School of Architecture, Urban Planning and Construction Engineering

Master of Science in Urban Planning and Policy Design

Social capital's relation to the built environment:

A case study of older adult populations in the United States

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Over the last century, society has seen changes to its spatial organization moving from a rural to an urbanized and suburbanized built environment. At the same time, the social structure is changing with increasing preference for external connections over the previously relied-upon, local ones. Scholars have theorized about the effects of these changes on social capital; defined as the social networks and interactions that inspire trust and reciprocity among citizens. It has been remarked that broad declines have occurred in traditional forms of community resulting in a shift towards more individualized, less cohesive networks. Additionally, relationships have been explored regarding social capital's pertinence to well-being, suggesting that declines can negatively impact mental health. The role of the changing built environment has been noted as one of many factors affecting social capital. Research has explored how environmental characteristics such as density, design and available services play a role in fostering social capital. Social capital, which has been shown to influence health and well-being, plays an important role in the lives of older adults. Their limited mobility and health challenges emphasize its importance in maintaining a vibrant life. Utilizing data from the National Social Life, Health and Aging Project, a survey of older adults in the United States, this study explored the relationships between these two categories to determine if such a connection exists. Some relationships were found as to the effect of the built environment on social participation in activities, interaction with neighbors and reliance on others for support. It suggests that factors such as the state of one's neighborhoods, the availability of amenities and density may play a role. However, none of these observations exhibited strong statistical significance and relationships may be confounded by other socioeconomic factors. The findings highlight the need for better data and further exploration of how differing spatial arrangements may foster socially supportive environments for older adults.

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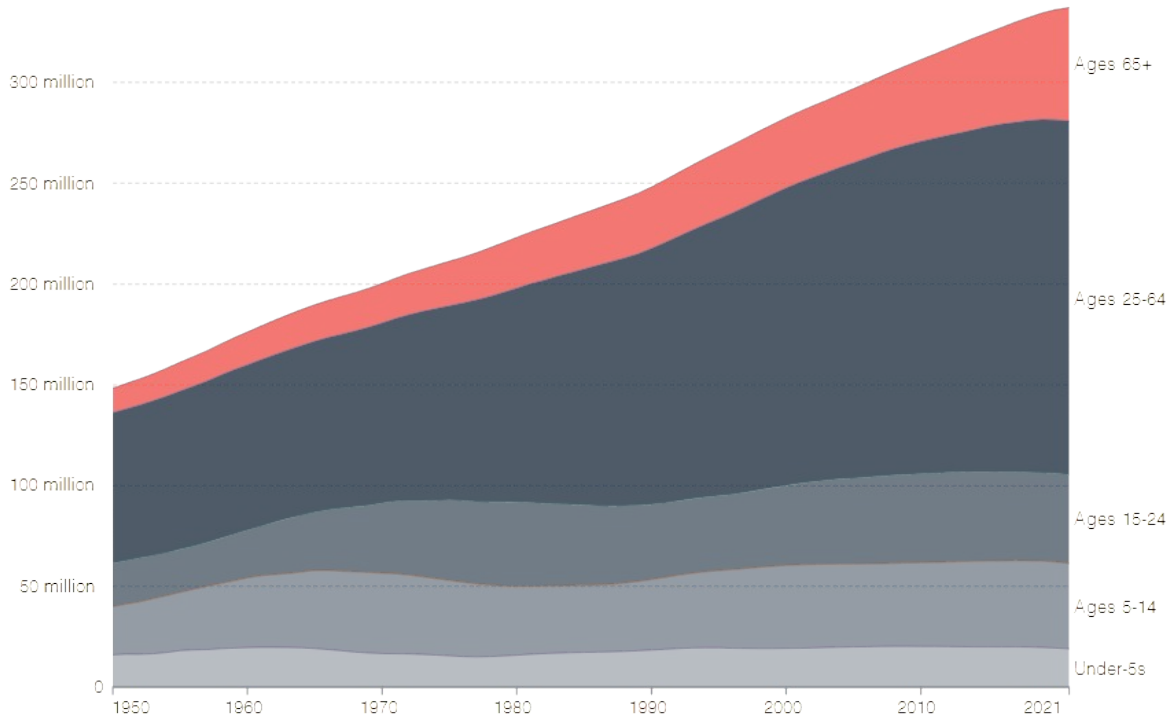
Introduction

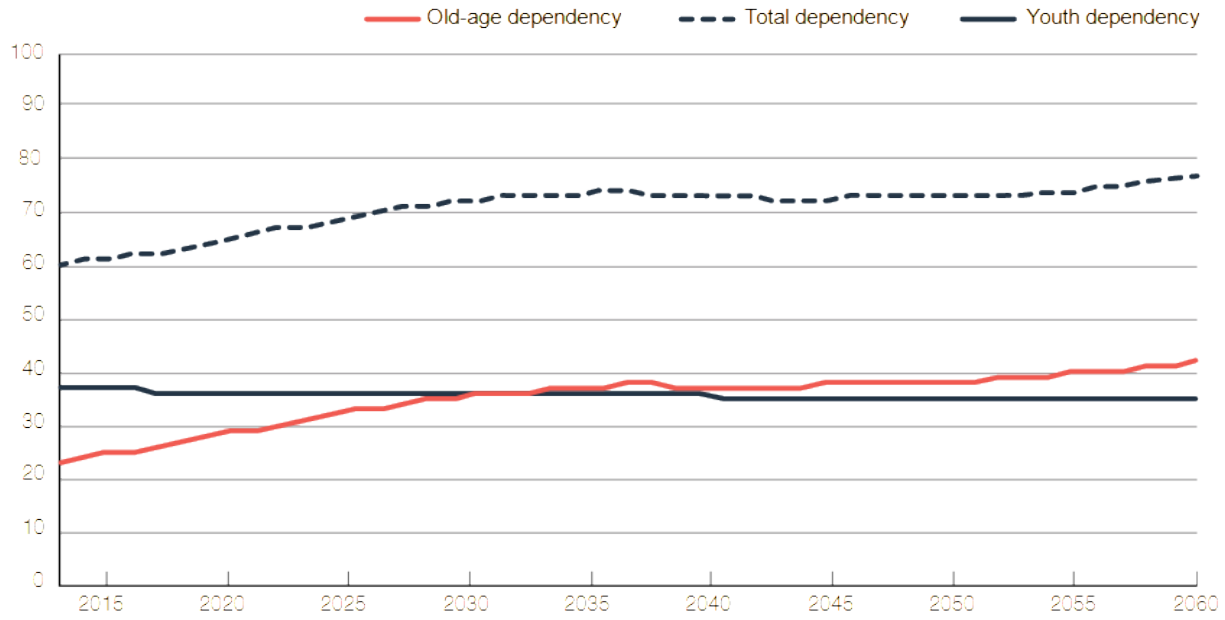
Modern society is confronting an aging population as the proportion of older adults has increased as a result of low fertility and longer life spans. The global total fertility rate has declined, halving from about 5 children per woman through 1965 to now below 2.5 children per woman; consequentially, global population growth rate has declined from its peak of 2.3% in 1963 to less than 1% (Roser, 2014). Concurrently, life expectancy has been lengthening almost linearly in most developed countries; in 1950, the probability of survival from age 80 years to 90 years was on average 15–16% for women and 12% for men; in 2002, these values were 37% and 25%. (Christensen et al., 2009). Demographic trends in the United States are not as dire as that of other developed European and East Asians countries, but overall it faces the same challenges of an aging population. Data from the UN (2022) shows that, in the United States, the share of population over the age of 65 has transitioned from 8.2% in 1950 to 17% in 2021, as shown in Figure 1. The dependency ratio is defined as proportion of dependent population (over 65 or under 18) over the population aged 18 to 64. By 2030, one in five Americans is projected to be 65 and over, and the old-age dependency ratio is expected to surpass the youth-dependency ratio by 2033, as shown in Figure 2 (Colby & Ortman, 2015).

Figure 1: Population by age group, United States



***Source**: UN, World Population Prospects (2024) – processed by Our World in Data*

Figure 2: Dependency Ratios, 2014 to 2060



Note: Old-age dependency – (Population aged 65 and over / Population 18 to 64) * 100
Youth dependency = (Population under 18 / Population aged 18 to 64) * 100
Total dependency = (Population aged 65 and over + Population under 18) / (Population aged 18 to 64) * 100
***Source**: U.S. Census Bureau, 2014 National Projections (Colby & Ortman, 2015)*

In an aging society, understanding the effects of social capital can contribute to promoting healthy aging and improve health outcomes. The importance of social capital for older adults is underscored by studies indicating that older adults with higher levels of social capital tend to have better health and better health outcomes (Bath & Deeg, 2005). As individuals age, their social networks and support systems become increasingly vital for overall well-being and quality of life. Social participation, one aspect of social capital, has been consistently linked to improved psychological well-being, better cognitive function, and improved physical health (Greaves & Farbus, 2006). One potential mechanism lies in social participation's effect to reduce isolation as social networks shrinks. Additionally, social support, from friends or family, helps counter their declining physical states and helps them cope with the challenges of aging. For such reasons, social capital may help improve one's subjective well-being—optimism, life satisfaction and positive thoughts—which has been positively associated with better health and longevity (Xu et al., 2022).

The built environment is one factor theorized to be influencing social capital levels. Our environments have changed dramatically since the onset of industrialization, prompting sociologists to theorize the effect it might have upon the individual. Wellman (1987) remarks that many leading social commentators have suggested various ways in which large-scale social changes associated with the Industrial Revolution may have affected the structure and operation of communities, reflecting its impacts to interpersonal relations. The importance of

examining our neighborhood environments' effect on social capital will influence our efforts in designing and building the place we live. As contemporary society is aging, it has become important to identify places and their characteristics that are conducive to healthy living among older adults. As social capital has been linked to positive health outcomes and that characteristics of our living environment could affect one's social capital, analyzing levels of social capital among older adults in different settings—urban, rural, and suburban areas—becomes crucial. First, the analysis helps identify in which environments social capital is lowest. Second, it can be seen how social capital might differ between these environments. Thirdly, a comparison can be made between the level of social capital and subjective well-being. This analysis becomes relevant as global organizations have stressed the importance of ensuring that seniors live in "enabling environments" and reduce health disparities between differing environments (Plouffe & Kalache, 2010). Unfortunately, challenges arise in the definitions used to classify our physical environments. Much debate has been had about the definition of the city, its boundaries and the urban-rural divide; further, still, with the addition of sprawl, metropolitan regions, and city-regions. Defining suburbs remains a difficult task, existing at the intersection of the urban-rural divide; and additionally, in that the physical characteristics of a suburb differ by country. It is not clear what the term suburb actually means, "its origins and critiques are mostly drawn from English-speaking countries where suburban topics generated the most debate, yet are neither a western nor recent innovation (Vaughan et al., 2009, p. 476)".

As social capital is a determinant of health and well-being for older adults and levels of social capital could differ between settings. This thesis will explore older adults' social capital and its effect on their well-being that may be influenced by different environmental characteristics. Understanding how different built environments impact social capital among older adults is crucial for realizing that reshaping our environments can have unknown impacts on society.

This thesis will delve into how different characteristics of the built environment play a role in determining the level of social capital on the older adult population in the United States of America. Additionally, it will explore how these different characteristics relate to urban, rural, and suburban settings and how these settings affect social capital formation. The thesis will analyze results from the National Social Life, Health and Aging Project (NSHAP), a nationally representative sample survey. Individuals responses pertaining to social capital will be assessed comparatively to variables pertaining to their neighborhood's environmental characteristics. Examining factors such as social networks, trust, reciprocity, and community engagement, gives insight as to the effect the physical surroundings of individuals have on the impact of their social connections and sense of belonging. Additionally, responses pertaining to subjective well-being will be considered to determine if the built environment has a relationship to the level of social capital and/or an individual's well-being as put forward by previous literature. Such an analysis will provide a better understanding as to how the places we live affect our social connections which consequently contribute to overall health as we age.

The thesis is organized as follows, the first chapter of the thesis will review existing literature pertaining to the general concept of social capital in sociology. It will explore the concept of social capital, from its origins in classical sociological literature such as theories put forward by Durkheim (1893/2023), to its contemporary form offered by Bourdieu (1986/2018) and Putnam (2002). Social capital has been indicated to have several benefits and effects on individuals and groups—such as well-being and crime—that will be explored. As many scholars have noted the changes and declines of social capital, factors that have been theorized to affect social capital formation will be laid out. It will then be shown how social capital has transformed during the shift from rural, agrarian societies to industrial, urban societies until the present.

The second chapter will explore theories on how the built environment has shaped social capital in contemporary society. It will also review the experience of older adults in the shifting rural-urban environments and how different environments affect their social capital. The built environment's role has been a core theme since sociologists began studying the effects of industrialization and the shift to an urban society; nevertheless, it has become an important topic for urban planners. Concerns were made as urban environments were thought to be impersonal, overstimulating, and stressful, contrary to the perceived socially cohesive rural lifestyle. This existing anti-urban settlement then contributed to the later escape to the country movement that was dominated by expanding suburban and urban deterioration. Suburbs have equally been criticized regarding their effect on social capital. New Urbanists have been an outspoken group, stating the importance of traditional forms of the built environment and their role in creating interpersonal interactions (Talen, 1999). The charter calls for compact, walkable and mixed use development of diverse housing types and prices to increase diversity to foster interaction and strengthen community bonds (*Charter of the New Urbanism*, 2001). The built environment is relevant for older adult populations that have specific needs and resources or may be experiencing physical and cognitive decline. It will be explored why our physical environment affects social capital, through neighborhood accessibility, sense of belonging and characteristics that affect social isolation.

The second part of the thesis will use statistical data analysis to explore how the built environment relates to levels of social capital and well-being across older populations in the United States. Data will be analyzed from the NSHAP, National Social Life, Health, and Aging Project [1], survey to investigate the levels of social capital among the older adults relating to specific variables of the built environment. The data is from the third round of survey data (ICPSR 36873), performed from 2015 – 2016 that includes over 4000 in-person interviews. The survey includes questions pertaining to social context, physical health, cognitive measures, sexual health, fertility, mental health, and their employment and financial standing. Additionally, a questionnaire was completed post-interview inquiring about social activities, neighborhood, family and friends relations. The data also contains basic background information that allows controlling for variables such as education and income. The questions all originate from the public core dataset. Questions pertaining to neighborhood, family, and friend social networks will be used for measuring social capital levels for individuals across different environments. Mental health and questions pertaining to subjective well-being will be analyzed as to whether well-being has a relationship to social capital and the built environment. The results will be compared to the results of previous studies to further the debate on the role of our physical environment in social capital formation.

[1] https://www.norc.org/research/projects/national-social-life-health-and-aging-project.html

Part I: Theory

1. Social Capital

1.1. Social capital and its importance

Social capital is a concept that, especially over the last decades, has gained significant attention with sociologists who have explored its role regarding individual and societal well-being. However, the ideas at the base of social capital are not new; rather, since the earlier stages of development of sociology as a discipline, the role of social relations for the well-being and development of our societies has been at the core of sociologists' work. The notion of involvement and participation in groups having positive consequences for the individual and the community is a staple notion. It dates back to theories originated by Durkheim (1897/2005) and Marx (1845/1965). Portes (1998) identifies how social capital derives from Durkheim's emphasis of group life as an antidote to anomie and self destruction; as well as Marx's distinction between an atomized class-in-itself and a mobilized and effective class-for-itself. Durkheim's (1897/2005, 1893/2023) idea is that *anomie*, a state of dysfunction pertaining to suicide, is a structural problem in society brought about by a deficiency in social interaction, while an integrated society brings about behavioral control. Marx's (1845/1965) distinction between classes, is that a class-in-itself has no collective identity, while a class-for-itself has developed a collective awareness to pursue a shared interest. These theories exhibit the beginnings of sociological interest that derives from the potential for positive consequences that arise from social connections and interactions. The concept is situated in a broader discussion of capital and calls attention to how such non-monetary forms can be important sources of power and influence (Portes, 1998). It is thus a deviation from the traditional focus on financial resources by also highlighting the importance of social connections.

Social capital can be encapsulated as the relations with others to which a person has access for their mutual benefit; it consists of sociability, social support, trust and reciprocity. Bourdieu viewed it as a private good; one to be exploited by the individual to obtain knowledge, information or help (Bourdieu, 1986/2018; Sørensen, 2016). He defined it as the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition (Bourdieu, 2018; Portes, 1998). Coleman (1988) added that social capital is a productive resource that actors derive from specific social structures for the achievement of certain ends; it is inherent to the structure of relations among actors. Social capital is composed of two elements. Firstly, the social relationship itself allows individuals to claim access to resources held by their peers and, second, the quality of those resources have an effect (Bourdieu, 1986/2018; Portes, 1998). Putnam (2002) also instantiated that social capital is simultaneously a public or collective good. Some benefit goes to bystanders, while some benefits serve the immediate interest of the person making the investment.

Social capital is inherent to the structure of relationships. It is the relationships themselves, the possession of social capital, that serve as the source of one's advantage. Hence, the holders of social capital are members of the community (Portes, 1998). Another source lies in Marx's (1845/1965) analysis of class consciousness. Portes' (1998) interpretation is that being placed in a common situation, a bounded solidarity is created where workers identify and support other's initiatives. The motivation for reciprocity in these exchanges comes from the individual in the form of repayment but also from the collectivity. The donor's returns may come in the form of status, honor, and approval; additionally, the collectivity acts as a guarantor of debts being repaid (Portes, 1998). Social capital is an investment that yields benefits for both the individual and the collective. Through membership in social networks, individuals and the collectivity benefit from the advantages obtained through the resulting relations.

Communities are a core component in social capital formation. Communities are groups of members sharing some common element consisting of interests, norms, values, and activities. They play a vital role in fostering trust, cooperation and collective action increasing civic engagement and communication. Kaplan (2023, pp. 6–7) defines community and its effects:

> "Real community produces an ecosystem in which every member is deeply embedded, not a collection of relationships that can be picked up and moved if the owners desire it. A real community requires commitment to a certain social order, a certain set of institutions and norms, and usually to a certain place—and that commitment by definition must constrain some of our individual choices. But in return for surrendering some of our freedoms, we gain something far more valuable: practical support when in need, day-to-day camaraderie, and a greater sense of security and belonging".

Collective efficacy theory emphasizes the role of mutual trust and solidarity (social cohesion) combined with expectations for pro-social action on the part of residents (informal social control) in explaining the impact of neighborhood factors on residents' well-being. It is the sense of attachment to community in combination with the willingness on the part of residents to intervene on each other's behalf regardless of a preexisting network tie that is critical to community level capacity to implement shared objectives (Browning & Cagney, 2002; Sampson et al., 1997). Social capital is inherent to communities, as being part of one, grants access to other members and the mutual advantages they offer. Thus, communities enhance quality of live and contribute to social cohesion through their role as social structures themselves and in fostering the social networks.

Social capital suffers from a broad terminology shaped by trust, civic participation and reciprocity, etc. As previously mentioned, the idea of social capital was originally rooted in early sociological theories that made distinctions in the structure of relations. One of the original distinctions, solidarity, was made by Durkheim (1893/2023). Mechanical solidarity, as described by Putnam (2002), is characterized by tightly knit and insular collectives and was typical of traditional societies with no division of labor. Contrastingly, organic solidarity is found in modern advanced society in which diverse individuals have specialized roles (Putnam, 2002). Societies with mechanical solidarity shares similar norms and beliefs; whereas in a society of organic solidarity, interdependence emerges due to specialization forcing reliance upon others for specific tasks. Durkheim along with other sociologists attempted to address social transformation from modernization, distinguishing between traditional and modern societies. The defining of the structure of societal relations, from which social capital later arose, has then been further divided. The types of relations, levels and effects in environments differ; thus subsequently, many components have been derived to explain the structures of relationships that compose an individual's social capital.

Formal and informal connections differentiate, respectively, association through organizations and social support between individuals. Formal networks are intentionally created through institutional mechanisms on the basis of addressing a specific purpose (Ferman & Kaylor, 2000). These are represented by community, political, and religious organizations, etc. Formal connections are more likely to be diverse, they offer benefits such as job opportunities, referrals and the achievement goals requiring a collective effort. Informal networks exist solely between individuals that often are the byproducts of formal networks and additionally, give rise to new formal networks as residents create new institutions in response to an idea (Ferman & Kaylor, 2000). Informal networks are based more in shared interests and background being more tight-knit. This distinction is important to show how individuals and organizations serve different purposes and leverage social capital for mutual benefit.

A second distinction is thick and thin social capital which is related to the quality of the interaction between individuals. Thick connections refer to multi-stranded connections, such as workers drinking together after work (Putnam, 2002). These types of relations are found in families, friend groups and, as suggested, work relations that extend beyond the workplace. On the opposite end of the spectrum, thin connections take the form of brief greetings in public, such as nodding (Putnam, 2002). These types of interactions are simpler and of lower quality but it highlights the importance frequent acknowledgments for reciprocity in social relations.

A third distinction is that of strong and weak ties. Granovetter (1973) introduced the concept of 'weak ties' as bridges outside of primary relationships, creating an extended network; thus, expanding access to social resources. Their importance being that they are channels through which socially distant ideas, influences or information flow, normally inaccessible when encapsulated within one's friendship circle. Weak ties are indispensable to an individual's opportunities, such as job mobility, as well as to their integration into a community, which often require introduction through individual contacts (Granovetter, 1973). Strong ties are defined in terms of the frequency of contact and closeness; better for social mobilization and social insurance. Strong ties are a key resource as trust is likely to be higher. Putnam (2002) comments how such ties have been used for pooling funds for the creation of small businesses in ethnic communities where trust is necessary when involving monetary resources. On the other hand, weak ties may be better for knitting a society together and for building broad norms of generalized reciprocity (Putnam, 2002). Granovetter (1973) noted that strong ties, breed social cohesion but can lead to overall fragmentation if a community is partitioned into restricted cliques; having a dense network but limited to the group's resources.

Another distinction is bonding-bridging social capital often overlapping the distinction of ties. Bonding capital links those of shared similarities while bridging capital pertains to linking those who are unlike each other (Putnam, 2002). Bonding social capital is held among people within the local community (intra-community) and bridging social capital exists as an extra-community social capital. (Sørensen, 2016). Most social support is received from bonding ties but can produce negative externalities due to exclusivity; it can solve collective agency problems but can foster redundancy of information, collusion and discrimination (Putnam, 2002; Sørensen, 2016). Cabrera and Najarian (2015) offered that spatial bridging ties connect two spatially distinct areas within a community and found a positive relationship between spatial bridging ties and an individual's social capital. Ferman and Kaylor (2000) remarked when examining a neighborhood in Philadelphia, that community institutions play a critical role in that their external ties link a community to the larger political, social and economic universes; expanding access to resources and other organizations.

A final distinction is that of inward-outward looking. Inward-looking tend to promote the material, social and political interests of their own members; outward-looking is concerned with public goods (Putnam, 2002). Inward-looking communities are thus more exclusive and tighter-knit, probably exemplary of families, close communities and friend groups. Outward-looking is more inclusive which would comprise political organizations and larger, diverse organizations.

These distinctions often overlap as one can see similarities between strong ties and bonding capital, weak ties and thin social capital, etc. It can be that a relation fits one part of each distinction. A close friend could be a strong tie, bonding capital, an informal connection and of a thick form. However, these distinctions serve to better understand the structure of relations between individuals and groups; and furthermore, to illustrate the benefits, both tangible and intangible, that each bring about.

1.2 Sociological interest in the benefits of social capital

The sociological interest in the impacts of social capital have led to a number of studies exploring its effects. Measures of social capital have been linked to: academic performance, high school drop rates, homicide rates, the perception of safety, adolescent smoking and obesity, individual psychological distress and depressive symptoms, suicide rates, and individual life-satisfaction (Leyden & Goldberg, 2015). The benefits of social capital derive from access to others and; hence through the construction of relationships, the ensuing access to the resources others may offer. Through social capital, actors gain direct access to economic resources; they are able to increase their cultural capital through contacts; and they can affiliate with institutions that confer valued credentials (Portes, 1998). As Putnam (1995) states, life is easier in a community with substantial social capital. Social capital fosters norms and social trust, facilitating coordination and communication resulting in collective action (Browning & Cagney, 2002; Leyden & Goldberg, 2015; Putnam, 1995). Effective norms, as highlighted by Coleman (1988), constitute a powerful form of social capital; they inhibit crime, make it possible to walk freely outside at night and enable older persons to leave their house without fear for their safety. These norms are rooted in a collective mindset, that is acting in the interest of the community over one's own self-interest. The existence of sufficient ties between a number of people ensure the observance of set norms due to the threat of ostracism (Coleman, 1988). Trust exists in this situation precisely because obligations are enforceable, not through recourse to law or violence but through the power of the community (Portes, 1998). Furthermore, the incentives for opportunism are reduced within this environment. Members can extend loans without fear of nonpayment, benefit from private charity and support, or send their kids to play in the street without concern (Portes, 1998).

Scholars have recognized the effects of informal social control on crime and the perception of safety in neighborhoods. The urbanist Jane Jacobs (1961) famously coined the term "eyes on the street" to emphasize the importance of vibrant street life for neighborhood safety. Many studies have since been conducted, exploring the correlation between social capital and crime. One study examining the concept of collective capacity by Sampson and colleagues (1997), found that it had a significant negative effect on the perception of crime, self-reported victimization and homicide rates. Collective efficacy mediated a substantial proportion of the effects of poverty, residential instability and ethnic heterogeneity on crime (Browning & Cagney, 2002). Furthermore, it has been found that the prevalence of both frequent and infrequent interaction was negatively associated with burglary, motor vehicle theft, and robbery suggesting that weak ties and bridging social capital act as possible mechanisms for societal control of crime (Browning et al., 2004). A study of one Chicago neighborhood, showed the importance of a partnership between parochial and public levels of social control, where informal strategies —neighborhood watch, court advocacy, etc.—are co-produced by residents and actors from formal agencies such as the local police (Browning et al., 2004; Carr, 2003). This hybrid approach to social control is a response to evolving societal conditions. Carr's (2003) research revealed disagreements between long-term residents and more recent arrivals on how social control should be exercised, stemming from different approaches to child rearing. Long-term residents noted a general lack of supervision of children; highlighting that supervision is difficult when both parents work and children lack proper guidance (Carr, 2003). In this case, social orientation was manifest through quasi-formal methods established through weak ties and bridging capital. These links demonstrate the capacity to solicit resources relevant to crime control from extra-neighborhood sources to generate regulatory capacity within communities (Browning et al., 2004).

Other research has been focused on identifying social capital's role regarding well-being, suggesting that higher levels of social capital lead to better health outcomes and increased life satisfaction. This stems from the notion

that higher levels of social capital equate to more interactions, access to support, and decreased isolation. The French sociologist Émile Durkheim (1897/2005) wrote about the link between suicide and social integration when discussing about *anomie*, a dysfunctional state in the structure of societal relations. Durkheim (1897/2005) wrote that the social suicide rate can only be explained sociologically, sadness of the individual pertains to the group in which one belongs. His conclusion is that the rates of suicide were related to the society's degree of social integration. A case study by Cacioppo and colleagues (2006) found that higher levels of loneliness were associated with more depressive symptoms in middle to older age adults. Social support, the positive counter, is the degree to which a person's basic needs are gratified through interactions and has two suggested effects: a buffering effect against stressful situations and a main effect in which the network provides an individual with feedback for self-maintenance and well-being (Andersson, 1998).

Building upon these ideas, a review of studies show positive relationships, social support, the ability to enforce social norms, feeling safe, little nuisance and antisocial behavior, and trusting others in the neighborhood were associated with fewer symptoms of depression and anxiety in adolescents and young adults (Breedvelt et al., 2022). Donnelly and colleagues (2016) found that children raised in neighborhoods with high collective efficacy experienced fewer depressive and anxiety symptoms during adolescence than similar children from neighborhoods with low collective efficacy. Another study conducted by Adams (1992) challenged classic urban theory suggesting that living in highly urbanized areas results in social isolation, disorganization and psychological problems. Resultingly, his final conclusion was that locally based social networks and perceptions of crime were associated with neighborhood satisfaction and that individual attributes and neighborhood satisfaction influenced psychological well-being. The more socially integrated into the local community people were, the more positively they viewed their community, which, in turn, promoted good psychological health (Adams, 1992).

The influence of social capital extends beyond mental health, also influencing one's physical health outcomes, perhaps indirectly from its positive effects on mental well-being. Browning and Cagney (2002) made an association between collective efficacy and one's self-reported physical health defined by: smoking, obesity, alcohol consumption, exercise and several known illnesses. They determined that neighborhood collective efficacy exerts a significant effect on self-rated physical health (Browning & Cagney, 2002). The mechanisms underlying the association between collective efficacy and health include: social control of health-compromising behaviors—illicit substances, alcohol abuse, child/elder neglect, reckless behavior; improved access to services and amenities; the management of physical hazards and, lastly, psychosocial processes (Kawachi & Berkman, 2000). Psychological processes such as the effect of a trustworthy environment on factors such as fear and self-respect may improve the health and well-being of residents (Browning & Cagney, 2002).

In summary, social capital provides access to resources providing more opportunities for people and creates a more harmonious social fabric where trust and cooperation can flourish. These connections, both formal and informal, have been found to reduce crime through social control that affect the perception of safety and well-being of urban environments. Research into the topic has also underscored its profound impact on individual well-being as social connections can affect mental health, physical health, and overall life satisfaction.

1.3. Factors affecting social capital formation

Understanding the societal factors influencing the formation of social capital remains a difficult task. Society has experienced an expansive shift over the last century from industrialization to post-modernity. Scholars have researched societal changes to try to understand their impacts on today's social composition.

Modernization theory describes that changes brought about by industrialization and rural-to-urban shift. The mass movement of people from cohesive rural areas to big, anonymous, atomistic cities translates into an overall decline in community and social capital (Putnam, 2002). Max Weber (1921/1958) described how cities involve permanent markets that influence lifestyles as rationality is involved in exchange and dwellers are characterized by impersonal orientations. Abrahamson (2013) states another characteristic being impersonal orientations in cities, originally emphasized by Louis Wirth, a shift from intimate, responsive relations in non-urban places to neutral, formal relations; people are psychologically detached from each other to cope with excessive stimulation. Classic urban theory then came to suggest that highly urbanized areas result in social isolation and social disorganization (Adams, 1992). More recent sociological theory has not corroborated the initial theories that urbanized life is less conducive for social life. Fischer (1982) found little difference between urban respondents and non-urban respondents regarding isolation, number of associates and quality of relations; however, urban respondents reported fewer kin and more non-kin relations. Kaplan (2023) writes that, at least in the US, as a response to the shift to urbanized life, new associational organizations arose to replace the older customs inherent to rural life through labor unions, fraternal and political organizations, etc. These new institutions acted an offset to any negatives that had been theorized to result from a large-scale social shift resulting due to urbanized life.

Overall, the twentieth century witnessed significant transformation in lifestyle and demographic patterns. A rise in secularity has taken place in the wake of globalization and a homogenized culture shift brought about by mass media. It has been accompanied by a surge of individualism characterized by personalized 'life-style' consumption and new worldviews embraced by the modern individual. Inkeles and Smith (1974) write that modern institutions place general demands on people, from which individuals must adapt. This adaptation necessitates a greater acceptance of personal mobility, both occupational and geographic; as well as a greater readiness to embrace changes in employment and lifestyle. It may be relevant that secularity, individualism and a globalized culture have affected social capital formation through the erosion on the reliance of traditional social structures and institutions. Durkheim (1893/2023) describes how the individual is rendered more independent by a dual emancipation, from both the organic environment and social environment, characterized by, respectively, the interdependency created by specialization of roles and the disintegration of extended family structures. Individual nature becomes more complex through specialization, thus being partly shielded against the effects from the collective and the influences of heredity. This societal shift has potential reshaped the landscape of social capital, challenging the traditional notions of community, belonging, and interdependence.

The institution of the family, previously a strong source of social capital has undergone a profound transformation. Major shifts have occurred in family structures as the extended family structure was replaced by the nuclear family unit as a result of industrialization. There appears to be some truth in modernization theory that increasing urbanism and industrialism tended to diminish the vigor of extended kinship relations due to increased distance and decreased economic dependence from industrial employment (Inkeles & Smith, 1974). Intertwined with this shift is the rise of individualism which may be playing a role in the erosion of extended kinship networks. As Inkeles and Smith write, "Men and women tied to binding obligations of extended kinship systems have sought to assert their rights as individuals. They have sought to replace a closed world, in which their lives tread the narrowest of circles, with a more open system offering more alternatives and less predestination." Families; however, offer a most intimate and trusting social network where norms such as trust, cooperation and reciprocity can develop from a young age and can transpire in our communities. Family is

important for nurturing children and weakening family bonds have been linked to delinquencies, violence and health issues.

Religion, another traditional institution acting as a source of social capital, has had its importance de-emphasized with individuals adopting more secular views. As individuals have increasingly embraced more secular worldviews, religious institutions have been viewed as increasingly incompatible with the modern era. Religion is seen as an obstacle to modernization as it represents a bulwark of tradition and a repository of beliefs and values incompatible with modern science, tech, and the idea of progress (Inkeles & Smith, 1974). It is important to recognize the roles religious institutions have played in cultivating social capital. It offers a community that instills many of the same norms such as trust and reciprocity. These communities prioritize the collective over the individual. Many religious groups organize social activities and provide mutual aid. Often members help each other with tasks, offer emotional support or extend aid during financial hardships. The benefits can extend outside the organization; religious communities often volunteer to support the local-community with addressing its needs. Religious institutions are, ultimately, place-based and contribute to a neighborhood's unique social habitat affecting the hospitality and trust within the neighborhood.

Concurrently, the role of education has evolved during industrialization, being regarded as a defining source for the modern man in its contribution to individual ideals, identity and social standing. Industrialization has given rise to "mass education" where secular schools teach and disseminate values that compete with and challenge traditional wisdom. Higher value is placed on formal education and schooling in skills such as reading, writing, arithmetic (Inkeles & Smith, 1974). Individuals place more prestige on the basis of education and technical skill over that of traditional status and view the importance of their employment for affecting their social standing. Inkeles and Smith (1974, p. 6) state, "Employment in complex, rationalized, technocratic, and even bureaucratic organizations has particular capabilities to change men so that they move from the more traditional to the more modern pole in their attitudes, values, and behavior."

Modernization has also led to consumerism as a prime driver of its economic model. In congruence with the rise in individualism, a defining thought has gripped today's society is that greater wealth and material consumption can bring about happiness. Thus, it is possible the views induced by modernization have minimized the importance of social capital or at least traditional forms without replacing them with meaningful alternatives.

Additionally, the life-course standardization of early industrialization has changed as well. Modernity, post 1950s, has experienced labor market changes with a rise in flexible, temporary and discontinuous employment, conjointly with increased female participation in the workforce. Such changes have disrupted previous family dynamics, unionization and may have decreased the amount of time, as a resource, people can devote to their neighborhoods, communities, local institutions and participate in civic engagement.

In the late half of the twentieth century in the US, Putnam (1995) notes that counter-trends have occurred in accordance with the dissociation from traditional organizations. New types of organization have sprung up along with newer social forms becoming the dominant forms of social interaction between individuals. There has been an increase in new mass-membership organizations that differ from classic "secondary associations". Though Putnam (1995) remarks that members share the same interest but are unaware of each other's existence; tied by common ideals, not each other. Another rise occurring is the expansion of support groups, such as AA, and more individualistic groups—sports groups, book clubs, hobby clubs. He notes the declines in neighborly association with increases in socializing outside of the neighborhood and work-place relationships. This observance may be

even more prominent in current decades with the technological changes and the rise of social media. The question then is whether these news types of social interactions adequately replace older forms.

Putnam (1995) acknowledges that the physical environment may be playing a role, as many factors associated with the decline in social capital appear to be related to suburbanization. Suburbanization of America coincided with the broad disengagement from civil society paralleling the decline in public trust, volunteerism and participation in social life (Leyden & Goldberg, 2015). Arguments allege to the role density and automobile dependence play on undermining social ties. A derivation being that distance, time spent commuting and decreased presence in the public realm decrease spontaneous interactions and time available for relationships.

Most recently, technological innovations have revolutionized social interactions with new technologies for entertainment, communication and information. These technologies have redefined our lifestyles in two distinct ways that may impact the interdependence that fosters social capital. Firstly, in the reduction for the need to rely on others for various tasks and second, through online social network platforms. Pre-modernization required people to interact for support for various tasks and problem-solving, either through their family or through external connections. The internet allows one to research information, purchase items, etc. Entertainment is also easily available in our homes, initially with the introduction of radios and televisions and now through the Internet. This differs from the past where one was required to attend a group event for socializing or a spectacle in a venue within the public realm. Online platforms can enhance communication and facilitate relationships, they also raise concerns about the depth and quality of these connections. They have enhanced our ability to maintain social networks across vast spaces but have also facilitated the withdrawal of some people from civic life and social life (Putnam, 2002).

In summary, the sweeping societal transformations of the modern era have profoundly reshaped the role and significance of traditional institutions that had contributed to the formation of social capital. The changing structure of society has prompted researchers to investigate both the past and present social structures and how social capital formation is affected in the evolving environments. Sociologists have challenged existing hypotheses emerging from modernization theory as well as the nostalgic notions towards pre-industrial social structures. Contemporary society is now seen to exhibit differences in the type of social capital and the variations may have distinct effects on individuals and communities in terms of their sense of belonging and collective well-being.

1.4. Social capital in contemporary societies

In contemporary society, a growing disconnect in civic engagement among individuals has been observed, accompanying declines in social capital. Putnam (1995) has indicated a trend of social decapitalization unfolding in the United States. He notes that Americans have disengaged psychologically from politics and government; additionally, net participation in religious services and groups has declined; and furthermore, there have been declines in union membership, parent-teacher organizations, women's groups, fraternal groups and volunteering (Putnam, 1995). Regarding place-based social capital, the proportion of people who socialize with their neighbors has slowly but steadily declined while socializing with those outside the immediate neighborhood has increased (Putnam, 1995). However, the United States is not unique; this trend has been observed to differing extents in other advanced democracies with a lag of about two decades. The commonalities underlying this trend appear to be the decline of traditional institutions, coupled with a rise of newer associational forms of social capital and concurrent decreases in political and/or social trust.

Social capital has become an important topic among sociologists, from which many theories have arisen as to quantify and explain the changes in contemporary society. The idea that modernization undermines community, led classical sociologists to put forward the notion that social capital would be higher in rural areas. Pre-industrialization, most people around the world lived in small villages in which their social lives were geographically bounded; rural lifestyles featured a strong set of binding norms and institutions that maintained community cohesion (Kaplan, 2023). Hanifan (1920), upon his return to his native rural hometown in the early 1900s, observed the change in neighborliness and associational life that he declared as being necessary for tackling community problems. “Gradually these customs [corn-huskings, barn-raisings, etc.] became almost wholly abandoned, the people becoming less and less neighborly. Community social life gave way to family isolation and community stagnation. It is a question whether this loss of rural social customs is not to some extent responsible for the exodus of rural populations to the cities which has been taking place for the past quarter of a century” (Hanifan, 1920, p. 9; Putnam, 2002).

However, current research has not validated the classical urban theory. Fischer (1982) states, when finding little evidence for the *solidarity urbanite thesis*, that the belief urbanites are more socially isolated could lie in the higher visibility of public familiarity in smaller communities being mistaken for invisible private relations. Others have argued not that social capital is higher, but that type and ties differ. In rural communities, being smaller, values are transmitted via the family and informal institutions; trust is higher due to the threat of ostracism (Sørensen, 2016). Nevertheless, this transition to an urbanized society has remained a central question. Research has explored numbers of relations but also the type, quality and manner in which they were formed. Some of considered, even if the relations have not decreased in intensity or frequency, that new forms may not be sufficient replacements. As Putnam (2002) writes, society has become more modern, industrial, and urban while community bonds have atrophied; the resulting urbanization from industrialization have displaced older forms of solidarity and social organization without replacing them.

With industrialization and urbanization, people became more mobile and relationships have been altered from what previous existing in traditional rural societies. Impersonal transactions and secular outlooks became more common due to a more urbanized society. However, Kaplan (2023) notes that new social institutions arose during this transformation:

> “Nationalism brought people together. Labor unions, women’s groups, ethnic groups, fraternal organizations, school boards, etc... offered new vehicles for meaning and companionship by place. Churches adapted to play central roles in neighborhoods. Local chapters of national organizations...nurtured shared identities and values across class and political divides...Americans built a slew of new organizations – fraternal, local, translocal, political and charitable (Kaplan, 2023, p. 41).”

Until the 1950s, the United States was considered as having a high level of social capital. Skocpol (2002) notes its high level of civic participation until the middle of the twentieth century, in which locally rooted but translocal and cross-class membership associations played a prominent role; already evident by the time of Tocqueville’s visit in the 1830s before large scale industrialization and urbanization. This ‘classic civic’ America remained vital until the middle 1960s (Putnam, 2002). Tocqueville's visit to the United States characterized the importance of associational life or the active engagement of by citizens in community affairs as being essential to democracy; “feelings and opinions are recruited, the heart is enlarged, and the human mind is developed only by no other means than by the reciprocal influence of men upon each other.” (Kaplan, 2023; R. D. Putnam, 2002;

Tocqueville, 1840/2003, p. 614). In Hanifan's *(1920) Community Center*, he reminisces about the importance of associational life that he declared as being necessary for tackling community problems:

"For a period of years covering most of the nineteenth century rural people were accustomed to assemble frequently,...for the purpose of entertainment and social enjoyment...For the most part these occasions were for mutual help, doing collectively what the farmers or their wives and daughters were unable to do unaided; while, on the other hand, many of these occasions, such as " apple-cuttings " and the like, were merely excuses for both young and old to get together for a good 'sociable' time (Hanifan, 1920, p. 8)."

In the second half of the twentieth century, researchers noticed a deterioration of the existing communities and institutions that had once existed. There is reason to suspect that some fundamental social and cultural preconditions for effective democracy may have been eroded, the result of a gradual but widespread process of civic disengagement (R. D. Putnam, 2002). In America, Putnam (1995) highlights declines in political engagement; withdrawal from community affairs; reduced participation in religious services; declines in social groups and volunteering. In a cross-country analysis of western democracies, a common theme of declining electoral turnout; public engagement in political parties; declining union membership; and declining church attendance (R. D. Putnam, 2002). Within this analysis, Skocpol (2002) concluded that the newer structure is more oligarchical, dominated by professionals, and less likely to bridge different classes and places. In the same analysis, Wuthnow (2002) argued the shift is not the disappearance of social connections, but a transformation from stable, long-term relationships toward more flexible, "loose connections". This is characterized by rising association in sports groups, hobby clubs, environmental groups, online groups, etc.

The declines in older forms of social capital generators appear to be offset by these "loose connections", which are more informal and fluid. The fear is that these new individualistic forms may be less conducive to the pursuit of collective goals. Do these small groups foster community as effectively or substitute forms of social capital demanding a more long-term commitment? The fading older forms were "multi-stranded, combining individual fun with collective purpose; newer forms are narrower, less bridging and less focused on collective or public-regarding purpose...more liberating but less solidarisitic" (Putnam, 2002, p. 412). A second remark is that these older forms bridged socioeconomic gaps:

> "Unions, parties, and churches aim to address imbalances in the social distribution of social capital, favoring the less privileged. Groups that organized the working class...have faded. The new groups – sports, environmental, social movements – appealing disproportionately to younger, college-educated middle class" (R. D. Putnam, 2002, p. 415).

A last concern regards the unequal distribution of social capital. It is accumulated most be those who need it least. Putnam (2002) even suggests it is less equitably distributed than even financial and human capital. These loose, informal connections may be more common in wealthier individuals with more time and money to participate in leisure activities and dedicate to hobbies. Older forms, as suggested, crossed class divides, stressing that those less fortunate have declining access to resources which can affect their well-being.

The most recent centuries have witnessed a significant shift in society. The environment is evolving much more rapidly than it had historically, thus, impacting social relations affecting both individuals and communities. The initial hypotheses regarding the rural-to-urban shift from industrialization have expanded and grown more convoluted. While the specialization of roles persist, the type of roles, the composition of the labor force and lifestyle choices have dramatically evolved which will have a profound effect on social relations. Additionally,

today's environment cannot easily be categorized into only urban and rural; there exists a large intermediate spectrum blurring what was thought of as traditional and modern. Acknowledging the multitude of factors, it is important to consider how distances and physical form of our environments affect the formation of social capital and its effect on community, belonging, and well-being.

2. The effect of the built environment

2.1. The relationship between social capital and the built environment

As it has been mentioned, some scholars have looked into the comparative differences in social capital regarding different physical human environments. Urban environments, as classified by Weber (1921/1958) and Wirth (1938), are large, densely populated settlements with specialized occupations, permanent markets, impersonal orientations and extensive heterogeneity (Abrahamson, 2013). Classical urban theory, put forth by Simmel (1903) and Wirth (1938), held that higher densities, diversity and the anonymity of urban life increased stress and degraded social ties. The sensory overload of urban environments was theorized to increase loneliness as individuals became more reserved (Freeman, 2001). Furthermore, individuals, while gaining freedom from control by intimate groups, lose the sense of self-expression and participation that comes with living in an integrated society (Wirth, 1938). Others have expanded that the feeling of crowding from perceived density acts in the same regard, leading to weaker social ties (Freeman, 2001). The anti-urban view of classical urban theory idealized rural areas and life in the countryside. It perceived rural life as having a flourishing agricultural industry that supports a socially cohesive and morally superior community of neighborly rural population (Davoudi & Stead, 2002). This view of urbanity led to the subsequent flight from the city with the introduction of the automobile. Suburbs became an escape back to rural life, where space and greenery would be better environments for living and raising a family. However, the urban-to-rural migration resulted in a service-less, car-dependent environment dominated by commuters. It cannot be classified as either urban or rural. As Jacobs (1961) wrote, “And so, each day, several thousand more acres of our countryside are eaten by the bulldozers, covered by pavement, dotted with suburbanites who have killed the thing they thought they came to find.”

Nonetheless, it was thought that living in the suburb to be much more conducive to happiness due to its low density, lower crime, green space, and stable population (Adams, 1992). Adams found; however, that there were no significant differences between the neighborhood satisfaction or psychological health of urbanites and suburbanites when controlling for ecological, individual and social network variables. More recently, criticism have arisen regarding sprawl’s negative impact on social ties and well-being. Duany (2010) writes, “The American private realm is a superior product, but the idealization of countryside homeownership has resulted in an unsatisfying environment of ‘isolation en masse’; upon leaving the refuge, one is confront by a brutal, tawdry and stressful environment”. Critics regard development as being important to creating a sense of place and belonging, fostering communities and strengthening linkages between neighborhoods.

New Urbanists have emphasized the role of the built environment for creating a sense of community and fostering social ties (Duany et al., 2010). Krier (1991) stated that the small-town philosophy inherent in traditional neighborhood design is not simply an architectural paradigm, but a social synthesis which will ultimately give way to a completely reconstituted civic realm. New Urbanism posits that environmental variables affect the frequency and quality of social contacts, sequentially creating group formation and social support, enhanced by: passive social contact in socially supportive settings; proximity; and appropriate space design (Talen, 1999). Jane Jacobs (1961), a prominent influence of the ideology, emphasized densities, mixed land uses, and the role of streets for facilitating trust and social structures. Density is a requirement for a flourishing diversity for a vibrant street life at all times of the day due to a mix of functions and buildings. Mixed uses are anchorages that attract people, avoiding monotony that is necessary for a successful neighborhood. Such a mix is necessary for providing ‘third places’, a term used to denote an additional social environment for people outside their homes and workplaces. These places can include: cafes, bar shops, parks and community centers, etc. This

is especially relevant as many ‘third places’ are public space. Community cannot form absent communal space, the town square or local pub; settings in which people meet as equals (Duany et al., 2010). Cabrera and Najarian (2015) propose that mixed design might lead to fostering social capital by helping residents overcome a tendency toward proximate social connections; segregation of uses reduces the likelihood that proximate neighbors will meet and form social connections. The privatization of space, another factor of sprawl, reduces the potential for spontaneous interactions as ample room is provided for gardens, patios and lawns; thus, public open space is resultantly reduced (Freeman, 2001). Traditional design then suggests: shrinking private space as small-scale, well-defined neighborhoods with clear boundaries and a clear center; sacrificing personal space in order to increase the density of acquaintanceship; and utilizing streets as a public space with an overt social purpose (Talen, 1999). New Urbanists espouse that such design will result in increased pedestrian activity, strengthening community bonds and promote sense of place. However, these ideals of traditional urban form may run counter to longstanding suburban ideals of American life with a preference for private space along with non-territorial forms of association (Talen, 1999).

The New Urbanist agenda relies on public space for facilitating interaction in order to create a ‘sense of community.’ Some research has correlated an increase in ‘neighboring’ with increased feelings of safety; the greater utilization of public space; and greater use of local facilities for shopping (Talen, 1999). Ahlbrandt (1984) found that the use of neighborhood facilities—shopping, worship, recreation—was linked to higher levels of resident interaction through its relation to neighborhood attachment and loyalty. Cabrera and Najarian (2015) suggest that neighborhoods businesses and certain governance structures, such as home-owner associations, may promote spatial bridging ties acting as ‘foci’ for social interaction. Although increased ‘neighboring’ have been associated with certain environmental characteristics; doubts have been expressed about the ability of design to affect social interaction. Additionally, other factors are linked to sense of community including: length of residence; the presence or absence of children; home-ownership and homogeneity (Talen, 1999). Moreover, studies, such as Gans’ study of Levittown, have found localized, cohesive social networks in suburban environments (Talen, 1999). Maybe noteworthy, many of these studies occurred during the stages of early suburban development and migration, during the ‘60s and ‘70s. Suburban neighborhoods of the time were relatively new and were remarked to be strongly homogeneous. These neighborhoods might feature many of the aforementioned factors – length of residence, home-ownership, similarities in family structure – and probably the age of individuals and income. This being that new developments are composed of similar priced houses across the entire development, receiving individuals and couples, likely in the same age bracket. These factors may not be as prominent in older suburban developments of contemporary society that have experienced more permutations in households. As regards to the success of new traditional communities, Talen (1999) suggests that town design may have indirect, catalytic effects such as through organizational dependence or cohesion through collective interest. Residents ‘buy into’ traditional design as a town identity; furthermore, the view of a community as a commodity attracts residents of certain qualities.

Another critique of New Urbanism’s philosophy regarding traditional design’s ability to foster a ‘sense of community’ relates to its omission of the ‘lost’ community dimension. It is a trend that community is ‘liberated’ from the confines of local space; an individual’s sense of community is extra-spatial, incompatible with territorial-bound neighborhood interaction as residents can seek affiliation with like-minded social groups across a larger region (Talen, 1999). New Urbanism relies on the spatial determinism that organization of space cultivates resident interaction and sense of community; therefore, presuming that non-proximal relationships incur a high spatial cost or time and energy cost by distance (Talen, 1999). Thus even in a ‘community liberated’

environment, a question arises if distance decay exists affecting the frequency and strength of varying social relationships. Distance probably has some effect on larger spatial social ties on the whole. Cabrera and Najarian (2015) have remarked that other research has demonstrated the effect of propinquity, showing its influence even on friendships formed in a virtual environment.

Research into the effect of the built environment on social ties has formulated mixed conclusions. Some research has found "sense of community" to be higher in neighborhoods featuring characteristics antithetical to that of sprawl (Freeman, 2001). Freeman (2001) reports others have shown, in accordance with classical urban theory, that high density environments weaken social ties, while alternative research has suggested there isn't any relationship regarding differing neighborhood characteristics. However, much of the late twentieth century studies have been criticized for failing to employ multivariate controls or socioeconomic controls (Freeman, 2001). Including measures of reliance on the automobile, Freeman (2001) suggests that automotive hegemony is antagonistic to the development of neighborhood social ties. The evidence indicates that increasing commute times curtails individual involvement in community affairs. The deduction is that transit-oriented neighborhoods would likely enhance neighborhood social ties, either by attracting individuals who are inclined to form such ties or by causing individuals already residing there to form them. Complementary research by Leyden (2003) found that being able to walk to more destinations from the places people live significantly enhances social capital; "residents living in walkable, mixed-use neighborhoods are more likely to know their neighbors, to participate politically, to trust others and to be involved socially". This aligns with studies that found traditionally designed, New Urbanist neighborhoods tend to have more neighbor interaction and higher levels of sense of community and/or social capital than do standard suburban subdivisions. Furthering this understanding, Cabrera and Najarian (2015) found physical distance to be a valid measure of spatial bridging ties; those who made use of the local shops and businesses had more ties, underscoring research showing that physical proximity influences the structure of relations.

Many theories have classified how the environment affects the type of social capital present. The original notion of higher social capital in rural environments arose from the classical sociologists, Durkheim's (1893/2023) and Tönnies' (1887/2017). Rural areas were theorized to contain primarily informal, strong ties with friends, relatives and neighbors; urban areas that of formal, weak ties and membership in groups and organizations; and suburban areas occupying some composition between the extremes (Mair & Thivierge-Rikard, 2010). The distinction between bridging and bonding social capital further delineates the differences between urban and rural environments. Bridging social capital was hypothesized to be higher in urban areas being extra-community, inclusive and outward-looking; whereas, bonding social capital would be higher in rural areas being intra-community (Sørensen, 2016). In rural settings, trust and maintaining good connections are necessary for small, tight-knit groups; furthermore, there is a reliance on cooperation due to the lower availability of institutional support. Findings have supported these hypotheses, suggesting that rural dwellers have many strong ties but fewer weak ties (Sørensen, 2016). Additionally, Sørensen (2016) found length of residence to be a strong determinant of interaction for rural dwellers and income for urban dwellers; implicating social reasons for the former and economic reasons for the latter. Observation by Glatz and Bodi (2020) indicated more family contacts and contacts pertaining to low-educated occupations in rural areas; constrastingly, urbanites exhibited more frequent contact with friends. This supports theories regarding the patterns of social networks between the rural-urban environments, with rural areas having stronger family bonds while urban areas offer opportunity to choose one's social network.

Theories regarding social capital in suburban environments have been less ascertained; often perceived as a blend of both the urban and rural extremes. Original sentiments, perceived the copious amounts of space and green as a healthier environment; while also having access to the economic advantages of the city. Others have described it as being the worst combination of urban-rural qualities in that it is unwalkable, less accessible and filled with vast, unsatisfying greenery. It is a compromised form, an engineered, degenerative landscape reduced by a set of regulations saying little about the configuration and quality of space (Duany et al., 2010). Its spatial configuration is regarded as a determinant for decreases in social capital. Sprawl, car dependency, destination unavailability, and inaccessibility decrease avenues of informal social interaction and discourage formal interaction (Mazumdar et al., 2018). Though as mentioned, suburban environments tend to be more homogeneous, an identified determinant in community formation; and, due to suburban flight in America, often feature higher incomes than many urban neighborhoods.

Determining these relationship of social capital with respect the built environment through simplistic categorizations can present challenges. The distinction between rural, suburban and urban environments may not be sufficient. Within each of these categories, sub-environments exhibit significant variability, independent of resident demographics and characteristics. It is recognized that not all urban environments have good mobility and accessibility. Numerous neighborhoods lack public transit options and many jobs are located outside the city, compelling the use of an automobile for daily activities. Moreover, many urban neighborhoods in US cities also lack access to goods and services within a close proximity with food deserts being prominent. Rural environments encompass both rural towns and more isolated conditions that necessitate significant travel distances to reach the nearest town. The categorization of suburban landscapes fall along a spectrum of semi-rural to semi-urban but frequently feature homogeneous development patterns with separation of land uses. Despite these diverse characteristics, factors like mobility and accessibility cannot be overstated in shaping the livability of an area.

2.2. Effects of the built environment on social capital of the older adult population

2.2.1. A Legacy of the Older Adults' Spatially-Changing Societal Position

Family dynamics and the standing of older adults within society has been a relevant topic in sociology. The process of modernization has affected the perceived and actual status of older Americans over time related to the prevailing conditions and values of the time (Achenbaum, 1978/2019). The conditions of older adults has changed drastically since the start of industrialization, becoming more segregated physically and isolated. Laws (1993) writes that the transition from a rural, agrarian society to an urban one had a profound impact on society where the extended family was eroded by an urban labor market; older workers were precluded in the search for productivity, becoming a perceived burden on society. Achenbaum (1978/2019) remarked that this transition in America began mostly after the Civil War and that our predecessors would have been surprised to know that one day the elderly as a group would be described as roleless and unproductive persons disengaged from active life. With the industrial transition, older adults became more dependent on their family members, and those who could not or were not, became residents of institutions such as almshouses. The concentration of increasingly likely-to-be-unemployed older people in cities contributed to the changes in attitude toward old age, and this probably accounts for the subsequent relegation of old people to separate spaces (Laws, 1993). Eventually, the welfare state came around to provide support for older adults with state-guaranteed pensions. In the US, this

came about with the Social Security Act of 1935. Laws (1993, p. 679) asserts that this change provided the development for new forms of residential care for the frail and dependent elderly:

> "Changes in the meaning of old age, from the antebellum view of the elderly as the bearers of wisdom and experience, through the industrializing society's dismissal of the elderly as potential workers, and finally to the idea of society 'owing' the elderly a minimum income in return for their years of work, were each associated with a different form of housing."

Post World War II marked a new shift with the expansion of the suburbs and an idealized preference towards suburban living. It yet further segregated older adults as young middle class families moved to the suburbs. Suburbs sprang up across the country being filled with young, middle-class families while inner cities became concentrated with older adults and the poor. Suburbanization further weakened the extended family and ordained that most children would grow up in intimate contact with only their parents and siblings; over the course of the century, persons over 65 living with one of their children had fallen from over 58% at the turn of the century to less than 13% by 1990 (Laws, 1993).

This post-World War II period, featured the thirty years of most dynamic economic expansion in history. This moment in time occurred concurrently with suburbanization and featured an expanding middle class as well as recording the largest generation birth, the baby-boomers. Laws (1993) remarks that two shifts occurred in the 20th century regarding the elderly in America: a decreasing in the proportion of senior citizens below the poverty line, medicare and the advent social security. These shifts led to a new segregation of older adults through the commodification of their lifestyle. These new forms of housing included: nursing homes, benefiting from health care spending; and retirement communities, as *retired* became a new phenomenon in an individual's life-course (Laws, 1993).

2.2.2. Why the Built Environment Matters for Older Adults

As aforementioned, subjective well-being has been associated with healthy aging which has been correlated to the level of social capital held by an individual. Xu and colleagues (2022) state that improving social capital of older adults could improve their subjective well-being for three reasons: older adults are more likely to feel lonely and isolated; their shrinking social networks could produce a self-perception of feeling useless; and contacts, both formal and informal, have been found essential for their mental well-being. Social networks are important for older adults because their diminished mobility reduces their ability to maintain ties outside of their neighborhood, thereby, becoming more dependent upon their place of residence for the services it provides (Ahlbrandt, 1984). The relationships and reliance on others helps compensate for diminished mobility in order to maintain a full lifestyle. Moorer and Suurmeijer (2001) hypothesized that different aspects of neighborhoods—the proportion of older people, crime and the number of activities—could influence loneliness and the size of one's social network. Having a larger pool of older adults could increase the likelihood of having a larger friend group (Moorer & Suurmeijer, 2001). This could explain why older adults have chosen to locate to retirement communities. The study however, did not find the proportion of older adults to have any effect; however, loneliness was correlated to the size of one's social network (Moorer & Suurmeijer, 2001). Moorer and Suurmeijer (2001) also noted that feelings of insecurity were found to lead to loneliness as older adults tend to stay home which also makes them more dependent on others being the ones to do the visiting.

The findings of the study by Xu and colleagues (2022) have shown the importance of family social capital as tight-knit family patterns as well as community social capital which contributes through collective action, informal social control and the dissemination of social resources. It thus emphasizes the contribution of formal and informal ties in facilitating social interaction, but these ties vary in different environments. Mair and Thivierge-Rikard (2010) analyzed the differences in formal ties in rural and urban environments in that such ties would contribute to a higher quality of life for older adults. They found similar amounts of strong ties in rural, urban and suburban areas; with phone contact being more frequent among urban adults and face-to-face interactions providing more benefit for their rural counterparts. It is not evident if phone versus face-to-face interactions is more or less advantageous. Glatz (2020) indicated that such effects of informal ties only applied for family contacts.

The differences shown by these studies highlight the physical built environment as a driver for social interactions, which are pertinent to the well-being of older adults. Föbker and Grotz (2006) remark that if the level of activity pertains to one's social network and influences psychological well-being, it confirms the importance of outdoor mobility as to its impact on life satisfaction. It is also of importance, as pointed out by disengagement theory, the older people deliberately disengage from some activities and relationships as a relieving effect (Föbker & Grotz, 2006). This places importance on not only accessibility to social activities, but also on the ability to withdraw. Certain neighborhood characteristics such as access to basic facilities that allow for an independent lifestyle become essential. Reduced physical ability from aging increases dependence on the nearby infrastructure to one's residence including: social infrastructure, shopping, and services. This is especially important for older adults further along regarding cognitive decline; for people with dementia walking to facilities and services further than 500 metres from their home was difficult (Mitchell & Burton, 2006). This is for three reasons: there is a relieving effect not requiring another's support for mobility in accordance to disengagement theory; it stimulates walking; and lastly, it facilitates social contacts within the immediate surroundings (Föbker & Grotz, 2006). Besides the availability of nearby shops and services, mobility infrastructure is also important for accessibility. Reliant public transportation and slow mobility—walking and cycling—infrastructure enhance accessibility for one's everyday needs. Hence, one assumes that urban areas offer better conditions for a self-determined way of life in old age because they possess a high density of shops and leisure facilities as well as a well-integrated public transport system in comparison with suburban or rural areas (Föbker & Grotz, 2006). On the other hand, automobile hegemony of the suburbs create a dependence on driving which can affect older adults who are unable. Thus, it can create an isolating environment where they are unable to access the services needed and may become socially isolated. Duany and colleagues (2010, p. 124) describe how the physical characteristics of suburban sprawl affect older adults:

> "As families age and disperse, parents find themselves in an environment no longer organized to serve their needs. As driving skills diminish, parents become increasingly dependent on others for mobility...The location of that house puts them out of reach of their physical and social needs, in effect, non-viable members of society...Unless they have a chauffeur, or burden a relative, they have no choice but to re-retire into a specialized home for the elderly, having left a community behind...It has inadvertently segregated the elderly."

The burden placed on relying on family and friends for mobility support to access their daily needs further effects their ability to withdraw as stated in disengagement theory. Traditional neighborhoods, and those promoted by New Urbanism, are mixed-use and walkable. Therefore, proximity of housing and shopping allow older adults to maintain a viable lifestyle and remain independent. Mitchell and Burton (2006, p. 29) highlight

the importance of a stimulating external environment for people with dementia, that participants in their study "tended to prefer vibrant spaces full of activity, such as urban squares surrounded by shops, offices and cafes and parks…; the more informal, lively, mixed-use settings were seen as more welcoming and safe than the…formal spaces". The quality of the infrastructure is also relevant as physical ability is declining with age. Age-friendly design becomes important as to not impose physical limitations and to maintain physical safety in public spaces with competing forms of transportation. Environments should offer alternatives to stairs, maintain wide, flat footpaths, remove physical obstacles, provide safe crossing points at intersections, allocate seating, and provide helpful way-finding features, etc. For example, people with dementia tended to find simple, well-connected street layouts with uncomplicated road junctions the easiest to use and understand (Mitchell & Burton, 2006).

2.2.3. Crises of Today's Environments

The world's population is becoming increasingly urban. More than half the world's population now live in urban areas with the share being over eighty percent in high-income countries (Ritchie et al., 2024). The proportion of the older adult population in cities matches and is rising with that of the younger age groups in developed countries while it is multiplying in developed countries such that by 2050 older people with comprise one quarter of the total urban population (World Health Organization, 2007). Within today's aging environment, older adults face a range of problems stemming from the effects of the past developments to our physical environment.

In North America, urban environments experienced deterioration and decay due to suburban flight. More recently, cities are seeing the return of young individuals preferring a more urban lifestyle. However, cities are still facing many problems affecting the older adult population and global capital movements are producing uneven development among cities (Buffel et al., 2012). Buffel and colleagues (2012) write that the consequences of globalization reinforce the need to re-address the relationship between older people and urban environments. In 2007, the World Health Organization released their guide for developing age-friendly cities. "An age-friendly city encourages active ageing by optimizing opportunities for health, participation and security in order to enhance quality of life as people age; ...its structures and services to be accessible to and inclusive of older people with varying needs and capacities" (World Health Organization, 2007). The guide targets eight domains including: outdoor spaces & buildings; housing; transportation; respect & social inclusion; social participation; communication & information; community support & health services and civic participation & employment. In a systematic review, Wood and collegues (2022) highlighted similar themes as urban environmental barriers to active and healthy aging. In studies, accessibility was the most commonly identified barrier highlighting the lack of access to local buildings, services and facilities (Wood et al., 2022). The physical environment was another commonly reported barrier referring to a lack of well-maintained outdoor environments, physical obstacles, absence of street crossing elements, negative aesthetics and lack of facilities (Wood et al., 2022). Mobility and transport are another important aspect affecting everyone with a significant impact on older adults. Webber and colleagues (2010) write that approximately one third to one half of individuals over the age of 65 have physical mobility impairments. Mobility takes many forms (walking, drive, public transit, etc.) and is fundamental to meeting life-maintenance needs (food, etc.) and fulfilling higher order needs (social, recreational) to promote well-being (Webber et al., 2010). Mobility limitations affect an individual's health through lack of physical activity; isolation and lack of access to resources (Rosso et al., 2011). Mobility is conceptualized by three domains: transportation & infrastructure; land use patterns and urban design (Rosso et al., 2011). Regarding transportation systems, Rosso and colleagues (Rosso et al., 2011) found a higher percentage of car commuters

negatively affected walkability for those over 75 and proximity to trails and paths increased daily walking. Other consistent factors were housing density, proximity to retail destinations, presence of parks and pedestrian safety measures (Rosso et al., 2011). Cities need to utilize better urban design to increase safety. The safety of pedestrians is a major issue as those over the age of 65 represent a significant portion of traffic fatalities (Buffel et al., 2012). Additionally, design is important for creating more walkable streets by adding shade. Cities suffer from the heat island effect and older people are more vulnerable to environmental changes with heat waves having a higher mortality for older people (Buffel et al., 2012).

Community support is another domain within age-friendly cities. In many cities there is a shortage of necessary services or services are poorly distributed while in more developed cities there is general dissatisfaction with existing services (World Health Organization, 2007). Wood and colleagues (Wood et al., 2022) found it to be another common theme necessary for health aging. Community support stresses "the importance of local communities and neighborhoods...providing support and encouraging social activities," including the availability of shops, public places as well as network associations, programs and religious institutions (Wood et al., 2022, p. 446). Engagement in social activities is influenced by factors such as mobility as well as the presence of social networks, neighbors and sense of community (Wood et al., 2022). A critical issue is that with inflows of youth and changes to urban neighborhoods, older adults are subjected to pressures from changes to their community as well as from gentrification. Older adults are particularly sensitive to changes in the physical environment, and the on its sense of identity (Buffel et al., 2012). Older adults often tend to feel excluded from institutions and organizations that have an influence on their neighborhood affecting their social relationships and participation causing feelings of isolation. (Buffel et al., 2012).

Affordable housing is a problem many urban areas are facing around the world. Housing shortages and gentrification raise the cost of living and can displace long-term residents. Older adults must have access to affordable and accessible housing close to community services and facilities that in turn affects their social interactions and interpersonal relationships (Wood et al., 2022). On the contrast from gentrification is the issue of naturally-occurring retirement communities, stemming from the migration of younger people, requiring supportive service programs (Buffel et al., 2012). Effective support requires interventions linking different parts of the urban system: housing, street design, transportation and accessibility to shops and services (Buffel et al., 2012). Age-friendly cities are a significant challenge in terms of urban design, management and organization; moreover, much of the older population feels excluded by plans put forth by cities competing globally (Buffel et al., 2012). However, older citizens are an advantage to urban environments because they tend to be more committed to their immediate community but are more adversely effected because of the greater reliance on neighborhood for support (Buffel et al., 2012).

Rural environments also have faced deterioration, becoming economically disadvantaged and shrinking. Rural counties have a higher share of adults who are over the age of 65 than do urban and suburban counties (Parker et al., 2018). Skoufalos and colleagues (2017) write that approximately 25% of Americans over 65 live in a small town or rural area while some states have a much higher percentage. One difficulty is younger individuals migrating to cities. The report by Parker and colleagues (2018) found that since 2000, more people left rural counties for urban, suburban or small metro counties than moved in from those areas. Rural areas are also disadvantaged in terms of resources and services. In addition to youth migration, local governments are financially poor; businesses are struggling; economic opportunities dwindling; and health services addressed at older citizens are seldom allocated to rural regions (Skoufalos et al., 2017). Primary concerns for older adults pertain to health care, housing, support and social isolation; they are exacerbated geographically by greater

distances to obtain services due to the lack of infrastructure and scarcity of resources because of economic constraints (Skoufalos et al., 2017). Skoufalos and colleagues (2017) indicate that 87% of older adults prefer to remain in their homes, referred to as *aging in place*, but it is often not practical because of limited access to preventative services and younger generations moving away. Well-being is a principle concern for older adults due to health disparities in rural regions: a higher prevalence of chronic disease, a higher rate of disability and lower life expectancy (Skoufalos et al., 2017). In these settings, older adults require more support due to a lower availability of services and greater distances required to access them. The need for support emphasizes the importance of higher levels of social capital within families for maintaining a higher quality of life or among neighbors when family support is absent. Those without such support may be forced to relocate to more urban settings, though they may lack the financial ability to do so. Although there is a significant overall deficit in social well-being in rural-dwelling older adults, it has been revealed that they display relatively higher community well-being—pride in the community, safety and stronger sense of purpose (Skoufalos et al., 2017).

Suburbs have emerged as a novel form along the urban-rural continuum to be explored. Often differentiated one-dimensionally by land use, social class or dominant transport type, yet the sense of suburban space is peculiarly intangible but involves development at the urban fringe or dispersion of urban activities (Vaughan et al., 2009). In North America, the identifiable features are separated land uses and roadways as the main form to connect the disassociated components (Duany et al., 2010). The past decades in the United States, have seen massive suburban expansion creating vast segregated and monotonous residential developments much more pronounced than what occurred in other areas around the world. American suburbs now represent a significant portion of the population, no longer a small blip in the urban-rural debate and extremely important for analysis of older adult populations. Today's suburbs are no longer a sprawl of young families; families that had originally moved to the suburbs at the beginning of this period are now aged. A 25-year old who moved to the suburbs in 1950 had been over 75 by the year 2000, today, the baby boomers, the first generation born during this suburban shift have mostly shifted into retirement. Suburban neighborhoods are now confronting the problem of aging. A 2018 report had determined that compared to urban and rural counties in the United States, the suburbs are facing a more rapidly aging population (Parker et al., 2018). Aging in the suburbs poses a significant challenge as a suburban household is not necessarily easy to manage. As Laws (1993) has stated, most older adults have not relocated to nursing and retirement facilities, the vast majority are still accommodated in their own home. Older adults thus require more support from friends and family. Unlike its urban counterpart, suburbs have a low density, are less walkable and are car dominated. Thus, it may be less accessible to services and facilities required for healthy aging. For older adults who are unable to drive, this environment can result in heightened feelings of isolation in the absence of a strong neighborhood community or strong support from family and friends. The system is showing itself to be unsustainable financially, producing traffic problems and exacerbating social inequity and isolation (Duany et al., 2010).

The built environment has a significant impact on the social capital of older adults. For healthy and active aging, older adults require better accessibility to shops and services. Our environments must improve mobility by removing barriers, increasing safety, providing better transport infrastructure and enhancing walkability. As well as by promoting community support and inclusion, opportunities for social interaction increase as well as the well-being and quality of life of the older adult population.

Part II: Empirical Research

3. Methodology

3.1. Data

This study utilizes the third wave of the National Social Life, Health and Aging Project (NSHAP) survey performed in the United States. The aim of the survey was to understand the well-being of older, community-dwelling Americans by examining the interactions among physical health, illness, medication use, cognitive function, emotional health, sensory function, health behaviors, and social connectedness (Waite et al., 2015). The survey was conducted by the National Opinion Research Center (NORC) and investigators from the University of Chicago. The third round was conducted from September 2015 to November 2016 involving over 4000 participants between the ages of 57 to 85 that includes: 2409 surviving round-two participants and a new cohort of adults born between 1948 and 1965. Data collection was performed through face-to-face interviews at the respondent's homes and a post-interview questionnaire. The following datasets constituted Round 3: Core Data, Social Networks Data, Disposition of Returning Respondent Partner Data, and Proxy Data (Waite et al., 2015).

For the purpose of this research, data will be used only from the public core dataset. In order to measure social capital, questions from the categories of social activities, relationships with family, relationships with friends, neighborhood, and feelings of isolation will be utilized. Variables pertaining to the built environment, that will be compared, originate from the interviewer's assessment of the respondents' neighborhood environments. These questions involve the home structure, level of area maintenance and block descriptors: cleanliness, noise, traffic, space between buildings, pollution, comfort, safety and number of amenities. The variables are measured on a 1-to-5 scale, and do not imply any specific contextual environment. However, these variables can relate to conditions in different environments—urban, suburban and rural—and the relations with those environments can be imagined to add context for each. To analyze the connection of social capital with the built environment to well-being, responses to questions related to mental-health and emotions will be used.

Table 1: List of used variables from survey data

BACKGROUND INFORMATION		
Section	**Variable**	**Question**
Basic Background Information	GENDER	I am required to ask you the following: are you male or female?
Basic Background Information	AGE	Calculated from date of birth
Basic Background Information	HEARN_RECODE	Now, I'd like to ask you about the income of your household. Altogether, what would you say was approximately the income of your household in [CURRENT YEAR MINUS 1] before taxes or deductions?
Basic Background Information	HSASSETS_RECODE	Now I'd like you to think about all of the assets of your household. These are things like your house if you own it, your cars, other rental properties and businesses you own, and financial assets like savings accounts, stocks, bonds, mutual funds, and pensions. Altogether, how much would you say that amounted to, approximately, after accounting for the loans you might have to pay off?
Basic Background Information	EDUC	Recoded into 4 categories: Less than high school, high school/equivalent, vocational/some college/associates, bachelors or more
Social Context	MARITLST	Are you currently married, living with a partner, separated, divorced, widowed, or have you never been married?
Neighborhood	RESIDEY2	About how many years have you lived in this area?

SOCIAL CAPITAL		
Section	**Variable**	**Question**
Social Activities	VOLUNTEER	In the past 12 months, how often did you do volunteer work for religious, charitable, political, health-related, or other organizations?
Social Activities	ATTEND	In the past 12 months, how often did you attend meetings of any organized group? (Examples include a choir, a committee or board, a support group, a sports or exercise group, a hobby group, or a professional society.)
Social Activities	SOCIAL	In the past 12 months, how often did you get together socially with friends or relatives?
Social Activities	ATNDSERV2	In the past 12 months, about how often have you attended religious services?
Relationships with Family	FAMRELY2	How often can you rely on members of your family for help if you have a problem? Would you say never, hardly ever or rarely, some of the time or often?
Relationships with Friends	FRRELY2	How often can you rely on your friends for help if you have a problem? Would you say never, hardly ever or rarely, some of the time or often?
Relationships with Friends	FRHELP	How often do your friends rely on you for help if they have a problem? Would you say never, hardly ever or rarely, some of the time or often?

Relationships with Friends	FRAMT	About how many friends would you say that you have?
Neighborhood	VISIT	How often do you and people in this area visit in each other's homes or when you meet on the street?
Neighborhood	DOFAVORS	How often do you and other people in this area do favors for each other?
Neighborhood	PERSADVICE	How often do you and other people in this area ask each other for advice about personal things?
Neighborhood	CLOSEKNIT	This is a close-knit area.
Neighborhood	HELPNEIGH	People around here are willing to help their neighbors.
Neighborhood	GETALONG	People in this area generally don't get along with each other.
Neighborhood	VALUES	People in this area don't share the same values.
Neighborhood	CANTRUST	People in this area can be trusted.
Neighborhood	AFRAIDNITE	Many people in this area are afraid to go out at night.
Thoughts & Feelings	LEFTOUT2	How often do you feel left out?
Thoughts & Feelings	ISOLATED2	How often do you feel isolated from others?

BUILT ENVIRONMENT		
Section	Variable	Question
Respondent's Home and His/Her Neighborhood Environment	STRUCTQ	Type of structure in which respondent lives:
Respondent's Home and His/Her Neighborhood Environment	OTBUILD	How well kept are most of the buildings on the street (one block, both sides) where the respondent lives? Very Poorly Kept – Very Well Kept
Respondent's Home and His/Her Neighborhood Environment	IWDESCRIBE1	Describe the street (one block, both sides) where the respondent lives, using the following scales: Clean – Full of litter or rubble
Respondent's Home and His/Her Neighborhood Environment	IWDESCRIBE2	Describe the street (one block, both sides) where the respondent lives, using the following scales: Quiet – Noisy
Respondent's Home and His/Her Neighborhood Environment	IWDESCRIBE3	Describe the street (one block, both sides) where the respondent lives, using the following scales: No traffic on the street – Heavy traffic on the street

Respondent's Home and His/Her Neighborhood Environment	IWDESCRIBE4	Describe the street (one block, both sides) where the respondent lives, using the following scales: Buildings/houses are close together – Buildings/houses are far apart
Respondent's Home and His/Her Neighborhood Environment	IWDESCRIBE5	Describe the street (one block, both sides) where the respondent lives, using the following scales: No smell or air pollution – Strong smell or air pollution
Respondent's Home and His/Her Neighborhood Environment	AREAAMENTITIES	Select your response to the following statements based on your observation of the area where the respondent lives: I saw many amenities (grocery stores, parks) - I saw few amenities

WELL-BEING		
Section	**Variable**	**Question**
Mental Health	MNTLHLTH3	What about your emotional or mental health? Is it excellent, very good, good, fair, or poor?
Mental Health	HAPPY	If you were to consider your life in general these days, how happy or unhappy would you say you are, on the whole…
Mental Health	FLTDEP	During the past week... I felt depressed
Mental Health	FLTEFF	During the past week... I felt that everything I did was an effort
Mental Health	NOSLEEP	During the past week... My sleep was restless
Mental Health	WASHAPY	During the past week... I was happy
Mental Health	WASLONLY	During the past week... I felt lonely
Mental Health	UNFRIEND	During the past week... People were unfriendly
Mental Health	ENJLIFE	During the past week... I enjoyed life
Mental Health	FLTSAD	During the past week... I felt sad
Mental Health	DISLIKD	During the past week... I felt that people disliked me

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study*

3.2. Analysis

The analysis will be conducted quantitatively using the statistical software R to examine the relationships between the built environment, social capital and well-being. It will include descriptive statistics to provide an overview of the sample characteristics, including: demographics, social capital, environmental factors and well-being variables. A bivariate analysis using ordinal regression modeling was applied only to explore if any relationships exist between specific variables and age (see appendix).

The analysis of social capital is divided into three main categories: participation in social activities; family and friend support-exchange; and neighborhood interactions and familiarity. Cross tabulations are used to develop an initial set of evaluations from which potential relationship between the different variables sets can be drawn. First by exploring how social capital relates to well-being, in order to highlight its importance. Then, to investigate the connection between the environment and its effect on social capital. For comparison purposes, selected variables from each of the three social capital categories will be analyzed. Specifically, variables pertaining to volunteering and socializing with family and friends will be used to assess participation. Family reliability and friend reliability will represent the analysis of family and friend support-exchange. Lastly, for neighborhood interactions, visits between neighbors and the exchange of favors are analyzed.

These evaluations derived from the cross tabulations will then undergo regression testing to control for background factors such as: income, asset wealth, education, and time spent in their current residence. The variables of education and years in the current residence, recorded by the survey as categorical groupings, will be recoded as intervals using midpoints for the regression analysis, as shown in table 2. The regression analysis provides a deeper understanding into whether any findings can be attributed to the built environment or if they are confounded by socioeconomic factors.

Table 2: Recoded background variables

Years of Schooling		Time in Residence			
< hs	10	(1) less than one year	0.5	(5) 16-20 years	18
hs/equiv	12	(2) 1-5 years	3	(6) 21-25 years	23
voc cert/some college/assoc	14	(3) 6-10 years	8	(7) 26-50 years	38
bachelors or more	16	(4) 11-15 years	13	(8) 50+ years	60

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

Participants were grouped into two categories for further analysis: the young-old, ages 65-74, and the old-old, over 75. The distinction is important, as the lifestyle for these two ranges feature distinct lifestyle characteristics. The young-old are recently retired and the old-old have a higher probability of worst health status. See the appendix for the distribution of the participant's ages. As shown in table 3, of the more than 4000 participants interviewed, only 2539 fell into the 65 and over range, with a minimum age of 65.0, a maximum of 95.0 and a median of 74.0. After controlling for participants where all social capital variables had the value of NA (n = 245), the final total number of respondents was 2294. The sample consisted of 44.8% males (n = 1027) and 55.2% females (n = 1267) with 52.5% (n = 1204) participants classified within the young-old category and 47.5% (n = 1090) participants in the old-old category. Regarding socioeconomic status, the largest percentage (25.9%, n = 593) of respondents fell in the $50000 to $100000 annual income range, and over 50% (n = 1201) had more than $100000 in assets. 60.4% (n = 1386) of respondents had greater than a high school level of education, with 28.0% (n = 643) completing at least a bachelor's degree. A majority of the participants (65.5%, n = 1501) appear to be living with a partner or married. Another important indicator that has been identified as being important to one's attachment to their neighborhood, which could affect their level of social capital, is time spent living in that area. A large portion of participants (47.7%, n = 1094) have spent at least 26 years in their current residence while only 13.3% (n = 307) have been there for less than 5 years.

Table 3: Descriptive statistics of participants background information

	Unique		Missing Pct.	Mean	SD	Min	Median	Max
Age	31		0	75.3	7.0	65.0	74.0	95.0
			N	%				
Gender	(1)	male	1027	44.8				
	(2)	female	1267	55.2				
Annual Household Income	(-2)	don't know	412	18.0				
	(-1)	refused	95	4.1				
	(1)	0-24,999	422	18.4				
	(2)	25,000-49,999	502	21.9				
	(3)	50,000-99,999	593	25.9				
	(4)	100k or higher	270	11.8				
Total Asset Wealth	(-2)	don't know	520	22.7				
	(-1)	refused	121	5.3				
	(1)	0-9,999	145	6.3				
	(2)	10,000-49,999	164	7.1				
	(3)	50,000-99,999	143	6.2				
	(4)	100,000-499,999	636	27.7				
	(5)	500k or higher	565	24.6				
Education Level	(1)	< hs	347	15.1				
	(2)	hs/equiv	561	24.5				
	(3)	voc cert/some college/assoc	743	32.4				
	(4)	bachelors or more	643	28.0				
Marital Status	(1)	married	1458	63.6				
	(2)	living with a partner	43	1.9				
	(3)	separated	26	1.1				
	(4)	divorced	214	9.3				
	(5)	widowed	503	21.9				
	(6)	never married	50	2.2				
Time at current residence	(1)	less than one year	65	2.8				
	(2)	1-5 years	242	10.5				
	(3)	6-10 years	212	9.2				
	(4)	11-15 years	259	11.3				
	(5)	16-20 years	190	8.3				
	(6)	21-25 years	203	8.8				
	(7)	26-50 years	764	33.3				
	(8)	more than 50 years	330	14.4				
Age Category	young-old		1204	52.5				
	old-old		1090	47.5				

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

4. Results

4.1. Analyzing social capital of the participants

4.1.1. Analysis of social capital: Participation in social activities

Social participation is an individual's involvement in formal and informal groups. It is an aspect of social capital that can facilitate the development of one's social networks and sense of social integration while also being linked to improving one's physical health through increased activity (Legh-Jones & Moore, 2012). Four variables from the study (2015) pertain to active social participation within the last 12 months: volunteering, organized social groups, religious services and socializing with friends and family. Table 4 presents the descriptive statistics for this category of social capital; the analysis comparison with age is available in the appendix. Volunteering had the lowest participation rate of the four. Among the young-old population (n = 440), 36.5% hadn't volunteered in the past year, while this percentage was higher (40%) for the old-old population (n = 437). The likelihood of volunteering appeared to decrease with age for both young-old (β = -0.014) and old-old (β = -0.05) groups, though this trend was only statistically significant for the old-old population. This decline could be attributed to physical limitations and declining health which may limit one's ability to devote time to volunteering.

Participation in organized meetings and groups was the second lowest category. Most respondents did not regularly attend organized meetings during the previous 12 months with many never attending in both the young-old (n = 366) and old-old populations (n = 370). Similar to volunteering, there was a decreasing trend in the old-old population (β = -0.05) for likely the similar reasons.

Attendance of religious services was more common, with 41.9% of the young-old and 48.7% of the old-old attending at least weekly. Fewer than 25% had never attended within the last 12 months, indicating that most members have at least some religious affiliation. The likelihood of attendance appeared to be increase with age possibly due to older individuals having stronger religious ties. However, there is a slight decrease for the old-old population, potentially due to the inability to attend, stemming from poor health or the loss of the ability to drive, creating a reliance on others.

Meeting with friends or family had the highest rate of participation. Most respondents indicated that they met at least once a month to several times a week, 79% for the young-old (n = 954) and 74% for the old-old (n = 809). It is expected that since family and friends compose the core members of one's social network, most social activity would involve this group. Additionally, as individuals age, they often become more reliant on others for managing their daily lives. Usually this dependency falls first upon family members which would result in a higher frequency of meeting. Overall, there did not appear to be any significant increasing or decreasing trend.

Table 4: Descriptive statistics of social capital pertaining to participation in social activities

			N	%
Volunteering	YOUNG-OLD	(0) never	440	36.5
		(1) less than once a year	109	9.1
		(2) about once or twice a year	131	10.9
		(3) several times a year	105	8.7
		(4) about once a month	122	10.1
		(5) every week	162	13.5
		(6) several times a week	92	7.6
	OLD-OLD	(0) never	437	40.1
		(1) less than once a year	76	7.0
		(2) about once or twice a year	85	7.8
		(3) several times a year	96	8.8
		(4) about once a month	106	9.7
		(5) every week	146	13.4
		(6) several times a week	78	7.2
Attending organized groups	YOUNG-OLD	(0) never	366	30.4
		(1) less than once a year	72	6.0
		(2) about once or twice a year	89	7.4
		(3) several times a year	121	10.0
		(4) about once a month	198	16.4
		(5) every week	196	16.3
		(6) several times a week	121	10.0
	OLD-OLD	(0) never	370	33.9
		(1) less than once a year	53	4.9
		(2) about once or twice a year	68	6.2
		(3) several times a year	93	8.5
		(4) about once a month	171	15.7
		(5) every week	191	17.5
		(6) several times a week	91	8.3
Socializing with friends or relatives	YOUNG-OLD	(0) never	10	0.8
		(1) less than once a year	13	1.1
		(2) about once or twice a year	44	3.7
		(3) several times a year	148	12.3
		(4) about once a month	250	20.8
		(5) every week	460	38.2
		(6) several times a week	244	20.3
	OLD-OLD	(0) never	24	2.2
		(1) less than once a year	11	1.0
		(2) about once or twice a year	43	3.9
		(3) several times a year	156	14.3
		(4) about once a month	193	17.7
		(5) every week	375	34.4
		(6) several times a week	241	22.1

Attending religious services	YOUNG-OLD	(0) never	295	24.5
		(1) about once or twice a year	162	13.5
		(2) several times a year	122	10.1
		(3) about once a month	85	7.1
		(4) every week	413	34.3
		(5) several times a week	92	7.6
	OLD-OLD	(0) never	226	20.7
		(1) about once or twice a year	106	9.7
		(2) several times a year	98	9.0
		(3) about once a month	82	7.5
		(4) every week	448	41.1
		(5) several times a week	83	7.6

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

4.1.2. Analysis of social capital: Family-friend support exchange

Family and friend support exchange refers to the participants' ability to rely on family and friends for help, a necessity for maintaining a satisfying and balanced lifestyle in old age. People turn primarily to family, friends, and relatives for help and support, referred to as the social network through which one can receive social support (Andersson, 1998). This support substitute for deficient social services, improving the options for help and care while also serving as an intervention to alleviate or prevent loneliness (Andersson, 1998). Four variables were grouped under this category: the ability to rely on family; the ability to rely on friends, the frequency of asking friends for help and the amount of friends one has.

The derived data (2015) shows, on a 0-to-4 scale, from never to often, the ability to rely on friends and family. The distribution of responses can be seen in table 5. Among the young-old population, 59.3% (n = 714) felt that they can often rely on family for help, while this percentage was slightly higher (62.4%, n = 680) in the old-old group. Regarding the ability to rely on friends for help, the largest percentage of respondents, 44.9% of the young-old (n = 540) and 43.7% (n = 476) of the old-old, felt they can rely on friends for help "some of the time".

When examining the frequency of asking friends for help, it appears that the likelihood decreases with age. This trend could be attributed to declining health of either the respondents or their friends, requiring reliance on younger individuals, or to simply falling out-of-contact with friends. There may also be a disconnect between the feeling of being able to rely on others and actually asking for help. The data suggests that most older adults from the study have a strong support network in their family and friends, with the majority feeling they can often rely on family for help.

Regarding the number of friends, the most selected category was between 4 and 9 friends, representing 36% (n = 432) for the young-old and 38% (n = 413) for the old-old. Only a small percentage (less than 2%) for both groups indicating not having any friends and between 2-3% reported only having one friend. 13.3% (n = 160) of the young old and 15% (n = 163) of the old-old indicated having more than 20 friends. There appeared to be a small statistically significant increasing trend ($\beta = 0.056$) in the number of friends for the young-old; the old-old showed the opposite, a decreasing trend, although it was not statistically significant.

Table 5: Descriptive statistics of social capital pertaining to family and friend support-exchange

			N	%
Relying on family	YOUNG-OLD	(0) never	37	3.1
		(1) hardly ever or rarely	80	6.6
		(2) some of the time	337	28.0
		(3) often	714	59.3
	OLD-OLD	(0) never	28	2.6
		(1) hardly ever or rarely	49	4.5
		(2) some of the time	286	26.2
		(3) often	680	62.4
Relying on friends	YOUNG-OLD	(0) never	69	5.7
		(1) hardly ever or rarely	159	13.2
		(2) some of the time	540	44.9
		(3) often	426	35.4
	OLD-OLD	(0) never	74	6.8
		(1) hardly ever or rarely	161	14.8
		(2) some of the time	476	43.7
		(3) often	356	32.7
Asking for help from friends	YOUNG-OLD	(0) never	78	6.5
		(1) hardly ever or rarely	260	21.6
		(2) some of the time	675	56.1
		(3) often	179	14.9
	OLD-OLD	(0) never	145	13.3
		(1) hardly ever or rarely	284	26.1
		(2) some of the time	531	48.7
		(3) often	112	10.3
Number of friends	YOUNG-OLD	(0) none	17	1.4
		(1) one	26	2.2
		(2) 2-3	301	25.0
		(3) 4-9	432	35.9
		(4) 10-20	258	21.4
		(5) more than 20	160	13.3
	OLD-OLD	(0) none	20	1.8
		(1) one	28	2.6
		(2) 2-3	219	20.1
		(3) 4-9	413	37.9
		(4) 10-20	222	20.4
		(5) more than 20	163	15.0

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

4.1.3. Analysis of social capital: Neighborhood

The last grouping of social capital to be analyzed pertains to the neighborhood. Neighborhoods represent a spatial community in which proximity is a significant advantage for receiving support and contributes to frequent social interactions. This category is exhibited by neighborhood interactions, the familiarity between neighbors, value-sharing and levels of trust. These variables can be used to assess the connection between participants and their immediate area, in which neighbors can be utilized as a form of social support.

The survey asked participants various questions about their feelings towards their neighbors and the overall neighborhood social dynamics. These questions aimed to assess how close residents are in the neighborhood and the frequency of their interactions. The questions and responses are presented in table 6.

When asked to agree or disagree with the statement that their neighborhood is close-knit, the majority of responses were neutral, leaning towards agreement. In the young-old group, 32% (n = 386) felt the neighborhood was close-knit, compared to 22% (n = 265) who disagreed. Similarly, 33% (n = 363) of the old-old group agreed, while 18.5% (n = 202) disagreed. Regarding whether people in the neighborhood share the same values, responses were also mostly neutral, with a lean towards having similar values. For the young-old group, 37% (n = 451) felt people had similar values, compared to 17% (n = 203). In the old-old group, 30% (n = 322) felt values were shared, versus 18% (n=199) who disagreed. Residents in a neighborhood might share similar values as there is a tendency for people from the same socioeconomic backgrounds to live in the same area. Dissimilarity in values could be explained by changing neighborhood dynamics, such as the introduction of a younger generation or people from different cultural backgrounds, or due to neighborhood decay or gentrification.

When asked if people in the area can be trusted, both groups strongly felt that their neighbors could be trusted, with over 58-61% agreeing and less than 7% disagreeing. Similarly, it was felt that others in the area would be willing to help their neighbors. The participants were also asked if they felt that people get along. As with the previous questions, most (over 60%) for both groups felt that people generally got along, with less than 6% of the young-old and 8% of the old-old group feeling otherwise. None of these indicators regarding participants' sentiments had any strong significant connection with increasing age.

Some questions attempted to more directly assess actual interactions between residents. When asked how often residents visited each others' homes, the responses regarding interactions with neighbors were intensified towards either end of the measured spectrum. For the young-old, most respondents said neighbors sometimes (36%) or rarely (29%) interacted, with 'never' and 'often' being less frequent. The old-old group was similar, with 31% choosing 'rarely' and 37% choosing 'never'. For both groups, there was an identifiable decrease in neighborhood interactions with the age; the decrease being much more significant ($\beta = -0.034$) for the old-old group. This decrease in visits with neighbors could be due to older individuals leaving their homes less often, leading to less interaction or awareness of others interacting. Reduced presence in the neighbor could be due to declining health, making it unlikely for them to walk through the neighborhood, or it may be deliberate withdrawal as suggested by disengagement theory. Changing neighborhood dynamics could also lead to unfamiliarity with newer neighbors.

Other questions targeted neighbors exchanging favors and advice. Most respondents indicated that they and other people in the area only sometimes do favors for each other. Regarding advice, most respondents, 75% (n =

912) of the young-old and 76% (n = 828) of the old-old, said that they or their neighbors ‘never’ or ‘rarely’ seek out advice from each other.

Neighbors serve as another extension of one’s social network, providing social support. Strong neighborhood connections act as a form of community that benefits from proximity to older adults in instances where distance between family and friends is large. “The aim of neighborhood helping is to establish social support within a geographically defined community” (Andersson, 1998, p. 269). A stronger neighborhood community is an important form of social capital that can expand the resources available to older adults to maintain their well-being by counter stressful situation and preventing unwanted loneliness

Table 6: Descriptive statistics of social capital pertaining to neighborhood interactions

			N	%
Visiting or meeting neighbors	YOUNG-OLD	(0) never	197	16.4
		(1) rarely	354	29.4
		(2) sometimes	432	35.9
		(3) often	209	17.4
	OLD-OLD	(0) never	158	14.5
		(1) rarely	337	30.9
		(2) sometimes	400	36.7
		(3) often	171	15.7
Neighbors doing favors for each other	YOUNG-OLD	(0) never	113	9.4
		(1) rarely	313	26.0
		(2) sometimes	567	47.1
		(3) often	192	15.9
	OLD-OLD	(0) never	100	9.2
		(1) rarely	261	23.9
		(2) sometimes	522	47.9
		(3) often	187	17.2
Neighbors seek advice from each other	YOUNG-OLD	(0) never	518	43.0
		(1) rarely	394	32.7
		(2) sometimes	236	19.6
		(3) often	37	3.1
	OLD-OLD	(0) never	477	43.8
		(1) rarely	351	32.2
		(2) sometimes	222	20.4
		(3) often	20	1.8
Neighborhood is close-knit	YOUNG-OLD	(1) strongly disagree	67	5.6
		(2) disagree	198	16.4
		(3) neither agree nor disagree	524	43.5
		(4) agree	317	26.3
		(5) strongly agree	69	5.7
	OLD-OLD	(1) strongly disagree	50	4.6
		(2) disagree	152	13.9
		(3) neither agree nor disagree	486	44.6
		(4) agree	302	27.7
		(5) strongly agree	61	5.6
Neighbors are willing to help	YOUNG-OLD	(1) strongly disagree	21	1.7
		(2) disagree	63	5.2
		(3) neither agree nor disagree	326	27.1

		(4) agree	625	51.9
		(5) strongly agree	148	12.3
	OLD-OLD	(1) strongly disagree	19	1.7
		(2) disagree	39	3.6
		(3) neither agree nor disagree	254	23.3
		(4) agree	617	56.6
		(5) strongly agree	137	12.6
Neighbors get along (recoded)	YOUNG-OLD	(1) strongly disagree	13	1.1
		(2) disagree	58	4.8
		(3) neither agree nor disagree	332	27.6
		(4) agree	550	45.7
		(5) strongly agree	228	18.9
	OLD-OLD	(1) strongly disagree	17	1.6
		(2) disagree	70	6.4
		(3) neither agree nor disagree	321	29.4
		(4) agree	466	42.8
		(5) strongly agree	178	16.3
Neighbors share the same values (recoded)	YOUNG-OLD	(1) strongly disagree	29	2.4
		(2) disagree	174	14.5
		(3) neither agree nor disagree	526	43.7
		(4) agree	359	29.8
		(5) strongly agree	92	7.6
	OLD-OLD	(1) strongly disagree	18	1.7
		(2) disagree	181	16.6
		(3) neither agree nor disagree	534	49.0
		(4) agree	252	23.1
		(5) strongly agree	70	6.4
Neighbors are trustworthy	YOUNG-OLD	(1) strongly disagree	16	1.3
		(2) disagree	58	4.8
		(3) neither agree nor disagree	387	32.1
		(4) agree	581	48.3
		(5) strongly agree	140	11.6
	OLD-OLD	(1) strongly disagree	15	1.4
		(2) disagree	40	3.7
		(3) neither agree nor disagree	308	28.3
		(4) agree	558	51.2
		(5) strongly agree	141	12.9
People are afraid at night	YOUNG-OLD	(1) strongly disagree	213	17.7
		(2) disagree	521	43.3
		(3) neither agree nor disagree	307	25.5
		(4) agree	104	8.6
		(5) strongly agree	33	2.7
	OLD-OLD	(1) strongly disagree	128	11.7
		(2) disagree	383	35.1
		(3) neither agree nor disagree	375	34.4
		(4) agree	139	12.8
		(5) strongly agree	38	3.5

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

4.1.4. Analysis of social capital: Loneliness & Isolation

Table 7 presents participants' responses when asked about feelings of exclusion and isolation. Among the young old, 26% of respondents indicated feeling left out some of the time (n = 292) or often (n = 28). Similarly, 27% of those in the old-old group felt left out some of the time (n = 275) or often (n = 26). A statistically significant positive trend (β = 0.030) is identifiable for the old-old population, suggesting an increasing likelihood of feeling left out with age.

Feelings of isolation showed a similar distribution, with most respondents indicating never feeling isolated or hardly ever, for both the young-old (n = 879) and the old-old (n = 788) groups. However, 27% of the young-old (n = 289) and 24% of the old-old (n = 260) reported feeling isolated some of the time or often. There was also a significant increase in the likelihood of feeling isolated with age within the old-old group.

Marital status may influence feelings of loneliness and isolation. As shown in table 8, when exploring the relationship between feelings of isolation and being left out with marital status, it becomes evident that being married has an inverse effect. Those who are not married may be more susceptible to feelings of exclusion and isolation.

Experiencing feelings of being left out and isolated reflects an absence of social capital, which can leave older adults with fewer resources for support and make them more vulnerable to changes in their lifestyle and health. In literature, the notion of loneliness represents the negative pole to social support, which can have "a buffering effect against detrimental effects resulting from stressful situations" (Andersson, 1998, p. 266). It is suggestive that individuals who feel more isolated and excluded may experience negative impacts on their overall mental health and well-being as they age.

Table 7: Feeling left out and isolated and its relationship with age

			N	%
Feels left out	YOUNG-OLD	(0) never	379	31.5
		(1) hardly ever	466	38.7
		(2) some of the time	292	24.3
		(3) often	28	2.3
	OLD-OLD	(0) never	324	29.7
		(1) hardly ever	418	38.3
		(2) some of the time	275	25.2
		(3) often	26	2.4
Feels isolated	YOUNG-OLD	(0) never	481	31.5
		(1) hardly ever	398	38.7
		(2) some of the time	253	24.3
		(3) often	36	2.3
	OLD-OLD	(0) never	399	36.6
		(1) hardly ever	389	35.7
		(2) some of the time	228	20.9
		(3) often	32	2.9

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

Table 8: Feelings of isolation by marital status

		MARITAL STATUS					
		Married	Living with a partner	Separated	Divorced	Widowed	Never Married
Isolated	Never	42%	34%	42%	35%	36%	31%
	Hardly ever	37%	29%	29%	34%	32%	33%
	Sometimes	18%	37%	21%	25%	28%	31%
	Often	2%	0%	8%	5%	5%	4%
Left Out	Never	34%	22%	35%	26%	30%	28%
	Hardly ever	42%	42%	26%	39%	36%	32%
	Sometimes	22%	32%	30%	32%	31%	38%
	Often	2%	2%	9%	3%	4%	2%

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

4.2. Social capital and its effect on well-being

4.2.1. An overview of participants' well-being

Table 9, shows the relation between the respondents' well-being and age among older adults. Most participants in the sample have reported at least a 'good' level of mental health, with 89% in the young-old group (n = 1071) and 87% in the old-old group (n = 950). However, there was a slight decrease (β = -0.05) in emotional and mental health with increased age in the old-old group. A similar trend was observed for overall happiness, with over 88% from both groups specifying being 'pretty happy'. While the decrease in happiness was statistically significant in the old-old group (β = -0.03, $p < 0.05$), it was less pronounced in the young-old group. Interestingly, in the young-old group, participants felt less feelings of unfriendliness or being disliked as they aged.

The study also examined emotional health over the previous week from the date of the interview. Participants in the young-old group reported feeling depressed 'some of the time' (n = 203), 'occasionally' (n = 118), and 'most of the time' (n = 25), with a slight increase in depression with age (β = 0.008). The old-old group showed a similar pattern, with 189 participants feeling depressed 'some of the time', 125 'occasionally', and 34 'most of the time'. However, the old-old group exhibited a much stronger trend for an increase in depression with age (β = 0.049). Regarding feelings of loneliness, the old-old group showed a slight increase (β = 0.064) with age, while the young-old group had an insignificant decrease. Most participants (66-73%) in both groups reported feeling lonely 'rarely or none of the time.' Furthermore, when asked about life enjoyment within the past week, there was a statistically significant decrease (β = -0.050) for the old-old group with age.

In general, most older adults reported good mental health and happiness. There were some differences between the two age groups, though usually, the opposite trend in one age group was not statistically significant and none of the trends showed any large changes with age. Most noticeably it was the old-old group that showed a slight decrease in emotional and mental health, happiness, and life enjoyment with age, as well as an increase in depression and loneliness.

Table 9: Descriptive statistics of mental health and well-being

			N	%
Emotional and mental health	YOUNG-OLD	(1) poor	7	0.6
		(2) fair	85	7.1
		(3) good	264	21.9
		(4) very good	445	37.0
		(5) excellent	362	30.1
	OLD-OLD	(1) poor	5	0.5
		(2) fair	80	7.3
		(3) good	232	21.3
		(4) very good	456	41.8
		(5) excellent	262	24.0
General happiness	YOUNG-OLD	(1) unhappy usually	14	1.2
		(2) unhappy sometimes	98	8.1
		(3) pretty happy	395	32.8
		(4) very happy	515	42.8
		(5) extremely happy	181	15.0
	OLD-OLD	(1) unhappy usually	24	2.2
		(2) unhappy sometimes	97	8.9
		(3) pretty happy	386	35.4
		(4) very happy	439	40.3
		(5) extremely happy	138	12.7
Past week feelings of depression	YOUNG-OLD	(1) rarely or none of the time	858	71.3
		(2) some of the time	203	16.9
		(3) occasionally	118	9.8
		(4) most of the time	25	2.1
	OLD-OLD	(1) rarely or none of the time	741	68.0
		(2) some of the time	189	17.3
		(3) occasionally	125	11.5
		(4) most of the time	34	3.1
Past week feelings of loneliness	YOUNG-OLD	(1) rarely or none of the time	876	72.8
		(2) some of the time	154	12.8
		(3) occasionally	133	11.0
		(4) most of the time	41	3.4
	OLD-OLD	(1) rarely or none of the time	721	66.1
		(2) some of the time	177	16.2
		(3) occasionally	147	13.5
		(4) most of the time	43	3.9
Past week feelings of unfriendliness	YOUNG-OLD	(1) rarely or none of the time	1036	86.0
		(2) some of the time	101	8.4
		(3) occasionally	48	4.0
		(4) most of the time	18	1.5
	OLD-OLD	(1) rarely or none of the time	966	88.6
		(2) some of the time	64	5.9
		(3) occasionally	39	3.6
		(4) most of the time	11	1.0
Past week enjoyment of life	YOUNG-OLD	(1) rarely or none of the time	17	1.4
		(2) some of the time	98	8.1
		(3) occasionally	39	3.2

		(4) most of the time	1050	87.2
	OLD-OLD	(1) rarely or none of the time	23	2.1
		(2) some of the time	102	9.4
		(3) occasionally	60	5.5
		(4) most of the time	903	82.8
Past week feelings of sadness	YOUNG-OLD	(1) rarely or none of the time	746	62.0
		(2) some of the time	250	20.8
		(3) occasionally	178	14.8
		(4) most of the time	30	2.5
	OLD-OLD	(1) rarely or none of the time	629	57.7
		(2) some of the time	228	20.9
		(3) occasionally	205	18.8
		(4) most of the time	26	2.4
Past week feelings of being disliked	YOUNG-OLD	(1) rarely or none of the time	1067	88.6
		(2) some of the time	89	7.4
		(3) occasionally	37	3.1
		(4) most of the time	9	0.7
	OLD-OLD	(1) rarely or none of the time	993	91.1
		(2) some of the time	54	5.0
		(3) occasionally	34	3.1
		(4) most of the time	5	0.5

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

4.2.2. Relationship between social capital and well-being

Cross tabulations were used to explore the social capital variables with those related to well-being. The analysis of these cross-tables reveals a relationship between the two categories. Table 9, highlights that a higher frequency of socializing with friends or family is associated with better overall mental health, particularly ignoring the 'poor' group which represents less than 1% of the sample. This relationship is evident in the increase observed in the 'weekly' socializing column and the decrease among those who socialize less than once per year. Table 11 shows a similar, but more pronounced, trend for those who volunteer.

Tables 12 and 13 illustrate the relationship between family and friend support-exchange variables and mental health. The ability to rely on family and friends indicates that those who often receive support from their social networks report better mental health. Conversely, individuals lacking strong family and friend support tend to have lower levels of mental health. Among those who reported 'excellent' mental health, 43% often felt they could rely on friends, compared to only 27% of those with 'fair'mental health. In contrast, 13% of individuals reporting 'fair' mental health felt they could never rely on friends, compared to just 5% of those reporting 'excellent'. It is more evident regarding family reliability, with 71% of those with 'excellent' mental health indicating they 'often' rely on family.

Regarding neighborhood interactions, visiting with neighbors and exchanging favors also demonstrate that higher levels of social interaction within a neighborhood positively contribute to mental health. The results are displayed in tables 14 and 6. For neighborly visits, 25% of those with ‘fair’ mental health reported no interactions with neighbors, while only 14% of those with ‘excellent’ mental health reported the same. Conversely, 22% of individuals with ‘excellent’ mental health had more neighborhood interactions compared to 13% of those with ‘poor’ mental health. In terms of favor exchange, there is a noticeable increase in the percentage of individuals with lower levels of mental health who reported neighbors ‘never’ or ‘rarely’ exchange favors, rising from 22.5% among those with ‘excellent’ mental health to 31% among those reporting ‘fair’.

Conversely, feeling left out and isolated were strongly inversely correlated with good mental health and happiness.16% of those who described themselves as ‘unusually happy’ often felt left out, compared to less than 1% of those who were ‘extremely happy’.Overall, feelings of being left out and isolated correlate with higher rates of depression, sadness, loneliness, and feeling disliked (see appendix). This inverse relationship highlights the detrimental effects of social isolation, which could lead to feelings of worthlessness and despair. The absence of social connections may deprive individuals of the emotional support necessary to cope with life's challenges, thus exacerbating mental health issues.

It is evident that participation in social activities, support from family and friends, and stronger neighborhood connections contribute positively to mental health, happiness, and life satisfaction. These forms of social capital might correlate with improved mental health outcomes by reducing feelings of loneliness, expanding one’s social network and providing support that buffers against stress and protect against disordered functioning, all of which are essential for maintaining mental well-being (Andersson, 1998). Overall, these results parallel the literature demonstrating that social capital plays a significant role in enhancing individual well-being (Xu et al., 2022). The effect of social capital on well-being highlights the importance of understanding what factors might effect social capital formation, which could be related to specific environmental factors such as how our environments are designed and built.

Table 10: Socializing with family and friends and mental health

		SOCIAL				
		Less than once a year	Once or twice a year	Several times a year	About once a month	Weekly
Mental Health	(1) poor	10.00%	10.00%	10.00%	10.00%	60.00%
	(2) fair	14.65%	2.55%	19.11%	21.66%	46.50%
	(3) good	3.57%	6.71%	14.88%	20.55%	54.30%
	(4) very good	1.62%	4.15%	14.98%	20.16%	59.10%
	(5) excellent	1.16%	1.65%	9.57%	18.48%	69.14%

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author’s elaboration*

Table 11: Volunteering and mental health

		VOLUNTEER				
		Less than once a year	Once or twice a year	Several times a year	About once a month	Weekly
Mental Health	(1) poor	90.00%	0.00%	0.00%	0.00%	10.00%
	(2) fair	72.61%	8.92%	7.01%	3.82%	7.64%
	(3) good	51.27%	9.75%	10.17%	9.75%	19.07%
	(4) very good	44.52%	11.54%	10.14%	10.02%	23.77%
	(5) excellent	44.92%	7.65%	7.32%	13.48%	26.62%

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

Table 12: Friend reliability and mental health

		FRIEND RELIABILITY			
		(0) never	(1) hardly ever or rarely	(2) some of the time	(3) often
Mental Health	(1) poor	16.67%	16.67%	50.00%	16.67%
	(2) fair	13.41%	16.46%	43.29%	26.83%
	(3) good	6.57%	16.02%	49.08%	28.34%
	(4) very good	5.42%	14.01%	47.12%	33.45%
	(5) excellent	5.02%	11.17%	39.97%	43.85%

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

Table 13: Family reliability and mental health

		FAMILY RELIABILITY			
		(0) never	(1) hardly ever or rarely	(2) some of the time	(3) often
Mental Health	(1) poor	27.27%	18.18%	45.45%	9.09%
	(2) fair	1.27%	8.86%	33.54%	56.33%
	(3) good	2.52%	6.50%	31.87%	59.12%
	(4) very good	2.89%	5.20%	29.56%	62.36%
	(5) excellent	3.47%	4.79%	20.63%	71.12%

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

Table 14: Interactions with neighbors and mental health

		VISIT NEIGHBORS			
		(0) never	(1) hardly ever or rarely	(2) some of the time	(3) often
Mental Health	(1) poor	33.33%	25.00%	16.67%	25.00%
	(2) fair	25.00%	31.25%	30.63%	13.12%
	(3) good	16.19%	34.43%	35.86%	13.52%
	(4) very good	14.29%	29.36%	40.16%	16.20%
	(5) excellent	14.26%	28.04%	35.98%	21.72%

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

Table 15: Favor exchange between neighbors and mental health

		NEIGHBORS EXCHANGING FAVORS			
		(0) never	(1) hardly ever or rarely	(2) some of the time	(3) often
Mental Health	(1) poor	16.67%	25.00%	41.67%	16.67%
	(2) fair	13.13%	31.25%	39.38%	16.25%
	(3) good	10.49%	27.57%	49.18%	12.76%
	(4) very good	8.10%	25.42%	49.16%	17.32%
	(5) excellent	8.46%	22.48%	49.59%	19.67%

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

Table 16: Happiness by feelings of isolation

		FEELING LEFTOUT			
		(0) never	(1) hardly ever or rarely	(2) some of the time	(3) often
HAPPY	(1) unhappy usually	18.92%	5.41%	59.46%	16.22%
	(2) unhappy sometimes	15.68%	28.65%	44.32%	11.35%
	(3) pretty happy	19.87%	42.78%	34.97%	2.38%
	(4) very happy	38.25%	42.84%	18.03%	0.87%
	(5) extremely happy	52.75%	36.25%	10.68%	0.32%

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

4.3. Exploring the role of the built environment

4.3.1 Analyzing the built environment characteristics

Responses to variables related to the participants built environment were set by the interviewer and thus represent a subjective point of view by the person performing the interview rather than the interviewee. Table 17, shows the variable statistics of respondents' neighborhoods.

The building type data shows that a majority of respondents were living in a detached single-family house being 76.6% (n = 923) for the young old and 70% (n = 765) for the old-old population. Detached single family home characterize the American suburban landscape suggesting that suburban-dwelling older-adults are over-represented in this survey. Trailers can be found in many suburban and rural landscapes usually in a dedicated zone. Two-family houses are most common in older semi-suburban neighborhoods. Row houses are most typically found in cities and older semi-suburban towns, but also characterize some newer suburban developments. Apartment houses, both 3 stories or less and 4 or more stories, represent the second-largest category (young-old, n = 71) (old-old, n = 98). They can be found in both cities as well as suburban environments. Respondents in assisted living facilities represented a small, but increasing with age, proportion of the survey.

Most areas in which the participants were living were found to be well-kept, over 80% for both groups. The street was also found to be free of litter and clean. Regarding noise, most participants in the survey appear to be living on quieter streets; less than 5% for both groups are living on a noisy or somewhat noisy street. Street noise alone cannot determine the type of environment in which one is living. High noise level could be a busy city street, an arterial suburban road or a major route passing through rural areas. Higher noise levels might impact social interactions if people feel uncomfortable along the street that would limit their ability to engage in conversation and interact. Higher noise streets could also represent those with more people, shops and cafes which could have a positive effect on social relations. Of course, noise levels can also affect a person's behavior due to irritation from constant exposure and loss of sleep.

The impact of noise on one's mobility would be related to the traffic. For the young-old group, most respondents live on a low (n=531) or somewhat low (n=385) traffic street. Few were indicated as living on a high (n=14) or semi-high (n=57) traffic street. For the old-old group, the distribution was similar: low (n=462), semi-low (n=352), semi-high (n=52) and high (n=24). In a city environment, a high traffic street may not potentially impede one's mobility or neighborhood social interactions; it would depend more on vehicle speed and pedestrian infrastructure. A higher vehicle speed would impact one's ability to move and interact by making the street more impassable and less safe. Urban design features can help make a street feel safer from traffic and easily crossable by offering crossing points, barriers, sufficient sidewalks as well as through limiting vehicle speed. Additionally, higher traffic can potentially help as a busy, slower speed street is safer than a high speed road for pedestrians. In a suburban setting, a higher traffic street is most likely an arterial road which is likely related to a higher noise neighborhood. Arterial roads have higher volumes of traffic and higher speeds. They are designed for cars thus are more impassable because they are less safe to cross and have fewer crossing points. This would affect a local's mobility and would inhibit neighborly social interactions and relationships. A noisy street in a rural setting could be either the main street of a small town or a higher speed rural route; the former being more similar to an urban environment while the latter is opposite.

The variable measuring distance between houses gives a rough sense of density in which the participants are living; however, the scale is rather vague. Most participants for both groups seem to fall in the middle of the spectrum. It is difficult to assume the type of environment, it could be imagined that houses closer together implies a more urban environment. However, often suburban subdivisions feature houses lined with very little space between. Houses far apart would be more indicative of a rural environment or suburban neighborhoods with larger plot sizes more likely to be wealthier. The distance between houses is an important measure because a denser pattern could lead to more interactions between residents. A denser area might also be mixed-use thus featuring local shops and places for residents to congregate. Larger distances between houses may indicate that residents are less likely to know or interact with their neighbors and that they prefer more privacy.

Area amenities are important as they represent *third places*, offering people opportunities for spontaneous interactions and meetings. This would lead to more and better relationships that would have a positive effect on social capital. In both groups, the distribution is quite divided. In both groups, the smallest portion were those living in areas with many amenities, less than 15%. This is parallel to the fact that most people live in detached single-family houses most characteristic of suburban neighborhoods, which have separated uses. It is also noticeable in the old-old group that the likelihood of living in an area with amenities decreases with age. The variable is again vague, being subjective to the interviewer and does not indicate any buffer distance. It can be imagined that places with more amenities are more mixed-use and likely more walkable. However, in a suburban environment, the respondent could live near a large shopping area with separated land uses that is not walkable. Areas with fewer amenities would be more representative of rural areas, suburban residential subdivisions, and areas in a city referred to as *food deserts*. Again, it is impossible to have a clear understanding of the type of environment in which the respondent lives.

Table 17: Descriptive statistics of built environment

			N	%
Type of structure in which the respondent lives	YOUNG-OLD	(1) trailer	54	4.5
		(2) detached single family house	923	76.7
		(3) two-family house, two units side-by-side	35	2.9
		(4) two-family house, two units one above the other	10	0.8
		(5) detached 3-4 family house	7	0.6
		(6) rowhouse (3 or more units attached in a row)	40	3.3
		(7) apartment house (5 or more units, 3 stories or less)	50	4.2
		(8) apartment house (5 or more units, 4 stories or more)	21	1.7
		(9) apartment house in a partly commercial structure	2	0.2
		(10) assisted living facility or group home	2	0.2
		(12) other	19	1.6
	OLD-OLD	(1) trailer	60	5.5
		(2) detached single family house	765	70.2
		(3) two-family house, two units side-by-side	57	5.2
		(4) two-family house, two units one above the other	10	0.9
		(5) detached 3-4 family house	1	0.1

		(6) rowhouse (3 or more units attached in a row)	19	1.7
		(7) apartment house (5 or more units, 3 stories or less)	58	5.3
		(8) apartment house (5 or more units, 4 stories or more)	40	3.7
		(9) apartment house in a partly commercial structure	1	0.1
		(10) assisted living facility or group home	30	2.8
		(12) other	25	2.3
Condition of the buildings on the street	YOUNG-OLD	(1) very poorly kept (needs major repair)	14	1.2
		(2) poorly kept (needs minor repair)	96	8.0
		(3) fairly well kept (needs cosmetic work)	459	38.1
		(4) very well kept	557	46.3
	OLD-OLD	(1) very poorly kept (needs major repair)	18	1.7
		(2) poorly kept (needs minor repair)	65	6.0
		(3) fairly well kept (needs cosmetic work)	433	39.7
		(4) very well kept	530	48.6
Amount of litter	YOUNG-OLD	(1) 1 clean	741	61.5
		(2) 2	277	23.0
		(3) 3	112	9.3
		(4) 4	23	1.9
		(5) 5 full of litter/rubble	4	0.3
	OLD-OLD	(1) 1 clean	691	63.4
		(2) 2	256	23.5
		(3) 3	82	7.5
		(4) 4	24	2.2
		(5) 5 full of litter/rubble	7	0.6
Amount of noise	YOUNG-OLD	(1) 1 quiet	753	62.5
		(2) 2	258	21.4
		(3) 3	110	9.1
		(4) 4	33	2.7
		(5) 5 noisy	8	0.7
	OLD-OLD	(1) 1 quiet	672	61.7
		(2) 2	235	21.6
		(3) 3	110	10.1
		(4) 4	42	3.9
		(5) 5 noisy	4	0.4
Amount of traffic	YOUNG-OLD	(1) 1 no traffic	531	44.1
		(2) 2	385	32.0
		(3) 3	174	14.5
		(4) 4	57	4.7
		(5) 5 heavy traffic	14	1.2
	OLD-OLD	(1) 1 no traffic	462	42.4
		(2) 2	352	32.3
		(3) 3	175	16.1
		(4) 4	52	4.8
		(5) 5 heavy traffic	24	2.2
Space between buildings	YOUNG-OLD	(1) 1 houses close together	163	13.5
		(2) 2	344	28.6

		(3) 3	358	29.7
		(4) 4	172	14.3
		(5) 5 houses far apart	122	10.1
	OLD-OLD	(1) 1 houses close together	141	12.9
		(2) 2	358	32.8
		(3) 3	363	33.3
		(4) 4	119	10.9
		(5) 5 houses far apart	84	7.7
Pollution	YOUNG-OLD	(1) 1 no smell or air pollution	921	76.5
		(2) 2	162	13.5
		(3) 3	73	6.1
		(4) 4	2	0.2
		(5) 5 strong smell or air pollution	3	0.2
	OLD-OLD	(1) 1 no smell or air pollution	830	76.1
		(2) 2	168	15.4
		(3) 3	64	5.9
		(4) 4	2	0.2
		(5) 5 strong smell or air pollution	0	0.0
Perception of safety	YOUNG-OLD	(1) 1 I felt safe	1046	86.9
		(2) 2	95	7.9
		(3) 3	46	3.8
		(4) 4	13	1.1
		(5) 5 I felt unsafe	1	0.1
	OLD-OLD	(1) 1 I felt safe	951	87.2
		(2) 2	90	8.3
		(3) 3	38	3.5
		(4) 4	9	0.8
		(5) 5 I felt unsafe	1	0.1
Amenities in the area	YOUNG-OLD	(1) 1 I saw many amenities	141	11.7
		(2) 2	207	17.2
		(3) 3	308	25.6
		(4) 4	299	24.8
		(5) 5 I saw few amenities	225	18.7
	OLD-OLD	(1) 1 I saw many amenities	142	13.0
		(2) 2	203	18.6
		(3) 3	298	27.3
		(4) 4	236	21.7
		(5) 5 I saw few amenities	196	18.0

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

4.3.2. Relationship between social capital and the built environment

In the following sections, the relationship will be explored between the built environment and the following three broader categories of social capital: participation in social activities, family and friend support exchange, and neighborhood interactions. For the purpose of this analysis, three specific variables have been selected.

The first variable is the overall condition of the neighborhood. A poorly maintained neighborhood may suggest an environment that is uncared-for and neglected, which can imply disorder and a lack of social control. Such an environment is likely to include residents who feel less attached to their immediate community, possibly due to a larger presence of non-residents who lack a sense of belonging. Additionally, residents in these neighborhoods may be mostly renters rather than homeowners, which can diminish their investment in the community, having less of a stake, and reduce their likelihood of staying for an extended period. This transient nature further weakens any ties they might have to their surroundings. While the state of the neighborhood is likely to be influenced by socioeconomic factors, its condition can hinder feelings of safety, thereby reducing interaction among neighbors. This lack of interaction can reinforce negative stereotypes and undermine social cohesion. Conversely, a well-maintained neighborhood may foster social cohesion through increased neighborly interaction and trust. Such neighborhoods are often linked to resident wealth and stability; areas with high resident turnover or low wealth may indicate that residents have less time to invest in community relationships.

The second variable represents the amount of amenities in the area. An area richer in amenities is typically more walkable and features ‘third’ places that encourage spontaneous interactions among residents. These interactions with neighbors help build relationships and strengthen social capital within the community. The third variable is the amount of space between buildings which can also indicate walkability. It can also, though weakly, be used to help define the type of neighborhood (urban, rural or suburban). A denser, more walkable area helps to foster relationships within the immediate community. Such relationships can develop into strong ties or bonding forms of social capital; they can also remain as weak ties or bridging forms that can extend one’s social network and resources.

These variables aim to give a sense of how the characteristics of one’s environment can induce interactions. Additionally, they represent how the spatial configurations of our environment may play a crucial role in shaping social capital and fostering community interactions.

4.3.3. Effect on participation in social activities

To understand the impact of the built environment on social capital, several variables were selected to represent each of the three overarching categories. Within the category of participation in social activities, the two key variables selected are socializing with family and friends, and volunteering.

Socializing with family and friends is an important indicator of participation, as these individuals form the most significant links in one’s social network. Friends and family represent an inward-looking, bonding form of social capital. Engaging with them is essential for maintaining strong social ties and a supportive network. Alternatively, volunteering is an active form of civic engagement that requires individuals to take initiative and invest time and effort in supporting others. It reflects a commitment to the community and represents a more

outward-looking, bridging type of social capital. Volunteering helps establish weak ties that can expand one's social network, increasing access to valuable resources. Both of these variables have been shown to improve mental health, alleviate feelings of loneliness, reduce depression, combat stress, and increase overall life satisfaction.

The first analysis focuses on socializing with family and friends. Table 2 illustrates how the state of maintenance of the neighborhood affects the frequency of social interactions. An observable trend shows that as neighborhood conditions improve, the frequency of weekly socializing increases, rising from 50% in very poorly maintained neighborhoods to 62% in very well-kept neighborhoods. There is also a decrease in the frequency of socializing less than once a year or 1-2 times a year, dropping from 12.5% in very poorly kept neighborhoods to only 2.9% in very well-kept neighborhoods. These trends are consistent across both the young-old and old-old groups. The increase in weekly socializing is more pronounced among the young-old (from 42% to 63.5%), while a less pronounced trend is observed in the old-old group (from 55.6% to 60.4%). The decreasing trend in socializing less than once a year or 1-2 times a year is also evident in both groups. However, it is important to note that the total number of individuals in the sample living in a "very poorly kept" neighborhood is not significant (n = 32). Nonetheless, there appears to be a noticeable effect of neighborhood conditions on socializing.

Table 18: Socializing with friends and family by the condition of the neighborhood

		Socializing with family and friends				
		(1) less than once a year	(2) about once or twice a year	(3) several times a year	(4) about once a month	(5) weekly
Condition of neighborhood	(1) very poorly kept (needs major repairs)	3.1% [0.0%, 5.6%]	12.5% [7.1%, 16.7%]	18.8% [28.6%, 11.1%]	15.6% [21.4%, 11.1%]	50.0% [42.9%, 55.6%]
	(2) poorly kept (needs minor repairs)	3.9% [4.4%, 3.2%]	6.5% [7.6%, 4.8%]	14.3% [13.0%, 16.1%]	20.8% [23.9%, 16.1%]	54.6% [51.1%, 59.7%]
	(3) fairly well kept (needs cosmetic work)	3.7% [2.9%, 4.6%]	4.2% [3.8%, 4.6%]	14.8% [13.2%, 16.5%]	18.8% [21.7%, 15.7%]	58.5% [58.4%, 58.6%]
	(4) very well kept	1.1% [0.2%, 2.0%]	2.9% [2.6%, 3.2%]	12.5% [12.2%, 12.8%]	21.6% [21.5%, 21.7%]	62.0% [63.5%, 60.4%]

Data is displayed as: total [young-old, old-old] percentages

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

The effect of the amount of neighborhood amenities on socializing is represented in Table 19. There is a small decreasing trend in socializing as the number of amenities decreases, dropping from 65% to 59.5% in weekly socializing. However, there doesn't appear to be any linearity as the amount of amenities decreases. An important observation is that those living in areas with the highest level of amenities have a higher rate of socializing with family and friends with only 1.5% socializing less than once a year and 2.9%, 1-2 per year. Higher rates of socializing in areas with fewer amenities could be attributed to the presence of wealthier individuals whom have many social connections and more free time. Within the young-old group, there isn't any clear trending increase or decrease in the frequency of socializing based on amenities. The old-old group parallels the trend of the entire sample.

Table 19: Socializing with friends and family by the amount of area amenities

		Socializing with family and friends				
		(1) less than once a year	(2) about once or twice a year	(3) several times a year	(4) about once a month	(5) weekly
Area Amenities	(1) I saw many amenities	1.5% [1.5%, 1.5%]	2.9% [3.6%, 2.2%]	9.6% [10.9%, 8.2%]	21.0% [23.2%, 18.7%]	65.1% [60.9%, 69.4%]
	(2)	3.0% [1.5%, 4.6%]	5.3% [4.4%, 6.1%]	16.0% [15.3%, 16.8%]	19.3% [21.2%, 17.4%]	56.4% [57.6%, 55.1%]
	(3)	2.9% [2.7%, 3.2%]	3.3% [3.4%, 3.2%]	13.6% [13.8%, 13.3%]	17.7% [16.5%, 19.0%]	62.5% [63.6%, 61.4%]
	(4)	2.9% [2.4%, 3.5%]	4.5% [4.5%, 4.4%]	13.7% [10.4%, 18.0%]	22.4% [25.3%, 18.9%]	56.5% [57.4%, 55.3%]
	(5) I saw few amenities	2.5% [1.4%, 3.7%]	3.9% [3.2%, 4.8%]	13.8% [12.3%, 15.4%]	20.4% [21.9%, 18.6%]	59.5% [61.2%, 57.5%]

Data is displayed as: total [young-old, old-old] percentages

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

Table 20 displays the effect of space between buildings on socializing with family and friends. No significant trend appears for the entire sample or each age category. Individuals who live in the lowest dense places have the lowest level of weekly socializing but also the highest level of socializing several times a year to once a month, falling in the middle of the spectrum. This could be that distance prevents a higher frequency of socializing but people living in the least dense areas have stronger connections, as has been suggestive of rural areas having a higher number of strong ties (Sørensen, 2016).

Table 20: Socializing with friends and family by the amount of space between buildings

		Socializing with family and friends				
		(1) less than once a year	(2) about once or twice a year	(3) several times a year	(4) about once a month	(5) weekly
Space between buildings	(1) houses close together	2.7% [1.9%, 3.7%]	3.7% [4.4%, 2.9%]	12.5% [17.0%, 7.3%]	20.6% [20.1%, 21.2%]	60.5% [56.6%, 65.0%]
	(2)	3.3% [2.4%, 4.1%]	4.9% [4.2%, 5.6%]	12.9% [11.1%, 14.7%]	18.1% [17.2%, 19.1%]	60.8% [65.1%, 56.6%]
	(3)	1.9% [1.2%, 2.6%]	3.9% [4.3%, 3.4%]	14.0% [12.6%, 15.4%]	21.4% [24.4%, 18.3%]	58.9% [57.5%, 60.3%]
	(4)	2.2% [1.2%, 3.6%]	2.2% [1.8%, 2.7%]	13.6% [10.7%, 18.0%]	20.1% [24.4%, 13.5%]	62.0% [61.9%, 62.2%]
	(5) houses far apart	1.0% [0.9%, 1.2%]	3.0% [1.7%, 4.9%]	16.6% [15.3%, 18.5%]	22.6% [23.7%, 21.0%]	56.8% [58.5%, 54.3%]

Data is displayed as: total [young-old, old-old] percentages

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

Volunteering represents the more outward-looking form of social capital suggestive of more weak ties. Table 21 shows the impact of the condition of one's neighborhood on volunteering. As with socializing, there is an observable trend showing that neighborhood conditions impact the frequency of volunteering. Weekly volunteering rises from 7% in very poorly-kept neighborhoods to 24% in very well-kept neighborhoods, consistent for both the young-old and old-old subgroups. Additionally, for those who volunteer less than once a year, there is an increase from 43.5% in very well-kept areas to 67% in very poorly-kept areas. The trend for volunteering less than once a year is only prominent in the young-old group and is not observable for the old-old. It should be noted that overall the conditions of the neighborhood are related to volunteering, as those who live in very well-kept neighborhoods represent over 50% of the population that volunteers. A factor could be that those living in very well-kept areas have a better socioeconomic position, allowing them more free time to invest in the community.

Table 21: Volunteering by the condition of the neighborhood

		Volunteering				
		(1) less than once a year	(2) about once or twice a year	(3) several times a year	(4) about once a month	(5) weekly
Condition of neighborhood	(1) very poorly kept (needs major repairs)	66.7% [92.3%, 47.1%]	3.3% [0.0%, 5.9%]	6.7% [0.0%, 11.8%]	16.7% [7.7%, 23.5%]	6.7% [0.0%, 11.8%]
	(2) poorly kept (needs minor repairs)	60.8% [69.2%, 48.4%]	11.1% [8.8%, 14.5%]	6.5% [6.6%, 6.5%]	6.5% [3.3%, 11.3%]	15.0% [12.1%, 19.4%]
	(3) fairly well kept (needs cosmetic work)	51.4% [48.6%, 54.5%]	8.4% [8.6%, 8.2%]	9.6% [9.7%, 9.5%]	10.0% [11.1%, 8.7%]	20.6% [22.0%, 19.2%]
	(4) very well kept	43.5% [40.7%, 46.5%]	11.3% [14.7%, 7.6%]	9.6% [9.7%, 9.6%]	11.3% [11.3%, 11.2%]	24.4% [23.6%, 25.2%]

Data is displayed as: total [young-old, old-old] percentages

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

The analysis of area amenities reveals an insignificant but almost inverse effect on volunteering, shown in table 22. Neighborhoods with the highest number of amenities had the lowest levels of 'weekly' volunteering (18.5%) and the highest levels of volunteering less than once a year (49.5%). This could suggest that since over 70% of the sample lives in detached single-family housing, which comprises the middle of the spectrum between many and few amenities, socioeconomic status may influence the amount of time one can devote to volunteering.

When examining the old-old subgroup specifically, there is no observable linear increase or decrease in volunteering. The decreasing trend is primarily applicable to the young-old population, falling from 25.4% in areas with few amenities to 15.2% in areas with many amenities regarding 'weekly' volunteering. The results indicate that there is no clear trend, suggesting that other factors, such as socioeconomic status likely play a more prominent role.

Table 22: Volunteering by the amount of area amenities

		Volunteering				
		(1) less than once a year	(2) about once or twice a year	(3) several times a year	(4) about once a month	(5) weekly
Area Amenities	(1) I saw many amenities	49.5% [50.0%, 48.9%]	11.8% [13.8%, 9.8%]	11.1% [10.9%, 11.3%]	9.2% [10.1%, 8.3%]	18.5% [15.2%, 21.8%]
	(2)	51.4% [47.3%, 55.8%]	9.4% [10.8%, 7.9%]	7.4% [10.8%, 3.7%]	12.2% [13.8%, 10.5%]	19.6% [17.2%, 22.1%]
	(3)	48.3% [50.7%, 45.7%]	10.1% [10.9%, 9.2%]	9.6% [9.9%, 9.2%]	10.4% [8.2%, 12.8%]	21.7% [20.4%, 23.1%]
	(4)	48.7% [45.5%, 52.9%]	8.2% [10.1%, 5.8%]	8.8% [6.6%, 11.6%]	9.4% [11.2%, 7.1%]	24.9% [26.6%, 22.7%]
	(5) I saw few amenities	46.7% [45.2%, 48.6%]	10.8% [12.0%, 9.4%]	9.8% [8.8%, 11.1%]	10.1% [8.8%, 11.6%]	22.6% [25.4%, 19.3%]

Data is displayed as: total [young-old, old-old] percentages

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

Table 23 presents the results of the analysis between the space between buildings and the frequency of volunteering. The data indicates a trend of higher levels of volunteering among individuals living in less densely populated areas. This trend is evident in both sub-groups. For the young-old population, the percentage of those volunteering weekly increases from 18% to 29% as the space between buildings increases. Similarly, among the old-old group, the percentage rises from 19% to 33% across the first four density categories, before declining in the lowest density category. Overall, the least densely populated areas exhibited the highest levels of volunteering.

While low-density areas may suggest rural environments, volunteering is typically seen as an outward-looking form of social capital that represents weak ties. This finding contrasts previous literature (2010), which suggested that rural areas tend to have higher levels of bonding capital, potentially leading to more exclusive social networks. Additionally, low-density zones may indicate wealthier neighborhoods characterized by larger homes and plots of land, implying a connection to socioeconomic factors.

Table 23: Volunteering by the amount of space between buildings

		Volunteering				
		(1) less than once a year	(2) about once or twice a year	(3) several times a year	(4) about once a month	(5) weekly
Space between buildings	(1) houses close together	49.1% [51.6%, 46.2%]	10.0% [9.4%, 10.6%]	9.6% [11.3%, 7.6%]	13.1% [10.1%, 16.7%]	18.2% [17.6%, 18.9%]
	(2)	51.6% [49.1%, 54.0%]	10.4% [12.2%, 8.7%]	8.6% [9.5%, 7.8%]	10.1% [9.8%, 10.5%]	19.3% [19.5%, 19.1%]
	(3)	49.4% [45.6%, 53.0%]	9.7% [12.8%, 6.7%]	8.7% [8.1%, 9.3%]	9.3% [10.5%, 8.1%]	22.9% [23.0%, 22.9%]
	(4)	46.2% [49.4%, 41.4%]	6.8% [8.9%, 3.6%]	10.4% [10.1%, 10.8%]	10.0% [9.5%, 10.8%]	26.5% [22.0%, 33.3%]
	(5) houses far apart	38.5% [38.5%, 38.5%]	13.3% [12.0%, 15.4%]	11.3% [6.8%, 18.0%]	11.8% [13.7%, 9.0%]	25.1% [29.1%, 19.2%]

Data is displayed as: total [young-old, old-old] percentages

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

In summary, the condition of one's neighborhood displayed a significant effect on both socializing with family and friends. Individuals living in very well-kept areas exhibited the highest levels of participation in these activities. The number of amenities in an area had a smaller impact, with a higher number of amenities slightly increasing the rates of socializing. The amount of space between buildings did not show any effect on socializing but illustrated some observable increase in socializing as density decreased. It is likely that socioeconomic factors play a significant role in determining participation in social activities.

An ordinal regression was used to validate the statistical significance of the observed trends from the selected environmental variables and to check the role of socio-demographic features. The observed population used represents the entire sample of respondents. Table 13 presents the results from the regression analysis with socializing with family and friends as the dependent variable.

While neighborhood conditions show a large increase in socializing as conditions improve, this trend is not statistically significant. This result may be, at least partially, impacted by the low sample size.[2] The presence of amenities in the area does exhibit a decrease in socializing as amenities decrease, but it is not significant. Lastly, space between buildings also shows an insignificant decrease in socializing as density decreases.

Regarding socioeconomic factors, the only variable with statistical significance is education, indicating that more highly educated individuals socialize more frequently. This suggests that socioeconomic factors play an influential role in shaping social patterns of which our built environment could be a by-product. It is a possibility that those living in better-kept areas are better-off and have more time to devote to social activities.

[2] Statistical significance reports the probability to reject the null hypothesis (no relationship exists between the variables considered and so no effect is present) with a 95% confidence. With small samples, the uncertainty of the estimations are higher resulting in a larger interval of confidence leading to not being able to reject the null hypothesis (the confidence intervals are more likely to overlap if their range is large).

Table 24: Ordinal regression of socializing and to the built environment

NEIGHBORHOOD CONDITIONS	Estimate	AREA AMENITIES	Estimate	SPACE BETWEEN BUILDINGS	Estimate
very poorly kept		1 (many amenities)		1 (houses close together)	
poorly kept	0.775	2	-0.204	2	-0.146
fairly well kept	1.775	3	-0.079	3	-0.154
very well kept	2.775	4	-0.197	4	-0.237
		5 (few amenities)	-0.237	5 (houses far apart)	-0.181
INCOME					
0 – 24999					
25000 – 49999	-0.045		0.001		0.009
50000 – 99999	-0.022		0.093		0.050
100k or higher	-0.145		-0.134		-0.093
YEARS OF SCHOOLING	0.051 *		0.050 *		0.047
ASSETS					
0 – 9999					
10000 – 49999	-0.368		-0.428 *		-0.356
50000 – 99999	-0.149		-0.180		-0.173
100000 – 499999	0.047		0.001		0.068
500k or higher	0.187		0.182		0.227
TIME IN RESIDENCE	0.003		0.003		0.004

Significance: *** p < 0.01 ** p < 0.05 * p < 0.1

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

In terms of volunteering, older adults were found to volunteer more frequently in well-kept areas, areas with fewer amenities, and neighborhoods with lower population densities. It was also theorized that socioeconomic factors play a significant role in this behavior.

Table 25 presents the results of an ordinal regression conducted on the entire sample of respondents with volunteering as the dependent variable. The analysis indicates that neighborhood conditions have a negative effect on volunteering as conditions improve; however, this effect is statistically insignificant. In contrast, education level and asset wealth demonstrate a significant positive effect on increased levels of volunteering.

Additionally, the presence of fewer amenities in an area has a statistically significant impact on volunteering, particularly in the middle range of the spectrum. The findings also indicate that education and asset wealth have a significant effect, suggesting that individuals living in areas with fewer amenities may be better off socioeconomically. A similar trend is observed with population density, where the lowest density neighborhoods show a significant increase in volunteering levels, although this effect appears to be confounded by socioeconomic status. In summary, the results suggest that wealthier, more educated people tend to reside in less dense, better-maintained areas and exhibit higher levels of participation in social activities. This aligns with the historical context of the latter half of the twentieth century, when the wealthier middle class migrated to suburban regions. Suburban areas are generally characterized by lower density compared to urban areas and a lower mixity of amenities. However, it is hard to distinguish between suburban and rural areas using these characteristics. The lowest density areas may overlap with rural regions, which according to the model, positively impact volunteering. This would imply that those living in rural areas may possess a strong sense of community and invest more in their social environment. Nonetheless, rural areas are not considered to be wealthier and socioeconomic status is being shown to be a considerable factor on the level of volunteering.

Table 25: Ordinal regression of volunteering and the built environment

NEIGHBORHOOD CONDITIONS	Estimate	AREA AMENITIES	Estimate	SPACE BETWEEN BUILDINGS	Estimate
very poorly kept		1 (many amenities)		1 (houses close together)	
poorly kept	-0.298	2	0.181	2	-0.028
fairly well kept	-0.350	3	**0.350 ****	3	-0.061
very well kept	-0.276	4	**0.300 ****	4	0.209
		5 (few amenities)	0.218	5 (houses far apart)	**0.393 ***
INCOME					
0 – 24999					
25000 – 49999	0.158		0.197		0.173
50000 – 99999	0.383 *		0.368		0.332
100k or higher	0.142		0.137		0.103
YEARS OF SCHOOLING	**0.176 *****		**0.190 *****		**0.179 *****
ASSETS					
0 – 9999					
10000 – 49999	0.201		0.158		0.180
50000 – 99999	**0.808 *****		**0.884 *****		**0.848 *****
100000 – 499999	**0.669 *****		**0.666 *****		**0.676 *****
500k or higher	**0.846 *****		**0.906 *****		**0.885 *****
TIME IN RESIDENCE	0.003		0.002		0.002

Significance: *** p < 0.01 ** p < 0.05 * p < 0.1

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

4.3.4. Effect on neighborhood interactions between residents

To analyze the category of social capital related to neighborhood interactions, two variables were selected: visits between neighbors and the exchange of favors between neighbors. The first analysis focuses on the extent to which neighbors visit each other's homes and meet on the street. Table 26 presents a cross-tabulation exploring how the state of neighborhood maintenance affects the frequency of these interactions. There appears to be an observable effect where improved neighborhood conditions exhibit a relationship with increased frequency of interactions.

Regarding the frequency of neighbors 'often' interacting, the trend is observable only among the old-old subgroup, increasing from 11% to 19%. However, all other columns display a linear trend for the total population. The frequency of neighbors 'never' interacting decreases for the total population from 25% to 14% as conditions improve, with decreasing trends for both subgroups of older adults. This trend also applies to the 'rarely' column, decreasing from 37.5% to 28.4%, mostly driven by the old-old subgroup (56% to 28%), while there is no linear decrease for the young-old. The frequency of 'sometimes' interacting shows an increase from 18.8% to 38.5% as neighborhood conditions improve, also being linear for the old-old. For the young-old, the increase is not linear, but 'sometimes' interacting is lowest (19%) in very poorly-kept neighborhoods.

It is conceivable that neighborhood conditions would relate to interactions between neighbors. A better-maintained neighborhood indicates some form of social order, implying that residents are more invested in their immediate community. More social order suggests the area is likely safer, and residents would express higher levels of trust, knowing that each cares for their environment. Residents in such areas would possibly be more likely to be homeowners of similar socioeconomic status and probably share similar underlying values. Such considerations imply that well-maintained neighborhoods will foster stronger community ties and more frequent social exchanges among residents.

Table 26: The frequency of interaction between neighbors by the condition of the neighborhood

		Visiting Neighbors			
		(1) Never	(2) Rarely	(3) Sometimes	(4) Often
Condition of neighborhood	(1) very poorly kept (needs major repairs)	25.0% [35.7%, 16.7%]	37.5% [14.3%, 55.6%]	18.8% [21.4%, 16.7%]	18.8% [28.6%, 11.1%]
	(2) poorly kept (needs minor repairs)	16.9% [15.8%, 18.5%]	32.5% [31.6%, 33.9%]	37.5% [40.0%, 33.9%]	13.1% [12.6%, 13.8%]
	(3) fairly well kept (needs cosmetic work)	15.9% [16.9%, 14.7%]	32.4% [30.3%, 34.6%]	36.2% [34.7%, 37.7%]	15.6% [18.0%, 13.0%]
	(4) very well kept	14.4% [14.7%, 14.1%]	28.4% [28.5%, 28.3%]	38.5% [38.1%, 38.9%]	18.7% [18.7%, 18.7%]

Data is displayed as: total [young-old, old-old] percentages

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

The effect of the amount of neighborhood amenities on interactions between neighbors is presented in Table 27. Regarding the frequency of 'never' interacting, there is no linearly decreasing trend as the number of amenities decreases. However, areas with many amenities had the lowest level of 'never' interacting for both the total population sample (13%) and the old-old group (8.6%). The young-old group also reported the highest percentage (21%) of 'never' interacting in areas with the fewest amenities. In support, an increasing trend of 'rarely' interacting is observed as the number of amenities decreases for both the total population (23% to 34%) and the old-old subgroup (29.5% to 40%). For the young-old group, the percentage of 'rarely' interacting (26%) is lowest in areas with many amenities. Additionally, areas with the highest number of amenities had the highest levels of people 'often' interacting for the total population (23%) and both subgroups of older adults.

These findings suggest that areas with more amenities provide places where people can meet and interact, whether planned or spontaneously. Coffee shops, bars, parks, and other public spaces offer opportunities for neighbors to socialize outside their homes and workplaces. A neighborhood with higher levels of sociability is likely to foster stronger relations between neighbors, potentially leading to higher levels of trust and shared values.

Table 27: The frequency of interaction between neighbors the number of amenities

		Visiting Neighbors			
		(1) Never	(2) Rarely	(3) Sometimes	(4) Often
Area Amenities	(1) I saw many amenities	13.3% [17.9%, 8.6%]	26.2% [22.9%, 29.5%]	37.6% [39.3%, 36.0%]	22.9% [20.0%, 25.9%]
	(2)	14.3% [14.6%, 14.0%]	29.6% [30.2%, 29.0%]	40.3% [39.0%, 41.5%]	15.8% [16.1%, 15.5%]
	(3)	18.1% [17.6%, 18.6%]	30.8% [30.3%, 31.3%]	35.3% [33.9%, 36.8%]	15.9% [18.2%, 13.4%]
	(4)	14.2% [13.3%, 15.4%]	30.5% [32.0%, 28.5%]	38.5% [37.4%, 39.9%]	16.9% [17.4%, 16.2%]
	(5) I saw few amenities	17.8% [21.2%, 14.0%]	34.2% [29.3%, 39.9%]	32.3% [32.4%, 32.1%]	15.7% [17.1%, 14.0%]

Data is displayed as: total [young-old, old-old] percentages

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

The final analysis regarding neighbor interactions focuses on the amount of space between buildings, with results presented in table 28. While no clear trend emerges, some notable observations can be made.

The two highest density categories contradictorily exhibit the highest percentages of neighbors both 'never' interacting and 'often' interacting, suggesting social behavior may be polarized in more densely populated areas. Regarding the frequency of 'never' interacting, there is a decreasing trend as density decreases for the total population (from 17.2% to 13.2%), although this pattern is not consistent across subgroups. For the 'rarely' interacting category, the percentage peaks (33%) in the middle of the spectrum and is lowest (26.5%) when houses are close together, a pattern consistent across both subgroups. However, the spectrum range (26.5% - 32.9%) is narrow, indicating limited variation across density levels. The 'sometimes' interacting category shows the highest overall frequencies and indicates higher levels of interaction at the two lowest density levels (40.8% and 39.7%).

This scattered distribution does not indicate a strong relationship between building density and neighbor interactions. Notably, most respondents appear to default to 'sometimes' as their choice, followed by 'rarely', both of which are somewhat vague categories. This might reflect the difficulty in precisely quantifying social interactions, leading respondents to favor more moderate responses. The polarization observed between 'never' and 'often' having higher frequencies at higher densities could be attributed to certain benefits of close proximity in urban environments. While proximity offers the potential for more frequent interactions, it may also be associated with higher resident turnover and lower ownership rates, which could inhibit the formation of durable neighborly relationships. This highlights how physical closeness in urban areas may not necessarily translate into consistent social engagement.

Table 28: The frequency of interaction between neighbors by the amount of space between buildings

		Visiting Neighbors			
		(1) Never	(2) Rarely	(3) Sometimes	(4) Often
Space between buildings	(1) houses close together	17.2% [21.1%, 12.8%]	26.5% [24.8%, 28.4%]	37.8% [36.0%, 39.7%]	18.5% [18.0%, 19.2%]
	(2)	16.3% [15.5%, 17.0%]	29.1% [28.7%, 29.4%]	34.5% [34.6%, 34.3%]	20.2% [21.1%, 19.3%]
	(3)	15.9% [17.0%, 14.9%]	32.9% [30.8%, 34.9%]	36.7% [36.2%, 37.2%]	14.5% [16.1%, 13.0%]
	(4)	12.2% [11.7%, 12.9%]	31.7% [31.0%, 32.8%]	40.8% [40.9%, 40.5%]	15.3% [16.4%, 13.8%]
	(5) houses far apart	13.2% [16.5%, 8.4%]	31.9% [32.2%, 31.3%]	39.7% [35.5%, 45.8%]	15.2% [15.7%, 14.5%]

Data is displayed as: total [young-old, old-old] percentages

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

The second variable analyzed highlights the frequency of neighbors exchanging favors. Table 29 presents the effect of neighborhood conditions on this aspect of social interaction. However, a clear relationship is not immediately evident from the data.

Analyzing the 'never' exchanging favors category reveals that neighborhood conditions do have some influence. The likelihood of never performing favors increases from 9% to 16% as conditions worsen for the total population, with similar trends observed in both subgroups of older adults. The frequency of 'rarely' exchanging favors is highest in 'very poorly-kept' areas for the old-old subgroup (40%) and the total sample (32%) but without a clear trend in neighborhood housing conditions.

The 'sometimes' exchanging of favors category also exhibits no relationship with neighborhood conditions. It is lowest in 'very poorly-kept' areas (29%) but highest in 'poorly-kept' areas (54.4%), while also remaining high in better-maintained areas. Conversely, the frequency of neighbors 'often' exchanging favors is highest in the worst-maintained areas for both the young-old subgroup (38.5%) and the total sample (22.6%). However, the old-old population demonstrates an increasing trend in 'often' exchanging favors as conditions improve, rising from 11% to 20%.

Initially, one might assume that better-maintained areas would foster higher levels of trust and stronger connections between neighbors, leading to more frequent favor exchanges. However, this analysis does not fully support this hypothesis. A possible explanation for the observed patterns could be that residents in less maintained areas may be less well off and require more resources for support, thus necessitating higher levels of connection with their immediate community. This highlights that factors such as economic necessity and community interdependence may also influence the frequency and nature of neighborly support.

Table 29: The frequency of neighbors exchanging favors by the condition of the neighborhood

		Doing Favors			
		(1) Never	(2) Rarely	(3) Sometimes	(4) Often
Condition of neighborhood	(1) very poorly kept (needs major repairs)	16.1% [15.4%, 16.7%]	32.3% [23.1%, 38.9%]	29.0% [23.1%, 33.3%]	22.6% [38.5%, 11.1%]
	(2) poorly kept (needs minor repairs)	12.0% [10.8%, 13.8%]	20.3% [21.5%, 18.5%]	54.4% [52.7%, 56.9%]	13.3% [15.0%, 10.8%]
	(3) fairly well kept (needs cosmetic work)	9.4% [8.7%, 10.2%]	26.0% [26.8%, 25.1%]	48.9% [48.8%, 49.1%]	15.7% [15.7%, 15.6%]
	(4) very well kept	9.0% [10.0%, 8.1%]	25.0% [26.3%, 23.6%]	48.3% [48.1%, 48.5%]	17.7% [15.6%, 19.9%]

Data is displayed as: total [young-old, old-old] percentages

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

Table 30 presents the results of a cross-tabulation analysis between the number of area amenities and the frequency of exchanging favors among neighbors. While the relationship between these two variables is not strongly evident, some notable patterns do emerge.

Overall, areas with the most amenities demonstrated the highest frequency of favor exchange. Regarding the 'never' category, areas with fewer amenities showed higher percentages (9-10%) compared to areas with many amenities (6.2%). This trend was consistent for the 'rarely' exchanging favors category, which was lowest in areas with many amenities—23.6% for the total population and 17.4% for the old-old subgroup. Conversely, for the young-old subgroup, the percentage (30%) was highest in areas with many amenities, but there was no clear trend across the spectrum of amenity availability. Notably, areas with many amenities had the highest percentages of 'often' exchanging favors for the total population (21%) and both subgroups. However, this category did not display a consistent increasing trend as the number of amenities increased.

While these results suggest that increased amenities in an area may positively influence the exchange of favors among residents, they provide limited support for the hypothesis that more amenities necessarily foster stronger local relationships that can be utilized for support. Amenities may provide opportunities for social interaction, but other factors such as culture, demographics, and socioeconomic status may play a deeper role.

Table 30: The frequency of neighbors exchanging favors by the number of amenities

		Doing Favors			
		(1) Never	(2) Rarely	(3) Sometimes	(4) Often
Area Amenities	(1) I saw many amenities	6.2% [3.6%, 8.7%]	23.6% [29.7%, 17.4%]	49.3% [47.1%, 51.5%]	21.0% [19.6%, 22.5%]
	(2)	10.4% [12.8%, 8.0%]	26.4% [26.5%, 26.4%]	48.4% [47.1%, 49.8%]	14.8% [13.7%, 15.9%]
	(3)	10.5% [10.8%, 10.2%]	25.3% [28.0%, 22.5%]	47.8% [46.3%, 49.5%]	16.3% [15.0%, 17.8%]
	(4)	9.2% [8.2%, 10.3%]	24.6% [24.0%, 25.4%]	47.7% [48.6%, 46.6%]	18.5% [19.2%, 17.7%]
	(5) I saw few amenities	9.9% [10.9%, 8.9%]	27.4% [26.2%, 28.7%]	47.5% [48.0%, 46.9%]	15.3% [14.9%, 15.6%]

Data is displayed as: total [young-old, old-old] percentages

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

The third analysis is presented in table 31, examining the relationship between favor exchange and the space between buildings. The analysis reveals that building density does not appear to have a strong or consistent relationship with the frequency of favor exchange among neighbors.

The frequency of 'never' exchanging favors was highest (12.3% for the total population) when houses were close together. 'Rarely' exchanging favors peaked (27%) in the middle of the density spectrum but decreased towards both extremes, indicating a non-linear relationship. Moreover, the frequency of 'sometimes' exchanging favors was higher at lower densities, reaching its peak (53%) when houses are farthest apart. However, this distribution was non-linear, and the range of percentages was relatively small (46.9% - 53.2%). The likelihood of 'often' exchanging favors showed a relatively equal distribution across the density spectrum for the total population and both subgroups, further highlighting the lack of a clear relationship between density and favor exchanges.

In summary, this analysis offers little insight into the complex relationship between neighborhood density and social interactions. While higher density might suggest increased walkability and potential for interactions, the sample indicates that this does not necessarily translate into more frequent exchange of favors between neighbors. Density is only one of many characteristics of a neighborhood that influence how relationships may be built, underscoring the importance of considering other socioeconomic factors.

Table 31: The frequency of neighbors exchanging favors by the amount of space between buildings

		Doing Favors			
		(1) Never	(2) Rarely	(3) Sometimes	(4) Often
Space between buildings	(1) houses close together	12.3% [13.8%, 10.6%]	22.6% [23.8%, 21.3%]	48.5% [46.3%, 51.1%]	16.6% [16.3%, 17.0%]
	(2)	9.6% [8.3%, 10.8%]	26.3% [28.2%, 24.5%]	47.2% [47.2%, 47.3%]	16.9% [16.3%, 17.4%]
	(3)	9.2% [9.3%, 9.0%]	27.2% [27.1%, 27.3%]	46.9% [47.5%, 46.4%]	16.8% [16.1%, 17.4%]
	(4)	7.3% [7.0%, 7.8%]	25.9% [27.5%, 23.5%]	50.7% [50.3%, 51.3%]	16.1% [15.2%, 17.4%]
	(5) houses far apart	8.4% [10.8%, 4.8%]	21.2% [24.2%, 16.9%]	53.2% [50.0%, 57.8%]	17.2% [15.0%, 20.5%]

Data is displayed as: total [young-old, old-old] percentages

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

Summarizing the effects on interactions between neighbors, the cross-tabulation analysis suggests a modest effect from the state of neighborhood maintenance. Areas with better upkeep appear to slightly increase interactions between residents. Similarly, the presence of amenities showed a small positive relationship with neighbor interactions, implying that increased amenities may foster social engagement by providing spaces for people to meet. However, building density did not demonstrate any evident effect on facilitating interactions between residents, showing a polarization at the highest densities between never and often interacting.

Table 14 presents the results from the regression used to validate the statistical significance of the observed trends, with meetings between neighbors as the dependent variable. While improved neighborhood conditions showed an increasing trend compared to the least well-kept areas, these results were not statistically significant. The most significant determinant was the duration of residence, though its effect was small ($\beta = 0.011$). Area amenities displayed a small, statistically significant decreasing effect on neighborhood interactions for two categories: the middle of the spectrum ($\beta = 0.409$) and areas with the fewest amenities ($\beta = -0.526$). Again, time living at one's current residence showed a small ($\beta = 0.01$) statistically significant effect, as did wealth, which had a slightly larger impact. The regression test using space between buildings as a predictor yielded similar results, with time spent in current residence and the highest categories of asset wealth showing small effects. Regarding density, only the second category demonstrated a small significant effect ($\beta = 0.021$) on improving neighborly interactions but the model does not present any clear relationship between the two variables.

It's important to note the challenges in quantifying neighbor interactions, as the categories for measurement were somewhat vague, with most respondents defaulting to 'sometimes'. While the results don’t support a hypothesis that certain characteristics of the built environment can foster interaction between neighbors, they neither rule out their role. Socioeconomic patterns play a crucial part in determining overall demographics, shared values, and resident turnover. Furthermore, it's essential to consider the historical context of housing development. Most respondents from the survey lived in detached single-family housing and were present during a new wave of changing spatial patterns as suburbs developed at the urban periphery while urban cores deteriorated. This historical backdrop may influence the distribution of people from similar cultural and socioeconomic backgrounds, affecting interaction patterns and neighborhood dynamics. In conclusion, while the built environment shows some influence on neighbor interactions, the results from the sample only show a modest impact.

Table 32: Ordinal regression of neighborhood interactions and the built environment

NEIGHBORHOOD CONDITIONS	Estimate	AREA AMENITIES	Estimate	SPACE BETWEEN BUILDINGS	Estimate
very poorly kept		1 (many amenities)		1 (houses close together)	
poorly kept	0.333	2	-0.078	2	**0.021 ***
fairly well kept	0.138	3	**-0.409 ****	3	-0.188
very well kept	0.338	4	-0.225	4	-0.115
		5 (few amenities)	**-0.526 *****	5 (houses far apart)	-0.273
INCOME					
0 – 24999					
25000 – 49999	**-0.327 ****		**-0.336 ****		**-0.309 ****
50000 – 99999	-0.136		-0.197		-0.178
100k or higher	-0.188		-0.269		-0.168
YEARS OF SCHOOLING	-0.022		-0.015		-0.023
ASSETS					
0 – 9999					
10000 – 49999	0.332		0.323		0.236
50000 – 99999	0.001		0.162		-0.039
100000 – 499999	0.299		**0.434 ****		0.313
500k or higher	0.584		**0.755 *****		**0.649 *****
TIME IN RESIDENCE	**0.011 *****		**0.010 *****		**0.011 *****

Significance: *** p < 0.01 ** p < 0.05 * p < 0.1

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

The cross-tabulation analysis examining the impact on neighbors exchanging favors yielded inconclusive results. Building conditions showed no clear relationship, and surprisingly suggested that more degraded areas might have higher levels of exchanging favors between residents. Regarding area amenities, while the distribution was not strongly related, areas with the highest amenity availability hinted that more amenities might foster relationships conducive to favor exchanges between neighbors. The spectrum representing space between buildings did not indicate any clear relation with the exchange of favors between neighbors from the cross-tables.

The regression results are displayed in table 33 with frequency of doing favors as the dependent variable. Contrary to expectations, better-maintained neighborhoods showed a negative effect ($\beta = -1.0$) on doing favors for neighbors. Time in residence emerged as the most statistically significant factor with only a small increase ($\beta = 0.011$). Asset wealth also demonstrated a modest influence on increasing the exchange of favors between neighbors. Pertaining to amenities, the model revealed a trend of higher frequency in favor exchange as amenities decreased for two categories. Asset wealth above $500,000 had a statistically significant effect ($\beta = 0.554$), as did time spent living in the residence. Regarding housing density, no significant trend emerged, with only asset wealth and years spent at the current residence being the significant determinants.

As with neighbor interactions, it is difficult to measure neighbors exchanging favors and the categories remain quantitatively vague. While it was noted that poorer conditions might induce a higher reliance on neighbors, the model implies that increased wealth yields a higher level of favor exchange. Additionally, it might be plausible that areas with fewer amenities necessitate a higher reliance between neighbors for support in the exchange of goods and services.

The resulting analysis regarding interactions between neighbors does not offer any conclusive hypothesis. The data did not show strong linear trends, nor do the models provide robust support for the observations drawn. The lack of clear patterns underscores that neighborhood dynamics are complex and many factors are involved that influence social interactions.

Table 33: Ordinal regression of neighbor favor exchange and the built environment

NEIGHBORHOOD CONDITIONS	Estimate	AREA AMENITIES	Estimate	SPACE BETWEEN BUILDINGS	Estimate
very poorly kept		1 (many amenities)		1 (houses close together)	
poorly kept	-0.861	2	0.301	2	-0.033
fairly well kept	**-1.032 ***	3	**0.163 ***	3	-0.104
very well kept	**-1.050 ***	4	0.425	4	-0.087
		5 (few amenities)	**0.669 ***	5 (houses far apart)	-0.123
INCOME					
0 – 24999					
25000 – 49999	-0.861		-0.043		-0.062
50000 – 99999	-1.032		0.102		0.065
100k or higher	-1.050		-0.141		-0.082
YEARS OF SCHOOLING	-0.002		-0.005		-0.013
ASSETS					
0 – 9999					
10000 – 49999	0.301		0.221		0.240
50000 – 99999	**0.163 ***		0.194		0.161
100000 – 499999	0.425		0.357		**0.417 ***
500k or higher	**0.669 ****		**0.554 ****		**0.636 *****
TIME IN RESIDENCE	**0.011 *****		**0.011 *****		**0.012 *****

Significance: *** p < 0.01 ** p < 0.05 * p < 0.1

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

4.3.5. Effect on family and friend support-exchange

The analysis of social capital related to support exchange utilizes the two variables: family reliability and friend reliability. Participants were asked about the frequency with which they could rely on these groups for help with problems. Family and friends form the core of an individual's social network and play a crucial role in providing support for older adults, which is essential for maintaining a balanced and fulfilling life. This section aims to explore how environmental factors may influence the frequency with which older adults can depend on family and friends, particularly as they may not be living within the same community as was more typical in the past.

Table 33 presents a cross-tabulation that explores the relationship between neighborhood conditions and reliance on family for support. For the 'never' category, there is a decreasing trend among the old-old group, dropping from 5.6% to 1.4% as neighborhood conditions improve, suggesting an increased reliance in nicer areas. In contrast, the young-old group shows an increase in never relying on family, rising from 0% to 3.3% with improving conditions.

For the 'sometimes' category, reliance on family appears to decrease for both the total population and the young-old group as neighborhood conditions improve, declining from 34.4% to 26%. Notably, the frequency of 'often' relying on family is highest (65.7%) when neighborhood conditions are optimal; however, this trend is only observed in the total population sample and not within either subgroup.

Overall, there does not seem to be a clear relationship between the state of buildings in an individual's neighborhood and their reliance on family for support. This finding makes sense, as the physical condition of the neighborhood may have less of an impact on family relationships, which are based on emotional bonds and personal histories rather than environmental factors.

Table 34: Reliance on family by the condition of the neighborhood

		Family reliability			
		(1) Never	(2) Rarely	(3) Sometimes	(4) Often
Condition of neighborhood	(1) very poorly kept (needs major repairs)	3.1% [0.0%, 5.6%]	0.0% [0.0%, 0.0%]	34.4% [35.7%, 33.3%]	62.5% [64.3%, 61.1%]
	(2) poorly kept (needs minor repairs)	2.6% [1.1%, 4.8%]	5.8% [6.5%, 4.8%]	29.5% [33.3%, 23.8%]	62.2% [59.1%, 66.7%]
	(3) fairly well kept (needs cosmetic work)	3.2% [3.2%, 3.2%]	6.6% [7.7%, 5.4%]	28.9% [30.9%, 26.8%]	61.4% [58.3%, 64.6%]
	(4) very well kept	2.4% [3.3%, 1.4%]	5.2% [5.7%, 4.7%]	26.7% [26.1%, 27.3%]	65.7% [64.8%, 66.6%]

Data is displayed as: total [young-old, old-old] percentages

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

Table 35 explores the impact of the number of neighborhood amenities on the reliance on family for support. The analysis suggests there is no clear relationship between the two factors. No linear trends are observed for any group within the sample across the various frequency categories.

One observation, for the young-old subgroup, the frequencies of 'never' and 'rarely' relying on family are highest in areas with the most amenities. Additionally, the percentage of 'often' relying on family is greatest in neighborhoods with the fewest amenities.

It's important to note that the majority of the population in the sample lives in detached single-family housing, which is prevalent across suburbs. Areas with more amenities imply a more walkable area, but suburbs are not typically known for their walkability or high density of amenities. In such contexts, the presence of neighborhood amenities is unlikely to have a significant impact on an individual's ability to rely on family members for support, as proximity to family members may be a more important factor.

Table 35: Reliance on family by the number of amenities

		Family Reliability			
		(1) Never	(2) Rarely	(3) Sometimes	(4) Often
Area Amenities	(1) I saw many amenities	4.8% [8.0%, 1.5%]	6.3% [9.5%, 3.0%]	27.3% [27.0%, 27.6%]	61.6% [55.5%, 67.9%]
	(2)	2.8% [2.0%, 3.6%]	6.5% [8.4%, 4.6%]	31.3% [32.5%, 30.0%]	59.5% [57.1%, 61.9%]
	(3)	2.6% [2.4%, 2.8%]	4.7% [6.1%, 3.2%]	25.9% [26.3%, 25.4%]	66.9% [65.3%, 68.6%]
	(4)	3.3% [3.1%, 3.5%]	6.8% [5.2%, 8.8%]	29.5% [32.4%, 25.9%]	60.4% [59.3%, 61.8%]
	(5) I saw few amenities	2.2% [2.8%, 1.6%]	5.2% [6.4%, 3.7%]	25.9% [24.8%, 27.1%]	66.8% [66.1%, 67.6%]

Data is displayed as: total [young-old, old-old] percentages

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

The final analysis of reliance on family examines its relationship with the distance between buildings, as shown in Table 34. For the 'never' frequency, the young-old group demonstrates a notable decrease, from 5.7% to 1.7%, as building density decreases, suggesting an increasing reliance on family. A similar trend is observed for the 'rarely' category, with a decline from 7.6% to 3.4% as density decreases. Furthermore, the young-old group reports a higher percentage of 'often' relying on family at lower densities, approximately 67%, compared to 57% when homes are in closer proximity.

The old-old group exhibits a comparable trend in the 'often' category, with reliance on family increasing at lower densities (68-70%) compared to higher densities (63-66%). However, there is also a higher percentage (29%) of the old-old group reporting 'sometimes' relying on family in higher-density areas, compared to only 22-24% in lower-density neighborhoods.

Given these observations, there is no clear overall relationship between the space between buildings and reliance on family support. One possible explanation is that individuals living in less dense areas have fewer amenities and may have less immediate community support, leading them to rely more heavily on family members for assistance. Additionally, generational differences may influence these dynamics; the younger age group has experienced significant societal shifts in living arrangements and may prefer different types of living environments, which could affect their reliance on family. Overall, limitations in the sample size and uneven distribution by participants' housing types hinder the ability to draw definitive conclusions from this analysis.

Table 36: Reliance on family by the amount of space between buildings

		Family Reliability			
		(1) Never	(2) Rarely	(3) Sometimes	(4) Often
Space between buildings	(1) houses close together	3.4% [5.7%, 0.7%]	6.4% [7.6%, 5.1%]	29.0% [29.6%, 28.5%]	61.1% [57.2%, 65.7%]
	(2)	3.1% [3.3%, 2.9%]	6.5% [7.5%, 5.6%]	29.8% [30.7%, 29.0%]	60.5% [58.4%, 62.6%]
	(3)	2.3% [2.3%, 2.3%]	4.9% [5.5%, 4.3%]	28.8% [30.0%, 27.7%]	64.0% [62.3%, 65.7%]
	(4)	2.5% [2.4%, 2.7%]	5.0% [6.6%, 2.7%]	23.6% [23.2%, 24.1%]	68.9% [67.9%, 70.5%]
	(5) houses far apart	2.5% [1.7%, 3.7%]	4.6% [3.4%, 6.2%]	25.8% [28.2%, 22.2%]	67.2% [66.7%, 67.9%]

Data is displayed as: total [young-old, old-old] percentages

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

The second set of analyses focus on the relationship between the built environment and the frequency with which older adults rely on friends. Table 37 presents a cross-tabulation exploring the relationship between the state of maintenance of the neighborhood and the reliance on friends.

The 'never' frequency category indicates that as neighborhood conditions improve, the reliability on friends increases, with the percentage dropping from 9.4% to 4.7% for the total population. This decline is consistent for both the young-old (7.1% to 4.3%) and the old-old (11% to 5%) subgroups. The frequency of 'often' relying on friends also shows an increase as neighborhood conditions improve for the entire sample, changing from 25% to 37.7% in the best-maintained areas. This increase was similar for the young-old (28.6% to 40.3%) and the old-old (22.2% to 34.8%) subgroups. Conversely, 'sometimes' relying on friends shows a decrease as conditions improve, declining from 56.3% to 43.5%. This decrease is consistent across both population subgroups.

The contradictory findings between the 'never' and 'often' categories, which imply a positive association between reliance on friends and neighborhood conditions, and the 'sometimes' category, which shows the opposite trend, could be attributed to the vague nature of the frequency categories in measuring the reliance on friends for support. Nevertheless, the existence of a linear trend in three of the frequency categories suggests that a relationship may indeed exist. It is also positive that both the young-old and old-old subgroups exhibit non-opposing trends.

While a relationship between neighborhood conditions and reliance on friends might exist, socioeconomic factors could also play a role in explaining a higher reliance on friends as conditions improve. A nicer neighborhood could imply that an individual is of a wealthier status, which could lead to a stronger friend group with more resources. Friends may also be from the same community and have higher levels of trust and shared values if they are of a similar socioeconomic status, contributing to stronger relationships. Additionally, better neighborhood conditions could foster a perception that friends are more likely to provide support based on the area's conditions and feelings of safety. Other factors that could be taken into account would be the quality of the friendships and distances from the participant.

Table 37: Reliance on friends by the condition of the neighborhood

		Friends reliability			
		(1) Never	(2) Rarely	(3) Sometimes	(4) Often
Condition of neighborhood	(1) very poorly kept (needs major repairs)	9.4% [7.1%, 11.1%]	9.4% [0.0%, 16.7%]	56.3% [64.3%, 50.0%]	25.0% [28.6%, 22.2%]
	(2) poorly kept (needs minor repairs)	6.9% [7.4%, 6.2%]	14.4% [12.6%, 16.9%]	51.2% [53.7%, 47.7%]	27.5% [26.3%, 29.2%]
	(3) fairly well kept (needs cosmetic work)	7.5% [6.8%, 8.3%]	13.9% [14.3%, 13.5%]	44.9% [44.7%, 45.1%]	33.6% [34.1%, 33.0%]
	(4) very well kept	4.7% [4.3%, 5.0%]	14.2% [12.7%, 15.8%]	43.5% [42.7%, 44.4%]	37.7% [40.3%, 34.8%]

Data is displayed as: total [young-old, old-old] percentages

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

Table 36 presents the effect of the number of nearby amenities on the reliance on friends. Those who ‘never’ rely on friends is most prominent in the middle of the spectrum of the amount of amenities. There is also an increase in 'rarely' relying on friends as the number of amenities rises, from 11.6% to 17.6% across the total sample. This trend is consistent among the young-old subgroup. For both older adult groups, the frequency of 'sometimes' relying on friends is highest (51%) when the fewest amenities are present. A linear trend is observed in the young-old group (38.6% to 51.4%), but not among the old-old. 'Often' relying on friends is most prevalent in areas with the largest presence of amenities for only the old-old group (37.4%); however, there is no clear positive trend across the amenity spectrum.

The relationship between neighborhood amenities and reliance on friends is largely inconclusive, with some suggestion that relying on friends is higher in areas with fewer amenities. This could be attributed to the possibility that areas with more amenities are more walkable and offer a wider range of services, allowing those living in these areas to maintain a fuller lifestyle without requiring as much support from others. Hence, individuals residing in areas characterized by a single land use or more isolated housing, such as in rural areas, may have a greater need for support from friends to compensate for the lack of amenities and services in their immediate vicinity.

Table 38: Reliance on friends by the number of amenities

		Friend Reliability			
		(1) Never	(2) Rarely	(3) Sometimes	(4) Often
Area Amenities	(1) I saw many amenities	5.0% [6.4%, 3.6%]	17.6% [18.6%, 16.6%]	40.5% [38.6%, 42.5%]	36.9% [36.4%, 37.4%]
	(2)	6.4% [6.3%, 6.5%]	13.2% [14.0%, 12.4%]	45.1% [44.4%, 45.8%]	35.3% [35.3%, 35.3%]
	(3)	8.8% [7.9%, 9.7%]	14.5% [13.8%, 15.2%]	45.2% [46.1%, 44.3%]	31.5% [32.2%, 30.8%]
	(4)	6.0% [5.1%, 7.3%]	14.7% [12.5%, 17.6%]	41.5% [42.8%, 39.9%]	37.7% [39.7%, 35.2%]
	(5) I saw few amenities	4.4% [3.2%, 5.8%]	11.6% [10.4%, 13.1%]	51.3% [51.4%, 51.3%]	32.7% [35.1%, 29.8%]

Data is displayed as: total [young-old, old-old] percentages

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author’s elaboration*

The final cross-tabulation analysis explores how the amount of space between buildings relates to reliance on friends for support. The results are presented in table 39. Overall, the findings suggest that those living at lower densities have a greater reliance on friends for help.

The frequency of 'never' relying on friends increases from 3% to 7-8.4% at the highest densities for the total sample; the increasing trend exists for both older adult subgroups. The percentage of those who 'rarely' rely on friends is also highest at higher densities, rising from 9.4% to 15.7-16.7% at the highest densities. This increase is most visible among the young-old (10% to 18.2%) but ‘rarely relying’ is also lowest (9.4%) at the lowest density for the old-old. There is no clear trend in 'sometimes' relying on friends, but this category is highest at the lowest density (51%). The same pattern is observed for 'often' relying on friends, which is highest at the second-lowest density (39.4%) and lowest at the highest density (32.4%). This is relatively consistent among both subgroups.

This analysis further suggests that a relationship may exist between areas that are more walkable and the need to rely on friends for support. It's important to note that reliance on friends does not necessarily imply sociability. It's possible that those who live in more accessible, higher-density areas might require less support from friends for carrying out everyday tasks, as they have better access to amenities and services within their immediate vicinity. In contrast, individuals residing in lower-density areas may have a greater need for friend support to compensate for the lack of walkability and proximity to essential services. This is especially true when a car is required for commuting and accounting for older individuals losing their ability to drive.

Table 39: Reliance on friends by the amount of space between buildings

		Friend Reliability			
		(1) Never	(2) Rarely	(3) Sometimes	(4) Often
Space between buildings	(1) houses close together	7.0% [5.7%, 8.6%]	15.7% [18.2%, 12.9%]	44.8% [42.8%, 47.1%]	32.4% [33.3%, 31.4%]
	(2)	8.4% [8.2%, 8.5%]	16.7% [15.3%, 18.2%]	42.0% [40.8%, 43.2%]	32.9% [35.8%, 30.1%]
	(3)	5.3% [5.9%, 4.8%]	12.5% [10.1%, 14.9%]	46.5% [46.7%, 46.4%]	35.7% [37.4%, 34.0%]
	(4)	3.5% [2.3%, 5.3%]	12.7% [12.3%, 13.3%]	44.4% [48.0%, 38.9%]	39.4% [37.4%, 42.5%]
	(5) houses far apart	3.0% [2.5%, 3.7%]	9.4% [10.0%, 8.5%]	51.0% [50.0%, 52.4%]	36.6% [37.5%, 35.4%]

Data is displayed as: total [young-old, old-old] percentages

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author’s elaboration*

A summary of the cross-tabulation analysis regarding reliance on family did not reveal any clear relationships. The results were non-linear and inconsistent across different frequency categories, as well as among the two subgroups of the older adult population. A slight observation of lower reliance on family at higher densities could suggest that individuals in more urban areas may require less support from family members.

Table 38 presents the results from the regression analysis used to validate the statistical significance of the observed trends, with reliance on family members as the dependent variable. No statistically significant trends emerged regarding how building conditions affect reliance on family. However, asset wealth above $100000 demonstrated a significant relationship ($\beta = 0.715 – 0.813$), indicating that wealthier individuals tend to have greater levels of support from family.

When using the number of amenities as a predictor, the analysis showed only a slight increase in reliance on family as amenities decreased; however, only the third category exhibited relevant statistical significance. Once again, asset wealth proved to be the most significant factor ($\beta = 0.780$) for individuals with more than $100,000 in assets. The analysis of space between buildings yielded similar results, where only asset wealth ($\beta = 0.765 – 0.826$) could potentially explain any changes in reliance on family.

In conclusion, there does not appear to be a strong hypothesis that can be formulated regarding the impact of the environmental characteristics analyzed on an older adult's reliance on family for support. As previously mentioned, socioeconomic status possibly plays a significant role, as individuals with higher wealth may enjoy stronger social capital through family bonds. Additionally, those living in less accessible or more isolated communities might have a greater need for support from family members.

It is important to note that reliance on family members does not equate to the frequency of socializing with them; however, it does indicate the existence of strong social bonds. Familial connections are often rooted in long-standing personal histories, which can enhance the reliability to provide support. The proximity to family members may also influence reliance, as family members living close may be more heavily relied on for assistance. Furthermore, the analysis does not account for how environmental factors might affect the quality of family bonds, particularly if individuals are relying on only a select few family members for support. The many complexities make it difficult to determine if any relationship exists between the built environment and reliance on family. Those with a lower reliance on family may be more independent due to their living conditions or may have weaker family bonds. Conversely, individuals who rely heavily on family support might do so because of strong familial ties or because their living environment limits their ability to seek assistance elsewhere.

Table 40: Ordinal regression of family reliability and the built environment

NEIGHBORHOOD CONDITIONS	Estimate	AREA AMENITIES	Estimate	SPACE BETWEEN BUILDINGS	Estimate
very poorly kept		1 (many amenities)		1 (houses close together)	
poorly kept	-0.368	2	-0.001	2	-0.168
fairly well kept	-0.315	3	**0.357 ***	3	0.069
very well kept	-0.045	4	0.023	4	0.176
		5 (few amenities)	0.365	5 (houses far apart)	0.094
INCOME					
0 – 24999					
25000 – 49999	-0.126		-0.103		-0.084
50000 – 99999	-0.251		-0.237		-0.214
100k or higher	-0.321		-0.340		-0.262
YEARS OF SCHOOLING	**-0.054 ***		**-0.061 ***		-0.048
ASSETS					
0 – 9999					
10000 – 49999	0.299		0.213		0.266
50000 – 99999	0.424		0.389		0.469
100000 – 499999	**0.813 ****		**0.788 ****		**0.826 ****
500k or higher	**0.715 ****		**0.776 ****		**0.765 ****
TIME IN RESIDENCE	0.006		0.003		0.003

Significance: *** p < 0.01 ** p < 0.05 * p < 0.1

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

The cross-tabulation analysis yielded mixed results regarding the relationship between neighborhood characteristics and reliance on friends. Some relationship might exist suggestive that better-maintained neighborhoods are associated with a higher frequency of reliance on friends, which may indicate the influence of socioeconomic factors. However, the amount of amenities in an area did not demonstrate any substantial relationship, making it difficult to draw definitive conclusions. The analysis of space between buildings revealed that individuals living in lower-density areas tend to rely on friends more often than those in higher-density neighborhoods. This suggests that older adults residing in denser, more accessible areas may have a reduced need to depend on friends for support.

The regression analysis used to validate the statistical significance of the observed trends is presented in Table 39, with reliance on friends as the dependent variable. Interestingly, more highly maintained neighborhoods showed a decrease in reliance on friends, although this finding was not statistically significant. The only statistically significant factor that demonstrated a small increase in reliance was education ($\beta = 0.083$). Similarly, the number of amenities did not yield any statistically significant effects, with education remaining the only significant factor ($\beta = 0.079$). When examining the measurement of space between buildings as the independent variable, a positive trend was observed, indicating higher reliance on friends as density decreases. However, only the least dense category was statistically significant, exhibiting the largest increase ($\beta = 0.411$). Education again proved to be a relevant factor in this model.

Reiteratively, it is important to note that this analysis focused on the use of social capital for support rather than measuring sociability, which would imply that prior contacts already existed. The analysis does not consider the size of an individual's social network. While reliance on friends could serve as an indicator of the quality of those relationships, a key takeaway is that older adults may require less support in denser areas. In such environments, higher accessibility can provide greater access to services, allowing older individuals more independence in managing their lifestyles. Alternatively, it is also possible that residents in denser areas may have weaker friendships, resulting in less reliable support compared to those in less dense neighborhoods as suggested by classical urban theory.

Table 41: Ordinal regression of friend reliability and the built environment

NEIGHBORHOOD CONDITIONS	Estimate	AREA AMENITIES	Estimate	SPACE BETWEEN BUILDINGS	Estimate
very poorly kept		1 (many amenities)		1 (houses close together)	
poorly kept	-0.494	2	0.121	2	0.009
fairly well kept	-0.503	3	-0.112	3	0.199
very well kept	-0.417	4	-0.003	4	0.272
		5 (few amenities)	0.114	5 (houses far apart)	0.411 *
INCOME					
0 – 24999					
25000 – 49999	0.185		0.201		0.232
50000 – 99999	0.101		0.162		0.129
100k or higher	0.147		0.132		0.199
YEARS OF SCHOOLING	0.083 ***		0.079 ***		0.082 ***
ASSETS					
0 – 9999					
10000 – 49999	-0.199		-0.283		-0.294
50000 – 99999	-0.092		-0.076		-0.111
100000 – 499999	-0.020		-0.023		-0.075
500k or higher	0.060		0.052		-0.002
TIME IN RESIDENCE	0.001		3.60E-04		3.67E-04

Significance: *** p < 0.01 ** p < 0.05 * p < 0.1

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

5. Conclusion

The purpose of this thesis was to explore the significance of our built environments, which have undergone substantial transitions over the last century, and how the characteristics of these environments may influence the social capital of older adults. Globally, the developed world is experiencing a demographic shift, with older adults comprising a larger proportion of the population than in the past, raising economic and social care concerns.

Furthermore, many scholars have commented on the decreases in social capital, beginning from the era of modernization and extending to contemporary societal changes. Concerns arose with the transition to an urban environment during industrialization and have since expanded to include suburbanization. Worries originally were expressed about the impersonal and superficial relations between individuals in urban areas, and most recently, the debate has included as to whether suburban environments are more conducive to healthy living or more isolating (Adams, 1992; Duany et al., 2010; Wirth, 1938). Concurrently, there has been a discussion about the declines in mental health and well-being that could be attributed to decreases in social capital. Durkheim (1897/2005) was among the first to discuss society's effect on mental health during the changing dynamics brought on by the industrial revolution. More recently, scholars have explored the links between social capital and its positive impact on mental health, through mechanisms such as maintaining social cohesion and reducing isolation (Kawachi & Berkman, 2000).

Some literature has suggested that our living environments could be a cause of these declines in social capital (Leyden, 2003; Mazumdar et al., 2018; Putnam, 1995). Additionally, focus has been placed on creating better living environments for the most vulnerable, such as older adults (Buffel et al., 2012). This has prompted global organizations, such as the WHO (2007), to provide guidance on improving our living environments to be age-friendly. Policy goals should support the idea of “aging in place” and raise awareness of the impact of urban change on the lives of older people (Buffel et al., 2012). Some researchers and urbanists have asserted that areas that separate uses and promote car dominance result in less accessible areas that do not facilitate interactions between residents and promote isolation (Duany et al., 2010). Such environments might have an even more significant impact on older adults due to the increased reliance on others for mobility. Concepts such as the 15-minute city have emerged, advocating for the fulfillment of essential urban functions within a walkable proximity to help people maintain a higher quality of life (Moreno et al., 2021). Moreover, these areas should not disadvantage people with respect to economic status or age. Additionally, older individuals may be more susceptible to changing environments and require more support as they age to maintain a balanced life. They face increasing physical and cognitive limitations as they age and may find certain environments more restrictive. Age-friendly cities have become a challenge not only in terms of urban design but also in ensuring that older adults do not feel excluded due to shifting environmental dynamics (Buffel et al., 2012).

The benefits that social capital brings for older adults have been an important topic, as studies have found improved health outcomes and highlighted the importance of social engagement for support (Bath & Deeg, 2005). A larger social network comprised of strong and weak ties extends the resources to which an individual has access. The support offered through relationships with others expands these resources, allowing older adults to maintain a fuller and more balanced lifestyle necessary for healthy aging. It enables older individuals to overcome changing situations and combat stressors that may arise in order to maintain a high quality of life (Andersson, 1998). Social engagement also seems to offer a complex ability to preserve functional ability, limit disease onset, and provide a greater sense of purpose (Bath & Deeg, 2005). Higher levels of social capital are

necessary for supporting older adult populations within an aging society, especially if economic and social resources become more limited due to macroeconomic conditions.

The analysis utilized a national dataset from a survey of older adults across the United States, which included questions related to social capital, well-being, and various environmental characteristics. For the purpose of this analysis, the social capital variables were grouped into three broader categories: participation in social activities; neighborhood interactions; and support exchange with family and friends. After briefly exploring these categories, two representative variables were selected for each category. Participation included volunteering and socializing with family and friends. Neighborhood interactions were analyzed through the variables pertaining to meetings between neighbors and the exchanging of favors. Lastly, support exchange was composed of reliance on family and reliance on friends. A comparison was then made to understand the relationship between social capital and mental health. The findings indicated that individuals with higher rates of participation, better support systems, and overall stronger relationships within their communities reported higher levels of mental health and well-being. Additionally, a strong negative relationship was observed between feelings of isolation and happiness. The relationship highlights the critical role of social capital in the lives of older adults.

Responses to variables regarding participants' environments were then explored and three variables were chosen for the purpose of performing the analysis: conditions of the neighborhood, number of amenities, and space between buildings.

The analysis of these variables related to participation in social activities revealed some noticeable patterns; however, the results did not reach statistical significance. Higher rates of socializing and volunteering were observed in better-maintained neighborhoods. The presence of area amenities suggested a potential relationship with socializing among family and friends, but no significant relationship was found for volunteering. Additionally, lower-density neighborhoods showed only a slight decrease in the frequency of volunteering. It is likely that socioeconomic factors play an important role in these trends. Individuals with greater financial resources tend to reside in more desirable areas, which may afford them more time and capital to engage in social activities and volunteer work. Nonetheless, mixed-use areas may still hold significance by providing spaces for people to meet outside their homes. While this may not necessarily lead to more established relationships, it might increase the frequency of social interactions.

In the analysis of neighborhood interactions, areas with better upkeep demonstrated a slight increase in interactions between residents, while a higher number of amenities also showed a small positive relationship. However, building density did not appear to have any significant effects on these interactions. Pertaining to exchanging favors, no strong relationships were observed with the built environment. Regression testing revealed little statistical significance between the variables, except that a decrease in area amenities might contribute to decreased interactions.

Controlled socioeconomic factors, such as asset wealth, frequently displayed statistical significance, suggesting that the effects of the built environment may be confounded by these factors. Additionally, the number of years an individual spends in their residence appeared to have a statistically significant effect, highlighting that a longer duration of residence increases one's investment in and sense of belonging to their neighborhood. It is possible that more accessible, mixed-use areas can foster increased interactions between neighbors, thereby enhancing the level of social capital and support available to older individuals. Socioeconomic factors play a crucial role, making it challenging to differentiate the effects of the built environment. Individuals from similar

socioeconomic backgrounds are likely to aggregate in the same neighborhoods, sharing common values that facilitate interactions and build trust among neighbors, ultimately contributing to higher levels of social capital.

When analyzing the effect on support exchange, reliance on family showed little relation to the built environment, with only a small pattern of increased reliance at lower housing densities. Reliance on friends, however, demonstrated some relationship with the state of the neighborhood and additionally suggested that those living at lower densities had a higher reliance on friends. The regression analysis did not indicate any statistical relationship regarding neighborhood conditions and amenities; only that asset wealth and education level might have an effect on support exchange. It did weakly indicate that those living at lower densities may have a higher reliance on friends.

It is important to note that a higher reliance on friends and family does not necessarily equate to being more or less social. It is possible that older individuals living at lower densities have more bonding social capital and stronger ties. Alternatively, those residing in lower-density areas, which tend to be less accessible, may require more support to maintain their daily lives, thus exhibiting a higher reliance on friends and family. Overall, it is difficult to determine whether individuals have more or less social capital based solely on housing density and reliance, as this measure does not account for the size of one's social network. The quality and nature of social ties, as well as the accessibility of resources and services, may play a more significant role in utilizing relationships for support.

This study is limited by the lack of comprehensive data on the built environment. National surveys analyzing aging across the United States often include questions pertaining to health and social factors, while considering only a few factors regarding one's surrounding living environment. The National Social Life, Health and Aging Project (NSHAP) includes a more extensive list of questions related to the respondents' environments; however, they do not capture the full range of environmental characteristics that influence social capital outcomes. Additionally, the study relies on subjective descriptors of the physical environment, which may not sufficiently characterize the neighborhood characteristics. The response categories are often vague, do not equate to exact measures, and do not assume equal intervals between each level, making an analysis difficult. It was also likely that participants defaulted to broader, middle, categorical answers, such as 'sometimes,' which encompass a wider range of frequencies. Future studies should place greater emphasis on the importance of environmental characteristics and provide more comprehensive questions to offer a richer dataset.

Overall, the results of this analysis are exploratory and cannot offer conclusive relationships between built environment characteristics and their relation to social capital for older adults. Considering the environment, it is challenging to measure the complex dynamics of each setting, as all environments present some uniqueness. Urban environments in the United States, while having higher densities, sometimes lack basic services and access to essential amenities such as food. Suburban neighborhoods, while more uniform due to zoning, leading to intense commercial centers and swathes of single-family housing, are differentiated by the types of streets on which they are located and their distances from other land uses. They also vary by location within the metropolitan area, affecting their ability to be serviced by public transport and their proximity to urban cores. Required driving distances to amenities may factor into the frequency of participation.

Additionally, there are many other factors that could have profound effects on social capital outside of socioeconomic status. Innovations such as television, phone applications, and social networks are also likely having a significant impact on behavior and interactions. These technological advancements have the potential to both enhance and hinder social capital, depending on how they are utilized and integrated into daily life.

This study highlights the need for more detailed data and comprehensive research on the relationship between the built environment and social capital among older adults. Although no statistically significant relationships were found, and socio-economic factors likely have a strong contribution; there appears to be some relation with social capital and the built environment. Future studies should employ a more considered approach for data gathering, utilizing better measures of environmental characteristics that may shape social interactions and support networks. Its importance is underlined by the current need for developing age-friendly cities with communities that foster social engagement and enhance the well-being of older adults.

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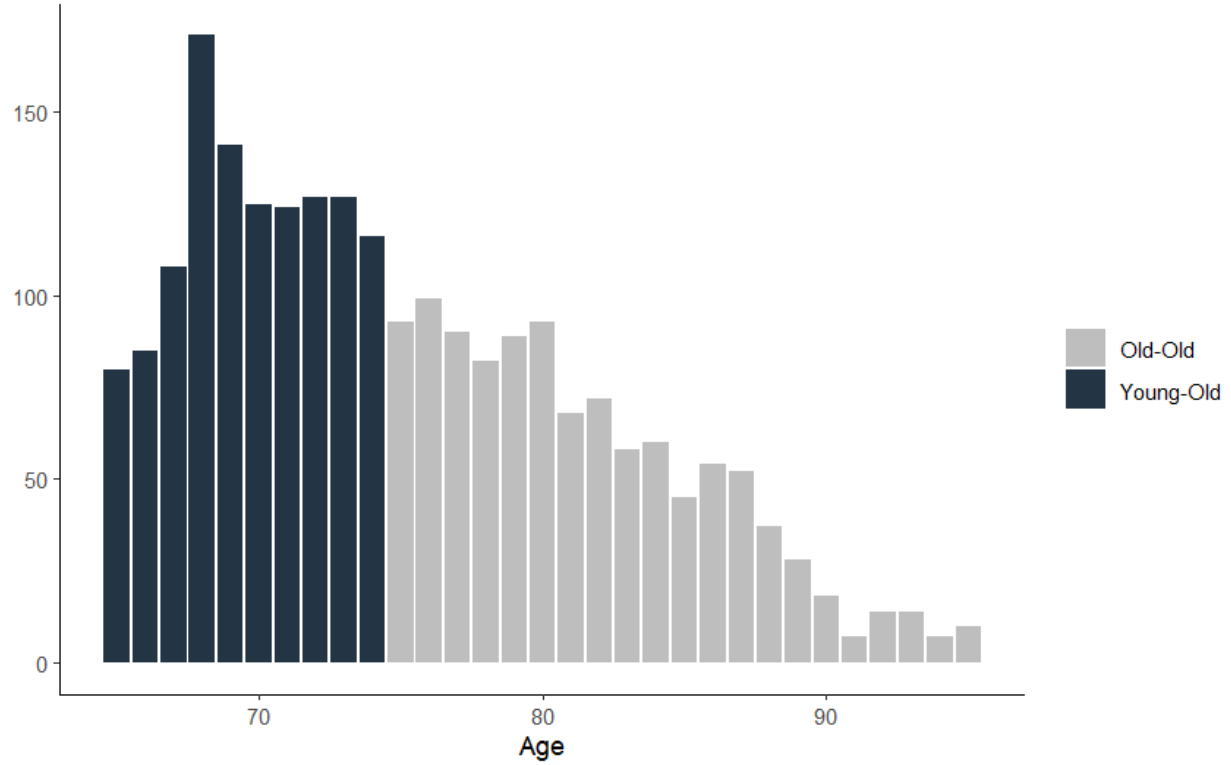
Appendix

Figure 1

Age distribution of participants



Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

Table 1

Ordinal Regression analysis of participation in social activities by age

	YOUNG-OLD	OLD-OLD
Volunteering	-0.012	-0.047
Attending organized groups	0.027	-0.047 ***
Socializing with friends or relatives	0.031	0.015
Attending religious services	0.042 ***	-0.023 **

Significance: *** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$

Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

Table 2

Ordinal Regression analysis of family and friend support-exchange by age

	YOUNG-OLD	OLD-OLD
Family Reliability	0.036	-0.010
Friend Reliability	-0.010	-0.015
Asking friends for help	-0.007	-0.051 ***
Amount of friends	0.056 ***	-0.011

*Significance: *** p < 0.01 ** p < 0.05 * p < 0.1*
Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

Table 3

Ordinal regression analysis of neighborhood interactions by age

	YOUNG-OLD	OLD-OLD
Visiting or meeting neighbors	-0.021	-0.034 **
Neighbors doing favors for each other	0.013	-0.004
Neighbors seek advice from each other	-0.017	-0.004
Neighborhood is close-knit	-0.005	0.008
Neighbors are willing to help	0.020	-0.017
Neighbors get along (recoded)	-0.014	-0.016
Neighbors share the same values (recoded)	-0.010	-0.002
Neighbors are trustworthy	0.026	-0.007
People are afraid at night	-0.002	0.047 ***

*Significance: **** p < 0.01 ** p < 0.05 * p < 0.1*
Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

Table 4

Ordinal regression analysis of feeling left out and isolated by age

	YOUNG-OLD	OLD-OLD
Feels left out	0.005	0.030 **
Feels isolated	-0.027	0.030 **

*Significance: *** p < 0.01 ** p < 0.05 * p < 0.1*
Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

Table 5

Ordinal regression analysis of feelings of isolation by marital status

	ISOLATED2	LEFTOUT2
Married	-	-
Living with a partner	0.503 *	0.516 *
Separated	0.237	0.413
Divorced	0.410 ***	0.466 ***
Widowed	0.322 ***	0.360 ***
Never married	0.590 **	0.513 *

Significance: *** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$
Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

Table 6

Ordinal regression analysis between well-being by age

	YOUNG-OLD	OLD-OLD
Emotional and mental health	0.004	-0.051 ***
General happiness	-0.0007	-0.035 **
Past week feelings of depression	0.008	0.049 ***
Past week feelings of loneliness	-0.026	0.064 ***
Past week feelings of unfriendliness	-0.091 **	-0.005
Past week enjoyment of life	0.051	-0.050 ***
Past week feelings of sadness	-0.002	0.014
Past week feelings of being disliked	-0.143 ***	0.004

Significance: *** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$
Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*

Table 7

Mental health by feelings of exclusion

	Overall Mental Health	In the past week...felt depressed	In the past week...felt happy	In the past week...felt sad	In the past week...felt lonely	In the past week...felt disliked
Feeling left out	-0.348	0.241	-0.221	0.249	0.331	0.175
Feeling isolated	-0.406	0.266	-0.259	0.255	0.338	0.209

Significance: *** $p < 0.01$ ** $p < 0.05$ * $p < 0.1$
Source: *National Social Life, Health and Aging Project (NSHAP): Round 3 and Covid-19 Study, author's elaboration*