THE GERONTOLOGICAL SOCIETY OF AMERICA®

OXFORD

Research Article

Environmental Influences on Life Satisfaction and Depressive Symptoms Among Older Adults With Multimorbidity: Path Analysis Through Loneliness in the Canadian Longitudinal Study on Aging

Daniel R. Y. Gan, PhD,[1,*], Andrew V. Wister, PhD, FGSA,[1] and John R. Best, PhD[1,2],

[1]Gerontology Research Centre, Simon Fraser University, Vancouver, British Columbia, Canada. [2]Department of Psychiatry, University of British Columbia, Vancouver, British Columbia, Canada.

*Address correspondence to: Daniel R. Y. Gan, PhD, Gerontology Research Centre, Simon Fraser University, #2800-515 West Hastings Street, Vancouver, BC V6B 5K3, Canada. E-mail: drgan@sfu.ca

Abstract

Background and Objectives: More older adults with multimorbidity are aging in place than ever before. Knowing how the environment affects their mental well-being could enhance the efficacy of age-friendly interventions for multimorbidity resilience. With reference to the Transdisciplinary Neighborhood Health Framework, we construct and examine a priori models of environmental influences on life satisfaction and depressive symptoms.
Research Design and Methods: Baseline and follow-up data (after 3 years) were drawn from the Canadian Longitudinal Study on Aging to identify a subsample (n = 14,301) of participants aged at least 65 years with at least 2 chronic diseases. Path analysis examined sociobehavioral attributes (i.e., social support, social participation, walking) and loneliness as primary and secondary mediators, controlling for age, sex, education, and outcomes during baseline.
Results: Good model fit was found (TFI = 1.00; CFI = 1.00; RMSEA < 0.001; SRMR < 0.001). The total effects of housing quality (r_{total} = 0.08, −0.07) and neighborhood cohesion (r_{total} = 0.03, −0.06) were weak but statistically significant in the expected direction. The mediators explained 21%–31% of the total effects of housing quality and 67%–100% of the total effects of neighborhood cohesion. Loneliness mediated 27%–29% of these environmental influences on mental well-being, whereas walking mediated a mere 0.4%–0.9% of the total effects. Walking did not explain the relationship between housing quality and mental well-being.
Discussion and Implications: Data supported a priori pathways from environment to mental well-being through sociobehavioral attributes and loneliness. If these pathways from neighborhood cohesion to life satisfaction reflect causal effects, community-based age-friendly interventions should focus on enhancing neighborhood cohesion to mitigate loneliness among multimorbid older adults for their mental well-being.

Keywords: Age-friendly community, Multimorbidity, Neighborhood effects, Social cohesion, Structural equation modeling

Approximately two thirds of older adults experience multimorbidity in Canada and the United States (Barnett et al., 2012; Marengoni et al., 2011). U.S. multimorbidity prevalence increases from 62% among persons aged 65–74, to 75.7% in ages 75–84, and 81.5% in ages 85 and older (Salive, 2013). Due to its functional and sociopsychological

challenges, scholars have studied the ability of multimorbid older adults to adapt to adversity, termed *multimorbidity resilience* (Wister et al., 2016).

In community settings, multimorbidity resilience may be affected by one's environment and sociobehavioral attributes (Suls et al., 2016; Wister et al., 2020), which are in turn associated with mental well-being (Garnett et al., 2018; Wister et al., 2015). Environmental influences of mental well-being are important because multimorbid older adults are more likely to experience mobility challenges and become depressed, which hinders disease management and recovery (Marengoni et al., 2011; Read et al., 2017).

From a public health perspective, policies that improve the environment such as housing and neighborhood may have a far-reaching impact on population health, for example, on health equity (Badland & Pearce, 2019). Understanding the pathways or their mechanisms of action may facilitate community-based interventions to support multimorbid older adults (Diez Roux & Mair, 2010; Gan, Zhang et al., 2021). This article seeks to identify policy goals by examining theoretical pathways through which the environment influences their mental well-being and the potential mediating effects of sociobehavioral attributes and loneliness. Knowing specific mediators clarifies policy goals and advances the development of innovative environmental interventions.

Literature Review

Multimorbidity challenges mental well-being due to the stress of managing the diseases financially, learning about them, and actively monitoring (Garnett et al., 2018). Difficulty accepting and enduring reduced physical function and mobility may result in anxiety especially when typical sources of social support become curtailed (Lee & Yun, 2020). Depression, distress, and unhealthy coping strategies may be common in the absence of social support and spirituality (Jacobs et al., 2017). These are often exacerbated by health services that are designed to treat single illnesses and not the complex needs of older adults with multimorbidity, of whom some may not be given opportunities to participate in health care decisions about themselves (Ploeg et al., 2019). Attending to numerous doctor appointments may be challenging (Ploeg et al., 2019) without mobility assistance.

To protect the mental well-being and personhood of older adults with multimorbidity, resources such as material support, health literacy, activities, relationships, emotional support, and personal values are required (Lim et al., 2017). These resources may be embedded in the environment. As precursors of effective self-management, sociobehavioral attributes may help multimorbid older adults access these resources (Garnett et al., 2018). With reference to the Transdisciplinary Neighborhood Health Framework (Gan, 2017), we construct an a priori analytic framework that links environment to mental well-being through sociobehavioral attributes and loneliness.

Environment

First, we hypothesize that housing quality and neighborhood cohesion are positively associated with the mental well-being (H_1). The availability and utilization of community parks and faith-based services are associated with improved mental well-being of older adults with multimorbidity (Springgate et al., 2018). These may foster neighborhood cohesion (Gan, Zhang et al., 2021). Depression is reduced with easy access to community health centers (Sadarangani et al., 2019). Better housing and recreational activities are associated with decreased mortality (St John et al., 2015). Satisfaction with one's environment may be associated with increased psychological quality of life (Coventry et al., 2015). Accessible transportation, opportunities for physical activity, and healthy food options may influence one's ability to self-manage (Schulman-Green et al., 2016).

Sociobehavioral Attributes

Second, we hypothesize that social support, social participation, and exposure to neighborhood environment increase mental well-being (H_2). Social context is critical for the effective management of chronic diseases (Clark, 2003; O'Conor et al., 2019). Adequate social engagement is linked to positive life satisfaction and reduced depression (Yeung et al., 2020). Social participation is associated with greater resilience or positive adaptation (Levasseur et al., 2017). Social support from one's spouse reduces depressive symptoms (Ahn et al., 2017).

We further hypothesize that sociobehavioral attributes mediate the association between environment and mental well-being (H_3). Social support and social participation may explain the protective effects of neighborhood cohesion (Elliott et al., 2014; Waverijn et al., 2017) and housing quality (Yeung et al., 2020) against depression. Social participation explains the effect of neighborhood cohesion on resilience (Levasseur et al., 2017) and life satisfaction (Au et al., 2020). Neighborhood physical activity may explain the relationship between neighborhood deprivation and mental well-being (Salman & Sellami, 2019).

Loneliness

Finally, we hypothesize that some of the effects of the sociobehavioral attributes are mediated by loneliness (H_4; Santini et al., 2020). Loneliness may be a precursor to depression (Lee & Bierman, 2019). In contrast with social isolation, loneliness is a feeling of inadequate social contact (Kemperman et al., 2019). Given its wide-ranging impact, loneliness has received increased attention (Leigh-Hunt et al., 2017; National Academies of Sciences, Engineering, and Medicine [NASEM], 2020). For various reasons, people with chronic loneliness may believe that making friends depends on external circumstances instead of their effort (Newall et al., 2009). The quality of neighborhood

friendship altered mental health trajectories during coronavirus disease 2019 (COVID-19; Gan & Best, 2021). Negative social interactions with family and friends and inadequate tangible support may exacerbate anxiety and depression (Ahn et al., 2017; O'Conor et al., 2019).

Method

Data Source and Sample

This study uses baseline and follow-up data from participants older than age 65 who have two or more chronic diseases in the Comprehensive and Tracking cohorts of the Canadian Longitudinal Study of Aging (CLSA; Kirkland et al., 2015; Raina et al., 2009, 2019). CLSA is a cohort study of 51,338 persons aged 45–85 years at the baseline collected in 2011–2015, with follow-up in 2015–2018. Participants were selected via stratified random sampling. Surveys were conducted in English or French in the homes of the comprehensive cohort (who also participated in physical examinations and biospecimens collection) or through phone for the tracking cohort. Individuals who were unable to provide consent were excluded. Unweighted data were used for two sets of path analysis with different missingness. Not using weights—which would account for the oversampling of ages 65 and older—is suitable given our interest in this subpopulation (see Supplementary Sections 1 and 2 for details).

Measures

Environment

Baseline values of two independent variables were used. *Housing quality* was measured with two items. First, participants were asked whether their homes have problems with electrical wiring or plumbing, heating, condensation, leaking, maintenance, infestations, and noise. Participants score one in the absence of each problem. Second, participants were asked whether they were satisfied with their current housing on a 4-point Likert scale, with responses ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Scores were transformed such that the minimum and maximum scores for both questions were the same. Both items were strongly correlated ($B = 0.248$; $p < .001$).

Neighborhood cohesion was measured with nine items on a four-option Likert scale. Examples are "I really feel part of this area," "Most people in this area are friendly," and "there are lots of people in this area who would help you". Four items were reverse-coded. The scale demonstrated good reliability with an alpha value of 0.85.

Sociobehavioral attributes

Follow-up values of three sociobehavioral attributes were included as mediators. *Social participation* was measured using eight items (Wister et al., 2019). Participants were asked to indicate their frequency of participating in various social activities in the past 12 months. These included "family or friendship-based activities outside the household," "church or religious activities," and "neighborhood, community or professional association activities." Higher scores indicated more social participation.

Social support was measured using the 19-item Rand Medical Outcomes Study Social Support Survey scale (Sherbourne & Stewart, 1991). Participants were asked whether various supports were typically available when needed. These included someone to "help you if you were confined to bed," "listen to you when you need to talk," and "get together with for relaxation." Responses ranged from 1 (*none of the time*) to 5 (*all of the time*). Higher scores indicated more social support availability.

Walking was measured using two items from the Physical Activity Scale for the Elderly (Washburn et al., 1999). Participants were asked how often they walked outside their home or yard in the past 7 days and how many hours they spend walking per day on average. Responses ranged from 1 (*never*) to 4 (*often*) and 1 (*less than 30 min*) to 5 (*4 h or more*). Scores were transformed such that the minimum and maximum scores for both questions were the same.

Loneliness

Loneliness was included as a secondary mediator. Loneliness was measured during follow-up with three items from the University of California Los Angeles Loneliness scale (Hughes et al., 2004). Participants were asked how often they "lack companionship" and "feel left out" or "isolated from others." Responses ranged from 1 (*hardly ever*) to 3 (*often*). Higher scores indicated feeling more lonely.

Mental well-being

Two outcome variables were assessed at both baseline and follow-up. *Life satisfaction* was assessed using five items from the Satisfaction with Life Scale (Diener et al., 1985). Participants were asked to indicate the degree to which they agree with five statements. Examples include "I am satisfied with my life," "My life is close to my ideal," and "I would change almost nothing." Responses ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). Higher scores indicated more life satisfaction.

Depressive symptoms were assessed using nine items from the short form of the Center for Epidemiologic Studies—Depression scale (Andresen et al., 1994). We excluded an item on loneliness to avoid confounding. Responses ranged from 1 (*rarely or never*) to 4 (*all of the time*). Two items were reverse-coded. Higher scores indicated more depressive symptoms. Variables used are summarized in Table 1.

Analytic Technique

Path analysis was conducted in Stata/SE 15.1 using maximum likelihood. We conducted analyses on each outcome variable in separate models without imputation, resulting in 14,301 and 14,052 observations. To distinguish stable components from change between baseline and follow-up,

outcome variables during follow-up were adjusted for baseline values as exogenous variables per previous work by Stafford et al. (2011). Intermediate variables were also adjusted for baseline values of outcome variables. We did not use change scores given the observational study design (Tennant et al., 2021). This "adjustment" was done by including baseline values of the outcome as a covariate in the path model.

In addition, intermediate and outcome variables were adjusted for age (in years), sex, and education as an indicator of socioeconomic status (SES) if their correlations were statistically significant at zeroth order (see Supplementary Section 3 for details). We did not use household income as an SES indicator as many older adults may depend on savings instead of pension income (Grundy & Holt, 2001). All independent, intermediate, and outcome variables were allowed to covary. In the absence of validation on hold-out data, we did not drop insignificant correlations nor used modification indices to avoid overfitting the model.

The strength of correlations (standardized beta coefficients, r) and their significance level (p value) are

Table 1. Variables Included in Model

Variables	Data source	Mean	SD	Min	Max
Independent variables					
Housing quality	Baseline	7.54	0.67	2	8
Neighborhood cohesion	Baseline	29.89	3.51	9	36
Intermediate variables					
Social participation	Follow-up	15.43	4.94	4	36
Social support	Follow-up	81.11	13.49	19	95
Walking	Follow-up	4.54	1.68	2	8
Loneliness	Follow-up	3.88	1.32	3	9
Outcome variables					
Life satisfaction	Baseline	28.27	6.07	5	35
	Follow-up	28.40	6.19	5	35
Depressive symptoms	Baseline	31.02	4.19	9	36
	Follow-up	30.90	4.23	9	36

reported in path diagrams. Potential mediation through the intermediate variables is quantified by calculating the indirect effect ($r_{indirect}$), which is the product of the beta estimate of the exogenous variable on the intermediate variation and the beta estimate of the intermediate variable on the outcome. Model fit statistics were obtained to examine the validity of the models based on recommended values (model chi-square p value > .05; TFI ≥ .95; CFI ≥ 0.90; RMSEA < 0.08; SRMR < 0.08).

Findings

The weighted mean age of participants was 73.6 (*SD* 6.4). The unweighted mean age was 74.5 (*SD* 6.6). Females comprised 55.7% of the weighted sample (53.2% in unweighted). Most participants had two to four chronic diseases (see Supplementary Section 1 for further details).

Both models demonstrated good fit. The total effects of housing quality (r_{total} = 0.08, $p < .001$) and neighborhood cohesion (r_{total} = 0.03, $p < .001$) on life satisfaction were weak but statistically significant and in the expected direction. The same could be said of the total effects of housing quality (r_{total} = −0.07, $p < .001$) and neighborhood cohesion (r_{total} = −0.06, $p < .001$) on depressive symptoms.

The path diagram in Figure 1 shows a weak but statistically significant direct association from housing quality (r = 0.06, $p < .001$, CI = [0.05, 0.08]) to life satisfaction; 21% of its total effect was mediated by social support ($r_{indirect}$ = 0.008, $p < .001$), social participation ($r_{indirect}$ = 0.006, $p ≤ .014$), and loneliness ($r_{indirect}$ = 0.005, $p < .001$). Loneliness further mediates parts of the indirect effects through social support ($r_{indirect}$ = 0.003, $p < .001$) and social participation ($r_{indirect}$ = 0.001, $p < .001$).

Neighborhood cohesion was not directly associated with life satisfaction as indicated by nonsignificant direct effect (r = −0.00, $p = .545$, CI = [−0.02, 0.01]). Instead, its effect was fully mediated by social support ($r_{indirect}$ = 0.014, $p < .001$), social participation ($r_{indirect}$ = 0.006, $p <$
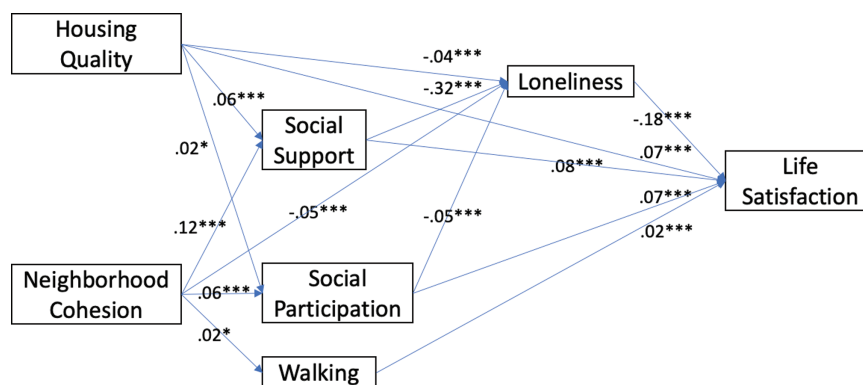

Figure 1. Environmental influences on life satisfaction (*n* = 14,301; outcome and intermediate variables controlled for age, sex, education, and baseline life satisfaction). Model fit statistics: Good fit; model chi-square p = .56 > .05; TFI = 1.00 ≥ 0.95; CFI = 1.00 ≥ 0.90; RMSEA = 0.000 < 0.08; SRMR = 0.000 < 0.08. *N* is larger in unweighted sample. Only statistically significant paths are shown.

.001), walking ($r_{indirect}$ = 0.001, p < .001), and loneliness ($r_{indirect}$ = 0.009, p < .001). Loneliness further mediates parts of the indirect effects through social support ($r_{indirect}$ = 0.007, p < .001) and social participation ($r_{indirect}$ = 0.001, p < .001).

Similarly, the path diagram in Figure 2 shows a weak but statistically significant direct association from housing quality (B = −0.05, p < .001, CI = [−0.06, −0.04]) to depressive symptoms; 31% of its total effect was mediated by social support ($r_{indirect}$ = −0.012, p < .001), social participation ($r_{indirect}$ = −0.002, p < .001), and loneliness ($r_{indirect}$ = −0.008, p < .001). Loneliness further mediates parts of the indirect effects through social support ($r_{indirect}$ = −0.006, p < .001) and social participation ($r_{indirect}$ = −0.0003, p < .001).

For depressive symptoms, neighborhood cohesion showed a weak, statistically significant, direct association (r = −0.02, p < .001, CI = [−0.03, −0.00]); 67% of its total effect was mediated by social support ($r_{indirect}$ = −0.019, p < .001), social participation ($r_{indirect}$ = −0.006, p < .001), walking ($r_{indirect}$ = −0.002, p < .001), and loneliness ($r_{indirect}$ = −0.011, p < .001). Loneliness further mediates parts of the indirect effects through social support ($r_{indirect}$ = −0.009, p < .001) and social participation ($r_{indirect}$ = −0.001, p < .001).

Results

Overall, the results support our path analytic framework that links environment to mental well-being via sociobehavioral attributes and loneliness. H_1: Housing quality is associated with life satisfaction and depressive symptoms both directly and indirectly. Neighborhood cohesion is similarly associated with depressive symptoms and with life satisfaction, albeit indirectly. H_2: Social support, social participation, and walking are associated with better life satisfaction and less depressive symptoms. The effects of social support are the strongest. H_3: Social support, social participation, and walking explain all the effects of neighborhood cohesion on life satisfaction, and

part of its effect on depressive symptoms. Walking does not mediate between housing quality and mental well-being.

H_4: Loneliness explains 42% and 11% of the effects of social support and social participation on life satisfaction, and 48% and 14% of their effects on depressive symptoms. Loneliness does not mediate between walking and mental well-being. Loneliness explains approximately 29.1% and 27.2% of the total effects of environment on life satisfaction and depressive symptoms:

$$\frac{r_{indirect}}{r_{total}} = \frac{0.005 + 0.003 + 0.007 + 0.009 + 0.007 + 0.001}{0.08 + 0.03}$$
$$= 29.1\%$$

$$\frac{r_{indirect}}{r_{total}} = \frac{-0.008 - 0.006 - 0.0003 - 0.011 - 0.009 - 0.001}{-0.07 - 0.06}$$
$$= 27.2\%$$

In comparison, walking explained merely 0.4% and 0.9% of the total effects on life satisfaction and depressive symptoms.

Discussion

The environment is important for the mental well-being of older adults with multimorbidity. The models provide excellent explanations of the effects of neighborhood cohesion, especially on life satisfaction. Its effect on depressive symptoms (Echeverría et al., 2008) is explained by social support, social participation, walking, and loneliness. Obtaining a comprehensive explanation helps to develop theoretically informed mental well-being interventions that are sensitive to community contexts, including norms, safety, and walking behavior (Azmi & Karim, 2012; Hohmann & Shear, 2002). The following paragraphs highlight various findings and discuss their implications in relation to extant literature.

The total effects of housing quality (r_{total} = 0.08, 0.05, p < .001) are consistently stronger than neighborhood
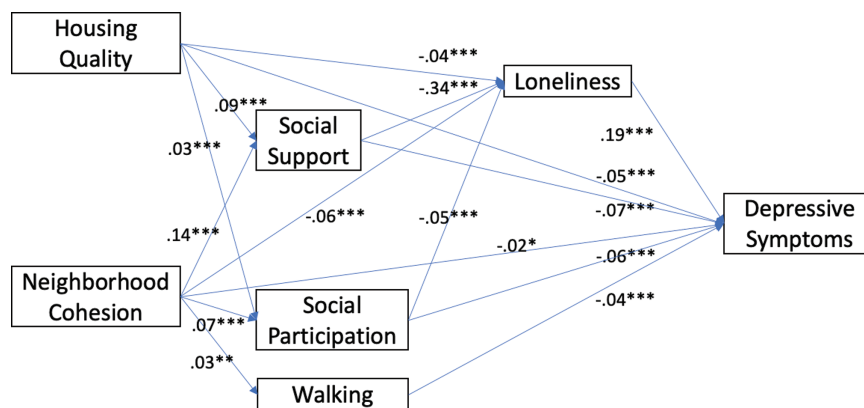

Figure 2. Environmental influences on depressive symptoms (n = 14,052; outcome and intermediate variables controlled for age, sex, education and baseline depressive symptoms). Model fit statistics: Good fit; TFI = 1.00 ≥ 0.95; CFI = 1.00 ≥ 0.90; RMSEA = 0.000 < 0.08; SRMR = 0.000 < 0.08. N is larger in unweighted sample. Only statistically significant paths are shown. Model chi-square p value is not available.

cohesion (r_{total} = 0.03, p < .001; r_{total} = 0.02, p = .020). This is in line with studies that have established the importance of home modifications for life satisfaction (Addae-Dapaah & Juan, 2014) and the contingent impact of neighborhood cohesion on mental well-being (Gan, Fung et al., 2021). The life spaces of older adults with multimorbidity tend to be smaller (Hauer et al., 2018), which makes the immediate environment more important. Poor housing quality is a source of stress (Adams & Roberts, 2010) that may explain the difficulties of managing multimorbidity in low-income contexts (Pathirana et al., 2018). Disparities in access to home modifications should be addressed to support healthy aging in place, especially for multimorbid older adults in low-income contexts (Bakk et al., 2017).

As a form of incidental social contact, the effects of walking are consistently weaker than social participation and support. "Natural neighborhood network" (Gardner, 2011) is limited if they remain as weak ties. Stronger ties might best be fostered prior to the onset of multimorbidity. Functional support is relevant when one has fewer chronic conditions (Olaya et al., 2017); emotional support is important for medical adherence amid multimorbidity (Lozano-Hernández et al., 2020). Different forms of social support may be required with differing barriers and quality of life (Rijken & van der Heide, 2019).

Weaker effects of walking among multimorbid older adults are consistent with extent literature (Dhalwani et al., 2016; Keats et al., 2017). Improving walk/wheelability alone may be "too little, too late" to reap the benefits of social support from neighborhood friendship in old age (Chaudhury et al., 2016; Gan, Fung et al., 2021; Gan, Mortenson et al., 2021). This does not deny the general importance of walking or incidental social interactions, because these may lead to stronger ties with neighbors (Gan, Fung et al., 2021). The timing and context of intervention are paramount from a life-course perspective. Psychosocial interventions may be required in existing naturally occurring retirement communities with poor mental well-being.

SES as indicated by housing quality is unrelated to neighborhood walking (Nordh et al., 2017). In order for neighborhood walking to improve mental well-being through stress reduction regardless of SES, socioeconomic disparities must not manifest as segregated neighborhoods of starkly different built quality. Environments of an acceptable minimum standard should be integrated into public health regimes (Krieger & Higgins, 2002; Nordh et al., 2017; Shaw, 2004). Additionally, psychosocial nuances (e.g., affection, neighborhood atmosphere) are required in addition to environmental toxicology and physical activity (Gee & Payne-Sturges, 2004). Psychosocial experiences of multimorbidity in the community must be considered while adapting the environment to enable coping (Coventry et al., 2015; Eckerblad et al., 2020; Grundberg et al., 2014).

A large proportion of the effect of the sociobehavioral attributes on mental well-being was explained by loneliness. Identifying this psychosocial pathway helps to provide an important focus for mental well-being interventions.

Reducing loneliness among multimorbid older adults is an important public health goal. Achieving this goal could yield significant improvements in population mental well-being despite uncertain effects on mortality (Courtin & Knapp, 2017; Olaya et al., 2017). Stress pathways may explain the unaccounted effects of social support on mental well-being. Functional support—for example, being brought to the hospital—may protect health by reducing stress instead of loneliness (Nausheen et al., 2007; Olaya et al., 2017).

While walking enhances mental well-being, it is not through a reduction of loneliness (Kowitt et al., 2020). Instead, walking may provide exposure to greenery and reduce stress (Horiuchi et al., 2013; Lee & Lee, 2014; South et al., 2015) through attention restoration (Berto, 2014; Joye & Dewitte, 2018; Lin et al., 2014), reduced cognitive load (Jiang et al., 2021), or social contact (Lottrup et al., 2013; Maas et al., 2009; Ng et al., 2021). Consistent with community-based age-friendly approaches, the provision of public greenery near homes may provide opportunities for stress reduction for multimorbid older adults with mobility limitations. Community-based interventions may consider the effects of greenery and stress pathways in addition to the effects of loneliness.

Limitations

We note small to medium effects, which nonetheless have public health significance as argued elsewhere (Badland & Pearce, 2019; Diez Roux & Mair, 2010). The use of self-reported measures at the individual level cannot preclude same-source bias as an explanation of the associations found. Confirmatory evidences via other designs such as experimental methods and mixed methods are required. Including both measures of mental well-being in a single model could yield different insights into the pathways. Another limitation is that we may not have fully specified the models; we examined a number of additional predictors prior to model reduction. Future research could incorporate neighborhoods as a unit of analysis. Neighborhood disparities are often symptomatic of the spatial structures of injustice (Soja, 2009). Environmental effects may be indicative of broader spatial inequities (Marcuse, 2009). Future research may examine whether environmental effects are moderated by area-based social deprivation (Moin et al., 2018; Orueta et al., 2013; Wister et al., 2020), with more data points and measures of stress.

Conclusion

This study examined how the environment affects the mental well-being of older adults living with multimorbidity. The pathways found could guide "equigenic" community-based interventions for mental well-being (Galster, 2011, p. 47; Mitchell et al., 2015). We highlighted the significance of loneliness and heeded the call to examine what works for whom (Fakoya et al., 2020). Interventions aimed at improving neighborhood cohesion, interpersonal skills, social cognition, social support, or access to social activities may be relevant

(Eibich et al., 2016; Fakoya et al., 2020; Harasemiw et al., 2018) and should guide public health goals to address loneliness and poor mental health during COVID-19, for example, through neighborhood networks (Gan & Best, 2021). Such as approach provides greater clarity to age-friendly efforts that prioritize social connectedness (Menec, 2017).

Supplementary Material

Supplementary data are available at *The Gerontologist* online.

Funding

Conflict of Interest

None declared.

Acknowledgments

References

Adams, K.B., & Roberts, A.R. (2010). Reported coping strategies and depressive symptoms among African American and White residents of congregate housing. *Journal of Gerontological Social Work*, **53**(6), 473–494. doi:10.1080/01634372.2010.486431

Addae-Dapaah, K., & Juan, Q.S. (2014). Life satisfaction among elderly households in public rental housing in Singapore. *Health*, **6**, 1057–1076. doi:10.4236/health.2014.610132

Ahn, S., Kim, S., & Zhang, H. (2017). Changes in depressive symptoms among older adults with multiple chronic conditions: Role of positive and negative social support. *International Journal of Environmental Research and Public Health*, **14**(1), 16. doi:10.3390/ijerph14010016

Andresen, E.M., Malmgren, J.A., Carter, W.B., & Patrick, D.L. (1994). Screening for depression in well older adults: Evaluation of a short form of the CES-D. *American Journal of Preventive Medicine*, **10**(2), 77–84. doi:10.1016/S0749-3797(18)30622-6

Au, A., Lai, D.W., Yip, H.M., Chan, S., Lai, S., Chaudhury, H., Scharlach, A., & Leeson, G. (2020). Sense of community mediating between age-friendly characteristics and life satisfaction of community-dwelling older adults. *Frontiers in Psychology*, **11**, 86. doi:10.3389/fpsyg.2020.00086

Azmi, D.I., & Karim, H.A. (2012). A comparative study of walking behaviour to community facilities in low-cost and medium cost housing. *Procedia—Social and Behavioral Sciences*, **35**, 619–628. doi:10.1016/j.sbspro.2012.02.129

Badland, H., & Pearce, J. (2019). Liveable for whom? Prospects of urban liveability to address health inequities. *Social Science & Medicine*, **232**, 94–105. doi:10.1016/j.socscimed.2019.05.001

Bakk, L., Cadet, T., Lien, L., & Smalley, A. (2017). Home modifications among community-dwelling older adults: A closer look at race and ethnicity. *Journal of Gerontological Social Work*, **60**(5), 377–394. doi:10.1080/01634372.2017.1341444

Barnett, K., Mercer, S. W., Norbury, M., Watt, G., Wyke, S., & Guthrie, B. (2012). Epidemiology of multimorbidity and implications for health care, research, and medical education: A cross-sectional study. *The Lancet*, **380**(9836), 37–43. doi:10.1016/S0140-6736(12)60240-2

Berto, R. (2014). The role of nature in coping with psycho-physiological stress: A literature review on restorativeness. *Behavioral Sciences*, **4**(4), 394–409. doi:10.3390/bs4040394

Chaudhury, H., Campo, M., Michael, Y., & Mahmood, A. (2016). Neighborhood environment and physical activity in older adults. *Social Science & Medicine*, **149**, 104–113. doi:10.1016/j.socscimed.2015.12.011

Clark, N.M. (2003). Management of chronic disease by patients. *Annual Review of Public Health*, **24**(1), 289–313. doi:10.1146/annurev.publhealth.24.100901.141021

Courtin, E., & Knapp, M. (2017). Social isolation, loneliness and health in old age: A scoping review. *Health and Social Care in the Community*, **25**(3), 799–812. doi:10.1111/hsc.12311

Coventry, P.A., Small, N., Panagioti, M., Adeyemi, I., & Bee, P. (2015). Living with complexity; marshalling resources: A systematic review and qualitative meta-synthesis of lived experience of mental and physical multimorbidity. *BMC Family Practice*, **16**(1), 1–12. doi:10.1186/s12875-015-0345-3

Dhalwani, N.N., O'Donovan, G., Zaccardi, F., Hamer, M., Yates, T., Davies, M., & Khunti, K. (2016). Long terms trends of multimorbidity and association with physical activity in older English population. *International Journal of Behavioral Nutrition and Physical Activity*, **13**(1), 8. doi:10.1186/s12966-016-0330-9

Diener, E.D., Emmons, R.A., Larsen, R.J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, **49**(1), 71–75. doi:10.1207/s15327752jpa4901_13

Diez Roux, A. V. & Mair, C. (2010). Neighborhoods and health. *Annals of the New York Academy of Sciences*, **1186**, 125–145. doi:10.1111/j.1749-6632.2009.05333.x

Echeverría, S., Diez Roux, A.V., Shea, S., Borrell, L.N., & Jackson, S. (2008). Associations of neighborhood problems and neighborhood social cohesion with mental well-being and health

behaviors: The Multi-Ethnic Study of Atherosclerosis. *Health & Place*, **14**, 853–865. doi:10.1016/j.healthplace.2008.01.004

Eckerblad, J., Waldréus, N., Stark, Å.J., & Jacobsson, L.R. (2020). Symptom management strategies used by older community-dwelling people with multimorbidity and a high symptom burden—A qualitative study. *BMC Geriatrics*, **20**(1), 1–9. doi:10.1186/s12877-020-01602-y

Eibich, P., Krekel, C., Demuth, I., & Wagner, G.G. (2016). Associations between neighbourhood characteristics, well-being and health vary over the life course. *Gerontology*, **62**, 362–370. doi:10.1159/000438700

Elliott, J., Gale, C.R., Parsons, S., Kuh, D., & HALCyon Study Team. (2014). Neighborhood cohesion and mental wellbeing among older adults: A mixed methods approach. *Social Science & Medicine*, **107**, 44–51. doi:10.1016/j.socscimed.2014.02.027

Fakoya, O.A., McCorry, N.K., & Donnelly, M. (2020). Loneliness and social isolation interventions for older adults: A scoping review of reviews. *BMC Public Health*, **20**(1), 1–14. doi:10.1186/s12889-020-8251-6

Galster, G.C. (2011). The mechanism(s) of neighbourhood effects: Theory, evidence, and policy implications. In: M. van Ham, D. Manley, N. Bailey, L. Simpson & D. Maclennan (Eds.), *Neighbourhood effects research: New perspectives* (pp. 23–56). Springer. doi:10.1007/978-94-007-2309-2_2

Gan, D. R. Y. (2017). Neighborhood effects for aging in place: A transdisciplinary framework toward health-promoting settings. *Housing and Society*, **44**(1–2), 79–113. doi:10.1080/08882746.2017.1393283

Gan, D. R. Y., & Best, J. R. (2021). Prior social contact prior and mental health trajectories during COVID-19: Neighborhood friendship protects vulnerable older adults. *International Journal of Environmental Research and Public Health*, **18**(19), 9999. doi:10.3390/ijerph18199999

Gan, D. R. Y., Fung, J. C., & Cho, I. S. (2021). Neighborhood atmosphere modifies the eudaimonic impact of neighborhood cohesion and friendship among older adults: A multilevel mixed-methods study. *Social Science & Medicine*, **270**, 113682. doi:10.1016/j.socscimed.2021.113682

Gan, D. R. Y., Mortenson, W. B., Mahmood, A., & Routhier, F. (2021). Walk/wheelability: An inclusive instrument-pair for participatory aging-friendly research and practice. *The Gerontologist*, **62**(1), e39–e47. doi:10.1093/geront/gnab079

Gan, D. R. Y., Zhang, L., & Ng, T. K. S. (2021). How do green spaces prevent cognitive decline? A call for research-by-design. *Journal of Urban Design and Mental Health*, **7**, 3. doi:10.6084/m9.figshare.16726045.v1

Gardner, P.J. (2011). Natural neighborhood networks—Important social networks in the lives of older adults aging in place. *Journal of Aging Studies*, **25**(3), 263–271. doi:10.1016/j.jaging.2011.03.007

Garnett, A., Ploeg, J., Markle-Reid, M., & Strachan, P.H. (2018). Self-management of multiple chronic conditions by community-dwelling older adults: A concept analysis. *SAGE Open Nursing*, **4**, 2377960817752471. doi:10.1177/2377960817752471

Gee, G.C., & Payne-Sturges, D.C. (2004). Environmental well-being disparities: A framework integrating psychosocial and environmental concepts. *Environmental Well-Being Perspectives*, **112**(17), 1645–1653. doi:10.1289/ehp.7074

Grundberg, Å., Ebbeskog, B., Gustafsson, S.A., & Religa, D. (2014). Mental well-being-promoting dialogues from the perspective of community-dwelling seniors with multimorbidity. *Journal of Multidisciplinary Healthcare*, **7**, 189. doi:10.2147/JMDH.S59307

Grundy, E., & Holt, G. (2001). The socioeconomic status of older adults: How should we measure it in studies of health inequalities? *Journal of Epidemiology & Community Health*, **55**(12), 895–904. doi:10.1136/jech.55.12.895

Harasemiw, O., Newall, N., Shooshtari, S., Mackenzie, C., & Menec, V. (2018). From social integration to social isolation: The relationship between social network types and perceived availability of social support in a national sample of older Canadians. *Research on Aging*, **40**(8), 715–739. doi:10.1177/0164027517734587

Hauer, K., Ullrich, P., & Eckert, T. (2018). Life-space mobility among multimorbid older persons with multiple impairments following rehabilitation. *Innovation in Aging*, **2**(S1), 518–519. doi:10.1093/geroni/igy023.1920

Hohmann, A.A., & Shear, M.K. (2002). Community-based intervention research: Coping with the "noise" of real life in study design. *American Journal of Psychiatry*, **159**(2), 201–207. doi:10.1176/appi.ajp.159.2.201

Horiuchi, M., Endo, J., Akatsuka, S., Uno, T., Hasegawa, T., & Seko, Y. (2013). Influence of forest walking on blood pressure, profile of mood states, and stress markers from the viewpoint of aging. *Journal of Aging and Gerontology*, **1**, 9–17. doi:10.12974/2309-6128.2013.01.01.2

Hughes, M.E., Waite, L.J., Hawkley, L.C., & Cacioppo, J.T. (2004). A short scale for measuring loneliness in large surveys: Results from two population-based studies. *Research on Aging*, **26**(6), 655–672. doi:10.1177/0164027504268574

Jacobs, R.J., Ownby, R.L., Acevedo, A., & Waldrop-Valverde, D. (2017). A qualitative study examining health literacy and chronic illness self-management in Hispanic and non-Hispanic older adults. *Journal of Multidisciplinary Healthcare*, **10**, 167. doi:10.2147/JMDH.S135370

Jiang, B., He, J., Chen, J., Larsen, L., & Wang, H. (2021). Perceived green at speed: A simulated driving experiment raises new questions for attention restoration theory and stress reduction theory. *Environment and Behavior*, **53**(3), 296–335. doi:10.1177/0013916520947111

Joye, Y., & Dewitte, S. (2018). Nature's broken path to restoration. A critical look at Attention Restoration Theory. *Journal of Environmental Psychology*, **59**, 1–8. doi:10.1016/j.jenvp.2018.08.006

Keats, M. R., Cui, Y., DeClercq, V., Dummer, T., Forbes, C., Grandy, S. A., Hicks, J., Sweeney, E., Yu, Z. M., & Parker, L. (2017). Multimorbidity in Atlantic Canada and association with low levels of physical activity. *Preventive Medicine*, **105**, 326–331. doi:10.1016/j.ypmed.2017.10.013

Kemperman, A., van den Berg, P., Weijs-Perrée, M., & Uijtdewillegen, K. (2019). Loneliness of older adults: Social network and the living environment. *International Journal of Environmental Research and Public Health*, **16**(3), 406. doi:10.3390/ijerph16030406

Kirkland, S.A., Griffith, L.E., Menec, V., Wister, A., Payette, H., Wolfson, C., & Raina, P.S. (2015). Mining a unique Canadian resource: The Canadian Longitudinal Study on Aging. *Canadian*

Journal on Aging/La Revue Canadienne du Vieillissement, **34**(3), 366–377. doi:10.1017/S071498081500029X

Kowitt, S.D., Aiello, A.E., Callahan, L.F., Fisher, E.B., Gottfredson, N.C., Jordan, J.M., & Muessig, K.E. (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. doi:10.1016/j.healthplace.2019.102278

Krieger, J., & Higgins, D.L. (2002). Housing and health: Time again for public health action. *American Journal of Public Health*, **92**(5), 758–768. doi:10.2105/AJPH.92.5.758

Lee, Y., & Bierman, A. (2019). Loneliness as a mediator of perceived discrimination and depression: Examining education contingencies. *The International Journal of Aging and Human Development*, **89**(2), 206–227. doi:10.1177/0091415018763402

Lee, J.Y., & Lee, D.C. (2014). Cardiac and pulmonary benefits of forest walking versus city walking in elderly women: A randomised, controlled, open-label trial. *European Journal of Integrative Medicine*, **6**(1), 5–11. doi:10.1016/j.eujim.2013.10.006

Lee, H.J., & Yun, J. (2020). Health-related quality of life in South Korean community-dwelling older adults with multimorbidity: A convergent parallel mixed-methods approach. *Quality of Life Research*, **29**(3), 721–732. doi:10.1007/s11136-019-02360-0

Leigh-Hunt, N., Bagguley, D., Turner, V., Turnbull, N., Valtorta, N., & Caan, W. (2017). An overview of systematic reviews on the public health consequences of social isolation and loneliness. *Public Health*, **152**, 157–171. doi:10.1016/j.puhe.2017.07.035

Levasseur, M., Roy, M., Michallet, B., St-Hilaire, F., Maltais, D., & Généreux, M. (2017). Associations between resilience, community belonging, and social participation among community-dwelling older adults: Results from the Eastern Townships Population Health Survey. *Archives of Physical Medicine and Rehabilitation*, **98**(12), 2422–2432. doi:10.1016/j.apmr.2017.03.025

Lim, C.Y., Berry, A.B., Hirsch, T., Hartzler, A.L., Wagner, E.H., Ludman, E.J., & Ralston, J.D. (2017). Understanding what is most important to individuals with multiple chronic conditions: A qualitative study of patients' perspectives. *Journal of General Internal Medicine*, **32**(12), 1278–1284. doi:10.1007/s11606-017-4154-3

Lin, Y.H., Tsai, C.C., Sullivan, W.C., Chang, P.J., & Chang, C.Y. (2014). Does awareness effect the restorative function and perception of street trees? *Frontiers in Psychology*, **5**, 906. doi:10.3389/fpsyg.2014.00906

Lottrup, L., Grahn, P., & Stigsdotter, U.K. (2013). Workplace greenery and perceived level of stress: Benefits of access to a green outdoor environment at the workplace. *Landscape and Urban Planning*, **110**, 5–11. doi:10.1016/j.landurbplan.2012.09.002

Lozano-Hernández, C. M., López-Rodríguez, J. A., Leiva-Fernández, F., Calderón-Larrañaga, A., Barrio-Cortes, J., Gimeno-Feliu, L. A., Poblador-Plou, B., Cura-González, I. D., & MULTIPAP GROUP (2020). Social support, social context and nonadherence to treatment in young senior patients with multimorbidity and polypharmacy followed-up in primary care: MULTIPAP Study. *PLoS One*, **15**(6), e0235148. doi:10.1371/journal.pone.0235148

Maas, J., van Dillen, S.M.E., Verheij, R.A., Groenwegen, P.P. (2009). Social contacts as a possible mechanism behind the relation between green space and health. *Health and Place*, **15**, 586–595. doi:10.1016/j.healthplace.2008.09.006

Marcuse, P. (2009). From critical urban theory to the right to the city. *City*, **13**(2–3), 185–197. doi:10.1080/13604810902982177

Marengoni, A., Angleman, S., Melis, R., Mangialasche, F., Karp, A., Garmen, A., Meinow, B., & Fratiglioni, L. (2011). Aging with multimorbidity: A systematic review of the literature. *Ageing Research Reviews*, **10**(4), 430–439. doi:10.1016/j.arr.2011.03.003

Menec, V.H. (2017). Conceptualizing social connectivity in the context of age-friendly communities. *Journal of Housing For the Elderly*, **31**(2), 99–116. doi:10.1080/02763893.2017.1309926

Mitchell, R.J., Richardson, E.A., Shortt, N.K., & Pearce, J.R. (2015). Neighborhood environments and socioeconomic inequalities in mental well-being. *American Journal of Preventive Medicine*, **49**(1), 80–84. doi:10.1016/j.amepre.2015.01.017

Moin, J.S., Moineddin, R., & Upshur, R.E.G. (2018). Measuring the association between marginalization and multimorbidity in Ontario, Canada: A cross-sectional study. *Journal of Comorbidity*, **8**(1), 1–9. doi:10.1177/2235042X18814939

National Academies of Sciences, Engineering, and Medicine (NASEM). (2020). *Social isolation and loneliness in older adults: Opportunities for the health care system*. The National Academies Press. doi:10.17226/25663

Nausheen, B., Gidron, Y., Gregg, A., Tissarchondou, H.S., & Peveler, R. (2007). Loneliness, social support and cardiovascular reactivity to laboratory stress. *Stress*, **10**(1), 37–44. doi:10.1080/10253890601135434

Newall, N. E., Chipperfield, J. G., Clifton, R. A., Perry, R. P., Swift, A. U., & Ruthig, J. C. (2009). Causal beliefs, social participation, and loneliness among older adults: A longitudinal study. *Journal of Social and Personal Relationships*, **26**(2–3), 273–290. doi:10.1177/0265407509106718

Nordh, H., Vistad, O.I., Skår, M., Wold, L.C., & Bærum, K.M. (2017). Walking as urban outdoor recreation: Public health for everyone. *Journal of Outdoor Recreation and Tourism*, **20**, 60–66. doi:10.1016/j.jort.2017.09.005

Ng, T.K.S., Gan, D.R.Y., Mahendran, R., Kua, E.H., & Ho, R.C.-M. (2021). Social connectedness as a mediator for horticultural therapy's biological effect on community-dwelling older adults: Secondary analyses of a randomized controlled trial. *Social Science & Medicine*, **284**, 114191. doi:10.1016/j.socscimed.2021.114191

O'Conor, R., Benavente, J. Y., Arvanitis, M., Curtis, L. M., Eldeirawi, K., Hasnain-Wynia, R., Federman, A. D., Hebert-Beirne, J., & Wolf, M. S. (2019). Perceived adequacy of tangible social support and associations with health outcomes among older primary care patients. *Journal of General Internal Medicine*, **34**(11), 2368–2373. doi:10.1007/s11606-019-05110-7

Olaya, B., Domènech-Abella, J., Moneta, M.V., Lara, E., Caballero, F.F., Rico-Uribe, L.A., & Haro, J.M. (2017). All-cause mortality and multimorbidity in older adults: The role of social support and loneliness. *Experimental Gerontology*, **99**, 120–126. doi:10.1016/j.exger.2017.10.001

Orueta, J.F., Nuno-Solinis, R., Garcia-Alvarez, A., & Alonso-Moran, E. (2013). Prevalence of multimorbidity according to the deprivation level among the elderly in the Basque Country. *BMC Public Health*, **13**(1), 918. doi:10.1186/1471-2458-13-918

Pathirana, T.I., & Jackson, C.A. (2018). Socioeconomic status and multimorbidity: A systematic review and meta analysis. *Australian and New Zealand Journal of Public Health*, **42**(2), 186–194. doi:10.1111/1753-6405.12762

Ploeg, J., Canesi, M., D Fraser, K., McAiney, C., Kaasalainen, S., Markle-Reid, M., Dufour, S., Garland Baird, L., & Chambers, T. (2019). Experiences of community-dwelling older adults living with multiple chronic conditions: A qualitative study. *BMJ Open*, **9**(3), e023345. doi:10.1136/bmjopen-2018-023345

Raina, P.S., Wolfson, C., Kirkland, S.A., Griffith, L.E., Balion, C., Cossette, B., Dionne, I., Hofer, S., Hogan, D., Van Den Heuvel, E.R., Liu-Ambrose, T., Menec, V., Mugford, G., Patterson, C., Payette, H., Richards, B., Shannon, H., Sheets, D., Taler, V., … & Young, L. (2019). Cohort profile: The Canadian Longitudinal Study on Aging (CLSA). *International Journal of Epidemiology*, **48**(6), 1752–1753. doi:10.1093/ije/dyz173

Raina, P. S., Wolfson, C., Kirkland, S. A., Griffith, L. E., Oremus, M., Patterson, C., Tuokko, H., Penning, M., Balion, C. M., Hogan, D., Wister, A., Payette, H., Shannon, H., & Brazil, K. (2009). The Canadian Longitudinal Study on Aging (CLSA). *Canadian Journal on Aging/La Revue Canadienne du Vieillissement*, **28**(3), 221–229. doi:10.1017/S0714980809990055

Read, J.R., Sharpe, L., Modini, M., & Dear, B.F. (2017). Multimorbidity and depression: A systematic review and meta-analysis. *Journal of Affective Disorders*, **221**, 36–46. doi:10.1016/j.jad.2017.06.009

Rijken, M., & van der Heide, I. (2019). Identifying subgroups of persons with multimorbidity based on their needs for care and support. *BMC Family Practice*, **20**, 179. doi:10.1186/s12875-019-1069-6

Sadarangani, T., Missaelides, L., Eilertsen, E., Jaganathan, H., & Wu, B. (2019). A mixed-methods evaluation of a nurse-led community-based health home for ethnically diverse older adults with multimorbidity in the adult day health setting. *Policy, Politics, & Nursing Practice*, **20**(3), 131–144. doi:10.1177/1527154419864301

Salive, M.E. (2013). Multimorbidity in older adults. *Epidemiologic Reviews*, **35**(1), 75–83. doi:10.1093/epirev/mxs009

Salman, A., & Sellami, M. (2019). Do older adults with multimorbidity meet the recommended levels of physical activity? An analysis of Scottish health survey. *International Journal of Environmental Research and Public Health*, **16**(19). doi:10.3390/ijerph16193748

Santini, Z. I., Jose, P. E., York Cornwell, E., Koyanagi, A., Nielsen, L., Hinrichsen, C., Meilstrup, C., Madsen, K. R., & Koushede, V. (2020). Social disconnectedness, perceived isolation, and symptoms of depression and anxiety among older Americans (NSHAP): A longitudinal mediation analysis. *The Lancet Public Health*, **5**(1), e62–e70. doi:10.1016/S2468-2667(19)30230-0

Schulman-Green, D., Jaser, S.S., Park, C., & Whittemore, R. (2016). A metasynthesis of factors affecting self-management of chronic illness. *Journal of Advanced Nursing*, **72**(7), 1469–1489. doi:10.1111/jan.12902

Shaw, M. (2004). Housing and public health. *Annual Review of Public Health*, **25**, 397–418. doi:10.1146/annurev.publhealth.25.101802.123036

Sherbourne, C.D., & Stewart, A.L. (1991). The MOS social support survey. *Social Science & Medicine*, **32**(6), 705–714. doi:10.1016/0277-9536(91)90150-B

Soja, E. (2009). The city and spatial justice. *Justice Spatiale/Spatial Justice*, **1**(1), 1–5. doi:10.5749/minnesota/9780816666676.003.0001

South, E.C., Kondo, M.C., Cheney, R.A., & Branas, C.C. (2015). Neighborhood blight, stress, and health: A walking trial of urban greening and ambulatory heart rate. *American Journal of Public Health*, **105**(5), 909–913. doi:10.2105/AJPH.2014.302526

Springgate, B., Tang, L., Ong, M., Aoki, W., Chung, B., Dixon, E., Johnson, M. D., Jones, F., Landry, C., Lizaola, E., Mtume, N., Ngo, V. K., Pulido, E., Sherbourne, C., Wright, A. L., Whittington, Y., Williams, P., Zhang, L., Miranda, J., … Wells, K. B. (2018). Comparative effectiveness of coalitions versus technical assistance for depression quality improvement in persons with multiple chronic conditions. *Ethnicity & Disease*, **28**(Suppl. 2), 325. doi:10.18865/ed.28.S2.325

Stafford, M., McMunn, A., & De Vogli, R. (2011). Neighborhood social environment and depressive symptoms in mid-life and beyond. *Ageing and Society*, **31**(6), 893–910. doi:10.1017/S0144686X10001236

St. John, P.D., Mackenzie, C., & Menec, V. (2015). Does life satisfaction predict five-year mortality in community-living older adults? *Aging & Mental Well-Being*, **19**(4), 363–370. doi:10.1080/13607863.2014.938602

Suls, J., Green, P.A., & Davidson, K.W. (2016). A biobehavioral framework to address the emerging challenge of multi-morbidity. *Psychosomatic Medicine*, **78**(3), 281. doi:10.1097/PSY.0000000000000294

Tennant, P.W., Arnold, K.F., Ellison, G.T., & Gilthorpe, M.S. (2021). Analyses of 'change scores' do not estimate causal effects in observational data. *International Journal of Epidemiology*, 1–12. doi:10.1093/ije/dyab050

Washburn, R.A., McAuley, E., Katula, J., Mihalko, S.L., & Boileau, R.A. (1999). The Physical Activity Scale for the Elderly (PASE): Evidence for validity. *Journal of Clinical Epidemiology*, **52**(7), 643–651. doi:10.1016/S0895-4356(99)00049-9

Waverijn, G., Heijmans, M., & Groenewegen, P. P. (2017). Neighbourly support of people with chronic illness; is it related to neighbourhood social capital? *Social Science & Medicine*, **173**, 110–117. doi:10.1016/j.socscimed.2016.12.004

Wister, A. V., Coatta, K. L., Schuurman, N., Lear, S. A., Rosin, M., & MacKey, D. (2016). A lifecourse model of multimorbidity resilience: Theoretical and research developments. *The International Journal of Aging and Human Development*, **82**(4), 290–313. doi:10.1177/0091415016641686

Wister, A., Cosco, T., Mitchell, B., Menec, V., & Fyffe, I. (2019). Development and concurrent validity of a composite social isolation index for older adults using the CLSA. *Canadian Journal on Aging*, **38**(2), 180–192. doi:10.1017/S0714980818000612

Wister, A., Levasseur, M., Griffith, L., & Fyffe, I. (2015). Multiple morbidity disease burden among older persons: A convergent construct validity study to discriminate between six chronic illness measures, CCHS 2008/09. *Biomedical Central (BMC) Geriatrics*, **15**(12), 1–12. doi:10.1186/s12877-015-0001-8

Wister, A., Rosenkrantz, L., Shashank, A., Walker, B. & Schuurman, N. (2020). Multimorbidity and socioeconomic deprivation among older adults: A cross-sectional analysis in five Canadian cities using the CLSA. *Journal of Aging and Environment*, **34**(4), 435–454. doi:10.1080/26892618.2020.1734138

Yeung, P., Severinsen, C., Good, G., & O'Donoghue, K. (2020). Social environment and quality of life among older people with diabetes and multiple chronic illnesses in New Zealand: Intermediary effects of psychosocial support and constraints. *Disability and Rehabilitation*, 1–13. doi:10.1080/09638288.2020.1783375