Social Science & Medicine 208 (2018) 25–33

Contents lists available at ScienceDirect

Social Science & Medicine

journal homepage: www.elsevier.com/locate/socscimed

Social isolation and loneliness in later life: A parallel convergent mixed-methods case study of older adults and their residential contexts in the Minneapolis metropolitan area, USA

Jessica M. Finlay[a,*], Lindsay C. Kobayashi[b,c]

[a] Department of Geography, Environment, and Society, University of Minnesota, Minneapolis, MN, USA
[b] Lombardi Comprehensive Cancer Center, Georgetown University, Washington, DC, USA
[c] Harvard Center for Population and Development Studies, Harvard T. H. Chan School of Public Health, Cambridge, MA, USA

ARTICLE INFO

Keywords:
United States
Mixed-methods
Residential context
Neighborhood
Social well-being
Aging
Geographical gerontology

ABSTRACT

Social isolation and loneliness are increasingly prevalent among older adults in the United States, with implications for morbidity and mortality risk. Little research to date has examined the complex person-place transactions that contribute to social well-being in later life. This study aimed to characterize personal and neighborhood contextual influences on social isolation and loneliness among older adults. Interviews were conducted with independent-dwelling men and women (n = 124; mean age 71 years) in the Minneapolis metropolitan area (USA) from June to October, 2015. A convergent mixed-methods design was applied, whereby quantitative and qualitative approaches were used in parallel to gain simultaneous insights into statistical associations and in-depth individual perspectives. Logistic regression models predicted self-reported social isolation and loneliness, adjusted for age, gender, past occupation, race/ethnicity, living alone, street type, residential location, and residential density. Qualitative thematic analyses of interview transcripts probed individual experiences with social isolation and loneliness. The quantitative results suggested that African American adults, those with a higher socioeconomic status, those who did not live alone, and those who lived closer to the city center were less likely to report feeling socially isolated or lonely. The qualitative results identified and explained variation in outcomes within each of these factors. They provided insight on those who lived alone but did not report feeling lonely, finding that solitude was sought after and enjoyed by a portion of participants. Poor physical and mental health often resulted in reporting social isolation, particularly when coupled with poor weather or low-density neighborhoods. At the same time, poor health sometimes provided opportunities for valued social engagement with caregivers, family, and friends. The combination of group-level risk factors and in-depth personal insights provided by this mixed-methodology may be useful to develop strategies that address social isolation and loneliness in older communities.

1. Introduction

Social isolation and loneliness are increasingly recognized in academic literature and popular media discourse as risks to physical health and well-being among older adults in the United States. Approximately one-third of Americans aged ≥60 years are estimated to feel lonely (Wilson and Moulton, 2010), and one-quarter of those aged ≥65 years are estimated to live alone (Stepler, 2016). Social isolation is defined as a measurable lack of social relationships, while loneliness is an affective state reflecting the subjective experience of feeling alone or lonely (Hawkley and Cacioppo, 2007; Klinenberg, 2016; Steptoe et al., 2013). Both constructs have been associated in large population-based studies of older adults with a range of health outcomes, including risks for dementia, cardiovascular disease and stroke, loss of physical mobility, and all-cause mortality (Pantell et al., 2013; Steptoe et al., 2013; Holt-Lunstad et al., 2015; Shankar et al., 2017; Rafnsson et al., 2017; Valtorta et al., 2016). Loneliness and social isolation have often been attributed to factors such as marital and family circumstances, economic status, and health status. Struggles with both cut across gender, race/ethnicity, social class, and geographic locations among older adults; and may be connected to broader trends in declining social integration, civic engagement, and social capital in American communities in recent decades (Goll et al., 2015; Fokkema et al., 2012; Cornwell et al., 2008; Berkman et al., 2000; Putnam, 1995; McPherson

* Corresponding author. Department of Geography, Environment, and Society; University of Minnesota; 414 Social Sciences, 267 19th Ave S, Minneapolis, MN, 55455, USA.
E-mail address: finla039@umn.edu (J.M. Finlay).

https://doi.org/10.1016/j.socscimed.2018.05.010
Received 2 October 2017; Received in revised form 20 March 2018; Accepted 3 May 2018
Available online 04 May 2018
0277-9536/

et al., 2006).

Feelings of loneliness may be caused by social isolation, but this is not always the case among older adults. Loneliness and social isolation have only a weak-to-moderate positive correlation within individuals (Steptoe et al., 2013; Cornwell and Waite, 2009). Although the prevalence of living alone increases with age in the United States, loneliness in fact decreases with age from 43% of those aged 45–49 years to 25% of those aged ≥70 years (Stepler, 2016). Social isolation and loneliness may be increasingly 'decoupled' as older adults expect and prepare for diminished social networks as their peers begin to decline in the physical and mental capacities needed for engagement (Cornwell and Waite, 2009; Achenbaum and Bengston, 1994).

The personal and neighborhood factors that may influence isolation and loneliness as separate outcomes for older adults have not yet been investigated in a single study. Existing research has investigated relationships between personal characteristics or broader social/neighborhood environmental characteristics and isolation or loneliness, but rarely have considered personal and contextual influences together (Garoon et al., 2016; Fokkema et al., 2012; Bromell and Cagney, 2014; Wu and Chan, 2012). Carpiano's (2006) framework of neighborhood social capital, which postulates that social capital is produced by interacting neighborhood socioeconomic processes and personal sociodemographic characteristics, is an exception to this trend. Social capital, defined by Bourdieu (1986) as the aggregate of actual or potential resources linked to possession of a durable network of institutionalized relationships, is important to recognize here as a potential determinant of social isolation and loneliness within neighborhoods. The small body of literature attending to geographic influences on social well-being in later life tends to apply either a purely qualitative (e.g., Rowles, 1978; Gardner, 2011) or quantitative (e.g., Cloutier-Fisher and Kobayashi, 2009) approach, and none have considered social isolation or loneliness as simultaneous outcomes. Further, the distinctions that individual older adults themselves make between isolation and loneliness, and their perspectives on the causes, contexts, and experiences of each, require investigation so as to help develop strategies to address these challenges in older communities.

In order to address these gaps, we aimed to identify interrelated personal and neighborhood influences on social isolation and loneliness in a community-based study of older men and women in the Minneapolis metropolitan area. Situated in the midwestern US, Minneapolis is known for its cold winters, abundant lakes, extensive park system, and cultural arts scene. The metropolitan area is home to approximately 3.5 million people (76% White, 8% Black, 6% Asian, and 6% Hispanic). The average age is 36.9 years, with 13% of the population aged 65 and over. Median household income is $73,231, and 8.8% of the total population (7% of those aged 65 and over) live below the poverty line (U.S. Census Bureau, 2016).

Three research questions guided the secondary analyses of an existing dataset (Finlay, 2017; Finlay and Bowman, 2017). First, how are social isolation and loneliness defined and experienced by older adults? Second, what personal factors contribute to or undermine reporting each of social isolation and loneliness? Third, what neighborhood contextual factors contribute to or undermine reporting each of social isolation and loneliness? We considered loneliness and social isolation separately, as their lived experiences as well as statistical neighborhood and personal correlates may differ. A parallel convergent mixed-methods design simultaneously incorporated quantitative and qualitative data. Our theoretical framework from the discipline of health geography involved a 'relational' approach to space and place. Informed by Cummins et al. (2007), we considered geographic neighborhood context as flexible and relational – an operational living construct that can shape lives and opportunities while being uniquely navigated by individuals. Applying a relational theory of space enabled deeper understanding of reciprocal and mutually reinforcing relationships between well-being and place, wherein older adults' neighborhoods and health statuses were inextricably linked.

2. Design and methods

2.1. Study design and sample

Data were collected in three case study areas of the Minneapolis metropolitan area: Downtown Minneapolis, North Minneapolis, and Eden Prairie (Finlay, 2017; Finlay and Bowman, 2017; Supplementary Table S1). These sites are socioeconomically diverse and range in infrastructure from a high-density, pedestrian-oriented downtown to a low-density, automobile-dependent outer suburb (U.S. Census Bureau, 2015). Nonprobability sampling targeting a 1:1:1 ratio of participants across case study areas was employed to recruit 125 participants, who volunteered in response to project flyers and advertisements placed in senior centers, gyms, community centers, coffee shops, sites of worship, residential buildings, and health clinics in each case study area. The eligibility criteria were: being over the age of 55, not institutionalized in a care setting, residing in a case study area, and demonstrating cognitive capacity to participate in the interview. Interviews were conducted from June to October, 2015. The study was approved by the University of Minnesota Institutional Review Board and informed consent was provided by all participants.

2.2. Data collection

In-depth interviews were conducted by the first author and a research assistant in participants' homes or a nearby public place. The interviews assessed demographics and living situations, and asked semi-structured questions to investigate daily routines, experiences in the home and neighborhood, and social interactions. Researchers inquired separately if participants felt lonely or isolated to assess how participants measured and experienced these constructs for themselves. Follow-up questions probed for multidimensional definitions of quality as well as quantity of social engagements (Valtorta and Hanratty, 2012). The Neighborhood Design Characteristics Checklist (NeDeCC) framed research sessions. Burton et al. (2011) developed the NeDeCC to spatially assess relevant aspects of older adults' residential environments at three levels: (1) *dwelling* (e.g. type, height, age), (2) *street* (e.g. shape, topography, sidewalks), and (3) *neighborhood within a 300-m radius* (e.g. street pattern, land use mix, greenery). The NeDeCC checklist provided a fine-grained analysis of participants' home locations and surrounding neighborhoods, as there was too much geographic variation within each case study area to examine by municipally-defined case site alone. This allowed researchers to more precisely capture neighborhood heterogeneity within each case study region through four types of residential location: major city center, major city district, major city suburban edge, and large town center/suburban edge (Burton et al., 2011). The researchers used in-person observations and ArcGIS mapping software to calculate the NeDeCC for every unique participant home location (n = 81). One participant declined to provide a specific home address due to privacy concerns.

2.3. Analyses

Researchers utilized a parallel convergent mixed-methods analytical design (Fig. 1; Creswell, 2015). The quantitative and qualitative data were collected and analyzed separately. Results were then paired side-by-side for comparison and to identify areas that converged and diverged across the two different methodologies.

2.3.1. Quantitative analysis

Data from the interviews and the NeDeCC were used to generate quantitative personal and neighborhood variables that were thought to influence experiences of social isolation and loneliness, based on evidence from previous literature (Fig. 1). The outcome variables for social isolation and loneliness were generated from the study interview questions, "Do you feel isolated?" (yes; no) and "Do you feel lonely?"

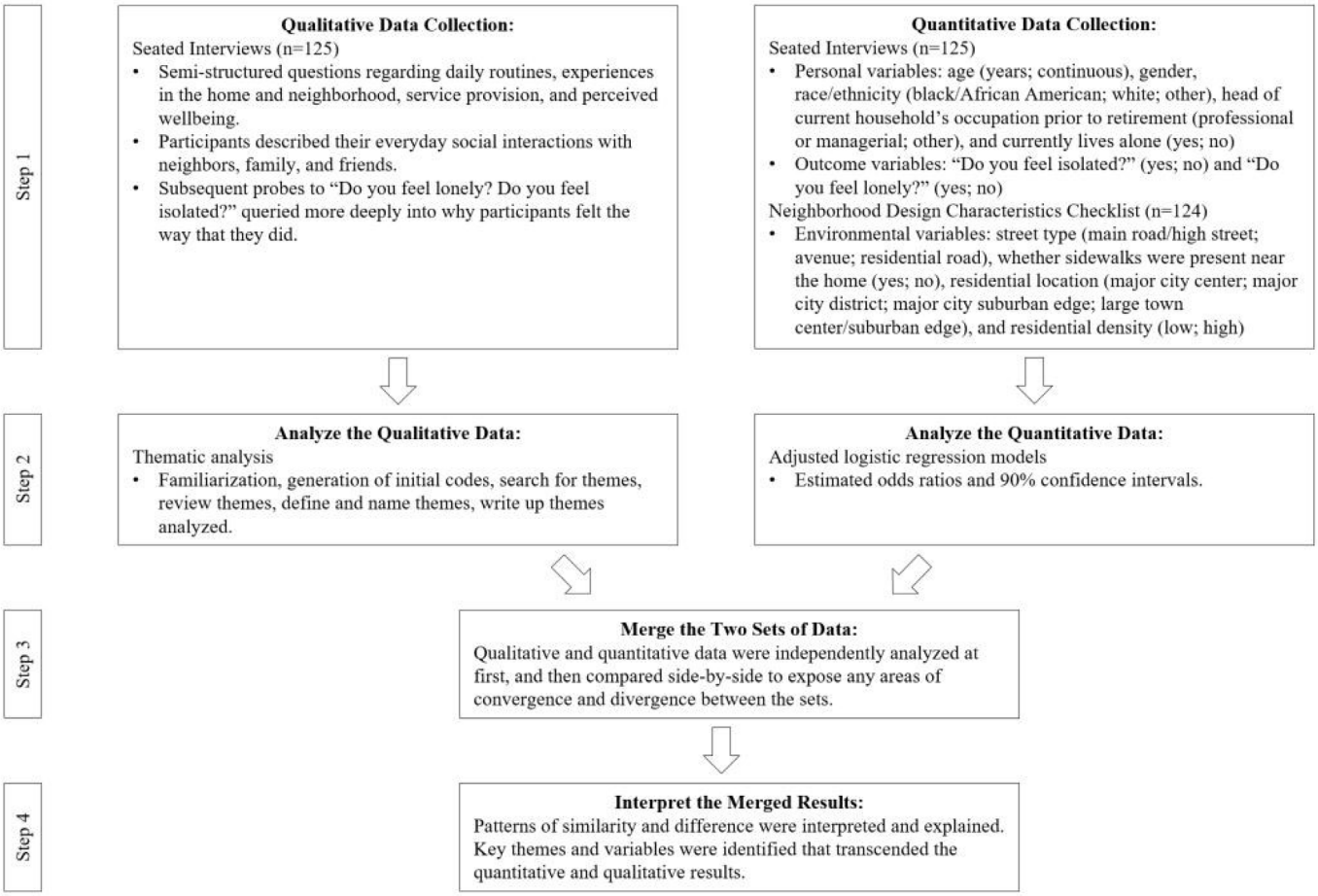

Fig. 1. Parallel convergent mixed-methods model.

(yes; no). Adjusted logistic regression models were used to estimate odds ratios (ORs) and 90% confidence intervals (CIs) for the associations between the predictor variables and each of social isolation and loneliness as outcomes using StataSE 14.2 (College Station, TX).

2.3.2. Qualitative analysis

Interview transcripts and field notes were organized in NVivo 11 and thematically analyzed by the first author (JF) and two research assistants. For secondary analysis to examine social isolation and loneliness, JF applied Braun and Clarke's (2006) six steps of thematic analysis: (1) JF and second author LK read through the transcripts and fieldnotes. (2) JF generated initial categories and themes, then discussed with LK to compare interpretations and points of divergence to refine and clarify codes. (3) JF coded all material. (4) JF and LK reviewed all coding, (5) defined and named the categories and themes, and (6) wrote up analyses. Audit trails (clear pathways detailing how the data were collected and managed) and bi-weekly peer debriefing between JF and LK enhanced transparency and credibility (Marshall and Rossmann, 2016).

2.3.3. Mixed-method analysis

After independent analyses of the quantitative and qualitative data, the results were paired side by side for comparison and identification of areas of convergence and divergence, which were iteratively discussed in order to validate the results (Creswell, 2015, Fig. 1).

3. Results

3.1. Quantitative analysis

Characteristics of the sample are shown in Table 1. A total of 48/124 (38%) participants reported feeling socially isolated and 40/124 (32%) were lonely. While social isolation was not differential by age and gender, just 16% of African American adults reported social isolation compared to half of White adults (Table 2). Having a current head of household who worked in a non-professional or non-managerial occupation was strongly associated with reporting social isolation (Table 2). Living alone was strongly associated with reporting social isolation, where over half of those who lived alone reported feeling socially isolated, compared to one-fifth of those who did not live alone. Residential location was associated with reporting isolation in a linear fashion, whereby the odds of reporting social isolation increased with each additional move "outwards" from the city center (Table 2).

Older age was associated with reduced odds of reporting loneliness (Table 3). One-quarter of women compared to just over one-third of men reported being lonely. Similar to the finding for social isolation, 16% of African American adults reported feeling lonely, compared to 35% of White adults. Two-fifths of older adults whose head of household worked in non-professional or non-managerial occupations reported feeling lonely, compared to one-fifth of those whose household head did work in a professional or managerial occupation (Table 3). Living alone was strongly associated with reporting loneliness (Table 3). Residential location was associated with reporting loneliness in a linear fashion, with the odds of reporting loneliness increasing with each additional move "outwards" from the city center (Table 3).

Table 1
Characteristics of the sample, Minneapolis, 2015, n = 124.

Characteristic	N (%)
Age	
Mean (SD)	71.3 (7.8)
Range	55–92
Gender	
Male	39 (31%)
Female	85 (69%)
Race/ethnicity	
White	71 (57%)
Black/African American	31 (25%)
Other	22 (18%)
Occupation	
Professional/managerial	51 (41%)
Other	73 (59%)
Lives alone	
No	60 (48%)
Yes	64 (52%)
Street type	
Main road/high street	22 (18%)
Avenue	40 (32%)
Residential	62 (50%)
Sidewalks	
No	16 (13%)
Yes	108 (87%)
Residential location	
Major city center	16 (13%)
Major city district	28 (23%)
Major city suburban edge	38 (31%)
Large town center/suburban edge	42 (34%)
Residential density	
Low	86 (69%)
High	38 (31%)

Table 2
Sociodemographic and environmental predictors of social isolation among older community-dwelling adults, Minneapolis, 2015, n = 124.

Predictor	Social isolation		OR (90% CI) Yes vs. No
	Yes 48 (38%)	No 77 (62%)	
Age (Mean [SD]; per year for OR)	72.4 (7.5)	70.7 (7.9)	0.98 (0.94, 1.04)
Gender			
Male	17 (43%)	23 (57%)	1.00 (ref)
Female	31 (36%)	54 (64%)	1.28 (0.56, 2.93)
Race/ethnicity			
White	34 (48%)	37 (52%)	1.00 (ref)
Black/African American	5 (16%)	27 (84%)	0.20 (0.06, 0.65)
Other	9 (41%)	13 (59%)	0.43 (0.16, 1.17)
Occupation[a]			
Professional/managerial	14 (27%)	38 (73%)	1.00 (ref)
Other	34 (47%)	39 (53%)	2.87 (1.27, 6.51)
Lives alone			
No	13 (21%)	48 (79%)	1.00 (ref)
Yes	35 (55%)	29 (45%)	6.11 (2.43, 15.4)
Street type			
Main road/high street	13 (59%)	9 (41%)	1.00 (ref)
Avenue	15 (38%)	25 (63%)	0.46 (0.14, 1.53)
Residential	20 (32%)	42 (68%)	0.40 (0.10, 1.61)
Sidewalks			
No	8 (50%)	8 (50%)	1.00 (ref)
Yes	40 (37%)	69 (63%)	0.44 (0.12, 1.56)
Residential location			
Major city center	8 (50%)	8 (50%)	1.00 (ref)
Major city district	10 (36%)	18 (64%)	1.34 (0.37, 4.88)
Major city suburban edge	9 (23%)	30 (77%)	5.25 (0.59, 46.5)
Large town center/suburban edge	21 (50%)	21 (50%)	9.28 (1.17, 73.4)
Per move 'outward' (trend)	–	–	1.97 (1.03, 3.75)
Residential density			
Low	31 (36%)	55 (64%)	1.00 (ref)
High	17 (45%)	21 (55%)	2.89 (0.70, 12.0)

[a] Either own occupation of head of household's occupation.

Table 3
Sociodemographic and environmental predictors of loneliness among older community-dwelling adults, Minneapolis, 2015, n = 124.

Predictor	Loneliness		OR (90% CI) (Yes vs. No)
	Yes 40 (32%)	No 85 (68%)	
Age (Mean [SD]; per year for OR)	71.2 (8.1)	71.4 (7.7)	0.93 (0.89, 0.98)
Gender			
Male	10 (25%)	30 (75%)	1.00 (ref)
Female	20 (35%)	55 (65%)	0.38 (0.16, 0.95)
Race/ethnicity			
White	25 (35%)	46 (65%)	1.00 (ref)
Black	5 (16%)	27 (84%)	0.17 (0.05, 0.57)
Other	10 (45%)	12 (55%)	0.95 (0.34, 2.65)
Occupation[a]			
Professional/managerial	10 (19%)	42 (81%)	1.00 (ref)
Other	30 (41%)	43 (59%)	3.17 (1.33, 7.51)
Lives alone			
No	10 (16%)	51 (84%)	1.00 (ref)
Yes	30 (47%)	34 (53%)	3.59 (1.45, 8.91)
Street type			
Main road/high street	12 (55%)	10 (45%)	1.00 (ref)
Avenue	15 (38%)	25 (63%)	0.32 (0.09, 1.14)
Residential	13 (21%)	49 (79%)	0.16 (0.04, 0.74)
Sidewalks			
No	4 (25%)	12 (75%)	1.00 (ref)
Yes	36 (33%)	73 (67%)	1.01 (0.26, 3.96)
Residential location			
Major city center	7 (44%)	9 (56%)	1.00 (ref)
Major city district	10 (36%)	18 (64%)	1.94 (0.53, 7.05)
Major city suburban edge	7 (18%)	32 (82%)	2.03 (0.27, 15.0)
Large town center/suburban edge	16 (38%)	26 (62%)	4.09 (0.59, 28.4)
Per move 'outward' (trend)	–	–	1.67 (0.90, 3.11)
Residential density			
Low	25 (29%)	61 (71%)	1.00 (ref)
High	15 (39%)	23 (61%)	1.45 (0.35, 5.90)

[a] Either own occupation of head of household's occupation.

3.2. Qualitative analysis

Researchers identified six overarching and interrelated categories from participant responses regarding *why* they did or did not feel lonely or socially isolated: (1) physical and mental health, (2) personal preference, (3) sense of aloneness, (4) safe spaces, (5) sense of community, and (6) services and amenities. Participants' perspectives blended personal and neighborhood contextual factors within these categories (Table 4). When possible, distinctions between the categories of social isolation and loneliness are made, but the qualitative results reflect the confluence and imprecision of participant perspectives on both concepts.

3.2.1. Physical and mental health

Poor physical health limited socialization opportunities for participants such as Rebecca (77y, Downtown Minneapolis). She felt lonely and "cooped up" at home following a health decline and surgeries:

> Before [the surgeries] I volunteered and was very active and social, but now… I had to quit a lot of them because I had a knee replacement and a hip replacement… I'm a little afraid to be on the ice, but yet I'm bored to tears staying home.

Rebecca lamented her loss of contacts and opportunities for daily social interaction. She was afraid to venture out on icy sidewalks, which led to increased isolation during winter months. Inclement weather was frequently mentioned by suburban-dwelling participants as exacerbating the challenges of limited mobility. Restricted driving also contributed to both isolation and loneliness in suburban areas with sparse services and amenities. Monica (61y, Eden Prairie) limited her driving given poor eyesight and slower reflexes. She was fearful driving in winter conditions. Without a nearby walkable center, Monica felt

Table 4
Qualitative thematic analysis framework.

Categories	Categorical description and illustrative examples
Physical and mental health	Responses indicating that physical and mental health impacts reported isolation and/or loneliness • Physical health limited opportunities to socialize (e.g., limited mobility by foot or car) • Physical health boosted opportunities to socialize (e.g., trips to medical services, healthcare visits) • Mental health impacted opportunities or willingness to socialize (e.g., reported self-isolation during bouts of depression)
Personal preference	Responses indicating that personal preferences impact reported isolation and/or loneliness • Preference for solitary activities • Preference for and contentment with a small social circle • Anti-social attitudes and behavioral tendencies
Sense of aloneness	Responses indicating that aloneness impacts reported isolation and/or loneliness • Impact of living situation (e.g., lack of daily contact due to living alone) • Fears of dying alone • Deaths of family and friends • Challenges of making new friends
Safe spaces	Responses indicating that stability, safety and comfort impact reported isolation and/or loneliness • Self-isolation due to lack of residential safety • Transitory and insecure homeless lifestyle patterns
Sense of community	Responses indicating that sense of community impacts reported isolation and/or loneliness • Racial inclusiveness • Multigenerational spaces • Shared public spaces • Housing characteristics (e.g., hallways, lobbies, and elevators in high-rise buildings)
Services and amenities	Responses indicating that community services and amenities impact reported isolation and/or loneliness • Recreational sites (e.g., parks, senior centers, faith organizations, libraries, coffee shops) • Services (e.g., grocery stores) • Reported scarcity of sites to gather

seasonally isolated and homebound in the winter. Samantha (62y, North Minneapolis) similarly expressed frustration and loneliness at being homebound due to physical disability and lack of driving:

> I do a little visiting every now and then, but other than that I'm a homebody. Like I said, most of the time I stay in the house because I can't walk long distances. I can't stand a long time, I definitely can't squat, or bend either forward or backward. It just keeps me at home a lot.

Several participants stated that poor physical health actually promoted social contact and reduced isolation. Trips to medical professionals, physical therapy, pool rehabilitation, and other health-related activities generated regular contact with staff and fellow patients. Roberta (70y, Downtown Minneapolis) noted the positive impact of healthcare experiences following a fall because it temporarily provided companionship:

> After my concussion was kind of like a big party, because I went to the emergency room and the nurses were great, then I had home health care. The socialization I had was like having a party every day… We laughed the whole time. It was just probably the greatest eight weeks of my life.

The attention, care, and socialization provided by home healthcare aides were a welcome reprieve for Roberta. Other participants, especially women, noted how health struggles helped them bond further with family and friends. Ingrid's (66y, North Minneapolis) family and coworkers, for example, supported her during dialysis and a kidney transplant by providing daily rides and food. She was rarely alone during that time and felt loved through the flood of support.

Mental health conditions, including depression, were reported to impact experiences of social isolation and loneliness. Betty (78y, North Minneapolis), for example, noted: “With friends, [I am] extremely satisfied. I know I have good friends. I know that a lot of my sense of loneliness and isolation is mine. I get lonely. That sounds funny because I've got all these people around.” Betty elaborated on lifelong struggles with loneliness despite a large network of acquaintances. Stephanie (72y, Downtown Minneapolis) stated that depression caused her to self-isolate: “I gave up on [my friends] now. Sometimes I just like to be at home and shut the door on the world and get quiet time.” Stephanie feared being vulnerable and reliant on others, and explained that she uses solitude as a coping mechanism to self-manage her mental illness.

3.2.2. Personal preference

A small group of participants mentioned their preferences for solitary activity and feeling content with a small social circle. Russell (61y, Eden Prairie), for example, worked full-time and felt too tired to make an effort to socialize after a long workday: “When I come home, I want a glass of wine and to go to bed. The last thing I want to do is say hello to the neighbors. I'm fairly anti-social. I strive to be.” Russell relied upon his wife to keep in touch with family and friends. Rhonda (85y, Downtown Minneapolis) expressed that she felt happier alone. After domestic abuse and divorce earlier in life, Rhonda purposefully cultivated a solitary lifestyle that satisfied her needs. She was alone most of the time, but not lonely. Rhonda felt connection to others and meaningful stimulation through book writing, travel, and visits to galleries and museums.

Participants reflected on their attitudes and personal agency as factors influencing social isolation and loneliness. Ellen (73y, Downtown Minneapolis), for example, downsized to Minneapolis from another state to be close to her only child and grandchildren. Ellen did not know many people locally, and recognized that this was primarily due to her own preference. After retiring she “swore off meetings”, and as a result of her self-imposed restriction was not part of the local community. Ellen chose to focus instead on maintaining contact with her longtime girlfriends through regular telephone calls, yearly trips and social visits, and a *trans*-state book club. In comparison, Elizabeth (63y, Downtown Minneapolis) moved into the same area around the same time as Ellen and found “instant community”. She began hosting building happy hours, and formed two book clubs and a social committee. Outgoing participants like Elizabeth developed new social networks through shared local activity.

3.2.3. Sense of aloneness

Numerous participants commented that living alone was the reason why they could spend days at a time without talking to or seeing anyone else. Participants who reported social isolation such as Layla (82y, North Minneapolis) consequently feared dying alone: “It dawned on me one day that I could be laying here on the floor for a week, and

nobody would even notice. That scared me a lot, you know?" Richard (77y, Downtown Minneapolis) similarly expressed that living alone contributed to his social isolation and vulnerability: "What would happen if I were to be incapacitated and needed help?" Richard acknowledged that the social worker in his subsidized building could help in an emergency, but felt acutely aware of his isolation.

Heightened fears of being alone made the task of building friendships feel like high stakes. There were fewer opportunities to build new relationships at this stage of life than in younger years, which had provided opportunities through school, children, and work. Many participants now sought out social contact through nearby neighbors, senior centers, book clubs, leisure facilities, and civic groups. Pamela (71y, Eden Prairie) regularly "put herself out there" and equated it to the stressful "dating world all over again". When asked why she felt isolated and lonely, Pamela responded:

> It's very, very hard to make friends in later life… I've gone to women's groups. I've extended myself. Maybe I come on too strong? But it doesn't seem [to be the case], because so many people have their children and now their grandchildren. They don't need friends.

3.2.4. Safe spaces

Residential spaces that provided stability, comfort and safety were perceived as essential factors to social well-being. Safety concerns caused participants such as Shirley (72y, North Minneapolis) to feel isolated. As a recent immigrant in subsidized housing, Shirley noted: "The neighborhood's no good. Too much drinking, fighting, smoking, using abusive language. It's not good. People drive by shooting at things." As a result, she stayed primarily in her room and avoided contact with unsafe neighbors. Iris (68y, Downtown Minneapolis), a homeless participant, discussed how she was more focused on staying alive and securing essentials such as food and shelter than on making friends. Daily travel around the city in search of free meals absorbed her attention. She did not feel isolated given regular social contact at charities and social services; but she did acknowledge loneliness given the lack of opportunities to sustain meaningful friendships. Ian (60y, Downtown Minneapolis) lived in a homeless shelter where he locked himself in his small single room by dusk and did not use the communal bathroom at night to avoid regular fights and crime just outside in the hallways. He stayed away from other residents, and lamented the loneliness of living on "skid row".

3.2.5. Sense of community

Participants tightly linked commentaries on isolation and loneliness to their local social environments. Multiracial and multigenerational communities were valued factors to feel accepted and connected to others. North Minneapolis participants such as Franny (58y, North Minneapolis) stressed the importance of racial diversity and inclusiveness: "One of the things I like about living in North Minneapolis is it's multicultural. They're used to my color and my skin, and they don't treat me different [sic]." Downtown Minneapolis participants including Allison (69y, Downtown Minneapolis) pointed to their communities' vibrant social scenes:

> [It's] multi-generational and that's really important to us… The very fact that you can go into the drug store and into the grocery store and the coffee houses, you have an opportunity to at least overhear and sometimes interact with all kinds of people. Children too. It just gives you a much better perspective about the totality of life.

Within urban public spaces and high-rise buildings, common areas stimulated daily connection and social contact. Participants explained how hallways and lobbies were regular places to say hello to neighbors. Elizabeth (63y, Downtown Minneapolis) elaborated on the importance of elevators and dogs to her social connectedness:

> It's a dog building, so you meet people through their dogs. One of the absolute pieces of wisdom is you learn the dog's name long before you remember the people's names. You meet them in the elevator. That's part of communal living, you're in the elevator all the time.

Building staff, caretakers, and resident social workers further provided social support and stimulation. When asked whom she sees on a typical day, Gertrude (63y, Downtown Minneapolis) replied: "The office staff. They are saving my life, and I tell them that. They are the key to keeping myself alive here." Gertrude praised specific front-office workers that provide warmth, care, and social support as she battled mental illness.

3.2.6. Services and amenities

Participants pointed to community resources (or the lack thereof) as factors that impacted on social connection. Local parks, senior centers, faith organizations, libraries, coffee shops, restaurants, grocery stores, and gyms/pools were hubs of planned and spontaneous social interactions. Downtown participants such as Audrey (91y, Downtown Minneapolis) countered living alone with daily contact through nearby services. Audrey purposefully moved to the city center after feeling isolated in the suburbs. Daily trips to the movies, music halls, stores, community garden, and church minimized her sense of isolation.

Participants in North Minneapolis lamented the lack of recreational spaces and retail amenities in lower-income areas to gather. Carmen (70y, North Minneapolis), who co-interviewed with her neighbor, explained:

> Any little neighborhood, no matter how poor, has a few coffee shops. We don't have one. It's a greeting place. It's a social occasion… There are a lot of seniors that are our friends who are isolated. And I think that's because we don't have the places where you can just go sit down, have a cup of coffee, see who comes in, visit with one another.

Carmen explained that a coffee shop would create spontaneous opportunities for local seniors to get out of their homes and interact with others. They felt that coffee shops would generate much-needed social stimulation.

A well-received recent addition was a newly-opened YMCA with a senior-specific gym and exercise classes, which helped to diminish social isolation and loneliness for attendees. Further, many North Minneapolis participants relied upon churches and faith communities for social support and stimulation. Safe, affordable, and social spaces to interact with peers were valued sites to diminish isolation and loneliness.

3.3. Mixed-methods comparison

Direct comparisons of the quantitative and qualitative findings revealed both convergence and divergence regarding personal and neighborhood contextual factors that contributed to or undermined social isolation and loneliness. In the quantitative models, African American adults were less likely to report feeling isolated and lonely than White adults. In the qualitative data, some African American participants alluded to the positive effect of their race/ethnicity as a reason for their embeddedness in strong multigenerational kinship networks composed primarily of other African Americans. However, no one stated outright that race/ethnicity directly affected social connectedness.

Age was inversely associated with reporting loneliness in the quantitative results. This result diverged from the qualitative results, where many older participants commented on the loneliness of outliving one's social network as family and close friends pass away. Some felt that they no longer "fit in" given neighborhood turnover to younger residents. Women were less likely to report feeling lonely than men in the quantitative results, which again diverged from the qualitative

results. When participants commented on gender, it was often women discussing female cliques and exclusive social practices that contributed to their loneliness.

In the quantitative regression models, having a non-professional or non-managerial occupation for head of household was strongly associated with reporting isolation or loneliness. However, a proportion of the more socioeconomically advantaged participants did still report feeling isolated and lonely. The qualitative findings showed that these participants attributed these feelings to living in large, isolated suburban homes far from family and friends. High-income participants simultaneously recognized that their resources allowed them to afford sociable leisure activities such as dining out, attending cultural events, and traveling to see family and friends; which was consistent with the quantitative findings. Low-income participants articulated disadvantages of living in marginalized areas with limited safe, public, and free spaces to gather and socialize. Further, a personal history of low-income jobs that included shift work, irregular hours, or the burden of multiple part-time jobs could result in workers being away from home for long periods of time, which could contribute to isolation and feelings of loneliness.

Living alone was strongly associated with reporting social isolation and loneliness in the quantitative models; this finding converged with most of the qualitative data. Participants discussed being isolated when spending prolonged periods of time at home alone, and feeling lonely in the absence of others. However, some participants strongly rejected this trend and explicitly stated feeling less isolated in their homes and happiest alone. One participant noted that the loneliest time of her life was when she was married. These participants stressed the importance of solitude and feeling connected to others through alternative means, such as reading, writing, engaging with pets, and art.

A linear trend in the quantitative results suggested that participants were more likely to report isolation and loneliness in locations moving outwards from the major city center to inner then outer suburbs. The loneliness model showed that participants living on residential streets were less likely to report feeling lonely than those living on main roads or high streets. These mixed findings both converged with and diverged from the qualitative results, which identified nuance and variation within each residential location. Participants living in the city center mentioned the benefits of building elevators, lobbies, and shared spaces to generate frequent planned and impromptu social contact. Participants in the inner suburb noted a lack of supportive infrastructure, such as coffee shops and cafes to gather. Those in the outer suburb frequently commented on long driving distances to social amenities and isolation from neighbors, both of which could result in social isolation and loneliness – particularly during long winter months. However, there were notable exceptions to this trend within each residential location that were obscured by the odds ratios generated in regression modeling. Some suburban residents thrived in supportive social environments, and many enjoyed abundant recreational amenities such as the senior center, gym, and other facilities. Those in the inner suburb mentioned the positive effect of the newly-opened YMCA to facilitate social interaction, in addition to the strength of faith communities and local kinship networks.

4. Discussion

This mixed-methods case study of older adults in the Minneapolis metropolitan area identified intersections between older people and their neighborhood contexts, which influenced daily experiences of social isolation and loneliness. The quantitative results suggested that African American adults, those with a higher socioeconomic status, those who did not live alone, and those who lived closer to the city center were less likely to report social isolation or loneliness; and that being older, female, and living on a residential street were associated with a lower likelihood of reporting loneliness. When in-depth qualitative observations on participants' understandings of isolation and loneliness were added, the interpretations evolved. The qualitative findings captured interrelated personal and contextual factors that shaped experiences of social isolation and loneliness: physical and mental health, personal preference, sense of aloneness, safe spaces, sense of community, and services and amenities.

Importantly, we found that social isolation and loneliness were overlapping, yet distinct constructs in both the quantitative and qualitative results. In the quantitative results, over one-third of socially isolated participants did not report feeling lonely; this was confirmed in the qualitative findings where some participants expressed feeling "alone but not lonely". At the same time, participants often conflated isolation and loneliness in the in-depth interviews: they created meanings of both constructs that were relevant to their own lives. With regard to our first research question, we found that participants challenged conventional definitions of social well-being, such as rejecting negative assumptions surrounding social isolation and highlighting personal agency in decision-making about being alone. The roles of personal agency, resilience, and ability to self-determine social isolation and feelings of loneliness have been emphasized in theoretical work, yet are often ignored in empirical studies (Hawkley and Cacioppo, 2010; Harris, 2008). Overall, participants voiced broader and less-straightforward approaches to social isolation and loneliness than those that are typically captured in quantitative research. Participants reflected a lifetime of accumulated experiences and hybrid identities as social categories such as gender, race/ethnicity, class, and health status intersected with older age (Valentine, 2007).

Despite powerfully suggestive causal pathways relating environmental factors to individual social isolation and loneliness, relatively few geographers to date focus explicitly on this complex issue. Our results are consistent with previous research on older populations highlighting the prevalence of loneliness (Wilson and Moulton, 2010) and living alone (Stepler, 2016), regardless of gender, race/ethnicity, social class, and geographic location (Goll et al., 2015; Fokkema et al., 2012; Cornwell et al., 2008). Social isolation did not necessarily generate feelings of loneliness (Steptoe et al., 2013; Cornwell and Waite, 2009), although participants conflated the two concepts. Context mattered: the impact of neighborhood and community characteristics was identified in both the quantitative and qualitative findings. The results are consistent with Carpiano's (2006) framework of neighborhood social capital, which emphasizes that social cohesion, support, and participation within neighborhoods are affected by contextual characteristics including median length of home ownership, ethnic composition, median income, and income inequality. Neighborhood contexts create opportunities that further hinge on the personal sociodemographic characteristics of inhabitants (Carpiano, 2006). The results also confirmed Cloutier-Fisher and Kobayashi's (2009) layered portrait of social vulnerability by demonstrating that individual characteristics were embedded within broader contextual variables: for example, one participant referred to a park as a valued site for social opportunities, while another participant referred to the same park as a site of fear and alienation given past negative experiences. Reflecting Gardner's (2011) investigation of older people's public lives and Garoon et al. (2016) investigation of trust and mistrust in neighbors and neighborhood environments, the results illustrated how neighborhoods are important social places of aging, which could produce a diversity of social experiences and perceptions between individual participants in this study.

Most of the qualitative categories identified in this study were not directly captured or measured in the quantitative models, demonstrating the different types of results that emerge from researcher-defined quantitative models and exploratory participant-driven qualitative approaches. These findings thus generate a critical rethinking of which person and place factors we consider as relevant to social isolation and loneliness in older populations. The factors identified by participants in the in-depth interviews can now be tested in further models and different geographic settings.

5. Limitations and strengths

Because Minneapolis is highly supportive to older adults through heavy investment in services and support, parks, care provision, and active transit, our findings may or may not apply in other settings. Older adults' experiences may vary in other places with distinct political, economic, sociocultural, and natural climates. Although we recruited from a range of public settings to capture a diverse sample of older adults living in three urban and suburban case study areas, this study did not include rural areas, institutional settings, or care environments. Given these limitations, the study illuminates a limited set of realities for some community-dwelling older adults living across the Minneapolis metropolitan area. These results should therefore be considered as hypothesis-generating to allow fuller exploration in larger-scale and longitudinal mixed-methods studies.

A strength of this paper is that we used the same rich dataset for quantitative and qualitative data collection. However, we utilized a non-random convenience sample, whereby lonely or isolated adults may have self-selected into the study in order to gain the social activity provided by the interview experience. If this did occur, it would not diminish the internal validity of the statistical associations or the thematic results of the qualitative analysis, but it may mean that lonely adults were over-represented in our study relative to the general population in the Minneapolis metropolitan area. Our findings may not be generalizable to lonely adults who had a lower inclination or ability to reach out to participate, or to those who were unable or unwilling to enter the public spaces where the study flyers were posted, if their experiences and correlates of loneliness and isolation differ from those observed in this study. Our binary measures of social isolation and loneliness were less sensitive and comprehensive than graded scales, such as the UCLA Loneliness Scale or the ELSA Social Isolation Index (Steptoe et al., 2013), and did not consider possible variation in the frequency or severity of isolation or loneliness. Although our measures have not been validated against existing survey scales, they did have face validity: asking a person whether he or she feels lonely or is isolated is readily interpretable, and the participants in this study responded with thoughtful, in-depth reflections on their feelings of loneliness and situations of social isolation, and the factors that they felt caused or ameliorated both of these experiences. Although the participant responses were overwhelmingly detailed and thoughtful, there is a possibility that loneliness and social isolation may have been underreported by individuals who did not feel comfortable sharing this information.

Social isolation was assessed subjectively in this study, which may have caused some conflation with loneliness, which is an inherently subjective experience. However, over one-third of adults in this study who reported social isolation indicated that they did not feel lonely. Further, social isolation and loneliness did not share all of the same predictors in the regression models, indicating that these measures still represent different, yet related constructs that were meaningful outcomes for this study sample. Finally, the sample size was small from a quantitative perspective, and resulted in relatively low precision of the statistical models and a necessary collapsing of categories of predictor variables, resulting in a loss of sensitivity to detect some associations.

6. Conclusions

The results of this study produce a rich picture of how and why older adults in specific communities report experiencing social isolation and loneliness. The quantitative data provided breadth in presenting group-level trends; while the qualitative data gave insight into variation within these trends and allowed the study participants to identify meaningful risk and protective factors for themselves. Our task as researchers is to translate theory and empirical evidence into individual and community-based strategies to enhance older adults' abilities to achieve and sustain high qualities of lives. Neither individual-level nor environmental interventions alone can fully support social well-being. We need more multi-scalar research approaches applying mixed methodologies in order to generate 'contextually sensitive' policies. Broadened understandings of the complex person-place underpinnings of social isolation and loneliness will facilitate more comprehensive strategies to support health and well-being in later life.

Acknowledgements

This research was supported in part by a grant from the National Science Foundation (Award Number 1558577). The authors are indebted to the participants in this research study who so openly shared their homes, knowledges, and experiences. Contributing research assistants included Jay Bowman, Joann Khong, Jessa Hohnstein, and Alec Trenda. Thank you to the anonymous reviewers who provided constructive feedback on earlier versions of this manuscript.

Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.socscimed.2018.05.010.

References

Achenbaum, W.A., Bengston, V.L., 1994. Re-engaging the disengagement theory of aging: on the history of assessment on theory development in gerontology. Gerontol. 34 (6), 756–763.

Berkman, L.F., Glass, T., Brissette, I., Seeman, T.E., 2000. From social integration to health: durkheim in the new millennium. Soc. Sci. Med. 51, 843–857. https://doi.org/10.1016/S0277-9536(00)00065-4.

Bourdieu, P., 1986. The forms of capital. In: Richardson, J.G. (Ed.), Handbook of Theory and Research for the Sociology of Education. Greenwood, New York, pp. 241–258.

Braun, V., Clarke, V., 2006. Using thematic analysis in psychology. Qual. Res. Psychol. 3 (2), 77–101. http://dx.doi.org/10.1191/1478088706qp063oa.

Bromell, L., Cagney, K.A., 2014. Companionship in the neighborhood context: older adults' living arrangements and perceptions of social cohesion. Res. Aging 36 (2), 228–243. http://dx.doi.org/10.1177/0164027512475096.

Burton, E.J., Mitchell, L., Stride, C.B., 2011. Good places for ageing in place: development of objective built environment measures for investigating links with older People's wellbeing. Biomed. Cent. Publ. Health 11 (1), 839. http://dx.doi.org/10.1186/1471-2458-11-839.

Carpiano, R.M., 2006. Toward a neighborhood resource-based theory of social capital for health: can Bourdieu and sociology help? Soc. Sci. Med. 62 (1), 165–175. http://dx.doi.org/10.1016/j.socscimed.2005.05.020.

Cloutier-Fisher, D., Kobayashi, K.M., 2009. Examining social isolation by gender and geography: conceptual and operational challenges using population health data in Canada. Gend. Place Cult. 16 (2), 181–199. http://dx.doi.org/10.1080/09663690902795787.

Cornwell, B., Laumann, E.O., Schumm, L.P., 2008. The social connectedness of older adults: a national profile. Am. Socio. Rev. 73, 185–203. https://doi.org/10.1177/000312240807300201.

Cornwell, E.Y., Waite, L.J., 2009. Social disconnectedness, perceived isolation, and health among older adults. J. Health Soc. Behav. 50 (1), 31–48. http://dx.doi.org/10.1177/002214650905000103.

Creswell, J.W., 2015. A Concise Introduction to Mixed Methods Research. Sage, Thousand Oaks, CA.

Cummins, S., Curtis, S., Diez-Roux, A.V., Macintyre, S., 2007. Understanding and representing 'place' in health research: a relational approach. Soc. Sci. Med. 65 (9), 1825–1838. http://dx.doi.org/10.1016/j.socscimed.2007.05.036.

Finlay, J.M., 2017. 'Walk like a penguin': Older Minnesotans' experiences of (non)therapeutic white space. Soc Sci Med 198, 77–84. http://dx.doi.org/10.1016/j.socscimed.2017.12.024.

Finlay, J.M., Bowman, J.A., 2017. Geographies on the move: a practical and theoretical approach to the mobile interview. Prof. Geogr. 69 (2), 263–274. http://dx.doi.org/10.1080/00330124.2016.1229623.

Fokkema, T., De Jong Gierveld, J., Dykstra, P.A., 2012. Cross-national differences in older adult loneliness. J. Psychol. 146 (1–2), 201–228. http://dx.doi.org/10.1080/00223980.2011.631612.

Gardner, P.J., 2011. Natural neighborhood networks — important social networks in the lives of older adults aging in place. J. Aging Stud. 25 (3), 263–271. http://dx.doi.org/10.1016/j.jaging.2011.03.007.

Garoon, J., Engelman, M., Gitlin, L., Szanton, S., 2016. Where does the neighborhood Go? Trust, social engagement, and health among older adults in baltimore city. Health Place 41, 58–66. http://dx.doi.org/10.1016/j.healthplace.2016.07.002.

Goll, J.C., Charlesworth, G., Scior, K., Stott, J., 2015. Barriers to social participation among lonely older adults: the influence of social fears and identity. PLoS One 10 (2), e0116664. http://dx.doi.org/10.1371/journal.pone.0116664.

Harris, P.B., 2008. Another wrinkle in the debate about successful aging: the undervalued

concept of resilience and the lived experience of dementia. Int. J. Aging Hum. Dev. 67 (1), 43–61. http://dx.doi.org/10.2190/AG.67.1.c.
Hawkley, L.C., Cacioppo, J.T., 2007. Aging and loneliness: downhill quickly? Assoc. Psychol. Sci. 16 (4), 187–191. https://doi.org/10.1111/j.1467-8721.2007.00501.x.
Hawkley, L.C., Cacioppo, J.T., 2010. Loneliness matters: a theoretical and empirical review of consequences and mechanisms. Ann. Behav. Med. 40 (2), 218–227. http://dx.doi.org/10.1007/s12160-010-9210-8.
Holt-Lunstad, J., Smith, T.B., Baker, M., Harris, T., Stephenson, D., 2015. Loneliness and social isolation as risk factors for mortality: a meta-analytic review. Perspect. Psychol. Sci. 10 (2), 227–237. http://dx.doi.org/10.1177/1745691614568352.
Klinenberg, E., 2016. Social isolation, loneliness, and living alone: identifying the risks for public health. Am. J. Publ. Health 106 (5), 786–787. http://dx.doi.org/10.2105/AJPH.2016.303166.
Marshall, C., Rossmann, G., 2016. Designing Qualitative Research, sixth ed. Sage, Newbury Park, CA.
McPherson, M., Smith-Lovin, L., Brashears, M.E., 2006. Social isolation in America: changes in core discussion networks over two decades. Am. Socio. Rev. 71 (3), 353–375. https://doi-org.ezp2.lib.umn.edu/10.1177/000312240607100301.
Pantell, M., Rehkopf, D., Jutte, D., Syme, S.L., Balmes, J., Adler, N., 2013. Social isolation: a predictor of mortality comparable to traditional clinical risk factors. Am. J. Publ. Health 103 (11), 2056–2062. http://dx.doi.org/10.2105/AJPH.2013.301261.
Putnam, R.D., 1995. Bowling alone: America's declining social capital. J. Democr. 6, 65–78.
Rafnsson, S.B., Orrell, M., d'Orsi, E., Hogervorst, E., Steptoe, A., 2017. Loneliness, social integration, and incident dementia over 6 Years: prospective findings from the English longitudinal study of ageing. J. Gerontol. B Psychol. Sci. Soc. Sci. http://dx.doi.org/10.1093/geronb/gbx087.
Rowles, G.D., 1978. Prisoners of Space? : Exploring the Geographical Experience of Older People. Westview, Boulder, CO.
Shankar, A., McMunn, A., Demakakos, P., Hamer, M., Steptoe, A., 2017. Social isolation and loneliness: prospective associations with functional status in older adults. Health Psychol. 36 (2), 179–187. http://dx.doi.org/10.1037/hea0000437.
Stepler, R., February 2016. Smaller share of women Ages 65 and Older are Living Alone: More are living with spouse or children. Pew Research Center, Washington, D.C. Retrieved from. http://www.pewsocialtrends.org/2016/02/18/smaller-share-of-women-ages-65-and-older-are-living-alone/.
Steptoe, A., Shankar, A., Demakakos, P., Wardle, J., 2013. Social isolation, loneliness, and all-cause mortality in older men and women. Proc. Natl. Acad. Sci. U. S. A. 110 (15), 5797–5801. http://dx.doi.org/10.1073/pnas.1219686110.
U.S. Census Bureau, 2015. QuickFacts. Retrieved from. https://www.census.gov/quickfacts/table/PST045216/00.
U.S. Census Bureau, 2016. American Community Survey 1-year Estimates. Census Reporter Profile Page for Minneapolis-St. Paul-Bloomington, MN-WI Metro Retrieved from. https://censusreporter.org/profiles/31000US33460-minneapolis-st-paul-bloomington-mn-wi-metro-area/.
Valentine, G., 2007. Theorizing and researching intersectionality: a challenge for feminist geography*. Prof. Geogr. 59 (1), 10–21. http://dx.doi.org/10.1111/j.1467-9272.2007.00587.x.
Valtorta, N., Hanratty, B., 2012. Loneliness, isolation and the health of older adults: do we need a new research agenda? J. R. Soc. Med. 105 (12), 518–522. http://dx.doi.org/10.1258/jrsm.2012.120128.
Valtorta, N., Kanaan, M., Gilbody, S., Ronzi, S., Hanratty, B., 2016. Loneliness and social isolation as risk factors for coronary heart disease and stroke: systematic review and meta-analysis of longitudinal observational studies. Heart 102 (13), 1009–1016. http://dx.doi.org/10.1136/heartjnl-2015-308790.
Wilson, C., Moulton, B., 2010. Loneliness Among Older Adults: a National Survey of Adults 45+. Retrieved from Washington, D.C. https://assets.aarp.org/rgcenter/general/loneliness_2010.pdf.
Wu, T., Chan, A., 2012. Families, friends, and the neighborhood of older adults: evidence from public housing in Singapore. J Aging Res 2012, 659806. http://dx.doi.org/10.1155/2012/659806.