



Social infrastructure, social cohesion and subjective wellbeing

Renee Zahnow*

School of Social Science, The University of Queensland

ARTICLE INFO

Keywords:

Social cohesion
Belonging
Subjective wellbeing
Social infrastructure
Neighborhood

ABSTRACT

Neighborhood physical places that bring people together, referred to as social infrastructure, form the foundation of communities. Studies suggest that by facilitating social encounters, social infrastructure can enhance sense of social cohesion and belonging and may also improve subjective wellbeing. Yet the extent to which wellbeing benefits are mediated through increased social cohesion and belonging is less understood. Drawing on data collected in March 2022 from a nationally representative sample of 1000 Australian adults aged over 18 years, we use mediated regression analysis to examine the extent to which the link between social infrastructure and subjective wellbeing is mediated by perceived social cohesion and belonging. Our findings reveal that social cohesion and belonging partially mediate the relationship between proximate social infrastructure and wellbeing. Our findings go beyond previous studies that note the importance of walking or greenspaces for social interaction and cohesion to demonstrate that social and wellbeing benefits can be accrued across a suite of ordinary neighborhood places when the social context is perceived as cohesive. The results highlight the capacity for ordinary places such as shops and cafes to contribute to social cohesion during everyday activities and facilitate subjective wellbeing by satisfying the basic human need to belong.

1. Introduction

Since the start of the COVID-19 pandemic in 2020, residents in cities around the world have spent increasingly large amounts of time in their residential neighborhoods (Fraser et al., 2024). As of April 2022, 38 percent of Australian workers regularly worked from home, compared to just 32 percent before the pandemic (Australian Bureau of Statistics, 2023). A similar pattern can be observed in the USA where the percentage of workers who regularly worked from home increased from just 20 percent prior the pandemic, to 59 percent as of January 2022 (Silver, 2023). The transition to working locally, coupled with post-pandemic returns to public spaces, has brought into renewed focus the vital role of neighborhood social infrastructure for providing physical spaces where individuals can engage in social contact and build social cohesion to help protect against loneliness and negative health outcomes (Cramm et al., 2013; Bertossi Urzua et al., 2019; Kim and Kawachi, 2017; Ward Thompson et al., 2016).

Social infrastructure refers to neighborhood facilities and physical settings that provide for residents' social service needs, generate opportunities for social contact and improve social cohesion (Klinenberg, 2018; Cattell et al., 2008; Orton et al., 2017; Ross and Searle, 2019; Atkinson et al., 2020). Common examples of social infrastructure

include parks, cafes, shops and places of worship (Latham and Layton, 2019; 4; Davern et al., 2017; Klinenberg, 2018). These sites represent physical places in the neighborhood that bring people together and in doing so support the development of sense of community, social cohesion and sense of belonging (Klinenberg, 2018; Latham and Layton, 2019; Lund, 2003). Social infrastructure and the sense of social cohesion it produces (Talen, 1999; Davern et al., 2017) have been linked to improvements in health (Kawachi and Berkman, 2000; Barton et al., 2021; Takano et al., 2002; Islam et al., 2022; Appiah et al., 2022), safety (Jacobs, 1961; Newman, 1972; Appau et al., 2019), and subjective wellbeing (Montgomery, 2013; Davern et al., 2017; Evans, 2003; Mouratidis and Poortinga, 2020; Mouratidis, 2018b; Mouratidis, 2021).

Subjective wellbeing can be defined as a person's self-assessed satisfaction with their life across multiple domains including health and social relationships (Diener, 2000; Diener and Eunkook, 2017; Shekhar et al., 2019). Maslow's (1943) hierarchy of needs identifies safety, and sense of belonging as important components of wellbeing. Maslow (1943) suggests that when individuals achieve a sense of safety through social stability and solidify a sense of their "place in the group" (p.379) they fulfill basic human needs required to achieve satisfaction and subjective wellbeing. From this perspective, social infrastructure may influence subjective wellbeing by generating opportunities for social

* Corresponding author at: School of Social Science Level 3 Building 9, The University of Queensland, St Lucia Campus, Brisbane Queensland 4072

E-mail address: r.zahnow@uq.edu.au.

connection (Mouratidis, 2021; Corcoran et al., 2019) and cohesion which in turn satisfies individuals' basic human needs for safety, social stability and sense of belonging (Davern et al., 2017; Talen, 1999; Mouratidis and Poortinga, 2020; Lakey and Orehek, 2011; Maslow, 1943).

While research has established the wellbeing benefits of social infrastructure, empirical studies providing evidence of the potential pathways through which wellbeing benefits are accrued remain underdeveloped (Davern et al., 2017; Barton et al., 2021). In this study we draw on survey data collected in March 2022 from a nationally representative sample of 1000 Australians to examine the mediating effect of perceived social cohesion and belonging on the link between social infrastructure and subjective wellbeing. This study extends previous knowledge by bridging two bodies of research that focus on: (1) the subjective wellbeing benefits of social infrastructure and, (2) the influence of perceived social cohesion on subjective wellbeing; to assess the mediating role of social cohesion and sense of belonging as the mechanism through which the link between social infrastructure and improved wellbeing operates (Davern et al., 2017).

2. Social infrastructure, social cohesion and wellbeing

The urban environment influences subjective wellbeing by shaping residents' everyday aesthetics (Saito, 2021; Saito, 2007), participation in physical activities (Zahnow et al., 2022; Frank et al., 2007) and opportunities for social encounters (Mouratidis, 2021; Corcoran et al., 2019). Individuals living in neighborhoods with well-maintained walking paths and a variety of proximate destinations are less likely to be obese and report fewer physical health concerns (Islam et al., 2022; Appiah et al., 2022). Similarly, living in close proximity to social infrastructure like shops, parks and cafes, contributes positively to subjective wellbeing (Mouratidis, 2018a; Mouratidis, 2021). One potential pathway between social infrastructure and wellbeing, operates through increases in perceived social cohesion, connection and belonging (Cattell et al., 2008; Orton et al., 2017; Ross and Searle, 2019; Atkinson et al., 2020).

Social cohesion and sense of belonging directly influence subjective wellbeing by reducing feelings of social isolation, enhancing residential satisfaction (Gale et al., 2011) and improving sense of safety (Ruijsbroek et al., 2015). Social cohesion and belonging can indirectly incur physical health benefits by reducing psychological stressors and encouraging outdoor activity such as walking (Wen et al., 2007). Studies report that sense of belonging to the local community is associated with better general health (Ross, 2002; Michalski et al., 2020; Shields, 2008; Holt-Lunstad et al., 2010), psychological health (Shields, 2008) and overall subjective wellbeing (Gale et al., 2011; Thoits, 1995; Carpiano and Hystad, 2011; Nejade et al., 2022; Thoits, 2011).

Living in close proximity to social infrastructure affords greater opportunities for individuals to encounter other residents and visitors and it is through these social contacts that social cohesion and belonging develop (Finlay et al., 2019; Finlay et al., 2020; Van Bergeijk et al., 2008; Gehl, 2011; Wood et al., 2017). The term social infrastructure encompasses both public institutions provided for the general community by the City or State (eg parks, footpaths, libraries); alongside facilities that operate as commercial entities but are open to the public (eg retail, food outlets) (Latham and Layton, 2019). Scholars suggest social infrastructure facilitates collective life and generates sense of community belonging by providing opportunities for residents and frequent visitors to observe each other engaged in similar activities and shared pursuits, encounter familiar faces and engage in incidental social contact (Gehl, 2011; Amin and Thrift, 2017; Jacobs, 1961; Sennett, 2017). Empirical studies show that individuals who live in close proximity to public parks (Wood et al., 2017; Liu et al., 2017), shops (retail) (Lund, 2003; Wood et al., 2010) and other amenities (including third spaces) (Klinenberg, 2018) are more physically active in the neighborhood (Duncan et al., 2005; Kepper et al., 2019), and report stronger sense of community

(Lund, 2003; Wood et al., 2010).

Of the many types of social infrastructure assets that comprise urban neighborhoods greenspaces are among those most frequently regarded as affording residents' health and wellbeing benefits. Rates of depression and high blood pressure are lower in cities where adults spend more time in greenspaces (Shanahan et al., 2016) and perceived proximity of greenspaces is associated with higher perceived social cohesion (Stahlmann et al., 2022; Nejade et al., 2022). A recent scoping review reported (Nejade et al., 2022) that 92 percent of 39 captured studies identified health benefits associated with spending more time in greenspaces. Sturm and Cohen (2014) suggest that the mental health benefits of living near an urban park are the equivalent of those associated with reducing the local unemployment rates by 2 percentage points. Public libraries also occupy an important social and symbolic role in community life. Libraries provide physical places for social connection without obligation to purchase or consume (Houghton et al., 2013). Research suggests that libraries encourage social inclusion and foster civic engagement by creating a bridge between community resources and involvement (Scott, 2011). Informal, recurrent interactions between library staff and patrons can provide social support, reduce social isolation and enhance patron wellbeing (Johnson, 2012).

In addition to public institutions, neighborhood places found to be associated with wellbeing include facilities that operate as commercial entities but retain public character such as local businesses and retail services (Latham and Layton, 2019). Deceptive in their ordinariness (Finlay et al., 2019: 1) retail and food services are reliable, convenient and non-obligatory sources of daily social contact for otherwise isolated individuals (Finlay et al., 2019; Lee and Tan, 2019; Graham et al., 1991; Cheang, 2002). They are essential settings for social connection and community building (Tan and Lee, 2022; Finlay et al., 2021). Drawing on a large health dataset, Finlay and colleagues (2019) found a direct and positive association between the density of fast-food restaurants in the neighborhood and cognitive functioning among older Americans. After conducting in-depth interviews with a sub-sample of their study participants, Finlay et al (2019) found that fast-food restaurants were popular places for older Americans to spend time because they were perceived as comfortable and affordable sites for social interaction (Finlay et al., 2019; Tan and Lee, 2022). Other studies also draw attention to the importance of interactions with staff and other customers in hospitality and retail settings for emotional and social wellbeing of older adults (Altinay et al., 2019; Song et al., 2018; Finlay et al., 2021).

Research has established that social infrastructure can facilitate wellbeing and scholars have proposed enhanced social contacts and perceived cohesion as a potential pathway through which wellbeing benefits are accrued (Atkinson et al., 2020; Curtis, 2010; Williams, 2007). Contemporary conceptual frameworks draw on Maslow's (1943) hierarchy of needs to theorise that, beyond basic physiological needs, safety, social stability and sense of belonging are required for human wellbeing. For example, Lakey and colleagues' (2016) relational regulation theory (RRT), suggests that ordinary social interactions contribute to subjective wellbeing by satisfying individuals' need for belonging (Maslow, 1943). Similarly, Davern et al (2017) propose a conceptual framework demonstrating that social infrastructure contributes to wellbeing by directly effecting behaviours, which incur intermediate outcomes and long-term health benefits. Consistent with Barton and Pretty (2010) healthy neighborhood design principles, Davern's framework describes an indirect effect of social infrastructure on wellbeing facilitated through multiple pathways, one of which is the promotion of place-based social interactions and positive perceptions of community connection (Davern et al., 2017; Talen, 1999).

Despite these theoretical and conceptual developments, empirical studies elucidating the mediating role of social factors in the relationship between social infrastructure and wellbeing remains limited (Aneshensel and Sucoff, 1996; Wood and Giles-Corti, 2008). At the time of publication, we are aware of only one study that has demonstrated

empirical support for the mediating effect of higher social interactions on the link between social infrastructure and improvements in wellbeing (Domènech-Abella et al., 2020). Therefore, our study contributes to the limited empirical understanding of social infrastructure in its capacity to act as an important public health asset by facilitating wellbeing through social cohesion. The results of this research will provide empirical evidence to inform place-based public health strategies that facilitate social connectedness and sense of belonging for improved subjective wellbeing.

3. Methods

3.1. Data

This study draws on self-report survey data collected online and via telephone from a randomly recruited panel of Australians aged 18 years of over. Data were collected between 15 March to 28 March 2022 by the Social Research Centre from 1,015 active Life in Australia™ members (<https://srcentre.com.au/our-research#life-in-aus>).

Life in Australia is a randomly recruited panel of Australians. A total of 1,400 active panel members were invited to participate in the survey, 1,015 (72.5 %) completed the survey, 26.6% were unable to be contacted and 0.9 % refused. The survey took an average of 5.7 minutes to self-complete online and 21.5 minutes to complete over the phone.

The survey instrument contains 33 items that ask respondents about their daily activities, the places they frequently go and the interactions they have with people in their community. The survey also contains questions about perceptions of social cohesion, crime and individual wellbeing. The specific variables used in this study are outlined in detail below.

3.1.1. The social research centre life in Australia panel

The Social Research Centre's Life in Australia™ panel was established in 2016. Original members were recruited using a dual-frame random digit dialling (RDD) sample design with a 30:70 split between the landline RDD sample frame and mobile phone RDD sample frame. Respondents provided their contact details so that they could take part in surveys on a regular basis. The panel was refreshed annually between 2018 and 2021 with a proportion of members being retired each year and new members recruited. This recruitment used a combination of methodologies: G-NAF (Geocoded National Address File) sample frame and push-to-web and mobile RDD sample frame. Life in Australia™ includes people both with and without internet access. Those without internet access or those who are not comfortable completing surveys over the internet are able to complete surveys by telephone. Life in Australia™ members receive a small incentive for joining the panel and another incentive for each survey they complete (value of \$10).

3.2. Dependent variables

Subjective wellbeing: Subjective wellbeing is a scale constructed from three survey items. The first asks respondents to report their overall life satisfaction on a scale of 1 to 10. The other two items are measured on a scale of 1 to 5 and ask respondents to rate their general physical health from (1) poor to (5) excellent, and report how often in the last four weeks they have felt lonely where 1 is never and 5 is very often. The latter two items were rescaled to a denominator of 10 and an overall subjective wellbeing score was computed as the mean of the three items, measured on a scale of 1 to 10. The alpha reliability score for this scale is 0.669.

3.3. Independent variables

Social infrastructure: Despite the apparent ubiquity of social infrastructure, perceptions of neighborhood places can vary across individuals depending on multiple factors. Individuals living in the same

neighborhood may perceive proximate social infrastructure differently depending on where they are located in the neighborhood, their experiences of the neighborhood and their personal capacities and expectations (Bengoechea et al., 2005; Blacksher and Lovasi, 2012). Therefore, our measure of social infrastructure captures participants' perceptions of social infrastructure in their local neighborhood. Social infrastructure is a mean scale constructed from survey items that ask respondents how strongly they agree with four statements: (1) there are shops, cafes or services within a walkable distance in my neighborhood; (2) there are places in my neighborhood where people might say hello and chat informally; (3) there are well maintained walkways on most of the streets in my neighborhood; (4) my neighborhood has free or low-cost places to meet friends or interact with others. Responses are on a five-point likert scale ranging from strongly disagree to strongly agree. This scale has an alpha reliability score of 0.728. The items comprising this scale capture a diversity of resources in the neighborhood environment that have the potential to influence subjective wellbeing. Studies demonstrate that individuals who perceive services, shops and greenspaces to be more accessible are more likely to gain health benefits by engaging in walking for transport (Giles-Corti et al., 2013) and recreation respectively (Sallis et al., 2016; Kowitt et al., 2020). Studies also show that places perceived as being more socially vibrant are perceived as more attractive and mentally restorative (Subiza-Pérez et al., 2021; Klein et al., 2021), when compared to places that are perceived as lacking opportunities for social contact.

Social cohesion and belonging: Social cohesion and belonging is a nine-item scale with an alpha reliability score of 0.894. Survey participants are asked how strongly, on a scale of 1 (strongly disagree) to five (strongly agree), they agree with nine statements about their community. The full list of statements are listed in Appendix 1. The items comprising this scale have been used extensively in the place attachment and social cohesion literature (Sampson et al., 1997).

Perceived neighborhood crime: Perceived neighborhood crime is a mean score computed from responses to seven items that ask respondents how frequently in the last 12 months the following events have occurred in their neighborhood: (1) a violent argument or fight; (2) a robbery or mugging; (3) a burglary or break in; (4) a motor vehicle theft; (5) graffiti or vandalism; (6) drug use; (7) young people getting into trouble with police. Response options are on a scale of 1 to 5 and include: never; rarely; sometimes; often; always; daily.

Number of social ties in the neighborhood: Neighborhood social ties is a measure of social bonds (Sampson et al., 1997). This is captured using a single survey item that asks respondents "apart from the people you live with, how many friends or relatives live in your neighborhood?" Responses are measured on a scale of zero to ten or more.

Demographic characteristics: We control for social-demographic characteristics that are noted in the literature to influence individual wellbeing, routine activities and social interactions. These include sex at birth (0 = man; 1 = woman), age (1 = 18–34 years; 2 = 35–54 years; 3 = 55–64 years; 4 = 65 years and above years); marital status (0 = married; 1 = not married); employment status (1 = work full-time; 2 = work part-time; 3 = retired; 4 = unemployed looking for work; 5 = other duties), home ownership status (0 = own; 1 = rent) and language spoken at home (0 = English only; 1 = non-English speaking at home). We did not include age categories in the final analysis as employment and age are highly correlated in this sample and theoretically employment status is the more proximate influence on routine activities and use of spaces in an all-adult sample.

Location of residence: We also include a variable to control for regional place of residence. Regional Australian towns are less densely populated and developed than neighborhoods in the Capital cities, thus we expect that regional residence may influence the neighborhood context.

3.4. Analytic strategy

Following the Baron and Kenny (1986) process for mediation analysis, we estimate three linear regression models with robust standard errors. In Model 1 we examine the direct association between perceived neighborhood environment and wellbeing. In Model 2 we examine the direct association between perceived place availability and the mediating variable, community cohesion and belonging. In Model 3, we regress both perceived neighborhood environment and community cohesion and belonging on wellbeing. We compute the Sobel (1) (1982) and Goodman (2) (1960) tests to check for significant mediation effects (Preacher and Hayes, 2004).

$$z - value = a * b / \text{SQRT}(b^2 * sa^2 + a^2 * sb^2) \tag{1}$$

$$z - value = a * b / \text{SQRT}(b^2 * sa^2 + a^2 * sb^2 - sa^2 * sb^2) \tag{2}$$

Tests for multicollinearity revealed variance inflation scores (VIFs) were below 2.0. Summary statistics for the variables are presented in Table 1. Results of the three regression models are presented in Table 2.

4. Results

The sample has slightly more women (55.84 %, $n = 559$) than men (44.16%, $n = 442$). The majority of respondents are homeowners (73.73%, $n = 738$) compared to renters (23.10%, $n = 231$). Approximately one third of the sample were employed full-time (34.77 %, $n = 348$) while slightly more than a third were retired (36.56 %, $n = 366$). On average, respondents reported moderately high levels of subjective wellbeing ($M = 7.12$, $SD = 1.5$); social cohesion and belonging ($M = 3.51$, $SD = 0.62$), and; positive perceptions regarding proximate social infrastructure.

The results of the regression analyses are shown in Table 2. The dependent variable in Model 1 is subjective wellbeing. The results of

Table 1
Summary statistics ($N = 1000$)

Variables	Mean (SD)	Min	Max
Subjective wellbeing	7.12 (1.50)	1.33	10
Social cohesion & belonging	3.51 (0.62)	1	5
Social infrastructure	3.86 (0.74)	1	5
Number of social ties in the neighborhood	4.64 (3.73)	0	10
Perceived neighborhood crime and disorder	2.07 (.852)	1	6
	% (n)		
Sex:			
Male	44.16 % (442)		
Female	55.84 % (559)		
Married			
Yes	76.90 % (769)		
No	23.10 % (231)		
Age			
18-34 years	14.99 % (150)		
35-54 years	30.47 % (305)		
55-64 years	20.58 % (206)		
65 years or above	33.97 % (340)		
Home ownership:			
Own	73.73 % (738)		
Rent	26.27 % (263)		
Employment Status:			
Full time employed	34.77 % (348)		
Part time employed	17.78 % (178)		
Retired/ pension	36.56 % (366)		
Unemployed looking for work	2.40 % (24)		
Other duties	8.49 % (85)		
Language spoken at home			
English	83.92 % (840)		
Language other than English (LOTE)	16.08 % (161)		
Location of residence			
Capital city	69.10 % (691)		
Region	30.90 % (309)		

Model 1 demonstrate a positive association between perceptions of social infrastructure and subjective wellbeing. For every unit increase in perceived social infrastructure, subjective wellbeing is 0.39 units higher ($p < 0.001$). Perceived neighborhood crime is negatively associated with subjective wellbeing ($B = -0.26$, $p < 0.001$) while having more social ties in the neighborhood benefits subjective wellbeing ($B = 0.06$, $p < 0.001$). Women ($B = -0.26$, $p < 0.01$), unemployed persons ($B = -0.86$, $p < 0.01$) and renters ($B = -0.49$, $p < 0.01$) report lower levels of wellbeing than men, employed persons and homeowners respectively. All associations in this model are in the expected directions.

The dependent variable in Model 2 is perceived social cohesion and belonging. According to the results of Model 2 there is a positive association between perceived social infrastructure and social cohesion and belonging. A 1 unit increase on the perceived social infrastructure scale is associated with a 0.20 unit increase on the social cohesion scale ($p < 0.001$). Perceived neighborhood crime is associated with lower perceptions of social cohesion and belonging ($B = -0.20$, $p < 0.001$) while having more social ties in the neighborhood is associated with higher perceptions of social cohesion and belonging ($B = 0.05$, $p < 0.001$). The direction of these relationships are as expected. Compared to homeowners, individuals who rent ($B = -0.11$, $p < 0.01$) have lower perceptions of social cohesion and belonging. Speaking a language other than English at home is also negatively associated with perceived social cohesion and sense of belonging ($B = -0.14$, $p < 0.05$), when compared to individuals who speak English only. Individuals who reside in regional neighborhoods perceive higher social cohesion and belonging than those who live in neighborhoods in capital cities ($B = 0.14$, $p < 0.001$).

Model 3 is the full mediation model. The dependent variable is subjective wellbeing. The results show that both perceived social cohesion and belonging ($B = 0.30$, $p < 0.001$) and perceived social infrastructure ($B = 0.33$, $p < 0.001$) are positively and significantly associated with subjective wellbeing. The coefficient associated with perceived social infrastructure diminishes from $B = 0.39$ ($p < 0.001$) in Model 1 to $B = 0.33$ ($p < 0.001$) in Model 3 with the addition of social cohesion. This suggests that the influence of perceived social infrastructure on wellbeing is partially mediated through perceived social cohesion and belonging. The results of the Sobel ($z = 4.65$, $p < 0.001$) and Goodman's ($z = 4.68$, $p < 0.001$) tests confirm that perceived social cohesion and belonging significantly mediates the relationship between perceived social infrastructure and subjective wellbeing. As in Model 1, in Model 3, perceived crime is negatively associated with wellbeing ($B = -0.21$, $p < 0.001$) while having more social ties in the neighborhood has a positive association with subjective wellbeing ($B = 0.04$, $p < 0.001$). Women ($B = -0.36$, $p < 0.001$), renters ($B = -0.56$, $p < 0.001$) and unemployed persons ($B = 0.82$, $p < 0.001$) report lower levels of subjective wellbeing than men, homeowners and employed persons respectively.

Taken together the results of the three models suggest there is a significant *direct* association between perceived social infrastructure and subjective wellbeing ($B = 0.39$, $\beta = 0.19$, $SE = 0.07$, $p < .001$), perceived social infrastructure and social cohesion and belonging (path a) ($B = 0.20$, $\beta = 0.24$, $SE = 0.03$, $p < .001$) and an *indirect* association between perceived social infrastructure and subjective wellbeing via enhanced social cohesion and belonging ($B = 0.33$, $\beta = 0.16$, $SE = 0.06$, $p < .001$). The results also show that when incorporated into Model 3, the direct association between social cohesion and belonging and subjective wellbeing is significant (path b) ($B = 0.30$, $\beta = 0.12$, $SE = 0.08$, $p < .001$) (Fig. 1).

Social infrastructure can influence subjective wellbeing by effecting opportunities for social contacts, social cohesion and sense of belonging. In this study we demonstrate that residing in close proximity to social infrastructure has a direct and positive influence on subjective wellbeing. We also show that the link between proximate social infrastructure and wellbeing is partially mediated through perceived social cohesion and sense of belonging. This finding aligns with our hypothesis and recent research that suggests (1) social infrastructure can facilitate ordinary social interactions which, in turn, are linked with positive

Table 2
Linear regression models examining mediating role of social cohesion and belonging on link between perceived social infrastructure and subjective wellbeing.

	Model 1: Subjective wellbeing			Model 2: Social cohesion & belonging			Model 3: Subjective wellbeing		
	B	SE		B	SE		B	SE	
Social cohesion & belonging							0.295	0.082	***
Perceived social infrastructure	0.389	0.066	***	0.199	0.027	***	0.330	0.064	***
Number of social ties in the neighborhood	0.056	0.058	***	0.052	0.005	***	0.041	0.013	**
Perceived neighborhood crime	-0.258	0.012	***	-0.204	0.021	***	-0.198	0.062	**
Sex (ref: man)									
Woman	-0.275	0.092	**	0.024	0.036		-0.283	0.093	**
Age (ref. 18-34 years)									
35-54 years	0.076	0.143		-0.003	0.059		0.077	0.141	
55-64 years	0.388	0.169	*	0.006	0.064		0.385	0.167	*
65-and above years	0.767	0.189	***	0.057	0.074		0.750	0.187	***
Married (ref: yes)									
No	-0.270	0.106	*	0.010	0.041		-0.273	0.107	*
Language spoken at home (ref: English)									
Language other than English	-0.079	0.132		-0.1145	0.049	*	-0.045	0.130	
Home ownership (ref: own)									
Rent	-0.488	0.112	**	-0.112	0.044	*	0.455	0.110	***
Employment status (ref: Work full-time)									
Work part-time	0.041	0.110		-0.081	0.055		-0.079	0.131	
Retired/pension	-0.346	0.126	**	-0.155	0.061	*	-0.480	0.151	**
Unemployed looking for work	-0.864	0.274	**	-0.087	0.095		-0.925	0.302	**
Other duties	-0.304	0.166		-0.148	0.064	*	-0.390	0.178	*
Location of residence (ref: Capital city)									
Region	0.137	0.083		0.139	0.038	***	0.70	0.094	
Constant	3.919	0.161		2.969	0.136	***	5.519	0.443	***
R ²	0.216		0.307			0.226			
F (15, 984)	18.21***		27.48***			17.17***			
RMSE	1.34		0.524			1.33			
AIC	3442.36		1562.09			3430.97			

NOTES: n = 1000.

*p<0.05;

**p<0.01;

***p<0.0015.0 Discussion

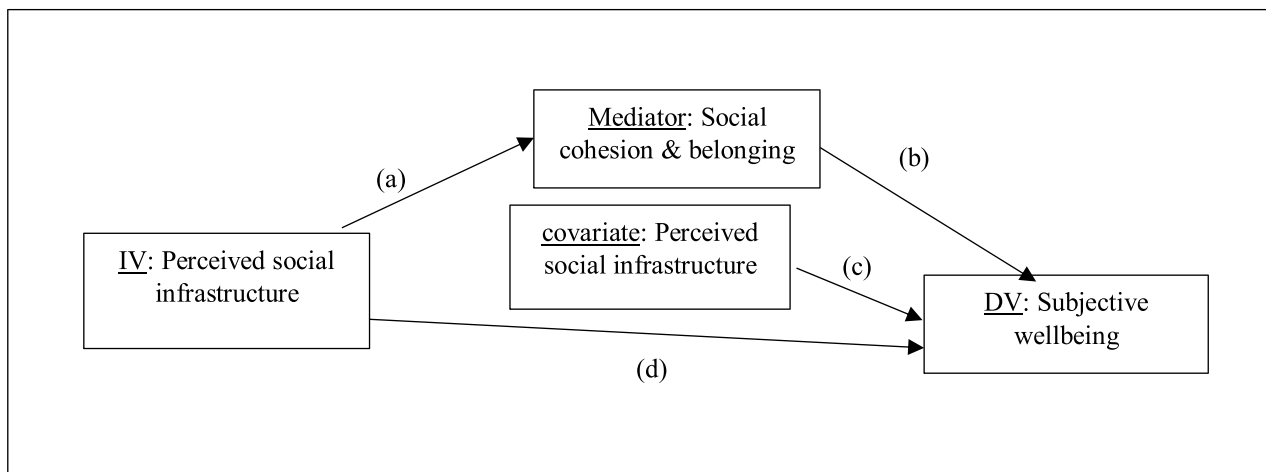


Fig. 1. Mediation model reporting the direct and indirect effect of perceived social infrastructure on subjective wellbeing.

(a) B = 0.20, p < 0.001; (b) B = 0.30, p < 0.001; (c) B = 0.33, p<0.001; (d) B = 0.39, p < 0.001.

affect (Blakely and Salmond, 2002) and contribute to perceived social cohesion (Talen, 1999; Klinenberg, 2018; Latham and Layton, 2019); (2) perceived social cohesion and belonging influence subjective wellbeing by satisfying individuals’ need to “belong to the group” (Maslow, 1943: 379; Thoits, 2011). The results of our study confirm the importance of social infrastructure as a catalyst for social connection, community cohesion and subjective wellbeing (Talen, 1999; Barton et al., 2021; Wickes et al., 2018).

Three key findings emerge from our study. First, the results confirm our hypothesis that perceived social cohesion and belonging act to partially mediate the association between social infrastructure and

wellbeing. This aligns with theoretical assumptions regarding social infrastructure and with the findings of two empirical studies that have looked at the mediating role of social cohesion in the relationship between walkability and wellbeing (Sugiyama et al., 2008) and green-spaces and wellbeing (Maas et al., 2009). Similar to our findings, Sugiyama (2008) demonstrated that the association between neighborhood walkability and wellbeing was mediated by frequency of social interactions in the street. Additionally, Maas et al. (2009) found that perceived social support mediated the effect of total neighborhood greenspace on wellbeing. Our findings extend on these previous studies by demonstrating the capacity for social cohesion to develop in a suite of

proximate places that go beyond outdoor walkways and greenspaces. This aspect of our study is important because individuals' activity spaces incorporate a range of place types depending on lifestyle, demographic and geographic characteristics. While some individuals are inclined to visit green spaces others are more likely to attend indoor facilities such as shops or cafes (Finlay et al., 2020). Our results suggest that ordinary places people visit during routine activities can provide wellbeing benefits if they are perceived as positive social environments. That is, the utility of ordinary places in the community goes beyond their functional use and the true wellbeing benefits of places lies in their capacity to act as social conduits (Wickes et al., 2018).

While individuals may visit a place to engage in its primary function (e.g. physical activity, shopping, dining), wellbeing benefits are partly a by-product of simply being at places alongside other people. Passive social interaction afforded through observing others and conducting everyday activities alongside fellow members of the community can enhance perceived social cohesion and sense of belonging which is pivotal for wellbeing (Cattell et al., 2008; Felder, 2020,2021; Maslow, 1943). Our study suggests that it is not the type of physical place per se, that is important for accruing wellbeing benefits. Instead, wellbeing benefits depend on whether the place provides for social contact and the promotion of social cohesion. This finding aligns with emerging literature highlighting the importance of everyday places like retail and fast-food services for social contact, particularly in the lives of older adults and those who would otherwise experience social isolation (Calise et al., 2019; Crick, 2011; Cheang, 2002; Rosenbaum et al., 2020; Finlay et al., 2019). These ordinary places provide affordable and non-obligatory social environments that are maintained, well-lit, supervised and are accessible in most residential neighborhoods (Lane et al., 2020; Ferreira et al., 2021).

Second, we find a direct relationship between social infrastructure and wellbeing remains after accounting for the mediating effect of social cohesion and belonging. This suggests that perceived quality, safety and accessibility of residentially proximate social infrastructure influences wellbeing through other mechanisms in addition to benefiting social cohesion and belonging. These mechanisms may include increased physical activity such as recreational walking (Van Dyck et al., 2013; Kowitt et al., 2020) and increased feelings of safety resulting in lower anxiety (Zhang and Lin, 2011; Mouratidis, 2021). The latter interpretation of the results is supported by our findings related to perceived crime, which we found to be negatively associated with wellbeing.

Safety is a central component of perceptions of the physical environment and, in turn, decisions to access social infrastructure (Foster et al., 2016; Syropoulos, 2022). Thus, while designing neighborhoods with proximate amenities and walking paths is one strategy to facilitate cohesive, healthy communities, ensuring ongoing maintenance and guardianship at social infrastructure assets is essential to achieve a perception among residents that neighborhood places are safe, social and useable (Poyser, 2005; Syropoulos, 2022; Wood et al., 2008; Letki and Steen, 2021). Indeed, studies show that individuals' perceptions of the physical environment matter more for determining propensity to use places and wellbeing benefits associated with use, than the actual features that are available (Zhang et al., 2019). Similarly, a large body of research on neighborhood disorder indicates that visible signs of disorder are associated with higher perceived crime, higher fear of crime and can dissuade legitimate use of public facilities (Hur and Nasar, 2014; Mouratidis, 2021). This suggests that healthy neighborhoods are not just a concern for urban design and planning. Ongoing involvement in the maintenance and safety of public places is vital to ensure that they are perceived positively by the public (Dempsey, 2008), are actively utilised and can facilitate social cohesion and wellbeing (Letki and Steen, 2021).

Our third key finding reiterates the direct impact of perceived social cohesion and belonging on subjective wellbeing. This is consistent with research that demonstrates residents who report greater community connection have higher levels of wellbeing (Ross et al., 2021; Davidson and Cotter, 1991; Royal and Rossi, 1996) and studies that note feelings

of belongingness are linked to subjective reports of wellbeing (Lambert et al., 2013; Ross et al., 2019; Quinn et al., 2021). Beyond individual benefits, previous research demonstrates that social cohesion and belonging delivers collective benefits at the neighborhood level pertaining to crime prevention (Hirschfield and Bowers, 1997), disaster resilience (Quinn et al., 2021) and reduced risks of child maltreatment (Maguire-Jack et al., 2021). These social processes at the collective level can then facilitate the ongoing maintenance and safety of public spaces with implications for individual subjective wellbeing.

5.1. Limitations

Overall, this study adds to the literature on by demonstrating that perceived social cohesion and belonging partially mediates the link between social infrastructure and subjective wellbeing. However, this study has a number of limitations that leave work for future research. The findings presented here are based only on individual perceptions of the quality, safety and usability of social infrastructure in close proximity to the residential home. The survey data used in the study were completely anonymous and did not include address data therefore it was not possible to account for the objective presence or quality of proximate social infrastructure. Given research shows that perceived environment is the primary antecedent to visitation preferences rather than objective place availability (Zhang et al., 2019) we are confident that the results presented here are meaningful and represent an extension to the current empirical literature. However, we suggest that future research should repeat the analyses while controlling for objective environmental features. We also suggest that further analysis is required to better understand the relationship between perceived safety, as a specific aspect of place perceptions, and social cohesion to more clearly articulate initiatives that can successfully promote social cohesion through place-based strategies such as enhanced lighting, maintenance and scheduling of legitimate activities to create sociality in underused places.

6. Conclusion

Through the years, scholars have articulated the valuable role that social factors play in the maintenance of human wellbeing and cities around the world have implemented public health strategies that aim to enhance social cohesion and community engagement through urban design and planning (Gehl, 2011; Barton et al., 2021). The link between social infrastructure and wellbeing is complex because much relies on *perceptions of places*, specifically the perceived *social quality and safety* of places that are objectively present. At the time this study was conducted, the world was emerging from the covid-19 pandemic and for the first time in almost two years, individuals in Australia were able to engage with social infrastructure in a meaningful way. From the results reported here we cannot discern the impacts of covid-19 on perceived safety, nor can we determine the extent to which the recency of stay-at-home orders and mobility restrictions may have enhanced the frequency and importance of engaging in social contacts provided by social infrastructure for subjective wellbeing. Studies show that during the pandemic, the closure of a many social infrastructure assets resulted in less frequent social interactions in the community and an increase in reports of social isolation (Cannon et al., 2023; Finlay et al., 2019). It is plausible that social contacts and perceived cohesion at ordinary places took on a new-found importance after experiencing periods when social infrastructure was not available. This may in part explain the links between social infrastructure, social cohesion and subjective wellbeing

highlighted in our results¹. Regardless of the pandemic effect, this study contributes valuable evidence to support the need for urban design and planning that facilitates and maintains social infrastructure in close proximity to residential neighborhoods. Our findings are novel because we highlight that it is not the type of physical place per se that matters for accruing wellbeing benefits but rather the capacity for the place to facilitate social contact, sense of cohesion and belonging.

Understanding the relationship between proximate social infrastructure and subjective wellbeing can help us to understand how social structures, processes and policies shape geographically bounded health inequalities and inform strategies to support wellbeing through urban planning (Carpiano, 2006). Designing and maintaining neighborhoods that support subjective wellbeing can reduce public and population health costs (Ambrey, 2016). Municipal councils and governments have started to recognise the social and wellbeing benefits of social infrastructure and incorporate social infrastructure strategies into their urban development plans. Empirical evidence to guide and inform these strategies is vitally important to ensure socially sustainable, healthy urban settlements for the future.

Appendix 1. Social cohesion and belonging scale

Social cohesion and belonging scale

How strongly do you agree with the following statements (responses 1"strongly disagree"- 5"strongly agree")

1. People in my neighbourhood are willing to help their neighbours
2. This is a close-knit community
3. People in this neighbourhood generally get along
4. People in this neighbourhood do not share the same values (reverse coded)
5. At this time in my life, this is the ideal neighbourhood for me
6. I feel like I belong in this neighbourhood
7. It would be hard for me to leave this neighbourhood
8. I believe my neighbours would help me in an emergency
9. Living in this neighbourhood gives me a sense of community

References

- Altinay, L, Song, H, Madanoglu, M, et al., 2019. The influence of customer-to-customer interactions on elderly consumers' satisfaction and social well-being. *Int. J. Hosp. Manage* 78, 223–233.
- Ambrey, CL, 2016. Urban greenspace, physical activity and wellbeing: The moderating role of perceptions of neighbourhood affability and incivility. *Land. Use Policy*, 57, 638–644.
- Amin, A, Thrift, N, 2017. *Seeing like a City*. John Wiley & Sons.
- Aneshensel, C.S., Sucoff, C.A., 1996. The neighborhood context of adolescent mental health. *Journal of health and social behavior* 293–310.
- Appau, S, Churchill, SA, Farrell, L, 2019. Social integration and subjective wellbeing. *Appl. Econ* 51 (16), 1748–1761.
- Appiah, D, Luitel, S, Fuentes, N, et al., 2022. Perceived neighborhood social cohesion and the 10-year risk of cardiovascular disease in low- and middle-income countries: the world health organization study on global aging and adult health. *Health Place* 77, 102895.
- Atkinson, S, Bagnall, A-M, Corcoran, R, et al., 2020. Being well together: individual subjective and community wellbeing. *J. Happiness. Stud.* 21 (5), 1903–1921.
- Australian Bureau of Statistics (2023) *Working from home remains popular but less than in 2021*. Available at: <https://www.abs.gov.au/media-centre/media-releases/workin-g-home-remains-popular-less-2021> (accessed 13 March 2023).
- Baron, RM, Kenny, DA, 1986. The Moderator mediator variable distinction in social psychological-research - conceptual, strategic, and statistical considerations. *J. Pers. Soc. Psychol.* 51 (6), 1173–1182.
- Barton H, Grant M and Guise R (2021) *Shaping neighbourhoods: for local health and global sustainability*. Routledge.
- Barton, J., Pretty, J., 2010. What is the Best Dose of Nature and Green Exercise for Improving Mental Health? A Multi-Study Analysis. *Environ. Sci. Technol.* 44 (10), 3947–3955.
- Bengochea, EG, Spence, JC, McGannon, KR, 2005. Gender differences in perceived environmental correlates of physical activity. *Int. J. Behav. Nutr. Phys. Activity* 2 (1), 12.
- Bertossi Urzua, C, Ruiz, MA, Pajak, A, et al., 2019. The prospective relationship between social cohesion and depressive symptoms among older adults from Central and Eastern Europe. *J. Epidemiol. Community Health* 73 (2), 117–122.
- Blacksher, E, Lovasi, GS, 2012. Place-focused physical activity research, human agency, and social justice in public health: Taking agency seriously in studies of the built environment. *Health Place* 18 (2), 172–179.
- Blakely, T, Salmond, C, 2002. Probabilistic record linkage and a method to calculate the positive predictive value. *Int. J. Epidemiol.* 31 (6), 1246–1252.
- Calise, TV, Chow, W, Ryder, A, et al., 2019. Food access and its relationship to perceived walkability, safety, and social cohesion. *Health Promot. Pract.* 20 (6), 858–867.
- Cannon, ML, Bergman, L, Finlay, JM, 2023. COVID-19 pandemic impacts on community connections and third place engagement: a qualitative analysis of older Americans. *J. Aging Environ.* 1–17. <https://doi.org/10.1080/26892618.2023.2225179>.
- Carpiano, RM, 2006. Toward a neighborhood resource-based theory of social capital for health: Can Bourdieu and sociology help? *Soc. Sci. Med.* (1967) 62 (1), 165–175.
- Carpiano, RM, Hystad, PW, 2011. Sense of community belonging" in health surveys: what social capital is it measuring? *Health Place* 17 (2), 606–617.
- Cattell, V, Dines, N, Gesler, W, et al., 2008. Mingling, observing, and lingering: everyday public spaces and their implications for well-being and social relations. *Health Place* 14 (3), 544–561.
- Cheang, M, 2002. Older adult's frequent visits to a fast-food restaurant: nonobligatory social interaction and the significance of play in a "third place". *J. Aging Stud.* 16 (3), 303–321.

¹ It is worth noting that some studies also found that some individuals who shifted to using virtual social infrastructure during the pandemic have not returned to offline physical spaces preferring instead to continue to engage with online workouts, home delivery of groceries and interaction through social media groups (Cannon et al., 2023; Finlay et al., 2019).

- Corcoran, J, Kimpton, A, Zahnow, R, et al., 2019. The temporality of place: constructing a temporal typology of crime in commercial precincts. *Environ. Plann. B Urban Anal. City Sci.* accepted 4 April 2019.
- Cramm, JM, van Dijk, HM, Nieboer, AP, 2013. The importance of neighborhood social cohesion and social capital for the well being of older adults in the community. *Gerontologist* 53 (1), 142–152.
- Crick, AP, 2011. *New Third Places: Opportunities and Challenges*. Emerald Group Publishing Limited.
- Davern, M, Gunn, L, Whitzman, C, et al., 2017. Using spatial measures to test a conceptual model of social infrastructure that supports health and wellbeing. *Cities. Health* 1 (2), 194–209.
- Davidson, WB, Cotter, PR, 1991. The relationship between sense of community and subjective well-being: a first look. *J. Commun. Psychol.* 19 (3), 246–253.
- Dempsey, N, 2008. Does quality of the built environment affect social cohesion? *Proc. Inst. Civil Eng. Urban Des. Plann.* 161 (3), 105–114.
- Diener, E, 2000. Subjective well-being: The science of happiness and a proposal for a national index. *Am. Psychol.* 55, 34–43.
- Diener, E, Eunkook, SM, 2017. Subjective well-being and age: an international analysis. *Annu. Rev. Gerontol. Geriatr.* 17 (1), 304–324.
- Domènech-Abella, J, Mundó, J, Leonardi, M, et al., 2020. Loneliness and depression among older European adults: The role of perceived neighborhood built environment. *Health Place* 62, 102280.
- Duncan, MJ, Spence, JC, Mummery, WK, 2005. Perceived environment and physical activity: a meta-analysis of selected environmental characteristics. *Int. J. Behav. Nutr. Phys. Activity* 2 (1), 11.
- Evans, GW, 2003. The built environment and mental health. *J. Urban Health* 80 (4), 536–555.
- Felder, M, 2020. Strong, weak and invisible ties: a relational perspective on urban coexistence. *Sociology.* 54 (4), 675–692.
- Felder, M, 2021. Familiarity as a practical sense of place. *Sociol. Theory.* 39 (3), 180–199.
- Ferreira, J, Ferreira, C, Bos, E, 2021. Spaces of consumption, connection, and community: Exploring the role of the coffee shop in urban lives. *Geoforum.* 119, 21–29.
- Finlay, J, Esposito, M, Kim, MH, et al., 2019. Exploring potential consequences for collective health and wellbeing. *Health Place* 60, 102225.
- Finlay, J, Esposito, M, Li, M, et al., 2021. Can neighborhood social infrastructure modify cognitive function? A mixed-methods study of urban-dwelling aging Americans. *J. Aging Health* 33 (9), 772–785.
- Finlay, J, Esposito, M, Tang, S, et al., 2020. Fast-food for thought: retail food environments as resources for cognitive health and wellbeing among aging Americans? *Health Place* 64, 102379.
- Foster, S, Hooper, P, Knuiaman, M, et al., 2016. Are liveable neighbourhoods safer neighbourhoods? Testing the rhetoric on new urbanism and safety from crime in Perth, Western Australia. *Soc. Sci. Med.* (1967) 164, 150–157.
- Frank, LD, Saelens, BE, Powell, KE, et al., 2007. Stepping towards causation: do built environments or neighborhood and travel preferences explain physical activity, driving, and obesity? *Soc. Sci. Med.* (1967) 65 (9), 1898–1914.
- Fraser, T, Feeley, O, Ridge, A, et al., 2024. How far I'll go: Social infrastructure accessibility and proximity in urban neighborhoods. *Landsc. Urban. Plan.* 241, 104922.
- Gale, CR, Dennison, EM, Cooper, C, et al., 2011. Neighbourhood environment and positive mental health in older people: the hertfordshire cohort study. *Health Place* 17 (4), 867–874.
- Gehl, J, 2011. *Life Between Buildings: Using Public Space*. Island Press.
- Giles-Corti, B, Bull, F, Knuiaman, M, et al., 2013. The influence of urban design on neighbourhood walking following residential relocation: Longitudinal results from the RESIDE study. *Soc. Sci. Med.* (1967) 77, 20–30.
- Graham, DF, Graham, I, MacLean, MJ, 1991. Going to the mall: a leisure activity of urban elderly people. *Canad. J. Aging /La Revue canadienne du vieillissement* 10 (4), 345–358.
- Hirschfield, A, Bowers, KJ, 1997. The effect of social cohesion on levels of recorded crime in disadvantaged areas. *Urban Stud.* 34 (8), 1275–1295.
- Holt-Lunstad, J, Smith, TB, Layton, JB, 2010. Social relationships and mortality risk: a meta-analytic review. *PLoS. Med.* 7 (7), e1000316.
- Houghton, K, Foth, M, Miller, E, 2013. The continuing relevance of the library as a third place for users and non-users of IT: the case of Canada Bay. *Aust. Libr. J.* 62 (1), 27–39.
- Hur, M, Nasar, JL, 2014. Physical upkeep, perceived upkeep, fear of crime and neighborhood satisfaction. *J. Environ. Psychol.* 38, 186–194.
- Islam, SJ, Kim, JH, Baltrus, P, et al., 2022. Neighborhood characteristics and ideal cardiovascular health among Black adults: results from the Morehouse-Emory Cardiovascular (MECA) Center for Health Equity. *Ann. Epidemiol.* 65, 120 e121-120. e110.
- Jacobs J (1961) *The Death and Life of Great American Cities*. New York: Random House.
- Johnson, CA, 2012. How do public libraries create social capital? An analysis of interactions between library staff and patrons. *Libr. Inf. Sci. Res.* 34 (1), 52–62.
- Kawachi, I, Berkman, L, 2000. Social cohesion, social capital, and health. *Soc. Epidemiol.* 174 (7), 290–319.
- Kepper, MM, Myers, CA, Denstel, KD, et al., 2019. The neighborhood social environment and physical activity: a systematic scoping review. *Int. J. Behav. Nutr. Phys. Activity* 16 (1), 124.
- Kim, ES, Kawachi, I, 2017. Perceived Neighborhood Social Cohesion and Preventive Healthcare Use. *Am. J. Prev. Med.* 53 (2), e35–e40.
- Klein, W, Dove, MR, Felson, AJ, 2021. Engaging the unengaged: understanding residents' perceptions of social access to urban public space. *Urban. For. Urban. Green.* 59, 126991.
- Klinenberg, E, 2018. *Palaces for the People: How Social Infrastructure can Help Fight Inequality, Polarization, and the Decline of Civic Life*. Crown.
- Kowitz, SD, Aiello, AE, Callahan, LF, et al., 2020. Associations among neighborhood poverty, perceived neighborhood environment, and depressed mood are mediated by physical activity, perceived individual control, and loneliness. *Health Place* 62, 102278.
- Lakey, B, Orehek, E, 2011. Relational regulation theory: a new approach to explain the link between perceived social support and mental health. *Psychol. Rev.* 118 (3), 482.
- Lakey, B, Vander Molen, RJ, Fles, E, et al., 2016. Ordinary social interaction and the main effect between perceived support and affect. *J. Pers.* 84 (5), 671–684.
- Lambert, NM, Stillman, TF, Hicks, JA, et al., 2013. To belong is to matter: sense of belonging enhances meaning in life. *Personal. Soc. Psychol. Bull.* 39 (11), 1418–1427.
- Lane, AP, Hou, Y, Hooi, Wong C, et al., 2020. Cross-sectional associations of neighborhood third places with social health among community-dwelling older adults. *Soc. Sci. Med.* (1967) 258, 113057.
- Latham, A, Layton, J, 2019. Social infrastructure and the public life of cities: Studying urban sociality and public spaces. *Geogr. Compass.* 13 (7), e12444.
- Lee, JH, Tan, TH, 2019. **Neighborhood walkability or third places? Determinants of social support and loneliness among older adults.** *J. Plan. Educ. Res.* <https://doi.org/10.1177/0739456x19870295>.
- Letki, N, Steen, T, 2021. Social-psychological context moderates incentives to co-produce: evidence from a large-scale survey experiment on park upkeep in an urban setting. *Public Adm. Rev.* 81 (5), 935–950.
- Liu, H, Li, F, Li, J, et al., 2017. The relationships between urban parks, residents' physical activity, and mental health benefits: A case study from Beijing, China. *J. Environ. Manage* 190, 223–230.
- Lund, H, 2003. Testing the claims of new urbanism: local access, pedestrian travel, and neighboring behaviors. *J. Am. Plann. Assoc.* 69 (4), 414–429.
- Maas, J, van Dillen, SME, Verheij, RA, et al., 2009. Social contacts as a possible mechanism behind the relation between green space and health. *Health Place* 15 (2), 586–595.
- Maguire-Jack, K, Yoon, S, Hong, S, 2021. Social cohesion and informal social control as mediators between neighborhood poverty and child maltreatment. *Child Maltreat.* 27 (3), 334–343.
- Maslow, AH, 1943. A theory of human motivation. *Psychol. Rev.* 50 (4), 370–396.
- Michalski, CA, Diemert, LM, Helliwell, JF, et al., 2020. Relationship between sense of community belonging and self-rated health across life stages. *SSM. Popul. Health* 12, 100676.
- Montgomery C (2013) *Happy city: Transforming our Lives Through Urban Design*. Penguin UK.
- Mouratidis, K, 2018a. Built environment and social well-being: How does urban form affect social life and personal relationships? *Cities.* 74, 7–20.
- Mouratidis, K, 2018b. Rethinking how built environments influence subjective well-being: a new conceptual framework. *J. Urban. Int. Res. Placemak. Urban Sustain.* 11 (1), 24–40.
- Mouratidis, K, 2021. Urban planning and quality of life: a review of pathways linking the built environment to subjective well-being. *Cities.* 115, 103229.
- Mouratidis, K, Poortinga, W, 2020. Built environment, urban vitality and social cohesion: do vibrant neighborhoods foster strong communities? *Landsc. Urban. Plan.* 204, 103951.
- Nejade, RM, Grace, D, Bowman, LR, 2022. What is the impact of nature on human health? A scoping review of the literature. *J. Glob. Health* 12, 04099.
- Newman O (1972) *Defensible space*. Macmillan New York.
- Orton, L, Halliday, E, Collins, M, et al., 2017. Putting context centre stage: evidence from a systems evaluation of an area based empowerment initiative in England. *Crit. Public Health* 27 (4), 477–489.
- Poyser, S, 2005. Shopping Centre Design, Decline and Crime Papers. *Int. J. Police Sci. Manage.* 7 (2), 123–136.
- Preacher, KJ, Hayes, AF, 2004. SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behav. Res. Methods Instrum. Comput.* 36 (4), 717–731.
- Quinn, T, Adger, WN, Butler, C, et al., 2021. Community resilience and well-being: an exploration of relationality and belonging after disasters. *Ann. Am. Assoc. Geogr.* 111 (2), 577–590.
- Rosenbaum, MS, Friman, M, Ramirez, GC, et al., 2020. Therapeutic servicescapes: restorative and relational resources in service settings. *J. Retail. Consum. Serv.* 55, 102078.
- Ross, A, Godwyll, J, Searle, M, 2021. Walking mediates associations between the neighborhood environment and flourishing. *Wellbeing. Space Soc.* 2, 100014.
- Ross, A, Searle, M, 2019. Age related differences in neighborhood sense of community: impacts of the neighborhood environment and leisure time physical activity. *Int. J. Commun. Wellbeing.* 2 (1), 41–59.
- Ross, A, Talmage, CA, Searle, M, 2019. Toward a flourishing neighborhood: the association of happiness and sense of community. *Appl. Res. Qual. Life* 14 (5), 1333–1352.
- Ross, N, 2002. Community belonging and health Health reports /Statistics Canada, Canadian Centre for Health Information = Rapports sur la santé / Statistique Canada, Centre canadien d'information sur la santé 13 (3), 33–39.
- Royal, MA, Rossi, RJ, 1996. Individual-level correlates of sense of community: Findings from work-place and school. *J. Community Psychol.* 24 (4), 395–416.
- Ruijsbroek, A, Droomers, M, Groenewegen, PP, et al., 2015. Social safety, self-rated general health and physical activity: Changes in area crime, area safety feelings and the role of social cohesion. *Health Place* 31, 39–45.

- Saito, Y., 2007. *Everyday Aesthetics*. Oxford University Press on Demand.
- Saito, Y., 2021. The aesthetics of imperfection in everyday life. *Studies in Mistakes, Flaws, and Failures*, p. 23.
- Sallis, JF, Cerin, E, Conway, TL, et al., 2016. Physical activity in relation to urban environments in 14 cities worldwide: a cross-sectional study. *Lancet* 387 (10034), 2207–2217.
- Sampson, RJ, Raudenbush, SW, Earls, F, 1997. Neighborhoods and violent crime: A multilevel study of collective efficacy. *Science* 277 (5328), 918–924.
- Scott, R, 2011. The role of public libraries in community building. *Public Libr. Q.* 30 (3), 191–227.
- Sennett, R, 2017. *The Fall of Public Man*. WW Norton & Company.
- Shanahan, DF, Bush, R, Gaston, KJ, et al., 2016. Health benefits from nature experiences depend on dose. *Sci. Rep.* 6 (1), 28551.
- Shekhar, H, Schmidt, AJ, Wehling, H-W, 2019. Exploring wellbeing in human settlements - A spatial planning perspective. *Habitat. Int.* 87, 66–74.
- Shields, M, 2008. Community belonging and self-perceived health. *Health Rep.* 19 (2), 51–60.
- Silver, H, 2023. Working from Home: Before and After the Pandemic. *Contexts*. (Berkeley, Calif) 22 (1), 66–70.
- Song, H, Altinay, L, Sun, N, et al., 2018. The influence of social interactions on senior customers' experiences and loneliness. *Int. J. Contemp. Hospital. Manage.* 30 (8), 2773–2790.
- Stahlmann, K, Mena, E, Kuhnert, R, et al., 2022. Social inequalities in the association between social infrastructure and mental health: an observational cross-sectional analysis of children and adolescents in Germany. *Int. J. Environ. Res. Public Health* 19.
- Sturm, R, Cohen, D, 2014. Proximity to urban parks and mental health. *J. Ment. Health Policy. Econ.* 17 (1), 19–24.
- Subiza-Pérez, M, Pasanen, T, Ratcliffe, E, et al., 2021. Exploring psychological restoration in favorite indoor and outdoor urban places using a top-down perspective. *J. Environ. Psychol.* 78, 101706.
- Sugiyama, T, Leslie, E, Giles-Corti, B, et al., 2008. Associations of neighbourhood greenness with physical and mental health: do walking, social coherence and local social interaction explain the relationships? *J. Epidemiol. Community Health* (1978) 62 (5), e9.
- Syropoulos, S, 2022. The association of urban environment quality and perceived safety: Evidence from seven nationally representative samples. *Peace Confl. J. Peace Psychol.* <https://doi.org/10.1037/pac0000647>. No Pagination Specified-No Pagination Specified.
- Takano, T, Nakamura, K, Watanabe, M, 2002. Urban residential environments and senior citizens' longevity in megacity areas: the importance of walkable green spaces. *J. Epidemiol. Community Health* (1978) 56 (12), 913.
- Talen, E, 1999. Sense of community and neighbourhood form: an assessment of the social doctrine of new urbanism. *Urban studies* 36 (8), 1361–1379.
- Tan, TH, Lee, JH, 2022. Residential environment, third places and well-being in Malaysian older adults. *Soc. Indic. Res.* 162 (2), 721–738.
- Thoits, PA, 1995. **Stress, coping, and social support processes: where are we? What Next?** *J. Health Soc. Behav.* 53–79. <https://doi.org/10.2307/2626957>.
- Thoits, PA, 2011. Mechanisms Linking Social Ties and Support to Physical and Mental Health. *J. Health Soc. Behav.* 52 (2), 145–161.
- Van Bergeijk E, Bolt G and Van Kempen R (2008) **Social cohesion in deprived neighbourhoods in the Netherlands: The effect of the use of neighbourhood facilities.** *Annual meeting of the Housing Studies Association, York, UK.*
- Van Dyck, D, Cerin, E, Conway, TL, et al., 2013. Perceived neighborhood environmental attributes associated with adults' leisure-time physical activity: Findings from Belgium, Australia and the USA. *Health Place* 19, 59–68.
- Ward, Thompson C, Aspinall, P, Roe, J, et al., 2016. Mitigating stress and supporting health in deprived urban communities: the importance of green space and the social environment. *Int. J. Environ. Res. Public Health* 13 (4), 440.
- Wen, M, Kandula, NR, Lauderdale, DS, 2007. Walking for transportation or leisure: what difference does the neighborhood make? *J. Gen. Intern. Med.* 22 (12), 1674–1680.
- Wickes, R, Zahnow, R, Corcoran, J, et al., 2018. Neighbourhood social conduits and resident social cohesion. *Urban stud.* 56 (1), 226–248.
- Wood, L, Frank, LD, Giles-Corti, B, 2010. Sense of community and its relationship with walking and neighborhood design. *Soc. Sci. Med.* (1967) 70 (9), 1381–1390.
- Wood, L, Hooper, P, Foster, S, et al., 2017. Public green spaces and positive mental health – investigating the relationship between access, quantity and types of parks and mental wellbeing. *Health Place* 48, 63–71.
- Wood, L, Shannon, T, Bulsara, M, et al., 2008. The anatomy of the safe and social suburb: an exploratory study of the built environment, social capital and residents' perceptions of safety. *Health Place* 14 (1), 15–31.
- Zahnow, R, Kimpton, A, Corcoran, J, et al., 2022. Neighbourhood correlates of average population walking: using aggregated, anonymised mobile phone data to identify where people walk. *Health Place* 77, 102892.
- Zhang, H, Lin, S-H, 2011. Affective appraisal of residents and visual elements in the neighborhood: A case study in an established suburban community. *Landsc. Urban. Plan.* 101 (1), 11–21.
- Zhang, L, Zhou, S, Kwan, M-P, 2019. A comparative analysis of the impacts of objective versus subjective neighborhood environment on physical, mental, and social health. *Health Place* 59, 102170.