuration, orientation to sunlight exposure, quality of materials of construction, artificial light sources, access to nature be it a garden or small yard, building massing, access to parks, and access to shade.

*For community planners*—create communities that are housing-centric versus neighborhood-centric, particularly from the standpoint of fostering a greater density of control over one's home range, and to also recognize that pedestrian-scaled, dense, historic neighborhoods may in fact not afford what they may appear to afford at first glance. Examine quality of sidewalks, curb cuts, quality of streets, transition points, bus stops, bike racks, and the creation of viable, sustainable points of destination relatively near to home, and above all, *eyes on the street* community design strategies.

*For public health professionals*—focus on the home as the epicenter for inculcating in seniors their involvement in health-promoting behaviors outdoors because the home/dwelling functions in most cases as the primary locus of control. Examine health-promoting points of destination such as parks, health food stores, places to walk, bike, and obtain respite.



Limitations of this study warrant mention, and can inform further research on this subject. First, a larger sample size in terms of respondents would have made it possible to study a broader set of housing types from the standpoint of learning more about their suitability for the aged. Cognitive maps may also be of value in this type of research in historic settings, because remembrances of “community” as it was long ago may disincline the aged to squarely confront present realities. In addition, a larger number of dwelling types would have also allowed for further comparative assessment: architectural amenity by type of residence, materiality, type of staircase, type of window, yard, and so on. A comparative research design between suburban and urban neighborhoods is a useful avenue in further work with the PRC in relation to community health promotion among the aged. Also, post occupancy evaluations of respondents’ home settings might include the documentation of floor plans and occupants’ patterns of daily use.<sup>2</sup>

American society is aging at an unprecedented rate. Safe, walkable communities are needed to allow the aged to live independently. Historic dwellings and urban neighborhoods are prime for retrofitting to meet the needs of this growing segment of American society. High tech wheelchairs are now able to “climb” conventional stairs, and historic houses can be retrofitted into wireless, digital *smart houses* (Neergaard, 2002). The correlation between personal safety and walking is a linchpin of successful community design, whether in a newly built or one hundred year old community. Recent public policy in Europe is having a measurably positive influence in the promotion of healthful physical activity outdoors, including among the aged (Fabrizio, 2001). Moreover, the universal design movement has reconceptualized neighborhoods and buildings to be planned and designed for persons of all ages regardless of one’s functional capabilities (Coleman, 2001; Dommer, 2002; Weisman, 2002). Above all, elderly citizens are entitled to full participation in the architectural design and community planning process.

## NOTES

1. Aged persons with these sensory deficits avoid situations they cannot clearly make sense of, be it a sidewalk that is cracked, or a set of unsafe stairs leading from one’s front porch. Vision, physical mobility, and agility are essential for one to predict, react quickly, and thus respond effectively to an uncertain situation in the outdoor milieu. Obesity was found in this study to also exert a deleterious influence on outcome, as this condition causes immobility, and hence, disengagement from walking activity. Obesity has acquired the status of a bona fide public health concern in the U.S. (Tumulty, 2006). Respondents who weighed the most opted to disengage from walking outdoors. Similarly, it was found that the pain caused by arthritis could be debilitating, making walking outdoors difficult. Arthritis is also on the rise in the U.S. at this time

(Lethbridge et al., 2004). However, more research is needed on the relationship between the obesity epidemic, in particular, and the architectural setting in terms of its influence on health promotion outdoors among the aged, be it walking cycling, or similar activities. The present investigation only obliquely addressed this issue.

2. Unfortunately, direct comparisons between the pre and post-Hurricane Katrina condition in terms of dwelling attributes, personal safety and walking activity outdoors was not possible in the present study for a number of logistical reasons. This neighborhood, however, post-Katrina, grew denser from a population standpoint: survivors from elsewhere along with disaster relief workers relocated in this area. In terms of re-population, less than one third of the respondent cohort had returned as of December 2006. Many remained in exile, living with relatives or friends elsewhere or out of state as part of the Katrina Diaspora. This might be due to a fear of having little access to healthcare in the metro area, lack of housing, jobs, crime, the threat of future hurricanes, and the fragile condition of the city's infrastructure. Upon inquiries nine months after the hurricane, returned neighbors indicated to this author that a number of respondents in the study cohort had died elsewhere while in evacuation, some in emergency shelters in the aftermath of this catastrophic hurricane.

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