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Difficulty and Independence in shopping among older Americans: More than just leaving the house

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Abstract

Background—The built, social, and economic environments are associated with disability, but knowledge of how these environmental characteristics simultaneously influence older adults' ability to shop independently is limited.

Objective—We investigated cross-sectional associations between the outdoor home, local neighborhood, and macro socioeconomic levels of the environment and shopping difficulty, and interactions between environmental factors and shopping difficulty.

Methods—Using nationally-representative data from a study of Medicare-eligible adults we conducted a cross-sectional secondary data analysis to examine associations between the environment and difficulty shopping (N=5,504).

Results—Sidewalk conditions, broken steps, neighborhood social cohesion and neighborhood socioeconomic disadvantage were associated with more difficulty shopping, although health factors partially accounted for associations between broken steps and disadvantage and shopping difficulty. The association between social cohesion and shopping difficulty also depended on the degree of socioeconomic disadvantage in the neighborhood.

Conclusions—Overall, results suggest that factors in the outdoor and local neighborhood environment influence the ability to shop independently for older adults, but that it also may depend on the socioeconomic context of the neighborhood. Interventions aimed at improving the built environment directly outside of older adults' homes, and helping increase social cohesion among neighbors, has the potential to reduce difficulty in carrying out this important activity.

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Declaration of interest

The authors have no conflicts of interest to declare

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Keywords

Disability; environment; neighborhood; shopping; older adults; instrumental activities of daily living

Introduction

Overview

Over 60% of adults over age 65 live with a physical disability that limits their participation in daily life activities [1]. Shopping, defined as an activity related to examining or buying merchandise, is an important life activity that can be challenging for older adults [2]. Shopping involves complex tasks such as safely leaving the home, navigating transportation, and interacting with built and social environments. Identifying the environmental factors that affect independence in tasks such as shopping is critical for supporting healthy aging. As people age, they may become more dependent on their local environments, [3] yet older adults may struggle with physical and cognitive limitations, and social isolation, that restricts them from traveling far from home [4]. In this research, we focus on shopping as an important daily life activity for older adults, and examine the role of environmental factors at multiple levels of society, as they impact difficulty shopping.

Difficulty and Independence in Shopping among Older Adults

Difficulty shopping is one of the most common self-reported difficulties with daily activities among older Americans, showing increases with age, physical impairment, and the number of comorbid conditions [5]. Shopping for groceries and other necessities involves a sequence of complex and physically demanding tasks, including physical and social interactions in the local environment related to leaving the home and traveling to the store. Environmental barriers outside the home and on route to the store are likely to be consequential for the ability to be independent in shopping. Disablement models emphasize the role of environmental factors in shaping disability [6, 7]. The International Classification of Functioning, Disability and Health (ICF) framework, for example, characterizes functioning and disability as interplay of health and environmental factors. Thus, a participation restriction such as having difficulty shopping or not being able to shop independently, is an indicator of disability that is jointly shaped by both an individual's health and functioning, as well as their physical (built), social and attitudinal environment [6, 7]. While multiple studies have examined the role of the environment on disability [8–11], few have simultaneously considered the economic, built, and social environments with which older individuals must regularly engage [11, 12]. Environmental influences on health and independence are complex and interrelated [13, 14], thus it is important to simultaneously consider multiple environmental factors to which individuals are exposed.

Environmental influences on disability

Much of the research on the environment and disability has focused on the outdoor home and neighborhood environment [15, 11, 9, 10, 16], including built environments that support mobility [9–11, 17]. Researchers have also established associations between the macro

socioeconomic environment and disability [8, 11, 18–20]. Limited evidence suggests that aspects of the local social environment such as neighborhood crime/safety [21, 22], social cohesion/collective efficacy [8], and social interactions, influence disability in older adults, although results are mixed [8, 3, 11, 23, 24]. The effects of the social environment are diffuse and indirect, and thus may be difficult to capture in survey research. It may also be that the social environment is most salient for older adults who are exposed to additional vulnerabilities such as poverty or physical impairment. Clark et al. found an increased risk of mobility disability related to higher levels of perceived neighborhood crime, but only for older adults who were living below the federal poverty level [21]. Given that the socioeconomic environment shapes the built and social environment, and thus the availability of resources [25], it is also possible that associations between the built and social environment and disability are dependent on the larger socioeconomic context. Considering how features of the outdoor home and neighborhood social environments interact with the socioeconomic context, may help elucidate the mechanisms through which the environment influences disability in older adults.

We seek to systematically investigate associations of the outdoor home environment, built and social local neighborhood environment, and the macro socioeconomic environment, with difficulty shopping in a national sample of older Americans. We hypothesize that physical barriers outside the home; low neighborhood social cohesion and high disorder; and high socioeconomic disadvantage will be associated with more difficulty shopping. We also consider interactions between the home and local neighborhood environment, and the larger socioeconomic context on shopping difficulty, based on social epidemiological theories that suggests an interdependence between contexts [26]. We hypothesize that the effect of the outdoor home and local neighborhood environment on disability will vary based on the broader socioeconomic context of the neighborhood, and that individuals living in areas with more barriers in the built and social environment, who also live in more socioeconomically deprived neighborhoods, will experience the greatest difficulty shopping. Due to well-documented gender differences in disability [27] we also hypothesize that differences in associations between the neighborhood environment and shopping difficulty will vary by gender.

Materials and methods

Data and measures

Data come from the National Health and Aging Trends Study (NHATS), a nationally representative study of the health and well-being of 8,245 Medicare recipients ages 65 and older. Blacks and the oldest adults were oversampled. Details of the sampling strategy and design are described elsewhere [28]. NHATS was designed to assess disability using a comprehensive model [6], which accounts for the influence of helpers and assistive technology in measuring difficulty performing activities. In-person interviews were used to collect most of the data, but information related to the environment was collected via participant report and interviewer observations. For this study, we used data from the second round of NHATS (2012), which included interviewer observations of sidewalk conditions

outside participants' homes. In our analysis, we focus on the 5,504 community-living participants with non-missing data on the outcome or covariates.

Shopping difficulty—Shopping was assessed in NHATS as one of four instrumental activities of daily living (IADL). Participants were first asked how they shopped and those who reported shopping on their own in the past month rated the degree of difficulty they had shopping (none, a little, some, a lot). Participants who shopped with help or had someone else shop for them were asked whether this was due to health or functioning or for other reasons (e.g., shared activity). Based on these responses we created a 5-level measure of shopping difficulty. Participants who did the activity by themselves and did not have any difficulty were assigned a 1 (no difficulty shopping), participants who reported a little/some difficulty were assigned a 2, and participants who reported a lot of difficulty or shopped with help were assigned a 3. Participants who had someone else shop for them or did not shop due to health/functioning were assigned a 4, and participants who did not shop due to non-health reasons were assigned a 5 (the “other” category). This measure was developed and validated in NHATS [29].

Environmental factors—Measurement of the outdoor home environment included interviewer observation of broken steps in front of the home and the presence of continuous sidewalks in both directions (yes/no). Interviewers were asked to observe the home and the sidewalks extending from both sides of the home, and to rate based on what they could see. The local neighborhood environment was assessed by physical and social aspects of the neighborhood. NHATS included questions on the neighborhood based on previously research on neighborhoods and health in older adults, using items from measures that were validated measures in older adult populations [30]. Interviewers reported on neighborhood physical disorder including the presence of graffiti, vacant houses, and litter/glass on the sidewalk (none, a little, some and a lot). A neighborhood disorder scale was created from the mean of the three items (range=0–3). Due to high skewness towards no disorder, an indicator of physical disorder was created (mean >0). Neighborhood social cohesion was assessed by participants based on their level of agreement with three items: people in this community know each other very well, people in this community are willing to help each other and people in this community can be trusted (a lot, a little or not at all) [30]. A dichotomous indicator of social cohesion was created due to skewness towards high social cohesion. Social cohesion scores with a mean of two (the maximum) were coded one to indicate socially cohesive neighborhoods, and means below two were coded zero.

The macro socioeconomic environment was characterized by indicators of the neighborhood socioeconomic environment using 2010 US Census and 2008–2012 American Community Survey data [31, 32]. Census tract-level measures were linked to participants' residential location and a composite measure of socioeconomic disadvantage was created using principal component factor analysis (with an oblique rotation) of multiple indicators commonly used to assess neighborhood socioeconomic structure [33, 34]. Factors with an eigenvalue equal to or greater than one were retained. A neighborhood socioeconomic disadvantage factor was represented by percentage of: female-headed households with children, unemployed households, households living at or below 150% of the Federal

Poverty Level, and households with public assistance income), which explained 63% of the total variance. A neighborhood socioeconomic disadvantage score was created from the mean of the indicators (Mean=10.93, SD=6.37, Range (0.92 – 39.19)), with higher values corresponding to greater disadvantage.

Covariates—We adjusted for individual factors that could influence independence, and select people into different types of neighborhood environments. Physical capacity addressed whether participants could perform tasks independently and without assistive devices. Tasks were paired into less and more challenging versions of the task. Participants were asked whether, in the last month, they could do each of the following: (1) walking 3 and 6 blocks; (2) going up 10 and 20 stairs; (3) lifting and carrying 10 and 20 pounds; (4) bending over and kneeling; (5) reaching overhead and reaching overhead with a heavy object; and (6) open small objects and open sealed objects [29]. A summary measure was created by assigning a 0 for not being able to do either task in the pair (no), 1 point for every easy task, and 2 points for each challenging task. To reduce skewness an indicator of high physical capacity was created and assigned to participants above the 50th percentile of the distribution.

Due to the sensitive nature of birthdate information in NHATS, age at the time of interview was only available in six 5-year age categories, which were collapsed: 65–74, 75–84 and 85+. Participants self-reported their primary race and ethnicity, and an indicator of minority status (non-White/minority vs. White) was used for analyses. Educational attainment was assessed in NHATS with nine categories ranging from “no schooling completed” to “Master’s, professional or doctoral”, which were collapsed into: less than high school, high school graduate/equivalent, and beyond high school. Marital status was collapsed into: married/living with partner (reference category) and not married (separated/divorced, widowed and never married). A count of 10 self-reported medically diagnosed chronic conditions was included as a measure of chronic burden (heart attack, heart disease, hypertension, cancer, lung disease, stroke, osteoporosis, dementia, arthritis, diabetes) by taking the sum of each disease that was present. We also examined a measure using a weighted sum, but model results were identical and we used the simpler approach. To reduce skewness we operationalized the measure as a dichotomous indicator of high chronic burden, based on being in or above the 75th percentile of the distribution.

Statistical Analysis

We used survey weighted multinomial logistic regression to examine associations of the environment with difficulty shopping, using Stata 15 [35]. All models were stratified by gender. Although difficulty shopping is a 5-level outcome, we present results for the first four levels that are related to health and functioning. We first tested the unadjusted association between the outdoor home, local neighborhood, and macro socioeconomic environment with difficulty shopping, as well as the simultaneous association of each level of the environment. Next, we adjusted for demographic and individual level socioeconomic covariates, and high chronic burden and high physical capacity. Finally, to test our hypothesis that the macro socioeconomic environment would modify the effect of the

outdoor home and local neighborhood environments, we tested statistical interactions across levels.

Results

A total of 5,504 participants had non-missing data on the outcome and model predictors (N=3,201 women, N=2,303 men). Approximately 37% of our sample reported having no difficulty shopping independently and 10% were not able to shop independently due to health concerns (Table 1). These older adults lived in relatively high socioeconomic status neighborhoods with low levels of physical disorder and moderate or high social cohesion. Thirteen percent of participants had broken steps at the entry to their homes, and 40% had continuous sidewalks. Most NHATS participants were White and had at least a high school degree. Approximately 43% of participants had at least two chronic conditions and on average, physical capacity was moderately high.

Outdoor home environment and shopping difficulty

Broken steps outside of the home presented problems for men and women (Tables 2–3). Adults with broken steps had higher rates of requiring assistance to shop or not shopping compared to having no difficulty (Risk ratio (RR) = 1.62, 95% Confidence Interval (CI) (1.62, 2.48) for men; RR = 1.49, 95% CI (1.10, 2.00) for women). Women who lived in homes with continuous sidewalks had an approximately 20% greater risk of reporting a lot of difficulty shopping/needing help (vs. no difficulty), but sidewalks were not associated with shopping difficulty for men.

Local neighborhood environment and shopping difficulty

Living in neighborhoods characterized by physical disorder was associated with higher rates of not shopping independently due to health (RR = 1.74, 95% CI (1.03, 2.94) for men; RR = 1.57, 95% CI (1.11, 2.22) for women) (Tables 2–3). Neighborhood disorder was also associated with a 40% lower risk of having a lot of difficulty shopping/needing help compared to no difficulty for men. Finally, neighborhood social cohesion was associated with a reduced risk of reporting some versus no difficulty shopping (RR = 0.26, 95% CI (0.12, 0.59) for men; RR = 0.65, 95% CI (0.45, 0.94) for women).

Full (all environmental predictors) environmental model

Men and women living in neighborhoods with more socioeconomic disadvantage had a 4–6% greater risk of not shopping independently due to health (vs. no difficulty) after accounting for characteristics of the home and local environment (Tables 2–3). For men, living in more disadvantaged neighborhoods also resulted in a greater risk of having some difficulty shopping, as well as a reduced risk of having a lot of difficulty shopping/needing help. Neighborhood social cohesion remained significantly associated with a reduced risk of having some versus no difficulty shopping independently for men and women in the fully adjusted model (RR = 0.26, 95% CI (0.12, 0.59) for men; RR = 0.67, 95% CI (0.47, 0.95) for women).

Demographic, economic and health adjusted models

After adjusting for demographics and education, having broken steps at the entry of a home remained associated with a higher risk of not shopping independently due to health, but the coefficient was attenuated to non-significance when measures of health were added to the models. However, women who had continuous sidewalks outside their home still had a higher risk (40%, CI (1.17, 1.67)) of having a lot of difficulty shopping independently/ needing help. Adults living in areas with social cohesion had a reduced risk of having some vs. no difficulty shopping independently, although the coefficient only remained significant for men (RR = 0.25, 95% CI (0.11, 0.58)). Associations between neighborhood socioeconomic disadvantage and shopping difficulty were attenuated after including health factors, although women who lived in neighborhoods with higher socioeconomic disadvantage had a higher relative risk of not shopping independently due to health compared to shopping without difficulty (Tables 2–3).

Although being non-White was strongly associated with having a lot of difficulty shopping/ needing help, or not shopping independently due to health, adjusting for chronic burden attenuated this association to non-significance. Older age, being married, lower education level, more chronic diseases and lower physical capacity were all associated with a higher risk of having some difficulty shopping independently, or having a lot of difficulty shopping/ needing help due to health concerns (Tables 2–3).

Environmental interactions

Social cohesion interacted with neighborhood socioeconomic disadvantage to influence shopping difficulty for women (results not shown) (RR=0.93, 95% CI (0.90, 0.96), $p<0.01$; adjusted Wald test, $F=3.65$, $p<0.01$ for shopping with a lot of difficulty/needing help; RR=0.95, 95% CI (0.91, 1.00), $p=0.04$; adjusted Wald test, $F=3.65$, $p<0.01$ for not shopping due to health). For women, living in neighborhoods with low social cohesion, and living in neighborhoods with high socioeconomic disadvantage resulted in a greater risk of having a lot of difficulty shopping independently/needing help and not being able to shop independently (Figure 1).

Discussion

We examined associations of the built, social, and socioeconomic environment, and difficulty shopping. We found evidence that multiple levels of the environment were associated with older adults' difficulty shopping which is consistent with socioecological models of health [36] and models of disablement [6, 7]. As we hypothesized, sidewalk condition, broken steps, neighborhood social cohesion, and socioeconomic disadvantage were associated with difficulty shopping, although accounting for chronic conditions and physical capacity weakened their effect. Additionally, associations between sidewalks and shopping difficulty were in the direction counter to that which we hypothesized. In the full model, the home and local neighborhood environment remained the most influential contexts for shopping. Associations between the macro socioeconomic context and shopping were fully explained by health factors. We found very limited support for our hypothesis that relationships between the outdoor home and local neighborhood environment and shopping

difficulty would vary based on census tract –level socioeconomic disadvantage. For women, the association between social cohesion and difficulty shopping varied based on the degree of neighborhood socioeconomic disadvantage. As expected, there were large, positive associations between age, chronic burden, and difficulty shopping. We also found a strong relationship between being married and having more difficulty/needing help or not being able to shop because of health concerns. This is likely not causal, as individuals who are married may have more help available, and thus may be more likely to rely on this help for shopping. It is also possible that men and women with worse disability are most likely to be married or live with a partner due to need.

Although researchers have considered the role of the built environment on disability in older adults, few have included observations of the immediate outdoor home environment such as sidewalks and broken steps [10, 17]. If older adults are not able to safely leave their homes, characteristics of the neighborhood and socioeconomic environment will be less relevant for independence [17]. Understanding how barriers and facilitators immediately outside of the home influence important life activities is a critical first step in helping older adults maintain independence. Achieving independence in activities such as shopping is also an important aspect of rehabilitation in older adults. Surprisingly, we found that continuous sidewalks were associated with higher difficulty shopping for women. This is counter to our hypothesis and prior research [9, 37–39]. Continuous sidewalks only presented a barrier to shopping for women, and not for men. Although it is unlikely that having continuous sidewalks is directly associated with difficulty shopping, women living in areas where sidewalks are in good condition may also be more likely to travel by foot, which may expose them to other unmeasured barriers. Having broken steps outside the home was also associated with more shopping difficulty, but these associations appeared to be at least partially mediated by health. Overall, our results indicate that the outdoor home environment is important for older adults' ability to shop. This is consistent with theory and previous research identifying relationships between environmental barriers and disability [9, 15]. In one study researchers found that having barriers outside of the home was associated with a 50% higher odds of staying inside [10]. Independence is an important aspect of successful aging and rehabilitation in older adults [40], both from a psychological and mental e.g., (self-efficacy, cognition) and physical (e.g. mobility, rehabilitation) perspective. From the standpoint of intervention, our results are also suggestive that first focusing on improving environments immediately outside of homes may be a necessary initial step in reducing disability by increasing independence in instrumental activities such as shopping.

The local neighborhood environment also affected older adults' difficulty with shopping. Although the association between neighborhood social cohesion and shopping difficulty became non-significant for women after accounting for health, living in a more socially cohesive neighborhood was associated with less difficulty shopping for men. Few researchers have assessed the effect of neighborhood social context on disability after accounting for additional neighborhood factors. Beard et al. [8] found that higher collective efficacy was associated with less difficulty leaving the home, but most researchers have found no association between social context and disability, or have found associations in the opposite direction [3, 23]. Our results suggest that the effects of the neighborhood social

environment are more distal than the outdoor home environment, and that they are mediated by other environmental factors.

Living in neighborhoods where neighbors trust and know each other may foster feelings of safety and thus support adults in leaving the home to shop. Researchers have found that perceived safety and crime are associated with disability [8, 21], and neighborhood social cohesion may increase perceptions of safety and reduce crime [41]. Older adults living in cohesive neighborhoods may also feel that they have more social support and people on whom they can rely in case of emergency. This peace of mind may help them feel more empowered to shop independently. Interventions to increase social capital and social cohesion have been successful in other domains [42], and similar attempts to help older adults get to know their neighbors and to generate trust in the community may be one strategy to increase independence and decrease disability in carrying out instrumental activities of daily living [43].

We found limited evidence that neighborhood socioeconomic context was associated with difficulty shopping after accounting for physical capacity and chronic burden in women. Women living in more disadvantaged census tracts had more difficulty shopping or not being able to shop independently, which is in line with previous research that supports associations between neighborhood disadvantage and disability [8, 11, 19]. The effect was small, however, and it is likely that the socioeconomic environment influences disability through more distal pathways. Theories of neighborhood context and health suggest that the macro socioeconomic environment influences the availability of resources critical for maintaining health [44]. This may explain why we found that physical capacity and chronic conditions greatly attenuated the association between neighborhood disadvantage and shopping difficulty. Neighborhood disadvantage also might not fully account for the spatial distribution of resources by race/ethnicity [45]. Researchers could consider including measures of racial/ethnic residential segregation [46] or specific measures of access/availability of resources [3, 47], which may be more proximate to disability outcomes.

The relationship between neighborhood social cohesion and difficulty shopping varied by the macro socioeconomic environment. Social cohesion was not directly associated with shopping difficulty for women, but social cohesion was protective in the poorest neighborhoods. We interpret these results with caution, given the large number of interactions that were examined. Although improving the economic characteristics of neighborhoods is not a simple task, our results suggest that increasing social cohesion in the most disadvantaged neighborhoods may be a more effective strategy for facilitating shopping among older adults.

Strengths and Limitations

This study is one of the first to examine multiple levels of the environment as they relate to shopping difficulty in a national sample of older Americans. While we did not have data on the environmental barriers that older adults encounter within stores, we did examine barriers in multiple levels of the surrounding environment. The use of interviewer observations to capture the outdoor home built environment is a strength of our study, since they are less likely to be biased by self-report. Although many associations between environmental

factors and shopping difficulty were attenuated after accounting for covariates, research on neighborhoods and health may ultimately over-control for individual-level covariates if their contribution to the outcome is mediated through neighborhood pathways [48]. Additionally, the effect of the environment on disability may depend on individual-level factors including physical capacity [49, 9] and race/ethnicity [16, 24], and testing these interactions was beyond the scope of this study. Older adults who are less healthy may also be more socioeconomically disadvantaged and may self-select into worse neighborhoods, or may be unable to move out of their current neighborhood [50]. However, while disabled individuals may self-select into more disadvantaged neighborhoods, environmental barriers such as broken steps are still likely to increase difficulty shopping. It is important to note, however, that the results from our sample are only generalizable to non-institutionalized, community dwelling American adults ages 65 and older, and to the extent of the representativeness of the NHATS study.

Conclusion

Environmental factors that influence shopping difficulty are likely to involve physical or structural barriers to independent mobility, in addition to social factors that may be associated with feelings of safety and self-efficacy, or operate through other non-examined pathways. We examined a broad range of environmental barriers/facilitators assessed at different socioecological levels using multiple sources of data. We found that sidewalk quality and neighborhood social cohesion contribute to older adults' ability to shop, independent of their health and other known correlates of disability. Our results suggest that the outdoor home and local neighborhood environment may be a particularly effective context for intervention to reduce disability for older adults, but also that these relationships are not independent of the broader socioeconomic context. Although effects of the neighborhood were small compared to some of the individual factors such as age, marital status and chronic burden, intervening at the neighborhood or community level has the potential to reach a larger population, and is amenable to intervention unlike demographic risk factors.

Resuming engagement in life activities is a critical aspect of rehabilitation for adults with disabilities [51], and thus our results indicate that the environment may be one context on which to focus intervention to improve opportunities for mobility and functioning. Interventions to improve the built and social environment have the potential to reduce difficulty in carrying out an activity that is essential for independence, and may also indirectly support physical rehabilitation and overall health. While reducing environmental barriers is a critical goal; technological advancements and support such as online shopping and grocery delivery services may also facilitate the act of acquiring groceries and other necessities for older adults living in less supportive environments. Rehabilitation efforts could also support adults in learning about these services and technologies, to lessen the impact of the environment on their ability to function independently outside of the home.

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Implications for rehabilitation

- Built features of the outdoor home environment including sidewalks and broken steps influence whether older adults are able to safely leave their home to conduct daily activities such as shopping, so it is important that clinicians and rehabilitation professionals are aware of these challenges when helping their patients resume daily activities such as shopping.
- The physical condition and safety of the immediate outdoor home and neighborhood environment is critical for maintaining independence and well-being for older adults, which is critical for physical rehabilitation as well as maintenance of essential activities such as shopping.
- Living in more socially cohesive neighborhoods may aid in physical rehabilitation efforts by helping older adults feel more comfortable and able to shop independently in neighborhoods with social and economic disadvantages

Figure 1.

The probability of reporting a lot of difficulty shopping independently, or needing assistance to shop compared to reporting no difficulty, based on local neighborhood social cohesion and census tract socioeconomic disadvantage (mean of the socioeconomic disadvantage score and $\pm$ one standard deviation of the score) for White, married, college educated women of average age and health status.

Table 1.Survey adjusted description of NHATS participants and their neighborhood, 2012 (N=5,504) ^a

	Mean (SE)/percentage ^b	Range
Shopping difficulty (%)		
No difficulty shopping independently	37.2	
A little/some difficulty shopping independently	4.0	
High difficulty shopping independently/shopping with others due to health reasons	40.4	
No independent shopping due to health concerns	9.9	
No independent shopping for non-health reasons	8.5	
Broken steps at home entry (%)	13.0	
Continuous sidewalks outside home (%)	38.8	
High neighborhood social cohesion (%)	33.0	
High neighborhood disorder (%)	10.3	
Neighborhood socioeconomic disadvantage	9.72 (0.20)	0.92–39.19
Neighborhood affluence	0.11 (0.05)	–1.64–3.57
Age (%)		
65–74 years	49.2	
75–84 years	36.4	
85+ years	14.4	
Male (%)	43.6	
Race/ethnicity (%)		
White	84.5	
Black	8.0	
Hispanic	4.4	
Other	3.1	
Education (%)		
< HS	20.8	
High school degree/equivalent	53.0	
>= College	26.3	
Married (%)	56.3	
High chronic burden (%)	42.8	
High physical capacity (%)	55.5	

^a Sample size corresponds to the analytical sample included in regression models, with valid data on the dependent variable and all model predictors

^b Continuous data are presented as a mean (standard deviation (SD)) and a range is also included, and categorical and discrete data are presented as a percentage.

Table 2.

Risk ratios (95% confidence intervals) for the association between environmental characteristics and the level of difficulty shopping for men in NHATS, Round 2 (N=2,303)

Level of difficulty shopping	Outdoor home environment			Local neighborhood environment			Full environmental model			Full environmental model + demographic controls + health		
	Some	A lot/with help	Don't shop	Some	A lot/with help	Don't shop	Some	A lot/with help	Don't shop	Some	A lot/with help	Don't shop
Continuous sidewalks	1.18 (0.65 – 2.13)	0.79 (0.62 – 1.01)	0.94 (0.67 – 1.32)				1.05 (0.59 – 1.87)	0.79 (0.63 – 1.00)	0.90 (0.65 – 1.27)	0.98 (0.54 – 1.78)	0.91 (0.71 – 1.16)	0.84 (0.54 – 1.30)
Broken steps	0.89 (0.37 – 2.16)	0.91 (0.66 – 1.24)	1.62* (1.06 – 2.48)				0.67 (0.29 – 1.54)	1.03 (0.74 – 1.42)	1.42 (0.91 – 2.20)	0.56 (0.24 – 1.33)	1.23 (0.85 – 1.79)	1.25 (0.73 – 2.14)
Neighborhood disorder				1.58 (0.82 – 3.05)	0.61** (0.43 – 0.87)	1.74* (1.03 – 2.94)	1.41 (0.75 – 2.64)	0.73 (0.51 – 1.04)	1.22 (0.71 – 2.10)	1.18 (0.59 – 2.37)	1.03 (0.63 – 1.68)	1.09 (0.50 – 2.38)
Neighborhood social cohesion				0.26** (0.12 – 0.59)	0.96 (0.76 – 1.21)	0.99 (0.72 – 1.36)	0.26** (0.12 – 0.59)	0.94 (0.75 – 1.18)	1.00 (0.72 – 1.39)	0.26** (0.12 – 0.58)	0.97 (0.75 – 1.26)	1.04 (0.70 – 1.55)
Neighborhood socioeconomic disadvantage							1.04* (1.00 – 1.08)	0.96** (0.94 – 0.99)	1.04** (1.01 – 1.07)	1.02 (0.98 – 1.07)	0.99 (0.96 – 1.02)	1.04* (1.00 – 1.08)
Minority race (non-White)										0.86 (0.39 – 1.87)	0.77 (0.55 – 1.08)	0.76 (0.47 – 1.22)
Age category (years)												
75–84										1.42 (0.71 – 2.84)	1.02 (0.78 – 1.34)	2.26* (1.33 – 3.83)
85+										1.24	1.00	3.18*

	Outdoor home environment	Local neighborhood environment	Full environmental model	Full environmental model + demographic controls + health
				(0.50 – 3.08) (0.69 – 1.46) (1.69 – 6.00)
Married				15.24** (11.47 – 20.27) 5.33** (3.35 – 8.47)
Education				
Disability/Rehabil				0.73 0.55** (0.36 – 0.83) 0.38** (0.24 – 0.62)
College +				0.42 0.63* (0.42 – 0.93) 0.72 (0.40 – 1.27)
High physical capacity				0.12** 0.45** (0.06 – 0.27) (0.31 – 0.64) 0.02** (0.01 – 0.04)
High chronic burden				1.17 1.03 2.64** (0.58 – 2.36) (0.77 – 1.36) (1.55 – 4.48)

*** p < .01,
** p < .05,
* p < .10

Table 3.

Risk ratios (95% confidence intervals) for the association between environmental characteristics and the level of difficulty shopping for women in NHATS, Round 2 (N=3,201)

Level of difficulty shopping	Outdoor home environment			Local neighborhood environment			Full environmental model			Full environmental model + demographic controls + health		
	Some	A lot/with help	Don't shop	Some	A lot/with help	Don't shop	Some	A lot/with help	Don't shop	Some	A lot/with help	Don't shop
Continuous sidewalks	1.04 (0.64 – 1.67)	1.21* (1.02 – 1.44)	1.20 (0.93 – 1.53)				1.01 (0.63 – 1.62)	1.20* (1.01 – 1.43)	1.13 (0.90 – 1.43)	0.99 (0.61 – 1.63)	1.40** (1.17 – 1.69)	1.10 (0.84 – 1.46)
Broken steps	1.74 (0.96 – 3.15)	1.24 (0.89 – 1.71)	1.49* (1.10 – 2.00)				1.70 (0.88 – 3.27)	1.18 (0.86 – 1.62)	1.30 (0.96 – 1.76)	1.60 (0.86 – 2.97)	1.20 (0.88 – 1.63)	1.25 (0.89 – 1.76)
Neighborhood disorder				1.10 (0.59 – 2.03)	1.24 (0.94 – 1.64)	1.57* (1.11 – 2.22)	0.83 (0.39 – 1.74)	1.13 (0.86 – 1.47)	1.07 (0.73 – 1.56)	0.81 (0.39 – 1.66)	1.20 (0.90 – 1.61)	1.07 (0.68 – 1.69)
Neighborhood social cohesion				0.65* (0.45 – 0.94)	0.96 (0.78 – 1.19)	0.79 (0.62 – 1.01)	0.67* (0.47 – 0.95)	0.98 (0.79 – 1.22)	0.83 (0.64 – 1.07)	0.71 (0.49 – 1.04)	1.01 (0.80 – 1.29)	0.82 (0.60 – 1.13)
Neighborhood socioeconomic disadvantage							1.03 (1.00 – 1.06)	1.01 (0.99 – 1.03)	1.06** (1.04 – 1.08)	1.01 (0.98 – 1.05)	1.01 (0.99 – 1.03)	1.03* (1.00 – 1.06)
Minority race (non-White)										0.88 (0.52 – 1.50)	1.23 (0.93 – 1.63)	1.33 (0.95 – 1.88)
Age category (years)										0.76 (0.47 – 1.23)	1.22 (0.95 – 1.56)	3.01** (1.86 – 4.88)
75–84												
85+										1.24 (0.88 – 1.88)	2.44** (1.56 – 3.88)	9.85** (4.88 – 19.85)

	Outdoor home environment	Local neighborhood environment	Full environmental model	Full environmental model + demographic controls + health
				(0.72 – 2.13) (1.74 – 3.41) (6.33 – 15.34)
Married				1.35 5.22** (0.79 – 2.30) (4.20 – 6.50) 2.39** (1.75 – 3.25)
Education				
Disability				
HCED				1.03 0.58* (0.63 – 1.68) (0.42 – 0.81) 0.47** (0.33 – 0.67)
College +				1.08 0.59* (0.59 – 1.99) (0.43 – 0.82) 0.56* (0.31 – 1.00)
High physical capacity				0.12** 0.37** (0.08 – 0.18) (0.29 – 0.46) 0.03 (0.02 – 0.04)
High chronic burden				1.46 1.29* (0.95 – 2.39) (1.04 – 1.59) 1.90** (1.40 – 2.58)

*** p < 0.01,
** p < 0.05,
* p < 0.10.