ALONE IN A CROWD:

SOCIAL ISOLATION IN LATER LIFE

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SOCIAL ISOLATION, PLACE, AND CONNECTION IN LATER LIFE

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Lay Abstract

The research reported in this thesis focuses on social isolation among older people and is organized into three papers. The first paper looks at data from the Canadian Longitudinal Study on Aging to learn more about how aspects of neighbourhoods might lead older people to become isolated. The second paper reports the major themes from in-depth, qualitative interviews with 17 older people living in Hamilton, Ontario. The third and final paper analyzes a set of articles evaluating friendly visiting programs for isolation older people and uncovers some of the characteristics and features of successful programs. The results of these three studies provide important insights into the ways in which neighbourhoods impact the social lives of older people, and how individual risk of becoming isolation might be tied to places. Results also show that friendly visiting programs for isolated older people can be very successful if they have certain key features included in their design.

Abstract

The problem of social isolation among older people has been thoroughly documented, studied, and addressed through both policy and social services, and yet persists as a major social issue. There exist several notable gaps within the scholarly literature on isolation, particularly with respect to the role(s) of place-based risk factors, the relationship(s) between exclusion and social isolation, and best practices for isolation interventions. This thesis addresses these knowledge gaps and presents both empirical and theoretical contributions resulting from a three-part investigation. These studies are presented in three distinct papers to constitute a sandwich dissertation. The first paper examines the role of neighbourhood characteristics in shaping social isolation among older people by analyzing the Canadian Longitudinal Study on Aging (CLSA) baseline data in a series of multiple regressions. Findings indicate that the selected neighbourhood characteristics account for only a small portion of the social outcome measures of interest but raise meaningful questions about the intersection of place and social connection that warrant further study. The second paper investigates both the harmful and protective aspects of places in shaping isolation risk through a qualitative study of older people informed by a place-based exclusion lens. Interview results highlight several aspects of places that contribute risk of isolation and are used to adapt the model of known isolation risk factors. The third and final paper analyzes a sample of friendly visiting programs by conducting a realist synthesis to determine how, for whom, and under what conditions friendly visiting programs are most successful. Results of the synthesis are used to build a friendly visiting program theory to be tested in future studies. Together these three papers contribute to both the applied and theoretical

literature on social isolation, and can inform the development of future research, policy, and intervention strategies.

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Declaration of Academic Achievement:

This thesis is a report of original research that I conducted under the supervision of Drs. Jim Dunn, Gavin Andrews, and Jenny Ploeg commencing in September 2015. Committee members contributed to the: (a) development of the research proposal including the topic, design, research questions, study sample, location of data collection, and data collection tools; (b) research ethics board submission; (c) data analysis; (d) sandwich paper drafts. Throughout the data collection I was the only interviewer (Paper #2) and analyzer of raw data (Papers #1, #2, #3). I transcribed all audio recordings of interviews (Paper #2).

INTRODUCTION

One of the most concerning barriers to well-being in later life is social isolation – a complex social experience that affects approximately 19% of all older people in Canada (The National Seniors Council, 2014). This estimate is worrying, as social isolation has been linked to many harmful associated outcomes. For many older people, experiencing social isolation can be detrimental to overall health and well-being, and can lead to both physical and mental health complications (Cornwell & Waite, 2009; Nicholson, 2012; Pantell et al., 2013). In addition, the harm done by social isolation is thought to extend beyond the individuals who experience isolation themselves. As prevalence rates of social isolation increase, it is possible, and perhaps likely, that whole communities may experience negative effects, such as the weakening of social bonds across generations and social groups (Buffel, Rémillard-Boilard, & Phillipson, 2015; Hortulanus, Machielse, & Meeuwesen, 2006; Keefe, Andrew, Fancey, & Hall, 2006).

Although social isolation has been a topic of interest among many scholars for several decades, there are several considerable knowledge gaps that remain. Existing research has established links concerning the relationship between social connection and place. Questions remain, however, regarding the relationship(s) between social isolation place. Within the gerontological literature that has specifically addressed isolation, much of the geographical/place-conscious research has studied isolation risk and experience among rural, community-dwelling older people (Havens et al., 2004). Given that there are likely considerable differences in experience across urban, rural, and suburban neighbourhoods, research on exclusively rural settings may not be applicable or generalizable to (sub)urban settings and neighbourhoods (British Columbia Ministry of Health, 2004). Additional work is

needed to investigate specific aspects of places and neighbourhoods that may shape the social isolation experience and risk.

The other practical gap in the wider literature concerns how and when to intervene in the trajectory of social isolation. Over the years, a plethora of interventions, prevention strategies, and social programs have been carried out with the objective of tackling the issue of social isolation. These interventions have had mixed success, and experts in the field have tended to agree that there does not exist one clear direction from which to approach social isolation prevention or reduction efforts (Findlay, 2003; Cattan et al., 2005). Many systematic and scoping reviews have been carried out to synthesize the existing program evidence and have provided useful summaries of promising approaches (see Dickens et al., 2011; Poscia et al., 2018). These reviews, however, have largely been focused on *whether or not* certain approaches are successful as opposed to *how* or *why* certain approaches my be successful. These questions are in need of answering if there is any hope of successfully confronting the problem of social isolation in later life.

The overall objective of this dissertation is therefore to address the aforementioned gaps in the literature and to inform targeted research and program responses in the future. The first two papers take steps towards better understanding the links between neighbourhoods (and other place-based factors) and late life social isolation. The third paper proceeds to closely examine friendly visiting programs – one of the most commonly used methods of reconnecting those who are socially isolated – to better understand the mechanisms through which they may bring about successful connection for their participants. As each of the three papers aims to address a different set of research questions and objectives, each paper contains an overview of literature germane to their respective

foci. In order to avoid repetition, literature specific to neighbourhoods and place-based factors will be covered in the first and second papers. Likewise, literature regarding friendly visiting programs and other interventions will be overviewed in the third paper. The below section, however, provides some additional background knowledge that may be helpful for the reader prior to engaging with the following three papers.

BACKGROUND

Defining and Understanding Social Isolation

Social isolation is a highly complex issue, and is often conflated with other social terms, such as loneliness. A single, unified definition of social isolation does not exist, and many scholars continue to disagree on how it may be best conceptualized and defined (Coyle & Dugan; 2012; Valtorta & Hanratty, 2016; Victor et al., 2000). However, social isolation generally refers to a state wherein a person experiences too little social contact with fulfilling social relationships, and minimal social engagement with their community (Keefe et al., 2006; Nicholson, 2012; Wister, 2014). Although definitions have shifted and changed over the course of the past several decades, social isolation in now thought by many to be a multifaceted experience that encompasses both objective and subjective components (Nicholson, 2009). Some recent approaches to social isolation have begun to incorporate measures of social contact quality and the perspective of the older person (e.g. subjective feelings of isolation or lack of engagement) rather than fully rely on objective measures (Valtorta & Hanratty, 2016). There are, however, scholars who continue to define social isolation as a strictly objective measure of social connectedness, underscoring the continued disagreement within the literature (Grenade & Boldy, 2008; Machielse, 2015).

Older people who experience social isolation are likely to experience myriad negative side effects. Although social isolation can take many forms with many possible antecedents, older people who live socially isolated lives are at an increased risk of developing several physical and emotional complications. For example, research has shown that social isolation may contribute to increased risk of cardiovascular disease (House, 2001), depression (Djernes, 2006), and even premature mortality (Beller & Wagner, 2018). Reducing the incidence of social isolation in Canada is therefore integral to promoting the well-being of older populations.

In terms of prevalence, estimates vary due to the challenging nature of quantifying such a disconnected and hidden experience. As mentioned, approximately 19% of all older people in Canada are considered isolated (The National Seniors Council, 2014). This estimate is exacerbated by the fact that a further 30% of older people are estimated to be at risk of becoming isolated (The National Seniors Council, 2014). These estimates are especially concerning given the harmful effects experienced by both the individual and the community as a whole (Buffel et al., 2015). As a result of these estimates, the Canadian federal government has launched several initiatives aimed at reducing the incidence of social isolation in Canada (The National Seniors Council, 2014; Weldrick & Grenier, 2018). Likewise, several provinces have set similar priorities (see Wister, 2014), indicating that isolation has certainly taken up a spot on the national agenda.

Risk and Social Isolation

A wealth of research has successfully linked social isolation with many significant risk factors among older people. Much of the research, however, has tended to emphasize risk

factors that exist at the individual level. For example, complex or compromised health status is often considered one of the most significant risk factors, alongside loss of a spouse or close confidante and living alone (Kobayashi, Cloutier-Fisher, & Roth, 2009; Nicholson, 2012). These factors are certainly important determinants of who may descend into isolation and who may not, and yet there are several key risk factors that exist at the level of the community as well. Structural and social factors, such as systemic ageism, social inequalities, and inaccessible environments can also contribute to risk experienced by certain older people (Buffel et al., 2012; Hortulanus et al., 2006). In general, however, these broader social, community, and structural risks have been not been afforded the level of attention typically given to more individualized risk factors (Nicholson, 2009; Weldrick & Grenier, 2018).

Overall, older people tend to accumulate a greater total risk of social isolation than do younger people (Nicholson, 2012). However, the social exclusion and isolation of older people tends to be pronounced among disadvantaged older populations, and within disadvantaged communities (Scharf et al., 2009), highlighting the role of inequality and marginalization. This may be partially explained by a cumulative disadvantage life course perspective, which would suggest that older people who have had life trajectories marked by disadvantage may experience higher rates of isolation due to accumulated risk and disadvantage (Dannefer, 2003). While this dissertation does not explicitly apply a life course framework to the research, it is acknowledged that isolation does not affect all people and communities equally. Working to better understand social isolation and intervention strategies is critical to confronting the issue, particularly among subgroups of older people who may be overrepresented.

RESEARCH QUESTIONS

This dissertation examines a series of research questions by conducting three empirical studies. Specific research questions include:

1. To what extent do neighbourhood characteristics contribute to social isolation in later life among people who live alone and people who do not live alone?
2. How do place-based factors contribute, either negatively or positively, to risk of social isolation in later life?
3. How does a place-based exclusion lens illuminate our understanding of late life isolation risk?
4. How (e.g. theoretical foundations) are friendly visiting programs successful?
5. For whom (e.g. age, gender) are friendly visiting interventions effective?
6. Under what conditions (e.g. research design, isolation measures, program location) are friendly visiting interventions successful?

METHODS AND DATA

The dissertation approaches the above research questions using several distinct methods and data sets. The first paper, a quantitative investigation into neighbourhood characteristics and social isolation risk, employs a series a statistical analyses to answer Research Question #1. The dataset used in this study was derived from the Canadian Longitudinal Study on Aging (CLSA) (Raina et al., 2009) comprehensive cohort dataset. This dataset includes data from 30,097 people across Canada. Descriptive statistics, regression

analyses, and other statistical tests were computed to address the research question. See Paper One for a full overview of methods and data used in this paper.

The second paper, a qualitative study of place, communities, and isolation risk, uses a constructivist approach to conducting and analysing the results of qualitative interviews in order to address Research Question #2. The data gathered for this study involved conducting and transcribing verbatim 17 in-depth, qualitative interviews. Interviews were carried out and transcripts were coded according to a constructivist grounded theory approach (Charmaz, 2014). These transcripts and themes were analyzed from a place-based exclusion (Walsh, 2018) lens to address Research Question #3. See Paper Two for a full overview of methods (e.g. sampling, recruitment, participant details) and data used in this paper.

The third paper, a review of friendly visiting programs aimed at socially isolated older people, employs a realist synthesis method of review in order to address Research Questions #4, #5, and #6. The dataset used in this study is comprised of seven studies of friendly visiting programs. Data gathering, appraisal, and synthesis was conducted according to the multi-step process outlined by Pawson and colleagues (2005). See Paper Three for a detailed description of the methods used in this paper.

ORIGIN OF THE THESIS

This thesis was developed in a roundabout way. After joining the McMaster community in 2013 to conduct master's research with Dr. Chris Sinding, I was exposed to a wide array of fascinating gerontological research that I had not encountered as an undergraduate at Acadia University. Ageism, life course theory, age-friendly communities…

these were unfamiliar terms that quickly grasped my attention and opened doors to new avenues of inquiry. I had studied psychology as an undergraduate and remained convinced that my future work would surely involve some aspect of clinical psychology. This interest in mental health and illness remained throughout master's coursework and research, but it became increasingly clear that my newest and most salient interests existed within the realms of gerontology and aging studies.

I began to read books and articles about mental health in later life and was quickly struck by what I learned. Hours and hours spent devouring works on aging, the life course, and mental health resulted in more questions than answers. At the time, I uncovered what I believed to be a gross imbalance in the literature. Despite a wealth of information on mental health in later life, it seemed that an overwhelming majority of this work centred around cognitive impairment, Alzheimer's disease, and other dementias. It seemed that only a small fraction of the work on mental health/illness among older people paid any attention to depression, anxiety disorders, mood disorders, and personality disorders, etc. As a recent graduate of a psychology bachelor's degree, I could not comprehend why so much of the literature seemed to turn a blind eye to these other types of mental concerns..

As I began to dig deeper into this literature and read stories of mental illness experienced in later life, I arrived at a very sad conclusion: many older people who live with severe forms of mental illness find themselves living in isolation in one way or another. It was this realization that led to an entire paradigm shift and spurred momentum in a new direction. I had read about isolation in my undergraduate studies, but most of this work pertained to profound cases of isolation among children and the long-lasting impacts of this type of neglect. The social isolation described in the gerontological books, however, was of a

different nature. Although vaguely aware that some older people, particularly those that live alone, may be lonely and somewhat disconnected, I had never realized the extent of the problem, let alone that there was a body of work aimed at better understanding and addressing it.

To this day, I reflect on the fact that somewhere around 1 in 5 older people in Canada is isolated or at-risk of becoming isolated and feel that there are deep-seated injustices in our communities. How have we established a social world in which so many of our older members are unable to connect with others, participate in the community, or receive the social support they need to thrive? The three parts of this thesis were intentionally built in order to take steps towards rectifying this unfairness. While this work is unlikely to immediately solve the issue, this thesis contributes important knowledge to the field and poses critical questions for future work. It is my hope that this work can be taken up and built upon by other scholars and program developers in order to continue chipping away at the issue of social isolation

OVERVIEW OF THE DISSERTATION

The first paper presents a quantitative analysis of Canadian Longitudinal Study on Aging (CLSA) data. This paper investigates the link(s) between neighbourhood characteristics and social connection/isolation to begin uncovering how and to what extent aspects of place may shape the experience of social isolation in later life. In this paper, I draw upon influential gerontological works from the United Kingdom to frame and inform a series of regression analyses linking neighbourhood deprivation and other neighbourhood characteristics to social participation, loneliness, and social support. The statistical analyses failed to uncover a strong link between the neighbourhood characteristics and the included social outcomes. These results, however, indicate a strong need for future research that directly investigates the impact of neighbourhood characteristics on social connection among at-risk sub-groups of older people in order to better understand this nuanced relationship.

The second paper presents a qualitative study of older people living alone in Hamilton, Ontario, Canada. This paper examines place-based factors, including neighbourhood characteristics and non-tangible aspects of places, as they relate to risk of social isolation in later life. Using in-depth, qualitative interviews, this study uncovers the aspects of places that older people living alone perceive to shape their risk of social isolation in some way. This study is informed by the work of Walsh (2018) and builds upon his conceptualization of place-based exclusion. The results of the study are used to build a proposed model of risk for social isolation in later life that takes into account both place-based factors and aspects of structural and/or societal risk.

Lastly, the third paper presents a realist synthesis of friendly visiting programs aimed at reducing and/or alleviating social isolation among older people. In this paper, I draw upon

the work of Ray Pawson and other pioneers in the field (Pawson, 2002; Pawson et al., 2004; Wong et al., 2013) to conduct a realist analysis of a select group of interventions in order to determine *how* they work, *for whom* they may work, and *under what conditions* they may work. As friendly visiting programs (also known as befriending schemes) are perhaps the most widely applied form of social isolation intervention, understanding the practical and *realist* underpinnings of these programs is of great value. The results indicate several critical aspects of friendly visiting programs that promote their success, and the implications of these findings are discussed.

The conclusion provides a summary of the main points addressed within the three empirical papers and details the contributions to the gerontological literature. Opportunities for future research and program development are then presented.

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PAPER ONE:

NEIGHBOURHOOD CHARACTERISTICS AS CONTRIBUTORS TO SOCIAL ISOLATION: AN ANALYSIS OF THE CANADIAN LONGITUDINAL STUDY ON AGING (CLSA)

INTRODUCTION

One of the most pressing concerns currently affecting older people is social isolation, a social experience characterized by little to no meaningful and fulfilling social connections, a lack of engagement with others, and little to no social support (Nicholson, 2009; Victor, Scambler, Bond, & Bowling, 2000). Although challenging to measure, recent estimates have found that somewhere between 12% and 30% of older Canadians may be experiencing social isolation or be at risk of becoming isolated in the future (Gilmour & Ramage-Morin, 2020; Keefe, Andrew, Fancey, & Hall, 2006). Estimates elsewhere have found that approximately 17% of older people in the United States are socially isolated (Ortiz, 2011), and 20% in the United Kingdom (Victor et al., 2000). Social isolation is a significant societal concern as it can be highly detrimental to the physical and mental health of those affected. Indeed, social isolation is associated with increased risk of cardiovascular disease (Shankar, McMunn, Banks, & Steptoe, 2011), depression (Alspach, 2013), and premature mortality (Holt-Lunstad, Smith, & Layton, 2010) as well as other health conditions. To make matters worse, practitioners and researchers alike have long disagreed on how best to challenge the growing problem of isolation (Findlay, 2003).

Despite a wealth of literature arising out of decades of research in environmental and geographical gerontology, few recent studies have directly investigated the role of neighbourhood characteristics in shaping risk, experience, and prevention of social isolation in later life. Several neighbourhood- and community-level characteristics have been identified in the literature as potential contributors to late life social isolation including deprived urban neighbourhoods, neighbourhoods with few opportunities for social participation, crime, low place attachment, and poor/inaccessible urban design among several others (Buffel, Rémillard-Boilard, & Phillipson, 2015). There exists, however, a need for more evidence directly linking neighbourhood characteristics and social isolation. This gap in the literature is notable, especially given what is known about older people and their relationships with their residential neighbourhoods as they age (Andrews & Phillips, 2004; Golant, 1984; Phillips, 1999; Sixsmith & Sixsmith, 2008). This study begins to address this gap by conducting cross-sectional analyses of the Canadian Longitudinal Study on Aging (CLSA) examining neighbourhood deprivation, sense of belonging, and active living environments and their relationship with social isolation. Particular attention is paid to differences across those who live alone and those who do not live alone in order to elucidate the potential means through which older people living alone may experience heightened risk of becoming socially isolated.

The paper begins with an overview of relevant background literature and rationale for the study. A detailed summary of the datasets and measures used is then presented. This is followed by descriptive statistics for relevant measures and participant characteristics. A series of regression models is then presented. Each model examines the explanatory value of the aforementioned neighbourhood characteristics in accounting for variation in three social

isolation indicators: social participation, availability of social support, and loneliness. The results of these analyses are discussed and opportunities for future research are considered.

BACKGROUND

A significant body of research has successfully acknowledged many risk factors for social isolation in later life. However, relatively few recent studies have directly linked social isolation to factors at the level of the neighbourhood despite decades of foundational research on ageing and neighbourhoods. Broadly speaking, place-based factors and neighbourhood characteristics (e.g. community resources, built environments) have been largely absent from research on risk and isolation (Weldrick & Grenier, 2018), although several recent studies have revealed significant connections between some geographic and/or place-based factors and risk of social isolation. For example, Portacolone and co-authors (2018) found that socially isolated participants felt a desire for social integration, and yet struggled to achieve this due to physical and social aspects of their high-crime neighbourhoods. In an analysis of the Canadian Longitudinal Study on Aging, Menec and colleagues (2019) found that likelihood of experiencing social isolation in later life was higher in urban areas of Canada with a high proportion of low-income older residents. With that being said, there remains a significant gap in knowledge regarding how and to what extent neighbourhood characteristics and other place-based factors shape risk of becoming socially isolated.

There is a rich history within environmental and geographical gerontology that has laid the foundation for this emerging work on place and social isolation (Andrews, Milligan, Phillips, & Skinner, 2009; Skinner, Cloutier, & Andrews, 2015). Much of this work has

solidified connections between characteristics of places and their intersections with aging, gender, race, and culture (Milligan & Tarrant, 2017). Environmental and geographical gerontologists in recent years have also studied neighbourhoods and their relation to aging, place attachment, and social connection, particularly within the context of the aging-in-place and age-friendly community agendas (Sixsmith & Sixsmith, 2008; Smith, 2009; Stewart et al., 2009; Wiles et al., 2009). Much of this work points to several key neighbourhood characteristics worthy of further investigation related to social isolation including neighbourhood deprivation, sense of belonging, and walkability/accessibility (Miller, 2017; Smith, Sim, Scharf, & Phillipson, 2004; Walsh, 2018).

The immediate residential neighbourhood may be an especially impactful place within the lives of older people living in deprived urban neighbourhoods. Critical gerontologists, particularly in the United Kingdom, have uncovered mounting evidence of major health and social disparities among older people residing in deprived urban neighbourhoods and communities (Buffel, Phillipson, & Scharf, 2013; Scharf, Phillipson, & Smith, 2004; Scharf, Phillipson, Smith, & Kingston, 2002; Smith, Sim, Scharf, & Phillipson, 2004). Characteristics of deprived urban neighbourhoods include high unemployment rates, high crime rates, poor public transportation, poor housing options, high mortality, and high neighborhood turnover rates among other things (Smith, 2009).

This growing body of literature, which has largely been built upon Peter Townsend's foundational work on poverty and deprivation (Townsend, 1972, 1979), strongly indicates that living in a deprived urban area is harmful to both social connection, inclusion, and overall well-being. For example, Scharf and colleagues (2002) conducted a large study of older British adults and found that approximately one quarter of all participants living in

deprived neighbourhoods experienced social isolation. Likewise, Buffel and colleagues (2013) found that many older people living in deprived urban neighbourhoods of the UK and Belgium experienced fear and/or feelings of insecurity which in turn served as a barrier to their social participation. In Canada, a recent study has also linked neighbourhood deprivation to multimorbidity risk in later life (Wister, Rosenkrantz, Shashank, Walker, & Schuurman, 2020). Additional work is needed to further develop our understanding of neighbourhood deprivation as it relates to social connection among older people, and the present study begins to address this need.

How and when older people, especially those living alone, choose to move around within their neighbourhoods of residence are likely determinants of social isolation risk, as well. These decisions are shaped by neighbourhood characteristics including walkability and perceptions of safety (Mitra, Siva, & Kehler, 2015; Portacolone et al., 2018; Smith, 2009). Aspects of the physical/built environments within the residential neighbourhood have the potential to encourage or discourage social engagement and participation. It has been well-documented that the absence of local amenities and the presence of inaccessible infrastructure and facilities can serve to restrict the social engagement of older people (Miller, 2017; Sixsmith & Sixsmith, 2008). Conversely, the presence of walkable streets and paths, local amenities, accessible infrastructure, and greenspace have the potential to promote active community participation among older people (Aneshensel, Harig, & Wight, 2016; Plouffe & Kalache, 2010; World Health Organization, 2015).

Other factors, such as the extent to which someone feels a sense of belonging is also an important element to consider. Sense of belonging within a neighbourhood is experienced as a result of objective neighbourhood qualities in addition to an individual's subjective

perceptions of said neighbourhood, meaning that people living within the same neighbourhood may feel differently about the sense of belonging in their community (La Gory, Ward, & Sherman, 1985; Young, Russell, & Powers, 2004). Particularly for older people, the extent to which they may feel a sense of belonging in their neighbourhood is likely to influence feelings of social exclusion and therefore disconnect from the wider community (Walsh, 2018). This is to say that neighbourhood characteristics can certainly shape and influence how, when, and why older people feel as though they can engage with their communities, which in turn leads to either connection or isolation.

It is also vital to recognize that some older people who live alone may be more sensitive to the influence of neighbourhood characteristics. Within the social isolation literature, living alone is recognized as being a top predictor or antecedent to becoming isolated in later life (Wenger, Davies, Shahtahmasebi, & Scott, 1996). Yet, it is also the case that many older people who live alone remain very socially connected and involved in their communities. How people living alone choose to engage with their neighbourhoods may look quite different than those living with a spouse and/or other household members, and connection with the local/residential area is likely to change depending on temporal factors. For example, those who have lived alone for the entirety of their adult lives are likely to develop mechanisms and strategies that support their engagement. On the other hand, those who suddenly find themselves living alone due to life transitions or loss may find that their relationship to their residential area has changed significantly. Language barriers and mobility barriers add layers of complexity to the person-neighbourhood relationship, as well. Given this, it is more important than ever to begin clarifying which neighbourhood

characteristics may constitute risk factors for social isolation among older people who live alone and who do not live alone.

METHODS

Research Questions

This paper investigates one primary research question: *To what extent do neighbourhood material and social deprivation, sense of belonging, and active living environments contribute to social isolation in later life among people who live alone and people who do not live alone?* In order to address this question, three sub-questions were devised:

1) To what extent do these neighbourhood characteristics account for variation in social support among those who live alone and those who do not live alone?

2) To what extent do these neighbourhood characteristics account for variation in social participation among those who live alone and those who do not live alone?

3) To what extent do these neighbourhood characteristics account for variation in loneliness among those who live alone and those who do not live alone?

A series of multiple linear regressions were conducted to examine these questions. Taken together, the results of these regression analyses build an understanding of how neighbourhood characteristics may contribute to social isolation in later life.

Data Sources

This study utilized the Canadian Longitudinal Study on Aging baseline data to conduct cross-sectional analyses (Raina et al., 2009)[1]. Launched in 2010, the Canadian Longitudinal Study on Aging (CLSA) is a national study following Canadian adults aged 45 to 85 at baseline for at least 20 years. As the second wave of the CLSA data has only recently been collected, this study utilized baseline data collected between 2010 and 2015 across 11 data collection sites. These sites are located in Calgary, AB, Surrey, BC, Victoria, BC, Vancouver, BC, Winnipeg, MB, St. John's NFLD, Halifax, NS, Hamilton, ON, Ottawa, ON, Montreal, QC, and Sherbrooke, QC. Baseline data collection included but was not limited to clinical, psychological, biological, and other information pertaining to well-being, housing, and transportation (Raina et al., 2009). This study also utilized data from the Canadian Urban Environment Health Research Consortium (CANUE) which has been linked with the CLSA dataset. CANUE data was applied for and accessed as part of the CLSA data access procedure. This study received ethics approval from the McMaster University Research Ethics Board (MREB#: 501).

Study Sample

This study included participants in the Comprehensive Cohort of the baseline wave of the CLSA (Raina et al., 2009). The 30,097 participants in the Comprehensive Cohort were randomly selected within age/sex strata among people residing within 25 km of data

[1] Supplementary information and supporting documents (including questionnaires and data dictionaries) can be found on the CLSA website: https://www.clsa-elcv.ca/researchers/data-support-documentation

collection sites in densely populated areas or within 50 km of lower population density sites (listed above). All participants participated in face-to-face data collection in their homes with a CLSA staff member who was helped by a computer-assisted instrument. Participants would later visit a data collection site to provide additional data and undergo various clinical assessments included in the baseline measurements. All participants ranged in age from 45 to 86 (m = 62.9). The Comprehensive Cohort included 50.9% female (n = 15,320) and 49.1% male participants (n = 14,777).

Measures

The first concept to be investigated is social isolation. Social isolation has been defined and operationalized in a number of ways within the existing literature (Findlay, 2003; Smith & Victor, 2018). Many studies of social isolation have utilized validated instruments, such as the Lubben Social Network Scale (Lubben et al., 2006). The CLSA employs a battery of social outcome measurements and scales to collect social outcome data but does not explicitly measure social isolation as a specific experience or concept. As such, our analyses used multiple social factors to build a composite understanding of social isolation based on Nicholson's multi-pronged conceptualization of social isolation: "a state in which the individual lacks a sense of belonging socially, lacks engagement with others, has a minimal number of social contacts and they are deficient in fulfilling and quality relationships" (Nicholson, 2009, p. 1346). Based on this definition, our analyses centered on three social measures: 1) the availability of social support; 2) social participation; and 3) loneliness. These three measures were chosen to represent several of the proposed facets or dimensions of social isolation as outlined by Nicholson (2009). Given that there has been little prior

research on neighbourhood attributes and social relationships in older age, the analyses in this paper treat these concepts as distinct and calculated a separate regression model for each measure to investigate the factors that predict such outcomes.

Availability of social support was measured using the Medical Outcome Study (MOS) Social Support Survey Scale. The MOS is a 19-item scale measuring several aspects of social support including emotional support and tangible support, among others. Each of the 19 items is measured using a 5-point Likert scale regarding the frequency of support ranging from 1 (none of the time) to 5 (all of the time). The scores from each of the 19 items are tallied to create a composite score ranging from 19 to 95. Low scores indicate lower levels of support and higher levels indicate greater levels of support.

Social participation was measured using a single-item question: In the past 12 months, *How often did you participate in family or friendship-based activities outside the household?* Responses for this question range from "at least once a day", "at least once a week", "at least once a month", "at least once a year" to "never".

Loneliness was measured using a single-item question from the Centre for Epidemiological Studies Short Depression Scale (CES-D 10). As part of the CES-D 10 participants are asked about the past week, *How often did you feel lonely?* Responses for this question range from "all of the time (5-7 days)", "occasionally (3-4 days)", "some of the time (1-2 days)", to "rarely or never (less than 1 day)". This Likert scale was recoded into a dichotomous variable such that responses "all of the time", "occasionally" and "some of the time" were coded as "at least some of the time" and "rarely or never" was left as is.

Predictors of social isolation

Barriers to social participation were measured using a series of CLSA items pertaining to social barriers experienced in the past 12 months. Participants were asked, *What prevented you from participating in more social, recreation, or group activities?* This was asked as an open-ended question, and responses were coded according to several possible categories including cost, transportation problems, health conditions, language barriers, and several others. These items were investigated for their impact on all three of the outcome measures employed in this study.

Personal and household characteristics

Personal and household characteristics incorporated in the analyses included age, sex, household income and living alone. Household income was operationalized as self-reported estimated total household income of all household members, from all sources, before taxes and deductions, in the past 12 months. Responses for this question were split into five categories. Lastly, living alone was recoded based on the living arrangement item, *How many people, not including yourself, currently live in your household?* This item was recoded into a binary variable that distinguished between people who were Living Alone and all other responses, which were coded as Not Living Alone.

Health and mental health variables

Health and mental health variables entered into the analyses included general health status and general mental health status. General health status was measured using a single-item question about self-rated general health, with five response options ranging from

'Excellent' to 'Poor'. Previous studies have found that self-reported health status is a robust and valid measure of overall health (Miilunpalo, Vuori, Oja, Pasanen, & Urponen, 1997). Mental health status was measured using a single-item question about self-rated general mental health. As with self-reported general health, participants were asked to rate their overall mental health with five possible response options ranging from Excellent to Poor.

Transportation variables

Transportation variables entered into the analyses included primary means of transportation and 'transportation problems' as a barrier to social participation. Primary means of transportation was measured using a single item. Participants were asked to identify their most common form of transportation used in the past year. Possible responses included: passenger in a motor vehicle, driving a motor vehicle, cycling, public transit, accessible transit, taxis, wheelchairs and/or motorized scooters, and walking. 'Transportation problems' as a barrier to social participation was measured using a question asking, *What prevented you from participating in more social, recreational, or group activities?* If participants indicated that some form of transportation problem or barrier prevented them from participating in more social activities the past 12 months, then this was coded as Yes.

Neighbourhood factors

As previously mentioned, several neighbourhood characteristics have been identified as potential contributors to social isolation risk in later life. These characteristics, including neighbourhood deprivation, sense of belonging and neighbourhood accessibility, are hypothesized as impacting the degree to which older people may connect with their

respective neighbourhoods. This study operationalizes these characteristics using the following measures: 1) material and social deprivation; 2) sense of belonging; and 3) active living environments.

Material and social deprivation at the neighbourhood level were measured using the Social and Material Deprivation Indices accessed as part of the CANUE dataset. The Material and Social Deprivation Indices, originally developed by Pampalon and Raymond (2000), are derived from Census of Canada data and synthesize specific neighbourhood factors into two scores: the material factor score and the social factor score. This study utilized both the material factor score and the social factor score in order to account for both facets of neighbourhood deprivation.

The Material Factor Score is computed to indicate the deprivation from material resources (e.g. goods, services, commodities). Material deprivation is scored using several indicators including household income, local unemployment rate, and high school education rate, and should therefore be distinguished from the concept of poverty (Pampalon & Raymond, 2000). The Social Factor Score is computed to indicate the deprivation from certain relationships among and within families, workplaces, and the broader community. Social deprivation is scored using several indicators including separation/divorce and widow rates, proportion of population that lives alone, and neighborhood turnover rates, and is related to the concept of social capital (Pampalon & Raymond, 2000). Both scores are calculated such that low scores indicate less deprivation (i.e. greater access to material resources and/or social capital) and higher scores indicate more deprivation (i.e. fewer material resources and/or social capital) and are calculated at the Dissemination Area level (i.e. small geographic unit comprised of several blocks). Together, social and material

deprivation scores represent the extent to which a local area may be experiencing deprivation and can be used to investigate the health and social outcomes and inequalities may be linked to this deprivation (Pampalon & Raymond, 2000).

Sense of belonging was measured using a single item which asked participants to reflect on their local area ("everywhere within a 20-minute walk or about a kilometer from your home"). Participants were asked to what extent they agreed with the following statement: [You] feel a part of the local area. Responses range from Strongly Agree to Strongly Disagree and for analysis purposes it was dichotomized to distinguish those who agree or strongly agree from those who disagree or strongly disagree.

Active living environment was measured using the Active Living Environment (ALE) Index accessed as part of the CANUE dataset. The ALE Index is part of the Canadian Active Living Environments (Can-ALE) database developed to measure the degree to which an area has a favourable active living environment (Herrmann et al., 2019). As with the Social and Material Deprivation Indices, the ALE Index is derived from Census data and is calculated at the centroid of the Dissemination Area level. It is computed using three indicators: the density of 3+ way intersections per square kilometre; the density of dwellings per square kilometre; and the number of 'points of interest' within one kilometre of the Dissemination Area centroid. Points of interest include parks, schools, stores, businesses, and other amenities and landmarks. Using the ALE Index, dissemination Areas are also assigned a single value to indicate the overall favourability of the active living environment in that area. This value, referred to as the ALE Class, ranges from a value of 1 (very low favourability) to 5 (very high favourability). Neighbourhoods that score highly are considered more conducive to active living (e.g. walking, cycling) (Herrmann et al., 2019), an important

characteristic of age-friendly communities (World Health Organization, 2007). Favourable active living environments are also associated with positive health indicators related to preventable diseases, such as decreased prevalence of diabetes and obesity (Herrmann et al., 2019).

Statistical Analyses

Statistical analysis was conducted using SPSS 26.0 software. Descriptive statistics for all relevant variables and participant characteristics are presented first. These tables are followed by the results of a series of chi-square tests examining barriers to social participation experienced by those who live alone and those who do not live alone. Lastly, a series of multiple linear regression analyses are presented. These regression analyses were conducted to investigate the extent to which neighbourhood factors (i.e. material and social deprivation, sense of belonging, and active living environments) account for variation in the three social outcome measures (i.e. availability of social support, social participation, and loneliness). For each of the regression analyses, blocks of variables were added sequentially into the model. Three regression models were built for each of three outcome variables. First, separate models were constructed for participants who live alone and participants who do not live alone in order to ascertain the relative predictive value of the predictor variables for each sub-group. Following this, models were constructed for all participants for reference (Appendix B). Throughout the analyses, listwise deletion was used to address missing data. Across all CLSA data, proportions of missing data are relatively low (i.e., less than 5%) (Raina, Wolfson, & Kirkland, 2018). A full list of variables and CLSA item names can be found in Appendix A.

RESULTS

Descriptive Statistics

In this section, five tables are presented describing the CLSA participants with descriptive statistics with comparisons on key variables between participants who live alone and those who live with others. As described previously, living alone is a recurrent risk factor for social isolation so it is given special attention in this analysis. *Table 1* shows descriptive analysis of relevant socio-demographic information for participants living alone, participants not living alone, and the full sample of all participants. As mentioned, living alone is presented as a central factor in the analyses given that living alone is widely recognized as being a top predictor of experiencing isolation. By analyzing the data for those living alone separately from those not living alone, we are able to illuminate critical differences in experience and risk across these two sub-groups. Chi-square tests of independence were also conducted to identify the statistical significance of differences between participants living alone and participants not living alone. As expected, a greater proportion of those living alone identified as being female (64.8%), and rates of widowhood (31.8%) and divorce (31.3%) were significantly higher among those living alone. In terms of self-reported health and mental health, there appears to be a modest difference between participants living alone and participants not living alone in several areas. Participants living alone were less likely to self-rate their health status as 'Excellent' (17.1%) compared to participants not living alone (20.8%). Similar differences were found with respect to self-reported mental health. Participants living alone were less likely to self-rate their mental health as 'Excellent' (23.7%)

compared to participants not living alone (29.3%). These differences are modest but suggest there are differences in how those living alone perceive their health and mental health.

Table 1. Descriptive statistics. Socio-demographics			
Gender (%)	Living Alone	Not Living Alone	All participants
Female*	64.8	46.8	50.9
	X^2 (1, N = 30097) = 680.840, p<0.001		
Age distribution (%)			
45-54*	12.7	28.9	25.2
	X^2 (1, N = 30097) = 733.636, p<0.001		
55-64*	28.5	34.0	32.7
	X^2 (1, N = 30097) = 72.398, p<0.001		
65-74*	29.2	23.1	24.5
	X^2 (1, N = 30097) = 109.207, p<0.001		
75+*	29.6	14.0	17.6
	X^2 (1, N = 30097) = 876.833, p<0.001		
Marital Status (%)			
Single, never married or never lived w/ partner*	28.1	3.2	8.8
	X^2 (1, N = 30089) = 4086.598, p<0.001		
Married / Common Law*	2.7	87.9	68.6
	X^2 (1, N = 30089) = 17781.770, p<0.001		
Widowed*	31.8	2.7	9.3
	X^2 (1, N = 30089) = 5281.470, p<0.001		
Divorced*	31.3	4.5	10.6
	X^2 (1, N = 30089) = 4012.453, p<0.001		
Separated*	5.9	1.7	2.6
	X^2 (1, N = 30089) = 378.709, p<0.001		
Education (%)			
Less than high school education*	4.9	3.7	4.0
	X^2 (1, N = 28043) = 28.141, p<0.001		
High school education*	85.0	90.4	89.2
	X^2 (1, N = 28043) = 28.141, p<0.001		
Completed post-secondary education*	71.6	79.2	77.4
	X^2 (1, N = 25552) = 29.253, p<0.001		
Household Income (%)			
Less than $20,000*	16.1	2.0	5.2
	X^2 (1, N = 28156) = 2216.647, p<0.001		
$20,000 or more, but less than $50,000*	40.1	15.6	21.1
	X^2 (1, N = 28156) = 2091.710, p<0.001		
$50,000 or more, but less than $100,000*	26.8	34.7	32.9
	X^2 (1, N = 28156) = 116.576, p<0.001		
	5.7	22.1	18.4

$100,000 or more, but less than $150,000*	X^2 (1, N = 28156) = 898.603, p<0.001		
$150,000 or more*	2.4	19.9	15.9
	X^2 (1, N = 28156) = 1168.685, p<0.001		
Self-Reported Health Status (%)			
Excellent*	17.1	20.8	19.9
	X^2 (1, N = 30074) = 44.515, p<0.001		
Very good*	38.0	42.2	41.3
	X^2 (1, N = 30074) = 38.733, p<0.001		
Good*	32.7	28.5	29.5
	X^2 (1, N = 30074) = 44.704, p<0.001		
Fair*	10.0	7.0	7.7
	X^2 (1, N = 30074) = 67.851, p<0.001		
Poor*	2.1	1.4	1.6
	X^2 (1, N = 30074) = 15.355, p<0.001		
Self-Reported Mental Health Status			
Excellent*	23.7	29.3	28.0
	X^2 (1, N = 30070) = 80.741, p<0.001		
Very good*	39.8	42.4	41.8
	X^2 (1, N = 30070) = 14.165, p<0.001		
Good*	28.6	23.4	24.6
	X^2 (1, N = 30070) = 75.775, p<0.001		
Fair*	6.6	4.3	4.8
	X^2 (1, N = 30070) = 63.493, p<0.001		
Poor*	1.2	0.6	0.7
	X^2 (1, N = 30070) = 28.096, p<0.001		
* = significant at the p<0.05 level			

Table 2 shows descriptive analysis of social support and participation variables for participants living alone, participants not living alone, and the full sample of all participants. Functional social support scores differed quite significantly across participants living alone and participants not living alone. On average, participants living alone reported much lower MOS scores (69.6) compared to participants not living alone (84.4). This is perhaps somewhat expected given that people living alone may be less likely to have immediate access to social support on a daily basis. Frequency of activity with friends and family outside of the household in the past 12 months was very similar across those living alone and those not living alone. The desire for more social and recreation in the past twelve months was

also similar, with 47.8% of those living alone and 47.4% of those not living alone indicating a desire for more social or recreational activities. Interestingly, however, larger differences were found with loneliness scores. When asked to reflect on the previous week, participants living alone were more likely to reported feeling lonely "occasionally" (16.7%) compared to participants not living alone (6.3%). A large majority of participants not living alone (79.6%) indicated that they "rarely or never" felt lonely in the past week compared to just over half of participants living alone (53.4%).

Table 2. Descriptive statistics. Social support and participation			
Functional Social Support			
	Living Alone	Not Living Alone	All Participants
Mean MOS Score (out of 100)*	69.6	84.4	81.11
	$t(29489) = 64.31$, $p<0.001$		
Frequency of activity with family/friends out of household in past 12 months (%)			
	Living Alone	Not Living Alone	All Participants
At least once a day	4.3	4.0	4.1
	X^2 (1, N = 30039) = 1.217, p=0.270		
At least once a week	50.8	49.9	50.1
	X^2 (1, N = 30039) = 1.593, p=0.207		
At least once a month*	34.9	39.2	38.2
	X^2 (1, N = 30039) = 40.141, p<0.001		
At least once a year*	8.2	6.2	6.7
	X^2 (1, N = 30039) = 32.560, p<0.001		
Never*	1.6	0.4	0.7
	X^2 (1, N = 30039) = 93.331, p<0.001		
Felt Lonely Within Past Week			
	Living Alone	Not Living Alone	All Participants
All of the time*	4.9	1.3	2.1
	X^2 (1, N = 29976) = 319.251, p<0.001		
Occasionally*	16.7	6.3	8.7
	X^2 (1, N = 29976) = 717.406, p<0.001		
Some of the time*	24.4	12.4	15.1
	X^2 (1, N = 29976) = 599.139, p<0.001		
Rarely or never*	53.4	79.6	73.7
	X^2 (1, N = 29976) = 1858.233, p<0.001		
Desire for more social, recreation, or group activities in past 12 months			
	Living Alone	Not Living Alone	All Participants
% Yes	47.8	47.4	47.6
	X^2 (1, N = 30017) = 0.239, p=0.625		

* = significant at the $p<0.05$ level

Table 3 shows descriptive results for relevant dwelling characteristics for participants living alone, participants not living alone, and the full sample of all participants. Overall, 22.7% of participants indicated that they lived alone. With respect to dwelling characteristics, predictable differences were found across those who live alone and those who do not. Unsurprisingly, participants living alone were less likely to report living in a detached house or townhouse (51.2%) compared to those not living alone (88.1%). Likewise, participants living alone were more likely to report living in an apartment or condominium (46.1%) compared to those not living alone (11.4%).

Table 3. Descriptive Statistics. Household characteristics			
Household Characteristics			
Mean # of people per household	1.27		
% of participants living alone	22.7		
Dwelling Characteristics (%)			
	Living Alone	Not Living Alone	All Participants
House or townhouse condominium*	51.2	88.1	79.8
	X^2 (1, N = 30087) = 4456.129, $p<0.001$		
Apartment or condominium*	46.1	11.4	19.3
	X^2 (1, N = 30087) = 4084.791, $p<0.001$		
Senior's housing (retirement or assisted living)*	1.9	0.2	0.6
	X^2 (1, N = 30087) = 288.844, $p<0.001$		
Other*	0.6	0.2	0.3
	X^2 (1, N = 30087) = 23.670, $p<0.001$		
* = significant at the $p<0.05$ level			

Table 4 shows the results of descriptive analyses for relevant neighbourhood characteristics across participants living alone, participants not living alone, and the full sample. The vast majority of all participants (86.7%) reported living in an area classified as an

'urban core', and approximately 8% of all participants reported living in an area classified as 'rural'. In terms of material deprivation, differences across participants living alone and participants not living alone were negligible. For social deprivation, however, significant differences emerged for participants living in Quintile 5 (i.e. areas with the most social deprivation) with a much greater portion of those living alone (42%) residing in these areas compared to those not living alone (17.4%). In other words, participants living alone were more likely to live in the most "deprived" areas of their respective provinces than those not living alone. Interestingly, a greater proportion of participants living alone reported living in both Class 4 (14.3%) and Class 5 (8.2%) Active Living Environments than those not living alone (8.1%; 2.7%). Areas in Class 4 and 5 are considered more favourable in terms of their promotion of walking, cycling, and active engagement with the environment. This difference indicates that participants living alone were more likely to live in active neighbourhoods with parks, schools, businesses, and other amenities.

Table 4. Descriptive statistics. Neighbourhood characteristics			
Urban / Rural Classification (%)			
	Living Alone	Not Living Alone	All Participants
Rural*	4.8	9.0	8.1
	X^2 (1, N = 29719) = 127.750, p<0.001		
Urban Core*	90.7	85.5	86.7
	X^2 (1, N = 29719) = 135.109, p<0.001		
Urban Fringe*	0.9	2.0	1.8
	X^2 (1, N = 29719) = 36.436, p<0.001		
Urban Population Outside CMA and CA	0.6	0.7	0.7
	X^2 (1, N = 29719) = 0.483, p=0.487		
Secondary Core	1.7	1.5	1.6
	X^2 (1, N = 29719) = 1.374, p=0.241		
Deprivation Index – Material Factor Quintile within Province (%)			
	Living Alone	Not Living Alone	All Participants

Quintile 1*	33.4	36.9	36.1
	X^2 (1, N = 28955) = 16.462, p<0.001		
Quintile 2*	21.5	25.9	24.9
	X^2 (1, N = 28955) = 41.590, p<0.001		
Quintile 3	15.5	16.6	16.3
	X^2 (1, N = 28955) = 1.985, p=0.159		
Quintile 4*	12.5	11.1	11.5
	X^2 (1, N = 28955) = 14.661, p<0.001		
Quintile 5*	11.5	6.2	7.4
	X^2 (1, N = 28955) = 232.731, p<0.001		
Deprivation Index – Social Factor Quintile within Province (%)			
	Living Alone	Not Living Alone	All Participants
Quintile 1*	7.2	20.6	17.6
	X^2 (1, N = 28955) = 632.769, p<0.001		
Quintile 2*	11.3	20.4	18.3
	X^2 (1, N = 28955) = 265.959, p<0.001		
Quintile 3*	12.4	18.7	17.3
	X^2 (1, N = 28955) = 130.353, p<0.001		
Quintile 4*	21.5	19.6	20.1
	X^2 (1, N = 28955) = 19.163, p<0.001		
Quintile 5*	42.0	17.4	23.0
	X^2 (1, N = 28955) = 1926.817, p<0.001		
Active Living Environments (%)			
	Living Alone	Not Living Alone	All Participants
Class 1 (Very Low Favourability)*	11.0	19.5	17.6
	X^2 (1, N = 29985) = 263.309, p<0.001		
Class 2*	27.3	38.0	35.6
	X^2 (1, N = 29985) = 265.865, p<0.001		
Class 3*	38.8	31.3	33.0
	X^2 (1, N = 29985) = 134.587, p<0.001		
Class 4*	14.3	8.1	9.5
	X^2 (1, N = 29985) = 232.928, p<0.001		
Class 5 (Very High Favourability)*	8.2	2.7	3.9
	X^2 (1, N = 29985) = 430.288, p<0.001		
* = significant at the p<0.05 level			

Table 5 shows the results of descriptive analyses for relevant transportation characteristics across participants living alone, participants not living alone, and the full sample. When asked about the most common form of transportation taken in the past 12 months, participants living alone and participants not living alone generally had similar

responses. Of note, however, is that a smaller proportion of participants living alone (64.4%) driving a motor vehicle as their primary transportation method compared to participants not living alone (76.1%). Analyses also found a very small difference in the proportion of people living alone that experienced 'transportation problems' as a barrier to social participation (2.4%) compared to those not living alone (1.1%), although the difference is minor.

Table 5. Transportation characteristics

Most Common Mode of Transportation in Past 12 Months (%)			
	Living Alone	Not Living Alone	All Participants
Passenger in Motor Vehicle*	0.8	3.8	3.1
	X^2 (1, N = 25367) = 119.817, p<0.001		
Taxi	0.1	0.0	0.0
	X^2 (1, N = 25367) = 3.398, p=0.065		
Public Transportation*	3.5	2.7	2.9
	X^2 (1, N = 25367) = 33.455, p<0.001		
Accessible Transportation*	0.2	0.0	0.1
	X^2 (1, N = 25367) = 25.517, p<0.001		
Cycling	1.0	1.6	1.5
	X^2 (1, N = 25367) = 3.744, p=0.053		
Walking*	3.9	3.0	3.2
	X^2 (1, N = 25367) = 41.649, p<0.001		
Wheelchair / Scooter	0.1	0.1	0.1
	X^2 (1, N = 25367) = 3.393, p=0.065		
Driving Motor Vehicle	64.4	76.1	73.5
	X^2 (1, N = 25367) = 0.378, p=0.539		
'Transportation Problems' Identified as a Barrier to Social Participation			
	Living Alone	Not Living Alone	All Participants
% Yes	2.4	1.1	1.4
	X^2 (1, N = 14302) = 69.353, p<0.01		
* = significant at the p<0.05 level			

Barriers to Social Participation

A series of chi-square tests of independence were conducted to determine the relationship between household population (i.e. living alone vs. not living alone) and a series

of barriers to social participation. Results from these analyses are presented in Table 6. Participants living alone differed significantly from participants not living alone on a number of items. When asked about barriers to social participation experienced in the past 12 months, participants living alone were significantly more likely to experience the following barriers: cost (5.3%); transportation problems (2.4%); lack of activities in the area (2.1%); location accessibility (0.6%); far distance (1.6%); health condition/limitation (12.0%); going alone (9.1%); weather (1.5%); grieving (0.7%); safety concerns (0.6%); other barriers (1.2%). On the other hand, participants living alone were less likely to experience the following barriers to social participation: suitability of activity timing (5.0%); personal/family responsibilities (4.5%); being too busy (14.7%).

Table 6. Chi-Square Tests. Barriers to social participation

Type of Barrier (% Yes)	Living Alone	Not Living Alone	All Participants
Cost*	5.3	2.9	3.4
	X^2 (1, N = 14302) = 91.218, p<0.01		
Transportation Problems*	2.4	1.1	1.4
	X^2 (1, N = 14302) = 69.353, p<0.01		
Lack of activities in area*	2.1	1.4	1.5
	X^2 (1, N = 14302) = 15.974, p<0.01		
Location accessibility*	0.6	0.3	0.4
	X^2 (1, N = 14302) = 6.277, p=0.012		
Far distance*	1.6	1.1	1.2
	X^2 (1, N = 14302) = 8.833, p=0.003		
Health condition/limitation*	12.0	6.9	8.0
	X^2 (1, N = 14302) = 201.079, p<0.01		
Suitability of activity timing*	5.0	5.7	5.5
	X^2 (1, N = 14302) = 4.878, p=0.027		
Going alone*	9.1	5.6	6.4
	X^2 (1, N = 14302) = 119.207, p<0.01		
Personal/family responsibilities*	4.5	10.4	9.0
	X^2 (1, N = 14302) = 252.386, p<0.01		
Language reasons	0.2	0.1	0.1
	X^2 (1, N = 14302) = 3.457, p=0.063		
Weather*	1.5	1.1	1.2
	X^2 (1, N = 14302) = 4.768, p=0.029		

Grieving*	0.7	0.1	0.2
	X^2 (1, N = 14302) = 105.533, p<0.01		
Being too busy*	14.7	23.4	21.5
	X^2 (1, N = 14302) = 350.208, p<0.01		
Safety concerns*	0.6	0.2	0.3
	X^2 (1, N = 14302) = 29.208, p<0.01		
Other barriers to participation*	1.2	0.8	0.9
	X^2 (1, N = 14302) = 7.711, p<0.01		
* = significant at the p<0.05 level			

Multiple Linear Regression Analyses

A series of regression models were constructed to determine the extent to which the neighbourhood characteristics of interest contribute to social isolation. In each model, blocks of variables were added sequentially into the model with the block of neighbourhood characteristics added in the final block. Several models were constructed for each outcome variable of interest. *Table 7* presents the models built for functional social support (living alone and not living alone). *Table 8* presents the models built for social participation (living alone and not living alone). *Table 9* presents the models built for loneliness (living alone and not living alone). A model for all participants was also constructed for each outcome variable and is located in Appendix B.

Functional Social Support

Table 7 presents the results of two multiple linear regressions for the first dependent variable: functional social support. A separate model was constructed for participants who live alone (left) and participants who do not live alone (right). In both instances, a series of blocks were entered sequentially to build a cumulative model. A model for all participants is presented in Appendix B for reference.

The left side of the table presents the results of the linear model of functional social support constructed for participants who live alone. When the block of sociodemographic variables was entered into the model (Step 1), sex and income emerged as statistically significant predictors ($p < 0.001$), but age did not. When the second block of variables was entered (Step 2), all sociodemographic and health variables emerged as statistically significant ($p \leq 0.001$), but age did not. Similarly, all sociodemographic variables, health variables, and transportation variables (Step 3) emerged as statistically significant when entered ($p < 0.05$), but age did not. Lastly, neighbourhood characteristics were entered into the final block (Step 4) with mixed results. Of the neighbourhood characteristics, only sense of belonging emerged as a statistically significant contributor ($p < 0.001$). Material deprivation, social deprivation, and Active Living Environments failed to make statistically significant contributions to the model. The final cumulative model achieved an R^2 of 0.155, with very little variation ($\Delta R^2 = 0.015$) contributed by the neighbourhood characteristics in the final block (Step 4).

The right side of the table presents the results of the linear model of functional social support for participants who do not live alone. When the block of sociodemographic variables was entered into the model (Step 1), both age and income emerged as statistically significant contributors ($p < 0.05$), but sex did not. When the second block of variables was entered (Step 2), both health variables, in addition to income, emerged as statistically significant contributors ($p < 0.001$), but age and sex failed to make significant contributions. When the block of transportation variables was added (Step 3), age and sex remained statistically insignificant, as did driving as a primary method of transportation. Lastly, when the block of neighbourhood characteristics was entered into the model (Step 4), only two of

the four variables, sense of belonging and Active Living Environments, made significant contributions ($p < 0.001$). Material and social deprivation both failed to make significant contributions to the model. The final cumulative model achieved an R^2 of 0.098 with a small amount of variation ($\Delta R^2 = 0.006$) contributed by the neighbourhood characteristics in the final block (Step 4).

Table 7. Multiple linear model of predictors of functional social support.

	Living Alone		Not Living Alone	
Step 1.	*B*	*p*	*B*	*p*
Constant		.000		.000
Age	0.03	.072	0.03	.005
Sex (Female)	0.30	.000	0.01	.459
Income	0.19	.000	0.21	.000
	$R^2 = 0.070$ ($p<0.001$)		$R^2 = 0.040$ ($p<0.001$)	
Step 2.	*B*	*p*	*B*	*p*
Constant		.000		.000
Age	0.01	.740	0.01	.315
Sex (Female)	0.19	.000	0.01	.328
Income	0.13	.000	0.16	.000
General Health	-0.07	.001	-0.06	.000
General Mental Health	-0.21	.000	-0.19	.000
	$\Delta R^2 = 0.062$ ($p<0.001$)		$\triangle R^2 = 0.051$ ($p<0.001$)	
Step 3.	*B*	*p*	*B*	*p*
Constant		.000		.000
Age	0.01	.623	0.01	.294
Sex (Female)	0.19	.000	0.01	.286
Income	0.11	.000	0.16	.000
General Health	-0.07	.000	-0.06	.000
General Mental Health	-0.21	.000	-0.19	.000
Primary transportation: driving	0.07	.000	-0.01	.245
'Transportation problems' as a barrier	-0.04	.027	-0.03	.003
	$\Delta R^2 = 0.008$ ($p<0.001$)		$\triangle R^2 = 0.001$ ($p=0.010$)	
Step 4.	*B*	*p*	*B*	*p*
Constant		.000		.000
Age	0.01	.754	0.01	.470

Sex (Female)	0.19	.000	0.01	.338
Income	0.12	.000	0.16	.000
General Health	-0.06	.003	-0.06	.000
General Mental Health	-0.20	.000	-0.19	.000
Primary transportation: driving	0.08	.000	-0.02	.045
'Transportation problems' as a barrier	-0.04	.043	-0.03	.004
Material deprivation	0.02	.243	-0.01	.420
Social deprivation	0.03	.114	0.01	.227
Sense of belonging (local)	0.12	.000	0.06	.000
Active Living Environments	-0.02	.303	-0.05	.000
	$\Delta R^2 = 0.015$ ($p<0.001$)		$\triangle R^2 = 0.006$ ($p<0.001$)	
Note: A comprehensive reporting of these models is presented in Appendix C.				

Social Participation

Table 8 presents the results of two multiple linear regressions for the second dependent variable: social participation. A separate model was constructed for participants who live alone (left) and participants who do not live alone (right). In both instances, a series of blocks were entered sequentially to build a cumulative model. A model for all participants is presented in Appendix B for reference.

The left side of the table presents the results of the linear model of social participation constructed for participants who live alone. When the block of sociodemographic variables was entered into the model (Step 1), sex and income emerged as statistically significant predictors ($p< 0.001$), but age did not. When the second block of variables was entered (Step 2), all sociodemographic and health variables emerged as statistically significant ($p< 0.05$), but age did not. The addition of transportation variables (Step 3) resulted in statistical significance for all variables except age and transportation problems as a barrier to social participation. Lastly, neighbourhood characteristics were entered into the final block (Step 4), once again yielding mixed results. Of the

neighbourhood characteristics, only sense of belonging and material deprivation made statistically significant contributions to the model ($p < 0.05$). Social deprivation and Active Living Environments failed to make significant contributions. The final cumulative model achieved an R^2 of 0.05, accounting for very little variation in social participation among participants who live alone.

The right side of the table presents the results of the linear model of social participation constructed for participants who do not live alone. When the block of sociodemographic variables was entered into the model (Step 1), sex and income emerged as statistically significant predictors ($p < 0.001$), but age did not. When the second block of variables was entered (Step 2), all sociodemographic and health variables emerged as statistically significant ($p < 0.05$), but age did not. The addition of transportation variables (Step 3) resulted in statistical significance for all variables except age and transportation problems as a barrier to social participation. Lastly, neighbourhood characteristics were entered into the final block (Step 4) with results similar to those yielded in the previous models. Of the neighbourhood characteristics, only sense of belonging and material deprivation made statistically significant contributions ($p < 0.001$). Social deprivation and Active Living Environments failed to make statistically significant contributions. The final cumulative model achieved an R^2 of 0.026, accounting for virtually none of the variation in social participation levels among participants not living alone.

Table 8. Multiple linear model of predictors of social participation.

	Living Alone		Not Living Alone	
Step 1.	*B*	*p*	*B*	*p*
Constant		.000		.000
Age	-0.01	.769	-0.00	.734

Sex (Female)	-0.09	.000	-0.05	.000
Income	-0.13	.000	-0.11	.000
	$R^2 = 0.023$ ($p<0.001$)		$R^2 = 0.013$ ($p<0.001$)	
Step 2.	*B*	*p*	*B*	*p*
Constant		.000		.000
Age	0.00	.853	0.00	.873
Sex (Female)	-0.09	.000	-0.05	.000
Income	-0.10	.000	-0.09	.000
General Health	0.06	.006	0.07	.000
General Mental Health	0.06	.010	0.03	.010
	$\Delta R^2 = 0.011$ ($p<0.001$)		$\Delta R^2 = 0.009$ ($p<0.001$)	
Step 3.	*B*	*p*	*B*	*p*
Constant		.000		.000
Age	0.00	.916	0.00	.991
Sex (Female)	-0.09	.000	-0.05	.000
Income	-0.09	.000	-0.08	.000
General Health	0.06	.008	0.07	.000
General Mental Health	0.05	.015	0.03	.013
Primary transportation: driving	-0.07	.000	-0.02	.027
'Transportation problems' as a barrier	0.02	.406	0.01	.300
	$\Delta R^2 = 0.006$ ($p<0.001$)		$\Delta R^2 = 0.001$ ($p=0.034$)	
Step 4.	*B*	*p*	*B*	*p*
Constant		.000		.000
Age	0.01	.441	0.01	.600
Sex (Female)	-0.08	.000	-0.05	.000
Income	-0.06	.005	-0.08	.000
General Health	0.05	.019	0.07	.000
General Mental Health	0.05	.025	0.03	.018
Primary transportation: driving	-0.08	.000	-0.03	.010
'Transportation problems' as a barrier	0.01	.464	0.01	.416
Material deprivation	0.08	.000	0.04	.000
Social deprivation	0.00	.895	-0.02	.095
Sense of belonging (local)	-0.05	.005	-0.04	.000
Active Living Environments	-0.00	.828	-0.00	0.676
	$\triangle R^2 = 0.010$ ($p<0.001$)		$\triangle R^2 = 0.003$ ($p<0.001$)	
Note: A comprehensive reporting of these models is presented in Appendix C.				

Loneliness

Table 9 presents the results of two multiple linear regressions for the final dependent variable: loneliness. A separate model was constructed for participants who live alone (left)

and participants who do not live alone (right). In both instances, a series of blocks were entered sequentially to build a cumulative model. A model for all participants is presented in Appendix B for reference.

The left side of the table presents the results of the linear model of loneliness constructed for participants who live alone. When the block of sociodemographic variables was entered into the model (Step 1), all variables emerged as statistically significant contributors ($p \leq 0.001$). When the second block of variables was entered (Step 2), all sociodemographic and health variables emerged as statistically significant ($p < 0.01$) except for general health. Similarly, all sociodemographic variables, health variables, and transportation variables (Step 3) emerged as statistically significant ($p < .05$), but general health did not. Lastly, neighbourhood characteristics were entered into the final block (Step 4) with only sense of belonging making a statistically significant contribution to the model ($p < 0.01$). Material deprivation, social deprivation, and Active Living Environments failed to make significant contributions. The final cumulative model achieved an R^2 of 0.081, accounting for very little variation in loneliness among participants who live alone.

The right side of the table presents the results of the linear model of loneliness constructed for participants not living alone. When the block of sociodemographic variables was entered into the model (Step 1), all variables emerged as significant contributors ($p< 0.001$). When the second block of variables was entered (Step 2), all sociodemographic and health variables emerged as significant ($p< 0.05$), but general health did not. The addition of transportation variables (Step 3) resulted in a significant contribution from 'transportation problems' as a barrier ($p< 0.001$). Lastly, neighbourhood characteristics were entered into the final block (Step 4) with similar results to previous models. Only sense of belonging emerged

as a statistically significant contributor ($p< 0.001$). Material deprivation, social deprivation, and Active Living Environments failed to make statistically significant contributions to the model. The final cumulative model achieved an achieved an R^2 of 0.081, accounting for very little variation in loneliness among participants not living alone.

Table 9. Multiple linear model of predictors of loneliness.

	Living Alone		Not Living Alone	
Step 1.	*B*	*p*	*B*	*p*
Constant		.000		.000
Age	-0.07	.001	0.04	.000
Sex (Female)	0.11	.000	-0.05	.000
Income	0.09	.000	0.15	.000
	$R^2 = 0.023$ ($p<0.001$)		$R^2 = 0.024$ ($p<0.001$)	
Step 2.	*B*	*p*	*B*	*p*
Constant		.000		.000
Age	-0.09	.000	0.02	.017
Sex (Female)	0.10	.000	-0.05	.000
Income	0.06	.004	0.11	.000
General Health	-0.00	.900	-0.02	.081
General Mental Health	-0.22	.000	-0.21	.000
	$\Delta R^2 = 0.049$ ($p<0.001$)		$\Delta R^2 = 0.049$ ($p<0.001$)	
Step 3.	*B*	*p*	*B*	*p*
Constant		.000		.000
Age	-0.09	.000	0.03	.009
Sex (Female)	0.10	.000	-0.04	.000
Income	0.06	.003	0.10	.000
General Health	-0.00	.856	-0.02	.115
General Mental Health	-0.22	.000	-0.21	.000
Primary transportation: driving	-0.04	.029	0.00	.757
'Transportation problems' as a barrier	-0.06	.004	-0.06	.000
	$\Delta R^2 = 0.004$ ($p=0.004$)		$\Delta R^2 = 0.003$ ($p<0.001$)	
Step 4.	*B*	*p*	*B*	*p*
Constant		.000		.000
Age	-0.09	.000	0.02	.028
Sex (Female)	0.10	.000	-0.04	.000
Income	0.06	.004	0.09	.000
General Health	-0.00	.960	-0.02	.118
General Mental Health	-0.22	.000	-0.21	.000

Primary transportation: driving	-0.03	.180	-0.00	.729
'Transportation problems' as a barrier	-0.05	.009	-0.05	.000
Material deprivation	-.01	.578	-0.00	.783
Social deprivation	0.04	.054	0.02	.051
Sense of belonging (local)	0.05	.005	0.06	.000
Active Living Environments	0.01	.724	-0.01	.194
	$\triangle R^2 = 0.005$ (p=0.008)		$\triangle R^2 = 0.005$ (p<0.001)	
Note: A comprehensive reporting of these models is presented in Appendix C.				

DISCUSSION

The present study investigates neighbourhood factors and three outcomes in order to determine the extent to which neighbourhood characteristics may contribute to social isolation among those who live alone and those who do not. The findings suggest that sense of belonging, material deprivation, and active living environments are potentially important factors influencing social support, social participation, and loneliness. Although material deprivation appears to be an important factor, social deprivation failed to make a single significant contribution to any outcome for either people living along or people living with others. Additionally, for those variables that made significant contributions to the models, the magnitude of the effect was small. Moreover, although statistically significant, the models constructed did not account for much variation in either functional social support, social participation, or loneliness. A superficial examination of these findings would suggest that the four neighbourhood characteristics entered as independent variables do not strongly impact social support, connection, or loneliness and therefore are unlikely contributors to risk and/or experience of social isolation. The relationships between these variables may be more nuanced, however.

The first neighbourhood characteristic of interest, material deprivation, was overall a weak predictor of the three dependent variables. Interestingly, material deprivation made a significant contribution to all three of the models constructed for social participation (i.e. living alone, not living alone, and all participants) but did not make significant contributions to any of the models constructed for social support or loneliness. Material deprivation, in theory, could influence someone's willingness or ability to access their neighbourhood leading to support access issues and loneliness, and yet no clear connection was found within the constructed models. As such, solid conclusions cannot be safely drawn regarding material deprivation as a contributor to social isolation. More evidence is needed to clarify the nature of this relationship.

The second neighbourhood characteristic, social deprivation, made no significant contributions to any of the models constructed for functional social support, social participation, or loneliness. This is somewhat surprising given that the social deprivation score used in these analyses is calculated based on variables including divorce rates, proportion of population living alone, and neighborhood turnover rates (Pampalon & Raymond, 2000). Existing studies have found that high neighbourhood turnover rates are associated with reduced social connection among older people (Bailey, Kearns, & Livingston, 2012). The failure to find a significant relationship between social deprivation and the three outcome variables does not necessarily imply that there is no relationship; it is likely that neighbourhood deprivation (both material and social) hold greater influence over those who are in some way vulnerable to deficits in the local area, such as those who are more dependent on immediately accessible community resources. As such, it is recommended that future studies consider investigating potential relationships between

neighbourhood deprivation and social isolation/connection among subgroups of older people, including caregivers and those experiencing significant mobility barriers.

The third neighbourhood characteristic, sense of belonging, was overall the strongest predictor of all three dependent variables and made a statistically significant contribution to all nine of the models. Although the relative contributions are slight, the broader trend indicates that sense of belonging is a meaningful contributor to social connection in life. This finding fits with established work in gerontology, which has identified sense of belonging as having a notable impact on older people's social well-being (Stanley et al., 2010; Young et al., 2004). The present findings are promising and are worthy of further investigation. Additional work is needed to begin teasing apart the nature of the relationship between sense of belonging and isolation risk, and whether feeling a high sense of belonging may somehow offer protective benefits, particularly as it relates to older people who live alone.

Lastly, active living environments as a predictor was very weak, and only made a significant contribution to two of the nine models constructed. Qualities of active living environments are thought to encourage residents to actively engage with their neighbourhoods and local areas (Bors et al., 2009), but the models were generally not strengthened by the inclusion of active living environments as a predictor variable. It is possible that active living environments do not influence outcomes such as social participation with friends and family, although it is likely that neighbourhoods with poor active living environments would shape loneliness to a certain extent for those who live alone. However, like material social deprivation, it is not possible to draw sound conclusions about the role of active living environments in risk of social isolation based on these findings.

Overall, the results from the analyses fail to paint a clear picture of how neighbourhood characteristics contribute to risk of isolation among those who live alone and those who do not live alone. No clear trends emerged with respect to differences across those who live alone and those who do not. With that being said, the study is subject to several limitations. The analyses conducted were constrained by the available CLSA data. Specifically, the baseline data collected as part of the CLSA does not directly measure social isolation as a concept. Although there are many popular social isolation measurement scales (e.g. Lubben Social Network Scale), all of which operationalize social isolation differently, having a single, reliable and valid measure would be beneficial for several reasons. Social isolation is a multifaceted experience encompassing several dimensions (Nicholson, 2009; Smith & Victor, 2018; Valtorta, Kanaan, Gilbody, & Hanratty, 2016). The present study utilized three distinct social outcomes in lieu of a single measure as this was not available. Although this strategy enabled a detailed examination of several dimensions of isolation, it is likely that the three outcome variables used were not able to create a true composite image of social isolation. This should be considered when designing future studies.

Based on the results from the present study, we recommend several next steps for future studies to consider in addition to the aforementioned suggestions. Future studies should consider the role of neighbourhood characteristics (e.g. deprivation) and other place-based factors on social outcomes among sub-populations of older people and those living alone, such as older widowers living alone, caregivers, and homebound seniors, among others. Analyzing the effect of these factors among specific subgroups was beyond the scope of this study but is needed to clarify the population(s) which may be especially vulnerable when it comes to place and isolation risk. It is likely that such investigations will find links

between temporal aspects of living alone (e.g., length of time living alone), long-term relationship status (e.g., never married), and relative risk of social isolation. We also recommend future studies consider replicating the study with a gender-diverse population. Given what is now known about gender differences in access to resources and living alone, examining the intersection between gender, living alone, and neighbourhood characteristics more closely is certainly needed. Taking these steps will serve to fill in many of the gaps and unanswered questions that remain.

APPENDIX A

Construct Breakdown.

COMPONENT: Social Outcomes (Dependent Variables)		
CONSTRUCT	INDICATOR	ITEM
Social Support (Availability)	Functional Social Support (MOS)	SSA_DPALL_COM
Social Participation	Frequency of social participation outside of the home (past 12 months)	SPA_OUTS_COM
Loneliness	Frequency of feeling lonely (past week)	DEP_LONLY_COM
COMPONENT: Health & Well-Being (Independent Variables)		
CONSTRUCT	INDICATOR	ITEM
General Health Status	Self-rated general health	GEN_HLTH_COM
Mental Health Status	Self-rated mental health	GEN_MNTL_COM
COMPONENT: Transportation (Independent Variables)		
CONSTRUCT	INDICATOR	ITEM
Primary Transportation Mode	Primary Transportation Mode	TRA_CMNTR1_MCQ
Transportation Problems	'Transportation Problems' as a Barrier to Social Participation	SPA_PREVAC_TP_COM
COMPONENT: Neighbourhood Characteristics (Independent Variables)		
CONSTRUCT	INDICATOR	ITEM
Material/Social Deprivation	Material Factor Score Social Factor Score	MSDYY_MFS_COM MSDYY_SFS_COM
Sense of Belonging	Freq 'Feel a part of local area'	ENV_FLPRTAREA_MCQ
Active Living Environments	Active Living Environment Class	ALE16_07_TRMCOM
COMPONENT: Socio-demographics (Independent Variables)		
CONSTRUCT	INDICATOR	ITEM
Age	Age (years)	AGE_NMBR_COM
Sex	Sex Female (Yes)	SEX_ASK_COM FEMALE_YN
Income	Estimated household income	INC_TOT_COM

Barriers to Participation	
Barrier	Item
Cost	SPA_PREVAC_CO_COM
'Transportation Problems'	SPA_PREVAC_TP_COM
Lack of activities in area	SPA_PREVAC_ANA_COM
Location accessibility	SPA_PREVAC_LNA_COM
Far distance	SPA_PREVAC_TF_COM
Health condition/limitation	SPA_PREVAC_HC_COM
Suitability of activity timing	SPA_PREVAC_TI_COM
Going alone	SPA_PREVAC_GA_COM
Personal/family responsibility	SPA_PREVAC_PR_COM
Language reasons	SPA_PREVAC_LRR_COM

Being too busy	SPA_PREVAC_TB_COM
Safety concerns	SPA_PREVAC_AF_COM
Other factors	SPA_PREVAC_OT_COM
Grief	SPA_PREVAC_GR_COM
Weather	SPA_PREVAC_WH_COM
No suitable options	SPA_PREVAC_ANS_COM

APPENDIX B

Multiple Regression Analyses for All Participants.

Functional Social Support

In this table, "Living Alone" was entered into the model prior to the first block of predictor variables to determine the individual explanatory value of living alone with respect to functional social support. The explanatory value of subsequent blocks of variables were then compared to this initial block containing only "Living Alone" as a variable. It emerged as a statistically significant contributor ($p < 0.001$) and achieved an R^2 of 0.122. Subsequent blocks included sociodemographics (Step 2), health (Step 3), transportation (Step 4), and neighbourhood characteristics (Step 5) – the main predictor variables of interest. When the first full block of variables was entered (Step 2), all sociodemographic variables emerged as significant ($p < 0.001$). With the addition of health variables (Step 3), all variables emerged as statistically significant within the model except for age ($p < 0.05$). The addition of transportation variables (Step 4) resulted in statistical significance for all variables except driving as a primary form of transportation ($p = 0.065$). Lastly, the main predictor variables of interest were added (Step 5). Although statistically significant, this block of neighbourhood characteristics contributed very little to the overall predictive value of the model. Age, driving as a primary form of transportation, material deprivation, and social deprivation failed to make statistically significant contributions to the model. Sense of belonging and Active Living Environments both made statistically significant contributions ($p < 0.001$). The final cumulative model achieved an R^2 of 0.213, although very little variation ($\Delta R^2 = 0.007$) can be credited to the neighbourhood characteristics in the final block (Step 5).

Multiple linear model of predictors of functional social support (all participants).				
	b	*SE B*	*B*	*p*
Step 1				
Constant	82.49	0.17		.000
Living Alone (Yes)	-15.28	0.37	-0.35	.000
$R^2 = 0.122$ ($p < 0.001$) for Step 1				
Step 2				
Constant	66.11	1.26		.000
Living Alone	-12.325	0.40	-0.28	.000
Age	0.07	0.02	0.04	.000
Sex (Female)	1.86	0.30	0.05	.000
Income	3.25	0.15	0.21	.000
$\triangle R^2 = 0.035$ ($p < 0.001$) for Step 2				
Step 3				
Constant	81.79	1.37		.000
Living Alone	-12.05	0.39	-0.28	.000
Age	0.03	0.02	0.02	.048
Sex (Female)	1.83	0.29	0.05	.000
Income	2.49	0.15	0.16	.000
General Health	-1.13	0.19	-0.06	.000
General Mental Health	-3.72	0.19	-0.19	.000
$\triangle R^2 = 0.048$ ($p < 0.001$) for Step 3				
Step 4				
Constant	81.24	1.39		.000
Living Alone	-12.01	0.39	-0.27	.000
Age	0.03	0.02	0.02	.028
Sex (Female)	1.93	0.30	0.05	.000
Income	2.41	0.15	0.15	.000
General Health	-1.11	0.19	-0.06	.000
General Mental Health	-3.70	0.19	-0.19	.000
Primary Transportation: Driving	0.66	0.36	0.02	.065
'Transportation Problems' as a Barrier	-3.54	0.92	-0.03	.000
$\triangle R^2 = 0.001$ ($p < 0.001$) for Step 4				
Step 5				
Constant	78.60	1.55		.000
Living Alone	-11.75	0.40	-0.27	.000
Age	0.03	0.02	0.02	.071
Sex (Female)	1.90	0.29	0.05	.000
Income	2.50	0.16	0.15	.000
General Health	-1.10	0.19	-0.06	.000
General Mental Health	-3.60	0.19	-0.18	.000
Primary Transportation: Driving	0.35	0.37	0.01	.342
'Transportation Problems' as a Barrier	-3.50	0.92	-0.03	.000
Material Deprivation	-1.30	4.13	-0.00	.753
Social Deprivation	7.54	4.16	0.02	.070
Sense of Belonging (Local)	5.11	0.56	0.07	.000
Active Living Environments	-0.75	0.16	-0.04	.000
$\triangle R^2 = 0.007$ ($p < 0.001$) for Step 5				

Social Participation

In this table, "Living Alone" was entered into the model prior to the first block of predictor variables to determine the individual explanatory value of living alone with respect to social participation. Living alone did not emerge as statistically significant in this instance. When the first full block of variables was entered (Step 2), all sociodemographic variables emerged as statistically significant ($p< 0.001$), with the exception of age. When the block of health variables was entered into the model (Step 3), all variables except age made statistically significant contributions ($p< 0.001$). The addition of transportation variables (Step 4) resulted in statistical significance for all variables except age and transportation problems as a barrier to social participation. Lastly, neighbourhood characteristics were entered into the model (Step 5) with two of the four variables, material deprivation and sense of belonging, making statistically significant contributions ($p< 0.001$). Social deprivation and Active Living Environments failed to make significant contributions to the model. Regardless, the final cumulative model achieved an R^2 of 0.03, accounting for negligible variation in social participation among participants.

Multiple linear model of predictors of social participation (all participants).				
	b	*SE B*	*B*	*p*
Step 1				
Constant	2.53	.01		.000
Living Alone (Yes)	0.00	0.01	0.00	.743
$R^2 = 0.000$ ($p= 0.743$) for Step 1				
Step 2				
Constant	2.86	0.05		.000
Living Alone	-0.06	0.02	-0.04	.000
Age	-0.00	0.00	-0.01	.453
Sex (Female)	-0.08	0.01	-0.06	.000
Income	-0.08	0.01	-0.12	.000
$\Delta R^2 = 0.015$ ($p< 0.001$) for Step 2				
Step 3				
Constant	2.59	0.06		.000
Living Alone	-0.07	0.02	-0.04	.000
Age	-3.02	0.00	0.00	.965

Sex (Female)	-0.08	0.01	-0.06	.000
Income	-0.06	0.01	-0.10	.000
General Health	0.05	0.01	0.07	.000
General Mental Health	0.03	0.01	0.04	.000
$\Delta R^2 = 0.009$ ($p < 0.001$) for Step 3				
Step 4				
Constant	2.63	0.06		.000
Living Alone	-0.07	0.02	-0.04	.000
Age	0.00	0.00	-0.00	.817
Sex (Female)	-0.08	0.01	-0.06	.000
Income	-0.06	0.00	-0.09	.000
General Health	0.05	0.01	0.07	.000
General Mental Health	0.03	0.01	0.04	.001
Primary Transportation: Driving	-0.06	0.01	-0.04	.000
'Transportation Problems' as a Barrier	0.06	0.04	0.01	.152
$\Delta R^2 = 0.002$ ($p < 0.001$) for Step 4				
Step 5				
Constant	2.71	0.07		.000
Living Alone	-0.06	0.02	-0.03	.001
Age	0.00	0.00	0.01	.549
Sex (Female)	-0.08	0.01	-0.06	.000
Income	-0.05	0.01	-0.08	.000
General Health	0.05	0.01	0.07	.000
General Mental Health	0.03	0.01	0.03	.001
Primary Transportation: Driving	-0.07	0.02	-0.04	.000
'Transportation Problems' as a Barrier	0.05	0.04	0.01	.242
Material Deprivation	0.94	0.18	0.05	.000
Social Deprivation	-0.26	0.18	-0.01	.155
Sense of Belonging (Local)	-0.11	0.02	-0.04	.000
Active Living Environments	-0.00	0.01	-0.00	.689
$\triangle R^2 = 0.004$ ($p < 0.001$) for Step 5				

Loneliness

In this table, "Living Alone" was entered into the model prior to the first block of predictor variables to determine the individual explanatory value of living alone with respect to loneliness. They explanatory value of subsequent blocks of variables were then compared to this initial block containing only "Living Alone" as a variable. It emerged as a statistically significant contributor ($p < 0.001$) and achieved an R^2 of 0.068. When the first full block of variables was entered (Step 2), only income and living alone emerged as significant contributors to the model ($p < 0.001$). When the block of health variables was entered into

the model (Step 3), general mental health emerged as a significant contributor ($p< 0.001$), but general health did not. The addition of transportation variables (Step 4) resulted in a significant contribution from 'transportation problems' as a barrier ($p< 0.001$). Lastly, neighbourhood characteristics were entered into the model (Step 5) with only sense of belonging emerging as a significant contributor ($p< 0.001$). Material deprivation, social deprivation, and Active Living Environments failed to make statistically significant contributions to the model. The final cumulative model achieved an R^2 of 0.135, account for a small amount of variation in loneliness among all participants.

Multiple linear model of predictors of loneliness (all participants).				
	b	*SE B*	*B*	*p*
Step 1				
Constant	3.60	0.01		.000
Living Alone (Yes)	-0.51	0.02	-0.26	.000
$R^2 = 0.068$ ($p< 0.001$) for Step 1				
Step 2				
Constant	3.20	0.06		.000
Living Alone	-0.40	0.02	-0.21	.000
Age	0.00	0.00	0.02	.052
Sex (Female)	-0.02	0.01	-0.02	.087
Income	0.09	0.01	0.13	.000
$\Delta R^2 = 0.015$ ($p< 0.001$) for Step 2				
Step 3				
Constant	3.84	0.06		.000
Living Alone	-0.39	0.02	-0.20	.000
Age	0.00	0.00	-0.00	.716
Sex (Female)	-0.02	0.01	-0.01	.134
Income	0.06	0.01	0.09	.000
General Health	-0.01	0.01	-0.01	.158
General Mental Health	-0.19	0.01	-0.21	.000
$\Delta R^2 = 0.046$ ($p< 0.001$) for Step 3				
Step 4				
Constant	3.85	0.06		.000
Living Alone	-0.39	0.02	-0.20	.000
Age	-9.43	0.00	-0.00	.899
Sex (Female)	-0.02	0.01	-0.01	.238
Income	0.06	0.01	0.09	.000
General Health	-0.01	0.01	-0.01	.199
General Mental Health	-0.19	0.01	-0.21	.000
Primary Transportation: Driving	-0.02	0.02	-0.01	.350

'Transportation Problems' as a Barrier	-0.27	0.04	-0.05	.000
$\Delta R^2 = 0.003$ ($p < 0.001$) for Step 4				
Step 5				
Constant	3.72	0.07		.000
Living Alone	-0.39	0.02	-0.20	.000
Age	0.00	0.00	-0.01	.548
Sex (Female)	-0.02	0.01	-0.01	.227
Income	0.06	0.01	0.02	.000
General Health	-0.01	0.01	-0.01	.257
General Mental Health	-0.18	0.01	-0.20	.000
Primary Transportation: Driving	-0.02	0.02	-0.01	.262
'Transportation Problems' as a Barrier	-0.26	0.04	-0.05	.000
Material Deprivation	-0.21	0.19	-0.01	.276
Social Deprivation	-0.07	0.19	-0.00	.735
Sense of Belonging (Local)	0.17	0.03	0.06	.000
Active Living Environments	-0.00	0.01	-0.01	.514
$\triangle R^2 = 0.003$ ($p < 0.001$) for Step 5				

APPENDIX C

Comprehensive Regression Analysis Results.

Functional Social Support (Living Alone)

Multiple linear model of predictors of functional social support (participants living alone).				
	b	*SE B*	*B*	*p*
Step 1				
Constant	47.72	2.85		.000
Age	0.07	0.04	0.03	.072
Sex (Female)	8.37	0.82	0.20	.000
Income	4.06	0.42	0.19	.000
$R^2 = 0.070$ ($p < 0.001$) for Step 1				
Step 2				
Constant	69.04	3.21		.000
Age	0.01	0.04	0.01	.740
Sex (Female)	7.87	0.79	0.19	.000
Income	2.92	0.42	0.13	.000
General Health	-1.55	0.46	-0.07	.001
General Mental Health	-4.55	0.47	-0.21	.000
$\Delta R^2 = 0.062$ ($p < 0.001$) for Step 2				
Step 3				
Constant	67.36	3.22		.000
Age	0.02	0.04	0.01	.623
Sex (Female)	7.92	0.79	0.19	.000
Income	2.49	0.43	0.11	.000
General Health	-1.50	0.46	-0.07	.000
General Mental Health	-4.46	0.47	-0.21	.000
Primary Transportation: Driving	3.13	0.83	0.07	.000
'Transportation Problems' as a Barrier	-4.02	1.82	-0.04	.027
$\Delta R^2 = 0.008$ ($p < 0.001$) for Step 3				
Step 4				
Constant	59.69	3.67		.000
Age	0.01	0.04	0.01	.754
Sex (Female)	7.88	0.78	0.19	.000
Income	2.68	0.45	0.12	.000
General Health	-1.36	0.46	-0.06	.003
General Mental Health	-4.25	0.47	-0.20	.000
Primary Transportation: Driving	3.25	0.87	0.08	.000
'Transportation Problems' as a Barrier	-3.67	1.81	-0.04	.043
Material Deprivation	10.74	9.19	0.02	.243
Social Deprivation	16.55	10.48	0.03	.114
Sense of Belonging (Local)	8.41	1.29	0.12	.000
Active Living Environments	-0.41	0.40	-0.02	.303
$\Delta R^2 = 0.015$ ($p < 0.001$) for Step 4				

Functional Social Support (Not Living Alone)

Multiple linear model of predictors of functional social support (participants not living alone).				
	b	*SE B*	*B*	*p*
Step 1				
Constant	68.97	1.38		.000
Age	0.05	0.02	0.03	.005
Sex (Female)	0.24	0.32	0.01	.459
Income	3.02	0.16	0.21	.000
$R^2 = 0.040$ ($p < 0.001$) for Step 1				
Step 2				
Constant	82.92	1.48		.000
Age	0.02	0.02	0.01	.316
Sex (Female)	0.30	0.31	0.01	.328
Income	2.36	0.15	0.16	.000
General Health	-1.02	0.20	-0.06	.000
General Mental Health	-3.42	0.21	-0.19	.000
$\triangle R^2 = 0.051$ ($p < 0.001$) for Step 2				
Step 3				
Constant	83.28	1.52		.000
Age	0.02	0.02	0.01	.294
Sex (Female)	0.33	0.31	0.01	.286
Income	2.34	0.16	0.16	.000
General Health	-1.00	0.20	-0.06	.000
General Mental Health	-3.41	0.21	-0.19	.000
Primary Transportation: Driving	-0.45	0.39	-0.01	.245
'Transportation Problems' as a Barrier	-3.19	1.09	-0.03	.003
$\triangle R^2 = 0.001$ ($p = 0.010$) for Step 3				
Step 4				
Constant	82.11	1.69		.000
Age	0.01	0.02	0.01	.470
Sex (Female)	0.30	0.31	0.01	.338
Income	2.30	0.17	0.16	.000
General Health	-1.01	0.20	-0.06	.000
General Mental Health	-3.31	0.21	-0.19	.000
Primary Transportation: Driving	-0.80	0.40	-0.02	.045
'Transportation Problems' as a Barrier	-3.10	1.08	-0.03	.004
Material Deprivation	-3.70	4.59	-0.01	.420
Social Deprivation	5.34	4.42	0.01	.227
Sense of Belonging (Local)	3.87	0.61	0.06	.000
Active Living Environments	-0.82	0.17	-0.05	.000
$\triangle R^2 = 0.006$ ($p < 0.001$) for Step 4				

Social Participation (Living Alone)

Multiple linear model of predictors of social participation (participants living alone).				
	b	*SE B*	*B*	*p*
Step 1				
Constant	2.89	0.10		.000
Age	0.00	0.00	-0.01	.769
Sex (Female)	-0.14	0.03	-0.09	.000
Income	-0.10	0.01	-0.13	.000
$R^2 = 0.023$ ($p < 0.001$) for Step 1				
Step 2				
Constant	2.56	0.12		.000
Age	0.00	0.00	0.00	.853
Sex (Female)	-0.13	0.03	-0.09	.000
Income	-0.08	0.02	-0.10	.000
General Health	0.05	0.02	0.06	.006
General Mental Health	0.05	0.02	0.06	.010
$\Delta R^2 = 0.011$ ($p < 0.001$) for Step 2				
Step 3				
Constant	2.62	0.12		.000
Age	0.00	0.00	0.00	.916
Sex (Female)	-0.13	0.03	-0.09	.000
Income	-0.07	0.02	-0.09	.000
General Health	0.05	0.02	0.06	.008
General Mental Health	0.04	0.02	0.05	.015
Primary Transportation: Driving	-0.11	0.03	-0.07	.000
'Transportation Problems' as a Barrier	0.06	0.07	0.02	.406
$\Delta R^2 = 0.006$ ($p < 0.001$) for Step 3				
Step 4				
Constant	2.70	0.14		.000
Age	0.00	0.00	0.01	.441
Sex (Female)	-0.12	0.03	-0.08	.000
Income	-0.05	0.02	-0.06	.005
General Health	0.04	0.02	0.05	.019
General Mental Health	0.04	0.02	0.05	.025
Primary Transportation: Driving	-0.13	0.03	-0.08	.000
'Transportation Problems' as a Barrier	0.05	0.07	0.01	.464
Material Deprivation	1.44	0.35	0.08	.000
Social Deprivation	0.05	0.40	0.00	.895
Sense of Belonging (Local)	-0.14	0.05	-0.05	.005
Active Living Environment Index	-0.00	0.01	-0.00	.828
$\triangle R^2 = 0.010$ ($p < 0.001$) for Step 4				

Social Participation (Not Living Alone)

Multiple linear model of predictors of social participation (participants not living alone).				
	b	*SE B*	*B*	*p*
Step 1				
Constant	2.82	0.06		.000
Age	0.00	0.00	-0.00	.734
Sex (Female)	-0.07	0.01	-0.05	.000
Income	-0.07	0.01	-0.11	.000
R^2 = 0.013 (p< 0.001) for Step 1				
Step 2				
Constant	2.56	0.07		.000
Age	0.00	0.00	0.00	.873
Sex (Female)	-0.07	0.01	-0.05	.000
Income	-0.06	0.01	-0.09	.000
General Health	0.06	0.01	0.07	.000
General Mental Health	0.02	0.01	0.03	.010
ΔR^2 = 0.009 (p< 0.001) for Step 2				
Step 3				
Constant	2.59	0.07		.000
Age	8.64	0.00	0.00	.991
Sex (Female)	-0.07	0.01	-0.05	.000
Income	-0.05	0.01	-0.08	.000
General Health	0.06	0.01	0.07	.000
General Mental Health	0.02	0.01	0.03	.013
Primary Transportation: Driving	-0.04	0.02	-0.02	.027
'Transportation Problems' as a Barrier	0.05	0.05	0.01	.300
ΔR^2 = 0.001 (p = 0.034) for Step 3				
Step 4				
Constant	2.68	0.08		.000
Age	0.00	0.00	0.01	.600
Sex (Female)	-0.07	0.01	-0.05	.000
Income	-0.05	0.01	-0.08	.000
General Health	0.05	0.01	0.07	.000
General Mental Health	0.02	0.01	0.03	.018
Primary Transportation: Driving	-0.05	0.02	-0.03	.010
'Transportation Problems' as a Barrier	0.04	0.05	0.01	.416
Material Deprivation	0.737	0.21	0.04	.000
Social Deprivation	-0.34	0.20	-0.02	.095
Sense of Belonging (Local)	-0.10	0.03	-0.04	.000
Active Living Environment Index	-0.00	0.01	-0.00	0.676
$\triangle R^2$ = 0.003 (p< 0.001) for Step 4				

Loneliness (Living Alone)

Multiple linear model of predictors of loneliness (participants living alone).				
	b	*SE B*	*B*	*p*
Step 1				
Constant	3.14	0.13		.000
Age	-0.01	0.00	-0.07	.001
Sex (Female)	0.21	0.04	0.11	.000
Income	0.09	0.02	0.09	.000
$R^2 = 0.023$ ($p < 0.001$) for Step 1				
Step 2				
Constant	3.92	0.15		.000
Age	-.001	0.00	-0.09	.000
Sex (Female)	0.19	0.04	0.10	.000
Income	0.06	0.02	0.06	.004
General Health	-0.00	0.02	-0.00	.900
General Mental Health	-0.22	0.02	-0.22	.000
$\Delta R^2 = 0.049$ ($p < 0.001$) for Step 2				
Step 3				
Constant	3.95	0.15		.000
Age	-0.01	0.00	-0.09	.000
Sex (Female)	0.20	0.04	0.10	.000
Income	0.06	0.02	0.06	.003
General Health	-0.00	0.02	-0.00	.856
General Mental Health	-0.22	0.02	-0.22	.000
Primary Transportation: Driving	-0.09	0.04	-0.04	.029
'Transportation Problems' as a Barrier	-0.25	0.09	-0.06	.004
$\Delta R^2 = 0.004$ ($p = 0.004$) for Step 3				
Step 4				
Constant	3.71	0.17		.000
Age	-0.01	0.00	-0.09	.000
Sex (Female)	0.20	0.04	0.10	.000
Income	0.06	0.02	0.06	.004
General Health	-0.00	0.02	-0.00	.960
General Mental Health	-0.22	0.02	-0.22	.000
Primary Transportation: Driving	-0.06	0.04	-0.03	.180
'Transportation Problems' as a Barrier	-0.23	0.09	-0.05	.009
Material Deprivation	-0.24	0.44	-.01	.578
Social Deprivation	0.96	0.50	0.04	.054
Sense of Belonging (Local)	0.17	0.06	0.05	.005
Active Living Environments	0.01	0.02	0.01	.724
$\triangle R^2 = 0.005$ ($p = 0.008$) for Step 4				

Loneliness (Not Living Alone)

Multiple linear model of predictors of loneliness (participants not living alone).				
	b	*SE B*	*B*	*p*
Step 1				
Constant	3.10	0.06		.000
Age	0.00	0.00	0.04	.000
Sex (Female)	-0.07	0.01	-0.05	.000
Income	0.10	0.01	0.15	.000
$R^2 = 0.024$ ($p < 0.001$) for Step 1				
Step 2				
Constant	3.69	0.07		.000
Age	0.00	0.00	0.02	.017
Sex (Female)	-0.07	0.01	-0.05	.000
Income	0.07	0.01	0.11	.000
General Health	-0.02	0.01	-0.02	.081
General Mental Health	-0.18	0.01	-0.21	.000
$\Delta R^2 = 0.049$ ($p < 0.001$) for Step 2				
Step 3				
Constant	3.70	0.07		.000
Age	0.00	0.00	0.03	.009
Sex (Female)	-0.06	0.01	-0.04	.000
Income	0.07	0.01	0.10	.000
General Health	-0.01	0.01	-0.02	.115
General Mental Health	-0.17	0.01	-0.21	.000
Primary Transportation: Driving	0.01	0.02	0.00	.757
'Transportation Problems' as a Barrier	-0.28	0.05	-0.06	.000
$\Delta R^2 = 0.003$ ($p < 0.001$) for Step 3				
Step 4				
Constant	3.58	0.08		.000
Age	0.00	0.00	0.02	.028
Sex (Female)	-0.06	0.01	-0.04	.000
Income	0.06	0.01	0.09	.000
General Health	-0.01	0.01	-0.02	.118
General Mental Health	-0.17	0.01	-0.21	.000
Primary Transportation: Driving	-0.01	0.02	-0.00	.729
'Transportation Problems' as a Barrier	-0.27	0.05	-0.05	.000
Material Deprivation	-0.06	0.21	-0.00	.783
Social Deprivation	-0.40	0.21	0.02	.051
Sense of Belonging (Local)	0.17	0.03	0.06	.000
Active Living Environments	-0.01	0.01	-0.01	.194
$\triangle R^2 = 0.005$ ($p < 0.001$) for Step 4				

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PAPER TWO:

'THERE IS NO COMMUNITY HERE': LIVING ALONE, PLACE, AND OLDER PEOPLES' RISK OF SOCIAL ISOLATION

INTRODUCTION

Social isolation is a foremost concern among many older people in Canada. A growing body of literature has identified a number of common risk factors for social isolation in later life (Nicholson, 2012), including physical/medical health problems (Havens, Hall, Sylvestre, & Jivan, 2004), the loss of a close contact (Wenger & Burholt, 2004), among many others. Important life course factors may also play a role, such as childhood hardships or trauma which can contribute to the accumulation of risk into later life (Dannefer, 2012; Machielse & Duyndam, 2020). Overall, living alone in later life has been shown to be one of the top predictors for experiencing isolation in later life, and yet it is also true that many older people live alone and maintain rich and meaningful social lives (Wenger, Davies, Shahtahmasebi, & Scott, 1996). These experiences have motivated some researchers and practitioners to begin teasing apart the nuances in the relationship(s) between living alone, subjective and objective isolation, and loneliness (Cloutier-Fisher, Kobayashi, & Smith, 2011; Nicholson, 2009; Smith & Victor, 2018; Victor, Scambler, Bond, & Bowling, 2000). At the same time, there is increasing evidence of gaps in the social isolation literature with respect to place and social exclusion, and how they may contribute to social isolation in later life (Weldrick & Grenier, 2018). Models of known risk factors for late life social isolation evolved in recent years, but place-based factors remain largely absent from these models.

This paper begins to address these areas by considering the role of place in both the protection from and promotion of social isolation among those living alone in later life.

This study contributes to the existing body of literature by using in-depth, qualitative interviews and a constructivist grounded theory approach to investigate links between place-based factors and risk of social isolation in later life. Interviews with older people living alone reveal vital information pertaining to the relationships between neighbourhoods, communities and infrastructure, and social connection. The results of this paper provide critical insights pertaining to these place-based factors, particularly given that many older adults spend the majority of their daily lives in their neighbourhoods and home environments (Baltes & Baltes, 1990; Golant, 1984). Indeed, neighbourhood and area effects may "disproportionately affect those who spend more of their day within their neighbourhood" (Smith, 2009, p. 4). Insights into the experiences of older people and their connection to their immediate environments therefore have the potential to be particularly useful in developing meaningful programs and targeted strategies aimed at reducing social isolation in the older population. These insights are discussed and developed in relation to place-based exclusion, that is, social exclusion experienced *through the domain of place*, rather than simply *within place* (Walsh, 2018). In doing so, this paper contributes to the existing literature on known risk factors of social isolation in later life.

Background

A wealth of research has identified a number of significant risk factors for social isolation among older people. Overall, older people experience a greater risk of becoming socially isolated than younger people (Nicholson, 2012). However, the social exclusion and

isolation of older people tends to be more pronounced among disadvantaged older populations, and within disadvantaged communities (Scharf, Phillipson, Smith, & Kingston, 2002), highlighting the role of inequality and marginalization, leading to an overrepresentation of isolated individuals from marginalized and excluded social locations. Older people may also experience heightened risk as a result of the death or institutionalization of friends and loved ones, retirement, and shifting family make-up, among other factors (Buffel, Rémillard-Boilard, & Phillipson, 2015; Cacioppo & Hawkley, 2003). Above all else, living alone is typically considered to be the primary predictor or risk factor for becoming socially isolated in the future (Victor et al., 2000; Wenger et al., 1996), meaning that by definition older people who live on their own are often considered to be a priority group when planning social interventions (Jopling, 2015).

This relationship between living alone and risk of isolation in later life is especially significant given ongoing demographic changes taking place in Canada and other countries. In Canada, the number of single-person households has doubled since 1981 (Statistics Canada, 2017a). This trend has been mirrored in several other countries. Most notably, the United States, the United Kingdom, France, Japan, Sweden, Norway, and Germany also reported increasing percentages of their populations living in single-person households (Statistics Canada, 2017b). With respect to all Canadians over the age of 65, the actual proportion of older people living alone has decreased in recent decades but has increased in the past several years among older men (Tang, Galbraith, & Truong, 2019). Overall, approximately 26% of all older Canadians reported living on their own in 2016 (Statistics Canada, 2017b). With roughly one quarter of all older people in Canada living on their own

in the community, understanding and improving the environments within which they live is increasingly critical.

For older people, the home environment and immediate neighbourhood environment are two places which can shape well-being and are important sites for daily activities and socialization (Andrews & Phillips, 2004; Golant, 1984; Phillips, 1999). However, recent literature on late life social isolation has typically failed to invoke the work in this area or consider place-based and geographic factors such as the role of neighbourhood in both risk and experience of social isolation (Weldrick & Grenier, 2018), with few notable exceptions (see Finlay & Kobayashi, 2018; Menec, Newall, Mackenzie, Shooshtari, & Nowicki, 2019; Portacolone, Perissinotto, Yeh, & Greysen, 2018). Other work has begun to consider social isolation through an ecological lens. For example, Cotterell and colleagues (2018) use an ecological framework to outline possible risk factors for social isolation in later life at the societal, community, relationship, and individual levels. Although several risk factors at the community level include place-based factors and neighbourhood characteristics (e.g. limited access to amenities, crime) (Cotterell et al., 2018), it is clear that additional work is needed to establish clear links between place and social isolation risk within the contemporary literature.

Indeed, most theoretical models of risk factors and/or antecedents to late life social isolation tend to center heavily around individual level factors, such as health and income. For example, Nicholson (2012) groups known risk factors for social isolation into categories, with many of the categories summarizing risk factors at the individual level. Although 'environmental' factors are included as a category within the model, the author predominantly draws upon literature related to living alone and neighbourhood safety

(Nicholson, 2012, p. 141). Place-based factors (e.g. built environment, community resources) are largely missing from the model, indicating a need for further model refinement to include such factors. In order to begin refining and building upon this model, research on isolation risk must investigate the role(s) of place-based factors.

Recent gerontological work has also suggested that social isolation in later life may be best understood as occurring as a symptom of, or indeed a type of, social *exclusion* (Weldrick & Grenier, 2018), or the marginalization/separation from wider or "mainstream" society (Walsh, Scharf, & Keating, 2016). Many risk factors for social isolation among older people living on their own actually exist at the community-level. Buffel and colleagues (2015) identify age-segregation, poor urban design, crime, and other community factors as being important determinants of isolation risk for older people living in urban environments. Likewise, reduced social cohesion and generational disconnect are considered to be negative outcomes of social isolation that occur at the community and societal levels (Buffel et al., 2015; Hortulanus, Machielse, & Meeuwesen, 2006). Furthermore, language minorities have often been overrepresented among those whose are isolated in later life (Weldrick & Grenier, 2018). In terms of applied work, others have called for an exclusion lens when developing policies and program responses to social isolation and healthy aging (Salma & Salami, 2019). Given this, there appears to be a strong rationale for investigating late life social isolation through the lens of social exclusion.

Theoretical Framework: Place-Based Exclusion

Critical gerontologists have advised that "the local residential environment may represent a much more important aspect of exclusion for older people than for other age

groups", in part because later life may lead to more time spent within the immediate neighbourhood (Scharf, Phillipson, & Smith, 2004, p. 85). The neighbourhood becomes an increasingly important site of daily activities, both social and otherwise, when a greater portion of time is spent within and around it. For some, advanced age and decline may also result in a heightened vulnerability with respect to environmental factors, such as neighbourhood crime and built environment (Portacolone et al., 2018; Smith, 2009). Neighbourhoods can then potentially become critical sites for risk and experience of social exclusion. As it stands, neighbourhood characteristics and place-based factors can be found within some late life exclusion frameworks, although the extent to which place may be a *domain* of exclusion has yet to be fully conceptualized (Walsh, 2018; Walsh et al., 2016). This has, to date, been an under-theorized area of the exclusion literature that may hold the key to unlocking significant links between how older people experience social isolation *in* and perhaps *because of* place.

Walsh's (2018) conceptualization of *place-based exclusion* is especially useful for linking place-based factors and late life social isolation. This framework, which builds upon the geographies of inclusion and exclusion, as well as the critical gerontological literature, suggests that place is more than a context within which exclusion can occur. Places have agency (Andrews, Evans, & Wiles, 2013) and can at times actively contribute to both social exclusion and inclusion across multiple levels (e.g. home environment, local neighbourhood) (Walsh, 2018). From this point of view, place can be seen as one of the critical domains within which exclusion, and perhaps isolation, can be experienced.

Walsh (2018) identifies five interrelated dimensions of place-based exclusion. The first dimension, *embedded services, amenities and the built environment,* refers to exclusion linked to

the services and infrastructure in a given neighbourhood or location (Walsh, 2018). This can include health services, transportation options, and other amenities delivered in place. The second dimension, *place-socioeconomic aspects*, refers to the susceptibility of older people to experience social exclusion in deprived neighbourhoods and/or structurally disadvantaged locations (Walsh, 2018). The third dimension, *social and relational aspects*, refers to exclusion linked to "relational and communities-in-place" (Walsh, 2018, p. 256). This accounts for the ways in which shifting social and cultural aspects of local environments (e.g. social cohesion, connection with neighbours etc.) can lead to the exclusion of some older people. Fourth, *socio-political power structures* refers to social exclusion in-place as a result of marginalisation or lack of inclusion in decision-making processes at the local level. The last dimension, *place-based policy,* refers to exclusion in later life as a result of exclusionary policies tied to particular locations. Much of the literature on this domain is tied to critical analyses of age-friendly initiatives (Walsh et al., 2016), but extends to exclusion within or via other forms of place-based policy. These five dimensions provide a helpful perspective for investigating place and social isolation and connection and will provide important insights later in the paper.

This paper applies a constructivist grounded theory methodology to investigate the connection between place and social isolation/connection in later life. Typically, grounded theory studies are thought of as being initially *atheoretical* – that is, they are built and conducted in such a way that allows the findings to be "grounded" in the data, rather than a pre-existing theory (Corbin & Strauss, 2014a). This is true, and yet it may be helpful in some cases to draw upon existing theoretical perspectives to identify initial concepts and insights to further explore within the context of a grounded theory study, particularly when working

to develop middle-range theories (Corbin & Strauss, 2014a). As such, this study uses *place-based exclusion* as a starting point to inform the development of initial research questions.

The Present Study

This paper examines two primary research questions: 1) How do place-based factors contribute, either negatively or positively, to risk of social isolation in later life; 2) How does a place-based exclusion lens illuminate our understanding of late life isolation risk? In doing so, the study aims to add two primary contributions to the existing gerontological literature. First, by investigating the role of place-based factors and risk of isolation, this paper contributes to the refinement of known isolation risk factors and sheds light on how place may fit into this model – a development which has been called for in recent years (Portacolone et al., 2018). Second, by drawing connections between these experiences and Walsh's (2018) dimensions of place-based exclusion, this paper contributes to the emerging body of conceptual work on social isolation as it relates to broader forms of social exclusion.

METHODS

The present study was guided by a constructivist grounded theory approach (Charmaz, 2014), and presents the results of 17 in-depth, semi-structured interviews. This study received ethics approval. Interviews took place between April and August 2019. All interviews were conducted in English, although non-English speaking individuals were eligible to participate.

Participants

Participant Eligibility and Theoretical Sampling

Participants were initially recruited via purposeful sampling according to several eligibility criteria. Although many studies of older people set the minimum age threshold for participation at 60 or 65 years of age, the minimum age threshold for this study was intentionally set at 55 years to account for the vulnerabilities and accelerated aging of certain subpopulations (Ferraro & Shippee, 2009; Levine & Crimmins, 2014). Other studies of social exclusion in later life have set comparable minimum age criteria (see Portacolone et al., 2018). The second inclusion criterion is that participants needed to report they lived alone in Hamilton, Ontario. In lieu of recruiting only those individuals who were objectively isolated, the present study recruited those living alone as it is a significant predictor of experiencing isolation in later life (Raina, Wolfson, & Kirkland, 2018; Victor et al., 2000). We intentionally chose to investigate those who live alone to better understand two things: 1) how living alone can contribute to the experience of isolation among some older people; and 2) what community characteristics and/or local resources helped people to avoid isolation.

As analysis began and theoretical categories started to take shape, recruitment shifted to theoretical sampling. Theoretical sampling is a tactic that is guided by the emerging theoretical categories to illuminate additional dimensions of the concepts being studied, and further develop the theory (Bryant & Charmaz, 2012; Corbin & Strauss, 2014b). Using self-reported postal codes, participants were sorted into one of six neighbourhood categories based on their neighbourhood of residence (summarized in *Table 1)*. The theoretical sampling strategy was built around the prevalence of low-income households and built environment. This was done for several reasons. Important community and neighbourhood

characteristics (e.g. public transportation availability, crime, recreation facilities) vary greatly across neighbourhoods within cities. Built environments have been linked to both active behaviour and loneliness among older people (Koohsari, Nakaya, & Oka, 2018; Yu, Cheung, Lau, & Woo, 2017), underscoring the importance of built environments in the everyday lives of older people. Additionally, well-being and social participation among older people has also been linked to poverty within their neighbourhoods (Scharf et al., 2004), with older people who live in impoverished neighbourhoods experiencing greater risk of isolation (Elder & Retrum, 2012). Ultimately, the built environments and resources within a neighbourhood can significantly shape how, when, and why older people (dis)connect with their local communities. By organizing the theoretical sampling strategy around these two principles, we increase the likelihood of gathering a diversity of experiences from a diversity of neighbourhoods, which will in turn contribute to the generalizability of the findings and the scope of the theory (Bryant & Charmaz, 2012).

		Prevalence of Low-Income Households (by Forward Sortation Area)		
		Low (0-12% LIM-AT)	**Med (12.1-24.9% LIM-AT)**	**High (25% + LIM-AT)**
Built Environment / Walkability	**Non-Compact (0-59 Walk Score)**	Car-Dependent, Low Poverty Neighbourhood	Car-Dependent, Med Poverty Neighbourhood	Car-Dependent, High Poverty Neighbourhood
	Compact (60-100 Walk Score)	Compact (Walkable), Low Poverty Neighbourhood	Compact (Walkable), Med Poverty Neighbourhood	Compact (Walkable), High Poverty Neighbourhood

Table 1. Theoretical sampling strategy. Six neighbourhood categories.

The built environment sampling criterion was operationalized using Walk Score, a numerical score of walkability (ranging from 1-100) in a given neighbourhood (Walk Score, n.d.). Existing studies (e.g. Collins, Tait, Fein, & Dunn, 2018) have used Walk Score to determine the degree to which a neighbourhood's built environment is compact (i.e. many amenities and services in close proximity) or not compact (i.e. fewer amenities within close proximity). Specifically, using Forward Sortation Areas (i.e. the areas designated by the first three digits of Canadian postal codes), the present study classified locations with a Walk Score of less than 60 as "non-compact", and those with a Walk Score of 60-100 as "compact".

Neighbourhoods were also sorted by prevalence of low-income households. This information was accessed using data from the 2016 Census of Population (Statistics Canada, 2017a). Like the aforementioned built environment score, Forward Sortation Areas were used to determine the prevalence of low-income households in each participant's neighbourhood. "Low prevalence" of low-income households was defined as areas with a

prevalence of low-income based on the low-income measure, after tax (LIM-AT) of 0-12%. "Medium prevalence was defined as those areas with a prevalence of 12.1-24.9%. "High prevalence" was defined as those areas with a prevalence of 25% or greater.

Participants were recruited into all six neighbourhood categories to ensure that participant experiences were based on a diverse range of neighbourhood types (e.g. low-income urban neighbourhood, high-income suburban neighbourhood, etc.) and to identify the boundaries of the emerging theoretical categories. A total of 17 individuals participated in the study. Participants included 12 women, 4 men, and 1 non-binary person. Participants ranged from 65 to 93 years of age. A summary of participant characteristics is presented in *Table 2*.

Personal Characteristics			**Housing Characteristics**		**Neighbourhood Characteristics**	
Name	**Gender**	**Age**	**Housing Type**	**Seniors' building or subdivision?**	**Built Environment**	**% Low Income Households**
Karmen	Female	93	Townhouse	Yes	Walkable	Low
Susan	Female	70	Apartment	No	Car-dependent	Med
Jin	Female	75	Townhouse	Yes	Walkable	Low
Prim	Female	79	Single-family detached home	No	Walkable	Low
Leslie	Female	71	Apartment	Yes	Car-dependent	High
Mitch	Male	77	Single-family detached home	No	Car-dependent	High
Jennifer	Female	75	Townhouse	No	Car-dependent	Med
Michelle	Female	71	Single-family detached home	No	Walkable	High
Sheila	Female	70	Townhouse	Yes	Car-dependent	Low
Pat	Female	71	Townhouse	No	Car-dependent	Low
Mel	Male	72	Apartment	No	Walkable	High
Harry	Male	86	Single-family detached home	No	Walkable	Low
Cynthia	Female	67	Single-family detached home	No	Car-dependent	Low
Kathleen	Female	72	Apartment	Yes	Walkable	Med
Ruth	Female	76	Apartment	No	Walkable	High
Lenny	Non-Binary	73	Apartment	Yes	Walkable	High
Marcus	Male	65	Apartment	Yes	Walkable	High

Table 2. Summary of participant characteristics.

Recruitment

In order to increase potential diversity among participants and to ensure balanced representation from different areas, recruitment for the study took place through several avenues. First, recruitment posters were posted at public locations within urban neighbourhoods of the city of Hamilton including parks, recreation centres, and seniors' centres. Second, study information and posters were shared with staff members of public housing buildings in Hamilton. Staff members were encouraged to hang posters in lobbies and/or common spaces in their respective buildings. Third, study information was sent to leaders of cultural centres in Hamilton. Contact information for these individuals was accessed through The Red Book of Hamilton (Information Hamilton, 2017), a publicly accessible database of social services and resources in Hamilton, Ontario. Fourth, recruitment information was sent to local non-profit organizations that offer seniors services. Contact information for these organizations was also accessed through The Red Book of Hamilton. Fifth, recruitment posters were distributed on social media sites including Facebook and Twitter. Sixth, an advertisement with study information was placed in *Coffee News*, a free publication distributed locally that is read by many older people in the area (Coffee News, 2018). This advertisement contained the same information as the recruitment poster.

Data Collection

In-depth, face-to-face interviews were conducted with 17 participants in order to gather rich, qualitative information. All interviews were directed by a semi-structured interview guide containing open-ended questions and prompts (see Appendix A). The

interview guide was initially developed using guiding concepts related to social connection and place. As interviews progressed, the interview guide was revised to account for the growing collection of data. This process of revision is common in grounded theory studies and occurs as the concepts are progressively focused (Bryant & Charmaz, 2012). Interviews took place in a location of the individual participant's choosing. As such, the majority of interviews took place within the homes of the participants. Five participants chose public locations that were comfortable and accessible for them (e.g. public library branch, drop-in centre, café). Interviews lasted between 42 and 110 minutes in length, with most interviews lasting around 90 minutes. All data collection was conducted by the primary author.

Data Analysis

Each interview was recorded and transcribed verbatim. Once transcribed, each transcript was cleaned, and any identifying information was removed. Transcripts were then uploaded into NVIVO 12 – a qualitative analysis software – to assist with the data analysis process. In accordance with the constructivist grounded approach, transcripts were initially coded to "name each word, line, or segment of the data" (Charmaz, 2014, p. 113) and to identify preliminary concepts. Transcripts were then re-coded through a process of focused and axial coding to synthesize the initial codes and identify how codes relate to one another (Charmaz, 2014). This process of open coding and re-coding began after the first interview and continued throughout the data collection process. As such, the coding scheme was modified and adapted as new data were gathered, and codes were collapsed or expanded upon to account for the growing dataset. After reaching saturation in the interviews – that is,

when no new themes emerged from the interview data – main themes were identified. These themes are presented below.

RESULTS

This analysis resulted in the following five key themes: 1) neighbourhoods without a sense of community; 2) invisibility and vulnerability; 3) accessible programming as social connectors; 4) transportation as a determinant of social connection; and 5) neighbourhoods for all ages. These themes are discussed individually alongside illustrative quotes from participants.

Theme 1 – Neighbourhoods without a sense of community

Participants underscored the importance of feeling a sense of community within their respective neighbourhoods. Many participants described a desire for a sense of community where they live and often described how beneficial this could be to them in terms of building connections with others. This desire for community was often accompanied by a comparison between other neighbourhoods and, by contrast, the neighbourhood where they currently lived. For some, the perceived or actual lack of this sense of community was tied to fear and a desire for a change to take place. Cynthia, a widow living in a non-compact/car-dependent neighbourhood, describes how increasing the feeling of community within her neighbourhood could be helpful in reducing her fear of becoming isolated:

"I hear about these neighbourhood groups that get together and they have barbecues and things like that. Our neighbourhood has never been like that and I think that if you could create a community within your neighbourhood… like a true community… I think that would take away from a lot of that fear of isolation."

- Cynthia, 67, single-family detached home

Other participants described barriers to achieving a sense of community in their neighbourhoods. These barriers were very much tied to the built environment and accessibility of the spaces within their respective neighbourhoods. For example, Mitch, a widower living alone in a non-compact/car-dependent neighbourhood, describes a desire for more communal spaces:

"This neighbourhood lacks community spaces… places to walk and sit that encourage people to meet and talk. These places would help us to connect more as a community of neighbours."

– Mitch, 77, single-family detached home

Barriers to achieving a greater sense of community were at times tied to housing-related spatial constraints. Sheila, for example, resides in a small complex of townhouses built for those 65 years and older where she believes many of the residents, including herself, are somewhat isolated. When asked to elaborate on this experience, she describes a critical lack of physical space to engage and connect with her neighbours:

"I would like the neighbourhood to be a little more community minded… especially for those of us that are single… because of keeping an eye on each other. We need more opportunity for conversation… But we don't have a communal space… Condo owners pay

maintenance, and to have a communal space would put up that cost quite considerably. I don't know whether anything like that could be done to improve the situation here, if you know what I mean…"

- Sheila, 70, townhouse in seniors' community

For others, perceived barriers to achieving a sense of community were tied to high turnover rates among their neighbours and residents of the street or housing complex, something which has been linked to reduced social connection (Bailey, Kearns, & Livingston, 2012). Mel, who has lived alone in the same apartment building for over 40 years, feels a disconnect from many of the other building tenants with shorter residencies:

"Living in an apartment building is always a challenge because most people come and go… and to be honest, you don't know many of them. So, in my building I don't have any deep connections. There is no community here."

– Mel, 72, high-rise apartment building

Overall, most participants felt a distinct lack of community within their immediate environments, which was linked to a lack of connection with other residents on their street and/or in their building. This desire for a sense of community represented a critical deficit in the social worlds of these participants and was described by participants living in both car-dependent (non-compact) and walkable (compact) neighbourhoods. This finding raises important questions about how and when older people may connect with neighbours and other community members, and how this connection (or lack thereof) may affect their overall social well-being. In recent years, intra-community connection has been identified as contributing to late life isolation and loneliness (Bantry-White, Connell, Sullivan, & Kenny,

2018; Buffel et al., 2015). Our findings build upon this literature. For some participants, this lack of a sense of community was felt within the immediate residential environment (i.e. apartment building or condominium complex), and for others was felt within the community and/or neighbourhood. Although there is a need for further evidence, this theme suggests that living alone in an environment without a strong sense of community may be a risk factor for social isolation.

Theme 2 – Invisibility and Vulnerability

Participants described feeling vulnerable within their communities and/or invisible from their neighbours in various ways. This vulnerability and invisibility were often described as being caused by a lack of 'indicators' in times of need. Some participants expressed a disappearance of indicators that may have at one time signalled to neighbours that someone was in need of help or a check-in. For example, Cynthia described how recent changes to the mail delivery system in Canada unintentionally removed such an indicator for those living alone:

> *"I don't think [my neighbours] would notice if something was wrong… We used to have door-to-door mail delivery… and if you didn't take the mail out of your mailbox, someone might think it was odd. But now it's at those mailboxes, and nobody even knows if you don't pick it up. Because that might be a clue that if the mail was piling up or something… and they may even go and knock on the door just to see if they're okay. Now you don't see any of that, so we have lost that kind of connectivity in the community."*
>
> *- Cynthia, 67, single-family detached home*

For Cynthia, the removal of door-to-door mail delivery in her neighbourhood represented a significant shift in how neighbours would be able to support one another in times of illness or need. Other participants expressed fear and concern over not being able to call for help in times of need due to a lack of indicators specific to housing type. This seemed to be a particularly salient issue for participants residing in apartment buildings. Leslie, for example, recounts a tragic anecdote regarding her neighbour:

> *"My neighbour down the hall was isolated… she somehow ended up getting stuck in between her shower and toilet and she died… Nobody found her for days and nobody heard her. You don't hear anything except traffic noises in these apartments. This could happen to me. You would never know... Unless the newspaper started to pile up outside the door…"*
>
> *- Leslie, 71, high-rise apartment building for adults 65+*

Leslie worried that as someone living alone in a high-rise apartment building, she would not be able to indicate to her neighbours if she were in need of assistance. This worry was also top of mind for Jennifer, a widow living in a townhouse complex, after experiencing a fall:

> *"In the summer, I fell in the bathtub. I lay there calling for help and banging. Finally, I heard the neighbours in the shared driveway and yelled for help again. They came to help me, but they only heard me because my window was open… I had been on the floor of the bathtub for 11 hours. Since then I have been looking at apartments or other places to live that might be safer…"*
>
> *– Jennifer, 75, townhouse complex*

All participants except one described a lack of indicator that could be used to signal that they were in need. On the other hand, one participant, Jin, described the lights on her house as acting as a possible indicator of well-being and/or distress. Despite living a very isolated life with minimal social contact, Jin expressed feeling reassured when a neighbour checked on her after noticing her lights had been left on through the night:

> *"...if my blinds are down and they don't go up in the morning, I would like to think that someone would notice and see if everything was alright… and that's exactly what happened with my neighbour. I forgot my lights – they were on all night. He called me in the morning to ask if everything was alright. It's the little things like that that make me feel really good… and I know someone is looking out for me."*
>
> *- Jin, 75, townhouse in complex for adults 65+*

Overall, feelings of vulnerability and at times invisibility were felt by almost all participants, specifically when at home – a place where many older people spend a large portion of their time (Baltes & Baltes, 1990). This widespread feeling of invisibility raises critical questions about how spaces may be optimized to support the needs of older people living alone, particularly within the context of the 'ageing in place' agenda (Smith, 2009). Participants living in all neighbourhood and housing types described some lack of indicator or ability to signal potential vulnerability, underscoring the pervasiveness of this concern across varying home environments.

This theme raises critical considerations about home and building design, and the extent to which certain types of homes are suitable for older people. For many, aging-in-place is the goal, and yet homes, when not purposively designed to fully support the specific

needs of individual older people, can have detrimental effects on well-being (Smith, 2009), resulting in vulnerability and risk. Several participants in this study recognized this vulnerability, even going so far as to engage in *option recognition* (Peace, Kellaher, & Holland, 2006), by considering where else they may be able to live in order to feel a greater sense of safety. Unfortunately, the reality for many older people is that moving to more age-friendly or optimal housing may be unattainable due to significant barriers, either financial or otherwise (Clapham, 2005; Peace et al., 2006). Overall, this theme underscores the need to further plan for housing suitability and explore economical methods of adapting existing homes and spaces to reduce this vulnerability and encourage connection.

Theme 3 – Accessible programming as social connectors

Interviews revealed the importance of local, accessible programming for older people living alone. Participants expressed feeling as though programs offered near them served as important connectors in their lives. Those who participated in such programming often credited the accessibility (e.g. cost, transportation) of these programs as enabling them to participate and stave off isolation. For Lenny, a formerly homeless non-binary person with no living relatives, free social and educational programs in their building and immediate neighbourhood play a critical role in their life and encourage them to leave their apartment regularly. Lenny describes relying heavily on free programming following the death of their sister:

> *"Even though I sometimes feel alone and isolated, I know that I can call the homeless program... When my sister died, I ended up doing 293 programs in 10 months. I was doing 2-*

3 programs a day, Monday to Friday. Then the second year I did 304… A lot of them are here in the building or in the courtyard outside."

- Lenny, 73, subsidized apartment

Other participants described feeling connected to these free and accessible programs and experienced noteworthy benefits as a result of attending. For some participants, free and accessible programming became an important part of their weekly routines and fostered connections with other program attendees. Marcus, a man with no living relatives who resides in a public housing building for seniors, describes free meal programs at community institutions as offering additional value to his life that he did not experience when using the food bank:

"I used to [use the food bank] but then I found… well, a lot of people realized that you get the same thing over and over again. Now, on Mondays I attend a community dinner down at the community church. They have a dinner once a week except on holidays. Then my church does a community dinner on Tuesdays and sometimes Wednesdays. Then I go to the mission on Sundays. They give you a bag lunch and a hot chocolate...I see a lot of the same people at these dinners."

- Marcus, 65, public housing apartment

Like Marcus, other participants felt that free and easily accessible programs benefited their lives. Kathleen, for example, praises a free exercise program that is hosted on the main floor of her apartment building:

"We have chair yoga in the common area twice a week. I think it's run by [a local charity] because it's free to us. I can't walk much anymore because of my hip injury, so I'm very

happy we have a free exercise class in the building. I don't really go out much, but I like seeing familiar faces when I go to the class each week."

– Kathleen, 72, high-rise building for adults 65+

By and large, accessible programming was an important social connector for many participants. Programs, whether recreation-, health-, or food-based, were most helpful when free-of-charge and physically accessible to those in-need of social supports. In Kathleen's case, her ability to access the yoga program hinged on the fact that it was delivered directly to her building by a local organization. In-building service delivery is thought to be an effective means of connecting with marginalized older people for other types of services, including mobile libraries (Meadows, 2008), and drop-in health assessment clinics (Agarwal et al., 2017). Particularly for vulnerable older people living on low and/or fixed income, programs that are both geographically and financially within reach are vital for maintaining some form of connection to the wider community.

In contrast with other themes, these accessible programs were framed by participants as having protective social benefits. Older people experiencing poverty tend to be overrepresented among those who are isolated (Kobayashi, Cloutier-Fisher, & Roth, 2009), and cost can be a significant barrier to both transportation and social participation for older people who are experiencing poverty. Free and subsidized programs delivered in a centralized location appear to have the ability to level the field for those who may be experiencing differential disadvantage, especially when offered for free or at a significantly subsidized cost. In some cases, delivering services and programs within the immediate

residential environment can actually promote attendance among older people with mobility concerns who may be unlikely to venture into the broader community for such an activity.

Theme 4 – Transportation as a determinant of social connection

Participant interviews highlighted the importance of transportation in the maintenance of their daily lives and social connections. For some participants, transportation mainly involved walking, which was considered a significant benefit of living in a compact (walkable) neighbourhood. For others, multi-modal transportation options in their immediate neighbourhoods were key to staying connected and engaged with their respective local communities. Susan, a participant living in a low-rise apartment building, describes being able to connect with others and participate in her community thanks to both walking and public transportation options:

> *"I got rid of my car years ago. My apartment is right on a bus route which really facilitates my social connection with others. And I have a couple of grocery stores within walking distance. I also have a corner store that is about the same distance away... and there is a hairdresser. Yes, everything is pretty close by."*
>
> *- Susan, 70, apartment complex for seniors*

Likewise, Lenny describes benefiting from both the public transportation network and the reduced bus fares available to older people in the city:

> *"I have a seniors' bus pass and our building is on the main bus routes. I can take unlimited bus trips for a couple hundred bucks a year. It's a no-brainer."*
>
> *– Lenny, 73, subsidized apartment*

For other participants, transportation remained an important determinant of their social connection, but took different forms based on what types of infrastructure were available in their respective neighbourhoods. Participants living in non-compact (car-dependent) neighbourhoods described being attached to and reliant upon their motor vehicles. Cynthia states that having a car is the sole reason she is able to get out:

> *"If I couldn't drive, I would be stuck at home. I don't have anybody to take me places and I don't have anybody to go out with. If I didn't have a vehicle, I couldn't do anything."*
>
> *– Cynthia, 67, single-family detached home*

For some, this car-dependency came as an unintended consequence of a residential choice. Pat, for example, chose to live in a townhouse in order to facilitate social connection but now experiences transportation-related barriers as a result of living in a car-dependent neighbourhood:

> *"I chose to live in a town house as opposed to a separate dwelling because… well, I didn't want to be totally alone or isolated. But you have to have a car to live here. The buses are not frequent. I have to drive wherever I'm going. I can't imagine anybody living here without a car. You'd be stuck. I wouldn't be able to do my errands or even go to the senior's centre because it's in the middle of nowhere… buses don't go there."*
>
> *– Pat, 71, townhouse complex*

Pat's decision to move into a townhouse is an illustration of a protective strategy and shouldering of responsibility in an attempt to prevent possible future isolation – a trend which has been documented among older people living in care homes (Barbosa Neves, Sanders, & Kokanović, 2019). And yet, despite Pat's personal attempt to prevent isolation,

the structural components of her neighbourhood threaten to exclude her if her access to a personal vehicle disappears. This theme emphasises important distinctions between those living in car-dependent (non-compact) and walkable (compact) neighbourhoods. While transportation played a major role in determining the social lives of all participants, the experiences were strongly linked to place-based factors such as built environments and embedded transportation infrastructure, such as public transportation and roadways. As Miller (2017) has previously stated, car-dependent neighbourhoods in Canada are rendering older people particularly vulnerable, as critical amenities such as grocery stores and pharmacies are largely inaccessible to those who do not drive. Our findings indicate that this is top-of-mind for many people.

This finding provides supporting evidence for existing literature. Recent studies have found that built environment and urban design can strongly impact older people's social lives and risk of isolation. For example, Portacolone and colleagues (2018) recently found that factors such as non-walkability and the poor condition of sidewalks created barriers for several of their socially isolated participants. Our findings support this existing literature, as participants in this study clearly expressed the importance of walkability while simultaneously expressing concern over car-dependent neighbourhoods. Non-walkable neighbourhoods and deficits in public transportation grids can drastically hinder older residents' ability to maintain fulfilling and healthy lives, this much is known (Hand et al., 2017). Yet, it is unclear whether these urban design and infrastructure choices can be appropriately adapted at the scale needed to support the aging population (Miller, 2017).

Theme 5 – Neighbourhoods for all ages

Lastly, participants strongly expressed the importance of living in an intergenerational neighbourhood. For most participants, this desire for intergenerational neighbourhoods was tied to the desire for intergenerational social opportunities, and the perceived benefits of engaging with members of other age groups. Participants underscored the social value provided by living in mixed neighbourhoods with people of all ages, contrasting descriptions of children and families with the undesirability of living exclusively with other "old" people. For example, Harry articulates a desire for having a mixed age neighbourhood:

> *"I would like to have more children nearby… families. You don't want to go around looking at other old people. It's nice to get around with the old people and maybe reminisce about the olden days, but you need younger people and children who are young enough to be uninhibited and remind you of what you were like once. At the church we have a number of young children and I can pick out one or two that I can identify myself with and others that I can identify with the friends I had at that age."*
>
> *- Harry, 86, single-family detached home*

This desire for intergenerational connection and engagement in place was often described in relation to long-term care homes, retirement homes, and other communities that exclusively house older people. These contrasts raise important considerations pertaining to the desirability and suitability of housing promoted for older people and how the makeup of these residential options may contribute to risk of isolation. For example,

Karmen, a woman living alone in a townhouse for over 30 years, described a strong disinterest in living solely with other older people:

> *"[I want] to have children around. I hate the thought of no children around…I think that a mix of generations would be [better]… because we can learn from one another. When they first started building adult-only retirement homes, I started thinking, "what's all this about? This isn't what life is about". So that would be probably my number one suggestion: a neighbourhood with people of all ages." - Karmen, 93, townhouse complex*

Likewise, Mitch describes the village where his parents resided during their retirement and how this re-affirmed his preference to live in a community with families and children:

> *"My parents retired in a senior's village. We used to call it "God's waiting room". I would die in a place like that. Those places are like a vision out of Dante's Inferno. I would never want to live there… but instead in a village with young families, children…that would be a huge social benefit."*
>
> *– Mitch, 77, single-family detached home*

Participants in all neighbourhood and housing types described a strong desire to avoid age-segregated neighbourhoods and living arrangements while simultaneously describing perceived social benefits of living with children and families in their immediate neighbourhoods. This theme underscores the importance of the social and demographic makeup of neighbourhoods, and the ways in which a diverse mix of ages within a local community could potentially enhance the social environment for older people who live on their own.

This theme, in addition to '*Invisibility and Vulnerability'*, suggests a need to revisit taken-for-granted assumptions about where older people should live, and with whom. Age-segregated housing or neighbourhoods did not appeal to any of the participants in this study and were in fact described by some as being potential barriers to healthy social lives. Yet, it remains true that most retirement homes and villages are purpose-built to exclusively house older people. In taking a critical point of view, Smith (2009) states that promoting the segregation of older people into communities exclusively designed for older people calls into question how and to what extent society values older people and their social participation. Portacolone and Halpern (2016) also highlight important ethical concerns related to the increasing push towards age-segregated living, while others have found that the purported benefits of living in retirement communities may not always live up to expectations (Nielson, Wiles, & Anderson, 2019). The participants in this study largely felt that the concept of age-segregation was a flawed concept, and one that would lead to loneliness as opposed to connection. While it is clear that age-segregated living is beneficial and even desirable for some, this theme suggests that for others it may contribute to risk of isolation.

DISCUSSION

Social isolation is a harmful and potentially deadly social outcome for many older people. Living alone in later life is considered by many to be one of the top predictors of experiencing social isolation in later life although many older people living alone continue to maintain richly connected social lives (Wenger et al., 1996). Existing research has linked many risk factors to social isolation among those who live alone, including but not limited to poor physical and mental health, particularly among certain subgroups of older people

(Smith & Victor, 2018). While these known risk factors have contributed greatly to the knowledge base, most recent discussions of risk for social isolation tend to focus on individual factors (Weldrick & Grenier, 2018). Factors tied to place often do not factor into these discussions and are consequently largely missing from conceptualizations of social isolation risk. Likewise, the overlap between social isolation and social *exclusion* is only beginning to be recognized within the literature on isolation risk and remains undertheorized. The results from the present study provide preliminary findings that contribute to both of these knowledge deficits.

Place-Based Factors and Risk of Isolation

By conducting in-depth, qualitative interviews, we gathered rich data on how older people living alone experience risk of social isolation in relation to place-based factors. These study findings have identified several place-based factors that may fit into the theoretical model of risk for social isolation, while also building upon existing literature. First, participants discussed the importance of a sense of community in their immediate residential environments and neighbourhoods. Most participants felt as though their neighbourhood, or residential building, did not possess or foster a sense of community. Second, participants described feeling invisible and/or vulnerable in their homes. With the exception of one participant, all felt as though they would have no way of indicating to their neighbours that they would need assistance in the event of a fall or emergency. This vulnerability may represent a form of risk. Third, participants discussed the importance of transportation in the maintenance of their social lives, indicating that infrastructure and other more tangible aspects of place may also play a role in creating and sustaining risk of social isolation. Fourth,

participants articulated protective social benefits experienced as a result of the accessible programs in their immediate environments. Lastly, most participants explicitly articulated a desire for intergenerational neighbourhoods, while simultaneously expressing concerns over age-segregated communities. These findings provide preliminary evidence that warrant further investigation to determine the extent to which they may contribute to and/or protect against social isolation.

The results from the present study can also be illuminated when examined in relation to place-based exclusion. Within their conceptualization of place-based exclusion, Walsh (2018) describes exclusion occurring in relation to "communities-in-place", and the local relational environment within the third dimension of place-based exclusion. Walsh (2018) states that older people may experience social exclusion in place as a result of changing relationships amongst neighbours and the disintegration of the "sense of community". Participants in this study expressed a lack of community within their neighbourhoods, and many identified this lack as a significant barrier to building connection with other people. Many participants also described barriers in their immediate residential environments that prevented neighbours from being able to support or "keep an eye" on one another. This, too, contributed to participants' feelings of risk and vulnerability. When examined from an exclusion lens, these insights point to broader exclusionary aspects of places as shaping, in part, the social lives of older people who live alone. Together, these themes justify a community-minded social exclusion lens when working on issues of isolation, as opposed to the individualized approach that can obscure and ignore the social conditions that may play a significant role in the experience of isolation (Weldrick & Grenier, 2018).

Findings from this study support a place-based exclusion lens as it relates to amenities and services accessible to older people. In the first dimension, Walsh describes exclusion "from or as a result of services located or delivered into place" (Walsh, 2018, p. 252). Unsurprisingly, participants felt strongly that their social lives hinged on infrastructure, amenities, and services within their immediate residential neighbourhoods. For some, transportation infrastructure that met their needs (i.e. public transportation options) was critical for connecting them with the broader community. For others, accessible programming close to home – or even within their building – served as a driver of social participation and inclusion. Existing work has established that accessible and affordable public transportation infrastructure is a key element of the local environment for many older people (Levasseur et al., 2015), particularly specialized public transport options for those with mobility concerns and/or physical disabilities (Alsnih & Hensher, 2003). Regardless of the type of service in question, it is clear that social participation for older people who live alone is influenced by the availability of amenities and services delivered in place. This overlap again supports the use of an exclusion lens when working to alleviate isolation in later life. Countless factors at the level of the residential environment and broader community can certainly impact the degree to which a person may experience risk of isolation. These types of factors fit squarely within the place-based exclusion lens, and may assist with our understanding of how, where, and why certain vulnerable older people may come to be isolated.

Place-based exclusion as a multi-dimensional concept can also inform the results of this study as they relate to power and policy. Within the fourth and fifth dimensions of their definition, Walsh (2018) describes the ways in which sociopolitical power structures and

place-based policies can generate exclusion. Through this lens we can see that older people are often excluded from decision-making processes at the municipal level, meaning that their voices, desires, and perspectives are not often taken into account when building local policy and making changes to local environments. Although many cities engage with older adults through mechanisms such as public meetings and advisory committees, the voices of the majority older citizens are not likely to be captured or considered when making decisions pertaining to infrastructure or policies that may greatly impact their lives. This is particularly frustrating given that existing research has identified several effective strategies for promoting the involvement of older people in policy and planning (Reed, Cook, Bolter, & Douglas, 2008).

As Walsh has stated, older people are often considered "marginal" to policy development (Walsh, 2018; Walsh et al., 2016), which can lead to tangible trickle-down effects. Participants in this study articulated barriers to social connection within their neighbourhoods, such as a lack of public spaces or low walkability. Others described unintended consequences of specific programs, such as the removal of door-to-door mail delivery. Overall, it must be acknowledged that if the voices of diverse older people continue to be excluded from relevant policy development, it is unlikely that their needs will be met when these policies are implemented. This finding, too, supports the application of an exclusion lens.

Together, these findings provide important preliminary data and a strong rationale for including both physical and non-physical place-based factors in social isolation research and prevention efforts.

Adapting the Model of Isolation Risk

Given the findings from this study and the relevant place-based factors that participants identified as contributing, either positively or negatively, to their risk of social isolation, we recommend a reconfiguration of the theoretical model of known risk factors (*Figure 1*). This adapted model of risk features five nested circles or layers, each representing a 'level' at which risk of social isolation may be experienced. At the centre of the innermost circle is the *Individual*, accounting for individual-level factors (e.g. personal health, comorbidities, personal income), which are often found at the centre of the social isolation literature. This 'level' also features two smaller circles that differentiate between demographic factors and other individual-level risks. These circles are intentionally overlapping, demonstrating that individual demographic characteristics (e.g. age) can intersect and interact with other individual factors (e.g. mental health). The second circle represents risk factors at the level of the *Immediate Residential Environment*. The results from this study indicate that place-based factors within the home and immediate environment (e.g. age-optimized home and building design) may contribute to risk of isolation and are therefore included in the theoretical model for further investigation. The third circle represents risks at the *Interpersonal* level (e.g. social network size, family connections), many of which are known and well-established in the literature. The fourth circle represents risks at the level of the *Community* (e.g. neighbourhood amenities, local infrastructure). Our findings build upon existing literature and provide evidence of critical social isolation risk factors existing at the neighbourhood/community level. The fifth and final circle represents *Societal / Structural* risks (e.g. systemic racism, exclusion relating to structural factors). The final component of the model is a bi-directional arrow representing *Policy*, accounting for the fact that policies

enacted by government at the local, provincial, and federal levels are in many ways cross-cutting and have the potential to interact with and/or create isolation risks at each level of the model.

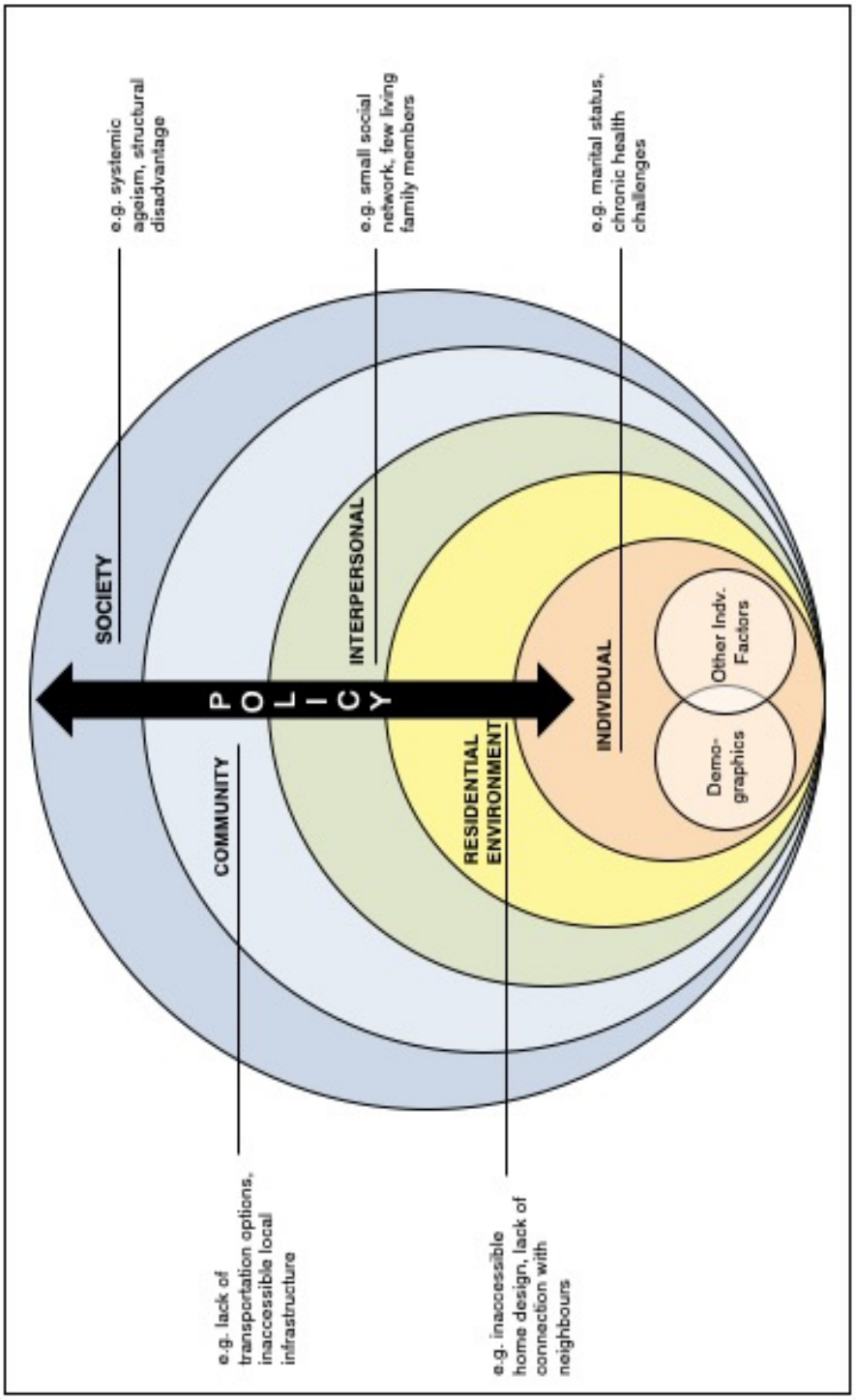

Figure 1. Levels of risk of social isolation in later life. Adaptation of theoretical model.

The proposed model serves several purposes. Firstly, this model serves to shift the dominant narratives around social isolation from an overly individualized approach to a more holistic and ecological approach. This approach takes into account risk factors tied to place that exist at multiple levels, while simultaneously recognizing that policies and political actions intersect with individuals and places at all levels. By conceptualizing and visualizing known risk factors in this way, social isolation in later life can be more clearly understood as being a product of community and societal problems that exclude some older people more than others. While the present study identified several preliminary themes and potential place-based risk factors, this model is intended to spur further research that considers the role of both *place* and broader forms of *exclusion*. This model will also assist in the planning and implementation of interventions. By framing and visualizing risk of isolation in terms of 'levels', our hope is that preventative programs and interventions may be targeted at specific levels. Altogether, our aim is for the proposed model to inspire future research, policy, and programming to address social isolation from this holistic and multi-level point of view.

Future Directions

The study findings suggest a need for several vital next steps in research, practice, and planning. In terms of research, we recommend the continued refinement of the theoretical model of known risk factors/predictors of late life social isolation. This study provides valuable contributions regarding how place may be implicated in the experience of social isolation. These findings can be used to further refine the known risk factors, particularly for sub-groups of those experiencing isolation. We recommend that future research building upon this study take a critical lens to better understand how place-based

factors and place-based exclusion may differentially impact older people with diverse gender identities and sexual orientations, and ethnocultural identities. Future theoretical and conceptual work should also build upon these findings by theorizing and investigating place-based *inclusion,* which has been under-theorised to date (Walsh, 2018). In terms of practice and planning, we recommend isolation prevention and intervention programs targeted at older people take into account the role of place-based factors. Built environment, connections with neighbours, local infrastructure and amenities are all place-based factors that are likely to impact the risk and experience of social isolation among older people who live alone.

APPENDIX A

Participant Interview Guide.

1. What does a typical week look like for you?
2. What types of social activities do you enjoy?
3. Who do you spend time with and when?
4. As someone who lives alone, what is it like to live in your neighbourhood?
5. In your opinion, what are the advantages and disadvantages to living in this area?
6. How satisfied are you with the social supports in your life? For example, social supports can include a spouse, child, friend, neighbour, etc.
7. Do you feel socially isolated? Why or why not?
8. Do you feel something is preventing you from seeing your family and friends more often? If so, what do you feel is preventing you?
9. If applicable, what do you feel would help you to better connect with your family, friends, and other people?
10. Are there things that help you to access programs and services in the local area? If so, what are these things?
11. In your opinion, what are some characteristics of a good neighbourhood for someone who lives alone?
12. Is there anything else you think I should know about your experiences?

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PAPER THREE:

FRIENDLY VISITING PROGRAMS FOR ISOLATED OLDER PEOPLE: A REALIST REVIEW OF WHAT WORKS, FOR WHOM, AND UNDER WHAT CONDITIONS

INTRODUCTION

Because the issue of late life social isolation remains at the forefront of concerns over the wellbeing of older people, myriad interventions have been developed and implemented in order to re-connect those who are isolated from the social world. There remains, however, a significant gap in the literature on social isolation interventions, regarding best practices, and a great deal of disagreement within the literature regarding how it should be identified, prevented, and addressed (Cattan, White, Bond, & Learmouth, 2005; Findlay, 2003). Recent developments in the field have brought about great interest in particular aspects of interventions including social prescribing, assistive technology, and intergenerational components with studies identifying mixed success of forms of each of these (Poscia et al., 2018). Friendly visiting programs, often referred to as befriending schemes, have been a mainstay in the world of isolation and loneliness interventions, and have been implemented in countless contexts and with many populations. While many program developers and researchers alike agree that friendly visiting programs hold great potential to improve the lives of socially isolated older people, few research studies have been able to determine *why* and *how* these types of programs may be so successful (Andrews, Gavin, Begley, & Brodie, 2003).

This study contributes to the existing body of literature on friendly visiting programs by conducting a realist evaluation in order to determine *what works, for whom, and under what conditions* with respect to improving the lives of program clients and older people who are at-risk and/or socially isolated. Unlike other review methods (e.g. systematic reviews) that primarily focus on *whether or not* a given intervention is successful, realist syntheses are concerned with identifying the mechanisms and contextual factors underlying successful and non-successful interventions in order to better understand *why* and *how* an intervention may be successful or not, and with which populations (Pawson, 2002). By de-constructing a sample of friendly visiting programs intended to re-connect older people who are isolated or at-risk, this study reveals many of the central program components that enable success within this type of intervention. The hope is that realist insights can be applied to the refinement of existing friendly visiting programs and development of new ones in a variety of contexts.

The present paper outlines relevant background knowledge concerning social isolation in later life, in addition to the state of the evidence related to friendly visiting programs and isolation interventions more broadly. The realist review method is then outlined. The results of the realist review analysis are summarised in the form of mechanisms and contextual factors that appear to lead to the success of friendly visiting programs. Lastly, these mechanisms and contextual factors are used to sketch a working diagram of a friendly visiting program theory that can be taken up by scholars and revised as additional evidence comes to light as well as used in the aforementioned refinement and development of programs.

BACKGROUND

Growing numbers of older people worldwide are experiencing social isolation – a harmful social state characterised by few to no reliable social contacts and little social support (Hortulanus, Machielse, & Meeuwesen, 2006; Nicholson, 2012). However, it is not possible to determine precisely how many people may be isolated at one time due to the very nature of the problem, specifically in that isolated older people are typically hard-to-find, hard-to-reach, and often considered to be "hidden" (Chan, Yu, & Choi, 2017; Portacolone, Perissinotto, Yeh, & Greysen, 2018). Recent studies in the Anglo-American world estimate that as many as 30% of older adults may be at risk of isolation. In Canada, estimates of older adults at risk of social isolation vary between 12% and 30% (Gilmour & Ramage-Morin, 2020; Keefe, Andrew, Fancey, & Hall, 2006); 17% in the United States (Ortiz, 2011); and 20% in the United Kingdom (Victor, Scambler, Bond, & Bowling, 2000). These proportions are extremely troubling, especially given that experiencing social isolation in later life has been linked to numerous negative health and social effects including cardiovascular disease, depression, and cognitive impairment (Alspach, 2013; Nicholson, 2012; Shankar, McMunn, Banks, & Steptoe, 2011), and has been identified as a significant predictor of mortality in older people (Holt-Lunstad, Smith, & Layton, 2010). As a result of recent estimates on the prevalence of social isolation and a growing body of literature on its health and well-being consequences, several countries including Canada and the United Kingdom have identified the prevention and/or reduction of social isolation as a policy priority (Cattan, Kime, & Bagnall, 2011; Weldrick & Grenier, 2018).

To ameliorate the problem and increase connection among isolated seniors, many group interventions have been developed and implemented in a wide array of contexts.

These interventions have come in many forms with varying degrees of success over recent decades. Many interventions have incorporated forms of information technology (e.g. computers, tablets) (Bradley & Poppen, 2003; Breck, Dennis, & Leedahl, 2018) with the hope of encouraging on-line communication. Otherwise, intergenerational engagement programs have been developed with the intent of building up the social networks of isolated older people by connecting them with younger people in various settings, such as in the cases of technology training programs and choirs (Harris & Caporella, 2014; Lee & Kim, 2019). Other group-based programs have come in the form of community arts programs (Teater & Baldwin, 2014), museum-based programs (Thomson, Lockyer, Camic, & Chatterjee, 2018), and physical activity programs (Chan et al., 2017).

Many program developers and community service agencies have instead opted for non-group one-to-one based programs. These programs have included interventions such as gatekeeping/referral programs (Bartsch, Rodgers, & Strong, 2013) and virtual learning programs (Botner, 2018) amongst others. To date, both group-based and one-to-one interventions have had mixed results, with some studies reporting successful reduction in social isolation, and others reporting no such change (Cattan et al., 2005). To muddy the waters further, systematic reviews and meta-analyses have also reported conflicting findings. For example, one review found that one-to-one-based programs have more commonly shown significant effects on isolation (Poscia et al., 2018), whereas others have reported that group-based programs tend to be more successful (Cattan et al., 2005; Dickens, Richards, Greaves, & Campbell, 2011). With respect to other defining features, a systematic review by Hawton and colleagues (2011) found that interventions with an explicitly articulated theoretical basis were more likely to result in successful outcomes. On the other hand, they

also found that interventions were less likely to be successful if they exclusively targeted socially isolated older people as opposed to opening up the intervention to all older people regardless of isolation (Hawton et al., 2011). Ultimately, no single isolation intervention has garnered enough evidence to be considered more effective than all others.

Overall, many questions remain with regard to social isolation interventions and how they might be successful for older people including what works, for whom, how, and under what conditions. Indeed, further research and refined evaluations are needed in order to draw meaningful conclusions for future program development (Cattan et al., 2005; Dickens et al., 2011; Findlay, 2003) to determine the relative benefits of both one-to-one and group-based interventions for different sub-groups of older people. These could include those recently widowed, those of particular ethnicities and cultures, those with particular physical conditions or mental illnesses, those of particular ages, etc. (Kobayashi, Cloutier-Fisher, & Roth, 2009).

One model of one-to-one social isolation intervention which has been implemented across many contexts and locations is the friendly visiting model. In a typical friendly visiting program, socially isolated older people are visited in their homes by volunteers. These volunteers are usually facilitated by a host organization, such as a non-profit group, seniors' service agency, or other community group. Many programs that fit into this category involve weekly or biweekly visits by the volunteer and operate under the assumption that the volunteer may be able to become a friend or confidante, thereby filling a void in the isolated client's social network or assist in development of new social connections (Andrews et al., 2003; Calsyn, Munson, Peaco, Kupferberg, & Jackson, 1984; Korte & Gupta, 1991). While these programs have been applied across many countries over the past several decades, there

remains a dearth of knowledge with respect to how, when, and why these programs may actually reduce social isolation in later life. Early studies purported that friendly visiting programs had not been sufficiently evaluated (Bogat & Jason, 1983), and that many studies were too flawed methodologically to draw credible conclusions (Calsyn et al., 1984). Others have stated an explicit need for studies of friendly visiting programs in non-Western contexts (Cheung & Ngan, 2000), and scholars have begun to address this need in recent years (e.g. Andrews et al., 2003; Wiles et al., 2019).

Additional evidence of underlying mechanisms and important contextual factors is needed to support the development of effective friendly visiting programs, especially given the immense potential they hold. Unlike many other types of isolation interventions, friendly visiting schemes can be easily modified to meet the needs of the individual clients. For example, they may be structured or unstructured, and can involve intergenerational components (Calsyn et al., 1984). They can be made available to both community-dwelling older people and those living in long-term care or nursing institutions (Damianakis, Wagner, Bernstein, & Marziali, 2007). Friendly visiting programs are also widely considered to be cost-effective, and may even be delivered over the phone when in-person visiting is not possible (Calsyn et al., 1984; Cattan et al., 2011), meaning that friendly visits can be successfully implemented in rural and/or remote areas where other forms of engagement may be less accessible. In fact, the widespread popularity of friendly visiting programs is also promising in and of itself. Existing programs could, in theory, adjust operations according to emerging evidence in order to better serve participants. In other words, research on friendly visiting programs has the potential to create a sizable impact due to the widespread popularity of this type of approach.

In this paper, we seek to better understand the potential of friendly visiting interventions using a method of knowledge synthesis known as the realist synthesis. Realist syntheses are somewhat unique in that they are concerned with theory development and refinement (Rycroft-Malone et al., 2012). Unlike systematic reviews, they are not concerned with whether or not a given intervention *works*, but rather *how* it works and, for *whom,* and under what *circumstances* (Pawson, 2002; Wong, Greenhalgh, Westhorp, Buckingham, & Pawson, 2013). Importantly, realist reviews are "grounded in a realist philosophy of science which holds that it is possible to discern generative mechanisms within the social systems in which they operate" (Pearson et al., 2015). Realist reviews take the perspective that programs/interventions and policies *are* theories and recognize that theories only work within certain contexts. It is not programs that "work" but rather the mechanisms that lead to change, and these mechanisms are only "triggered" within certain circumstances (i.e. contexts).

The realist synthesis methodology is considered by many to be especially helpful for reviewing and synthesizing knowledge from complex social interventions (Rycroft-Malone et al., 2012; Wong, Greenhalgh, & Pawson, 2010). Typically, complex interventions exist within open systems (i.e. not controlled experimental settings or limited in their components), have varying degrees of success depending on the context, but rely on mechanisms which may "misfire" at any point (Pawson, 2002, p. 342). According to this definition, all social isolation interventions would fit in the category of "complex intervention". In fact, recent work has called for a realist review to investigate social isolation and loneliness interventions among older people because of the complex nature of such interventions and the need to more clearly conceptualize *how* and *why* such interventions may bring about successful outcomes

(Fakoya, McCorry, & Donnelly, 2020). The present review seeks to answer this call by conducting a realist synthesis of friendly visiting programs for socially isolated older people. The overall purpose of this synthesis is to take steps towards filling several gaps in the social isolation literature while simultaneously identifying how friendly visiting programs work, for whom, and in what circumstances. As noted, this synthesis will provide the foundation for a friendly visiting program theory.

METHODS

This realist synthesis followed the iterative seven-step process outlined by Pawson and colleagues (2005). The first step involves clarifying the focus and scope of the study, including the research questions. The second step entails searching for relevant evidence to address the scope and research question. This is a crucial step in the process and differs significantly from the literature searching process in other types of reviews (e.g. systematic reviews) in that it is non-linear and often continues concurrently with later steps (Pawson, 2002; Pawson, Greenhalgh, Harvey, & Walshe, 2004). The third step involves appraising studies for relevance and rigour to determine which pieces of evidence are included in the review. Notably, steps four and five consist of extracting and synthesizing evidence from studies deemed relevant in order to identify potential program theories and mechanisms. Finally, steps six and seven involve drawing conclusions, making recommendations, and disseminating those recommendations with the ultimate goal of eventually influencing the development of new interventions and/or refinement of existing interventions (Pawson et al., 2004). These steps are discussed in greater detail in the following sections.

Clarify the scope of the review

In order to address the topic at hand, the following research questions were used to guide the realist review: 1) How are friendly visiting programs successful (e.g. in terms of the strength of their theoretical foundations)?; 2) For whom are friendly visiting interventions effective (e.g. demographics)?; and 3) Under what conditions are friendly visiting interventions successful (e.g. program design, context, location)?

For the purpose of this review, interventions or programs were deemed "successful" based on their reported outcomes. Definitions of "success" varied quite significantly depending on the study design, population, outcome measures, and other contextual factors. For example, one study measured life satisfaction as a primary outcome measure (Calsyn et al., 1984), whereas another study used qualitative interviews and a combination of standardized scales measuring isolation, loneliness, and life satisfaction to determine the impact of the program (Roberts & Windle, 2020). This is to be expected, as realist reviews compile a wide variety of evaluation and study designs. As methodologies differed across studies, so too did the accompanying evidence. Qualitative, quantitative, and mixed-method studies are included in the sample, meaning that not all evidence came in the form of objective measurements or validated scales or otherwise from interviews/narratives.

Search for relevant evidence

A search strategy was developed and used to conduct an initial search for relevant intervention studies. Six search engines and databases were searched, including: AgeLine, Social Work Abstracts, Social Science Abstracts, Medline, PsychInfo, and Web of Science. Search terms differed slightly across the databases as there are differences is how articles are

indexed, and under what terms, but all searches included a combination of terms relating to older people, social isolation, and interventions. Examples of relevant search terms are included in *Table 1*.

Construct	**Terms**
Older adults	Late* life Old* person* Old* people Elder* Old* adult* Senior* Retiree* Pensioner*
Social Isolation	(Social* or perc* or feel*) AND Isol*
Intervention	Interven* Program* Health promot* Evaluat* Reduc*

Table 1. Example of search terms used.

Inclusion/Exclusion Criteria.

Studies were eligible for inclusion if they met the following criteria:

1) The study is pertaining to older people (as defined in the study)

2) The program is intended to reduce or alleviate social isolation

3) The study included/reported some form of outcome measure(s)

4) The program involved friendly visiting and/or befriending

5) The study is published in English

Study appraisal

When the final search of the literature had been conducted and initial screening was complete, relevant full texts were appraised. Once again, this process differs from the process of quality appraisal in other types of reviews that may utilize a 'hierarchy' of evidence. In realist reviews, studies are judged based on relevance and rigour (Pawson et al., 2004). In terms of relevance, studies are judged on whether they address a particular program theory, not whether they address a particular topic. This is a critical distinction. With regards to rigour, studies are judged on whether the inference(s) made by the original researchers are able to carry enough weight "to make a methodologically credible contribution" (Pawson et al., 2005, p. 30). This process is not used to determine whether a given study is methodologically flawless, but rather whether the study is appropriate for inclusion in a particular review. In other words, the reviewer assesses a study based on "fitness for purpose" (Pawson et al., 2005). In doing so, the reviewer ensures that only relevant intervention studies that speak to the review at hand are included. These two appraisal criteria guide the process of determining which evidence is analyzed.

Seven studies were included in the final analysis following the study appraisal phase (Figure 1). It should also be noted that many of the full texts that were excluded were removed for lack of detail on program components or execution. This obstacle is unpacked in the *Discussion*.

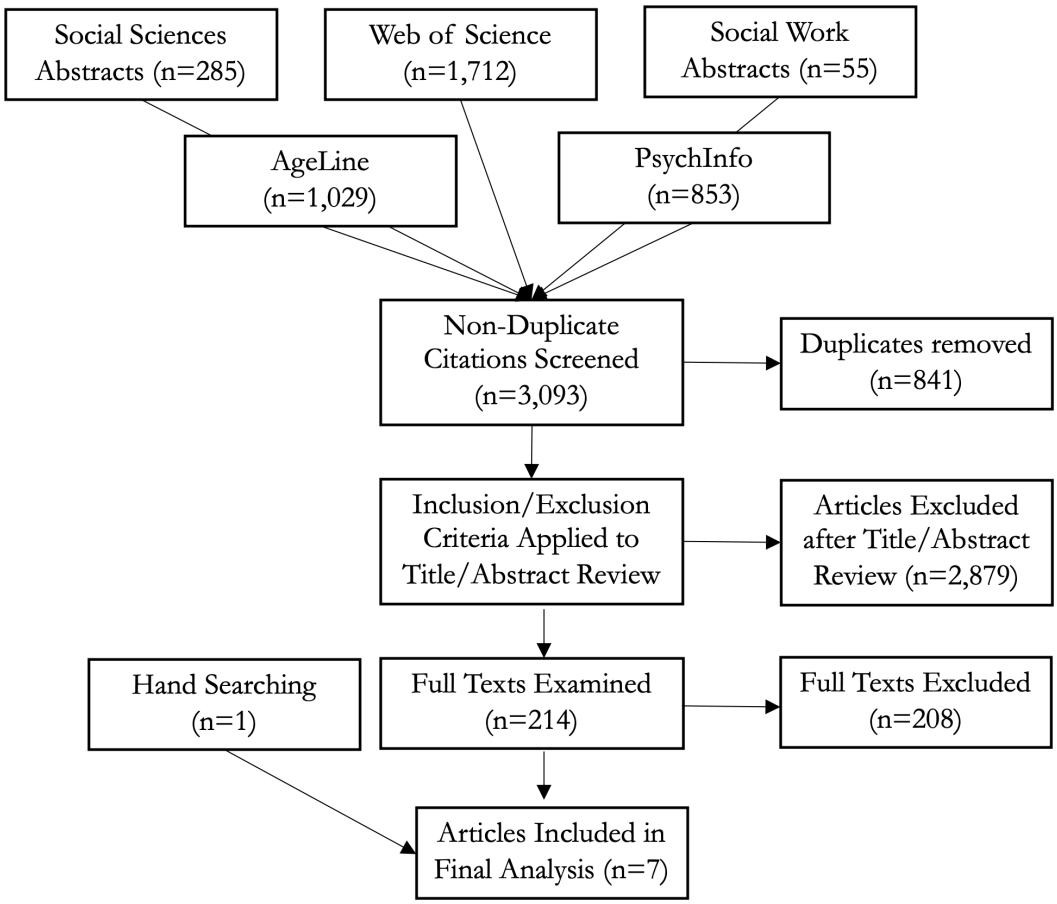

Figure 1. PRISMA Flow Diagram.

Data extraction

The first phase of data extraction and analysis involved scanning articles/reports for *demi-regularities*. In realist syntheses, demi-regularities are prominent themes and/or "patterns of outcomes" (Wong et al., 2013, p. 10). The goal of the realist review is not to explain every aspect of the moving parts and interacting contexts within an intervention, but rather to identify these patterns and gain insights into the inner workings of a given family of interventions. For this first phase of the analysis, key information was not always taken from the actual results of a given program or intervention, but rather from their respective

methods and discussion sections. Key descriptive information regarding program implementation, barriers to success, facilitators of success, and authors' reflections on the process of carrying out the intervention or program tended to occur within the methods and discussion sections of most reports, rather than in the results sections of the papers included. This strategy of sifting helpful bits of knowledge from descriptive information is a tactic used by many scholars who conduct realist syntheses and is a distinguishing feature of this type of review (Greenhalgh, Macfarlane, Steed, & Walton, 2016; Pawson, 2002).

Data synthesis

Information extracted from programs was scrutinized and compiled during the data synthesis phase, although data extraction and data synthesis are often concurrent. The process of data synthesis involves piecing together demi-regularities with the intent of forming a coherent theory of how they may fit together. In this case, the goal of data synthesis is to develop a middle-range theory about how (i.e. through what mechanism(s)) friendly visiting programs have the potential to reduce social isolation among older people. The goal of this middle-range theory is not to produce a final, rigid understanding of how friendly visiting works, but rather to construct a theory that can be tested, re-tested, and refined through further research and program development. It should be noted that within the scope of this realist synthesis, a comprehensive analysis of all befriending programs was not undertaken. Rather, a detailed and *realist* look at a sample of studies, with supporting evidence pulled in throughout, provided a foundation on which to build a preliminary middle-range theory that can be further tested and refined.

Recommend and disseminate

The final two steps in this realist review involved making recommendations and disseminating findings with the intention of influencing policy and/or existing interventions (Pawson et al., 2004). Within the context of this paper, observations and recommendations for future research and/or program development are provided in the discussion section. These recommendations are based on the findings of this realist review and provide practical suggestions according to the program theory developed.

RESULTS

Included Studies

Seven studies were included in the final analysis. A brief overview of the included studies is provided in *Table 2*.

Authors & Year	**Program Name (if applicable)**	**Country**	**Program Description**
Andrews, Gavin, Begley, & Brodie (2003)	*Age Concern Buckinghamshire*	United Kingdom	- one-to-one pairing of volunteer and client - one in-person visit per week, indefinitely - aimed at improving quality of life and reducing isolation through visits that emphasize undivided attention and listening
Bogat & Jason (1983)	*Friendly Visitor Program*	United States of America	- volunteers assigned to two clients for independent visits - one visit per week for three months - clients assigned to one of two conditions: "visit only" or visits with an emphasis on network building
Calsyn, Munson, Peaco, Kupferberg, & Jackson (1984)	N/A	United States of America	- volunteers assigned to two clients for independent visits - one visit per week for 12 weeks

			- clients assigned to one of two conditions: personal history approach or companionship approach
Cattan, Kime, & Bagnall (2011)	*Call in Time*	United Kingdom	- exclusively phone-based friendly visits delivered across multiple regions - volunteers responsible for calling multiple clients (varied by region) - one friendly visit phone call per client per week on an ongoing basis
Cheung & Ngan (2000)	N/A	China	- in-person friendly visit program delivered across multiple regions - clients visited by pairs or teams of volunteers - infrequent visits (<1 /month), varied by individual client - structured volunteer training
Korte & Gupta (1991)	*Sunshine Visitor Program*	United States of America	- one-to-one pairing of volunteer and client - one in-person visit per week for six months - clients assigned to one of two conditions: "regular" friendly visits or network-building visits
Roberts & Windle (2020)	*Cadwyn Môn*	Wales	- one-to-one pairing of volunteer and client - one in-person visit per week for 10-15 weeks - aimed at building companionship while also setting individualized goals for connection to existing social groups

Table 2. Brief overview of friendly visiting programs included in analysis.

Research Question 1: How are friendly visiting programs successful?

The first demi-regularity identified in the sample of studies pertaining to how friendly visiting programs may function successfully was related to reciprocity between clients and volunteers. In this regard many program evaluators identified the importance of reciprocity in the development of a mutual relationship between the volunteer and client. This reciprocal, two-way dynamic was described in several studies as being a meaningful and important characteristic of the newly formed relationship. For example, Andrews and colleagues stated that "reciprocity in the befriending relationship was regarded by clients as important and they needed to feel that both they themselves and their befrienders were getting 'something' out of the relationship" (2003, p. 358). Additionally, Cattan and colleagues (2011) reported that participants in the *Call in Time* program experienced benefits stemming from the fact that their relationship with the volunteer was not one-sided. Participants articulated that the befriending program enabled them to engage in friendly, two-way conversations about everyday life, whereas "doctors or social workers dealt with problems" (Cattan et al., 2011, p. 203).

Other program evaluations, including the one reported by Calsyn and colleagues (1984), also found reciprocity to be a key factor in the success of the client-volunteer relationship. The authors of this study report the findings of two conditions: one "traditional" friendly visiting program, and one which involved a personal history component. Reciprocity was identified as a key determinant of success in both conditions. Calsyn and co-authors stated quite plainly that from their perspective "clients in both conditions had more positive outcomes the more reciprocal the relationship was between

client and visitor", and that some clients went out of their way to reciprocate by giving their volunteers a homemade pie or other token of appreciation (Calsyn et al., 1984, p. 38). In this regard, truly reciprocal relationships between clients and volunteers may mirror the benefits gained through existing friendships and relationships outside of arranged programs. The development of a meaningful and reciprocal friendship between the volunteer and client may set friendly visiting programs apart from other forms of arranged and/or formal social support.

The second demi-regularity identified pertaining to how friendly visiting programs may successfully improve the social well-being of isolated older people was connected to knowledge of local services and amenities. Several studies described an improvement in clients' knowledge of services and programs accessible to them in their respective communities over the course of their involvement with the friendly visiting program. For example, Roberts and Windle stated that the participants in their program "were often not aware of groups and clubs in their communities, and the majority report having joined groups or classes during their time with the volunteer" (Roberts & Windle, 2020, p. 159). Likewise, Cheung and Ngan (2000) intentionally measured "knowledge of services" as an outcome measure and found that participants in the program reported a significantly greater knowledge of community services and amenities six months after completing the initial survey.

Although on the surface this finding may seem slightly removed from the end goal of re-connecting socially isolated older people, the implications of increased awareness of services are likely far-reaching. A study of adults aged 50 and over found that many older people are not aware of community support services available to them (Denton et al., 2008).

Furthermore, older people experiencing social exclusion are often marginalized from the access of local services (Scharf, Phillipson, & Smith, 2004). Connecting isolated older people with supportive volunteers who are knowledgeable of local services may therefore represents an important first step in re-engaging them to supports in their communities. Indeed, the benefits that may be derived here can go a step further if and when the host organization has a direct connection to a service agency or program which may provide these services and supports.

Research Question 2: For whom are friendly visiting interventions effective?

The gender distribution of sample interventions arose as the most noteworthy demi-regularity related to the second research question. Most studies in the sample described a mix of both male and female participants but tended to have a greater proportion of female participants. These proportions ranged quite significantly. For example, Cheung and Ngan (2000) reported that 65% of their participants were women, whereas Korte and Gupta (1991) reported that 80% of their participants were female. Likewise, Andrews and colleagues (2003) report that all but three of the participants interviewed were women, which was representative of the 150 service users enrolled in the befriending program. Other programs, including the *Call in Time* program (Cattan et al., 2011) and the *Friendly Visitor Program* (Bogat & Jason, 1983) did not provide gender distributions.

The presence of a female-skewed gender distribution is both expected, and yet illuminating with respect to the success of the friendly visiting programs. As a demi-regularity, this finding suggests that friendly visiting programs have a real potential to improve social connection among older women in particular, given the success of the

programs included. In terms of participation, previous studies have shown that older women are more likely to participate in social programs and services (Marhánková, 2014). Additionally, in many cases women are found to be the social gatekeepers in long-term heterosexual relationships, often leaving the male partner with few quality social contacts following divorce or widowing (Wister & Strain, 1986). In other words, women may be more likely to join or attend social programming, but older men may be in greater need of such programming, particularly as social isolation among older men is on the rise (Beach & Bamford, 2014).

The second demi-regularity revealed in the analysis pertaining to participant characteristics related to "homebound" or "housebound" participants. Several studies described participants as being housebound, meaning that they were largely confined to their homes with limited time spent out in the community or beyond. Cattan and coauthors stated that participants in the *Call in Time* program "were often housebound, had restricted mobility, lived alone and were reliant on external agencies for their health and social care needs" (Cattan et al., 2011, p. 200). Similarly, Cheung and Ngan (2000) describe a process through which a government department prioritized vulnerable older people living in public housing for participation in the friendly visiting program. Based on the prioritization factors, older people with significant mobility concerns and/or those who were bed-ridden were enrolled prior to those without such concerns (Cheung & Ngan, 2000). This finding is promising and suggests that friendly visiting programs have the potential to improve the social lives of isolated and/or at-risk and homebound older people, who may be especially susceptible to experiencing long-term isolation.

Research Question 3: Under what conditions are friendly visiting interventions successful?

The analysis revealed several demi-regularities regarding the intervention conditions that led to successful outcomes for program participants/clients. The most significant demi-regularity addressing this research question was client and volunteer matching within the friendly visiting programs. Most studies clearly articulated the importance of appropriately matching clients and visitors in order to encourage the formation of a strong and supportive relationship. For example, Roberts and Windle (2020) states that one of the keys to the success of the *Cadwyn Môn* program was the care taken in putting together compatible client-volunteer matches. They go on to say that the interviews with clients reflected the importance of the matches. Likewise, Andrews and co-authors identified in their qualitative interview data that "good matching appeared to be a prerequisite for the development of an enduring relationship" (Andrews et al., 2003, p. 356). In terms of program conditions, it appears that forming compatible matches is a cornerstone to success in friendly visiting interventions.

The demi-regularity of client and volunteer matching is a helpful finding that may serve to guide program development in the future, and yet it is not clear how exactly good matches may be formed, and what characteristics may be most beneficial to use as the foundation for the matching. Korte and Gupta (1991) described a process of volunteer and client matching in order to meet the needs of both parties. They stated that matches were determined "with consideration given to the perceived compatibility between the two individuals (e.g. gender, personality, background) and any personal requests that either party had made" (Korte & Gupta, 1991, p. 406). They also stated that matches were "cleared" with both the volunteer and the client prior to the first visit. It is not clear what this entailed, but

the presumed goal was to assure both parties were satisfied with the pairing. Calsyn and colleagues also reported attempts "to match clients and visitors on the basis of expressed interest and other preferences as well as demographic characteristics" but that they did not have a systematic method for doing so (Calsyn et al., 1984, p. 39). Overall, it became clear that host organizations could encourage the success of the friendly visiting program by forming compatible matches, but it remains unclear what criteria may be best used for this purpose.

Another notable demi-regularity that became apparent among the included studies was the role of volunteer training in the success of the friendly visiting programs. Most programs in the sample included a description of training provided to the volunteers involved with the program. Although training content varied across programs, most included some form of communication skills training, and education on local services and amenities for older people. Cheung and Ngan emphasized the significance of thorough volunteer training and described the training process as including eight distinct topics such as communication skills and knowledge of local services for older people (Cheung & Ngan, 2000). Calsyn and colleagues report that in their study, volunteers were trained during three four-hour sessions that included topics such as aging, death, communication skills, and active listening, among others (Calsyn et al., 1984). By training volunteers, host organizations are able to extend their influence and support to the isolated individual through the volunteer. In this way, volunteers can perhaps be seen as paraprofessionals delivering indirect or mediated formal support to the isolated clients.

In some cases, the volunteer training was quite thorough. Korte and Gupta (1991) specified that volunteers in both their regular friendly visiting and their "network building"

conditions received several hours of training. Volunteers in the friendly visiting condition received four hours of training, whereas the volunteers in the network building condition received eight hours. Both groups of volunteers received four hours of training on aging, skills needed for friendly visiting, and community services for older people. The volunteers in the network building condition then received an additional four hours of training on specific aspects of social networks and network deficiencies that they would be attempting to improve upon during their time as visitors (Korte & Gupta, 1991). It is not clear whether the additional four hours of training for the volunteers in the network building condition led to any additional benefits. However, this is a distinction that could be further explored in future programs and reviews.

The final demi-regularity identified pertaining to program conditions relates to ongoing support for volunteers throughout the duration of the friendly visiting program. Most studies in the sample included a description of some form of ongoing volunteer support provided by host organizations. This support varied across programs but appears to be an important contextual factor in shaping the success of these befriending programs. For example, Bogat and Jason stated that volunteers in the *Friendly Visitor Program* participated in weekly supervision sessions with the host organization in order to "generate resources, strategies, and support" for the volunteers to pass on to their respective clients (1983, p. 271). Not only did these supervision sessions ensure that volunteers felt equipped to support their isolated client, they also enabled the organization to indirectly provide additional individualized support to the clients.

Calsyn and coauthors (1984) provided a helpful and detailed look into the supervision process within their program. Supervision meetings, which included between six

and eight volunteers and one of the authors, provided opportunity for the volunteers to discuss each of their clients individually. Through this process, volunteers and organizers would provide "suggestions regarding activities to do on the visit and/or agencies which might provide needed services" (Calsyn et al., 1984, p. 34). Once again, this type of supervision was a means through which the program organizers may have been able to influence the success of the program. Without some form of supervision and/or check-in procedure volunteers may be left to rely upon their existing knowledge and skills in order to improve the social well-being of their paired client. Future friendly visiting programs, and indeed other social programs which rely upon volunteers, are encouraged to build-in ongoing supervision or support where feasible.

Mechanisms

Based on the analysis of demi-regularities presented, we identified three main mechanisms through which friendly visiting programs/befriending schemes appear to achieve the goal of reducing social isolation. Using these theoretical mechanisms, we have assembled a middle-range theory (Pawson, 2002) to illustrate how these mechanisms may fit together, and what contexts may "trigger" them (see *Figure 2).*

Mechanism #1) Formation of a new and meaningful relationship

Most studies in the sample described the formation of a new relationship between client and volunteer visitor and emphasized the importance of this relationship being as much like a "real" friendship as possible within the confines of an arranged friendly visiting scheme. Based on the evidence, it seems likely that socially isolated older people are more

likely to experience positive results in a friendly visiting program if they are able to form a new and meaningful friendship with the volunteer. Reciprocity, reliability, and authenticity were all key elements in successful formation of client-volunteer relationships across the programs included. Together these findings suggest that clients may experience social benefits from friendly visiting that they may not experience in other types of relationships with service providers, health professionals, etc. In other words, the formation of a new, authentic relationship serves as a mechanism through which social isolation may be remedied within a friendly visiting program.

Our sample of studies identified several vital contextual factors that influence that successful triggering of this mechanism. The most critical contextual factor appears to be thoughtful matching of clients and volunteer visitors. The programs included in our sample provided varying degrees of detail pertaining to how matches were determined, although most studies explicitly stated that matching was an important determinant of program success. Likewise, volunteer training in many programs involved some aspect of communication and/or active listening skills training. This training appears to have greatly supported the development of authentic relationships between volunteers and isolated clients. In some cases, the ongoing support of volunteers, such as through supervision and/or check-in meetings, may have also provided volunteers with helpful feedback regarding their new relationship with the client. These contextual factors facilitate the building of a supportive relationship with a new social contact, previously unknown to the isolated client. When this newly formed relationship feels authentic, the isolated client may experience greater benefits.

Mechanism #2) Provision of informal social support

In successful programs, it appears that the formation of a new and authentic relationship with the volunteer enables the volunteer visitor to provide informal support to the client much like a friend or family member would. Informal social support is conceptualized here as the social and personal supports received from friends, kin, neighbours, and other network members that exist outside of the formal social support system (e.g. public assistance) (Cantor, 1979), and includes support in the form of socialization, personal assistance, and advice among many others. As volunteers and clients meet during the weekly or biweekly visiting sessions, isolated older people build up a new and trusting relationship (Mechanism #1). It is once this relationship is built that the isolated individual may begin to reap the benefits of the informal support, which is crucial for retaining a sense of well-being in later life (Morano & Morano, 2006). Engaging in everyday activities, discussing mutual interests and sharing stories are all examples of activities undertaken by volunteers which may provide informal support and contribute to the reduction of social isolation and associated experiences (e.g. loneliness). Although the benefits of informal support may be less obvious and more difficult to measure when compared to formal support, participants across the sample programs described multiple social benefits experienced as a result of the friendly visits. This informal support appears to act as a mechanism through which the isolated older person may receive assistance with aspects of their social network and/or personal life. As the volunteer and client meet repeatedly throughout the duration of the program, it is likely that this mechanism is triggered repeatedly and/or in an ongoing fashion.

Mechanism #3) Provision of mediated formal support

In addition to informal support, programs in this sample suggest that volunteers are in some cases able to successfully provide mediated formal support. Whereas informal support may take the form of casual advice, active listening, and emotional connection, mediated formal support involves indirect assistance from a community organization or host agency through a third party (i.e. volunteer). Most programs included in the sample described an increase in knowledge of local amenities and services among their isolated clients. In some cases, friendly visitors accompanied clients to community groups and/or programs based on the guidance of the host organization. Together, these findings provide evidence for the role of the community agencies in these friendly visiting programs. Although the volunteer is the primary, if not only, individual directly interacting with the isolated client, it is clear that the host organization is playing a critical role behind the scenes. This mediated formal support is the third mechanism is the proposed program theory.

The sample of studies identified several key contextual factors that appear to influence the triggering of this mechanism. This is articulated in part by Cheung and Ngan (2000), who describe the volunteers in their program as being mediators of the host organization. As mentioned, many programs included in the sample described volunteer training that typically touched on communication and listening skills. Several studies, however, described training modules specifically pertaining to seniors' services and programming in their respective areas. This training appears to be crucial, particularly as many older people are not aware of the services available to them in their local area (Denton et al., 2008). In some instances, programs in the study provided supervision/check-in meetings for volunteers where clients' needs could be discussed with the program organizers

and other volunteers. By enabling volunteers to seek individualized guidance and advice regarding recommended services and supports for their clients, volunteers are then able to direct this support towards the isolated individual. This, too, appears to be an important contextual factor which may support the triggering of this mechanism.

Program Theory

This theory depicts three primary mechanisms that appear to contribute to the success of friendly visiting programs aimed at ameliorating social isolation among older people. The three mechanisms are depicted by the white nodes. Important contextual factors that are theorized to influence these mechanisms are depicted in the blue nodes. As previously described, these are contextual factors are the elements thought to determine in part whether or not the mechanisms are "triggered". The three theorized mechanisms (and their accompanying contextual factors) are intentionally depicted in a sequential order. We have theorized that the development of a new and meaningful relationship between the program participant and volunteer is one mechanism, and the provision of support (formal and informal) are conceptualized as separate mechanisms that repeatedly trigger (or fail to trigger) throughout the duration of the friendly visiting scheme. Based on the evidence gathered in this review, we have theorized that it is the combination of these mechanisms, when triggered successfully under the influence of certain contextual factors, that have the potential to explain how and why friendly visiting programs can lead to such positive outcomes among certain participants.

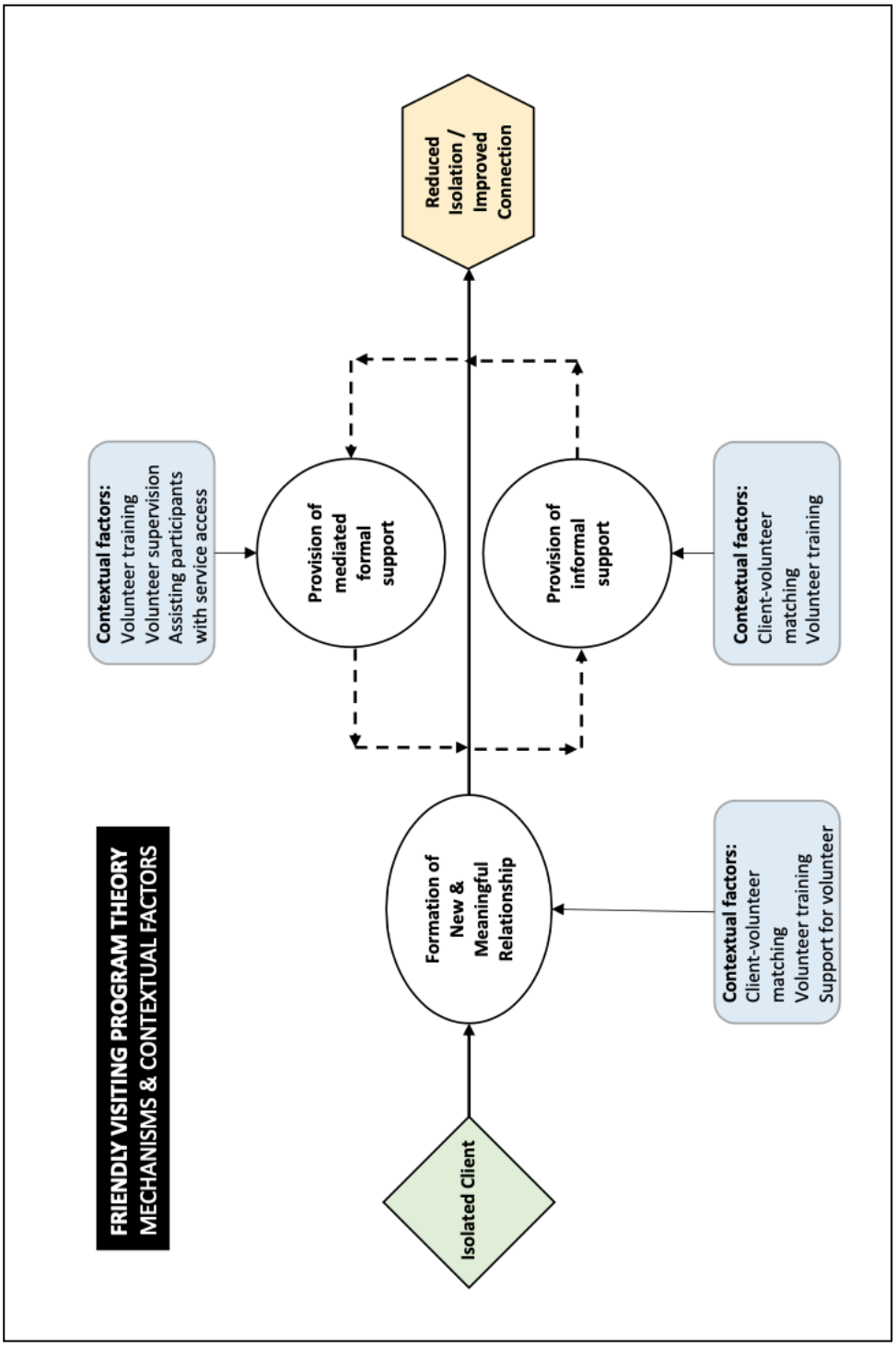

Figure 2. Friendly visiting program theory.

DISCUSSION

Unlike other types of reviews that may focus on *if* programs work, realist reviews concentrate on *how*, *for whom*, and *under what circumstances* programs work. The results of the realist review presented here provide a starting point for the development of effective friendly visiting programs aimed at reducing social isolation among older people by illuminating mechanisms and contextual factors which may bring about a positive outcome. The mechanisms identified highlight the ways in which these types of programs may have meaningful impact on the lives of those participating, and the vital contextual factors identified provide important insight into when and how these mechanisms may be "triggered". These results present several implications for future research and program development.

The findings in this study underscore the importance of matching clients and volunteers that are on some level compatible. As mentioned, however, many of the studies included in the sample provided little detail pertaining to how and why pairings were made. Aside from basic requests for a volunteer of a specific gender, it is not clear what may constitute a best practice. This gap represents a noteworthy area for future consideration and may have significant implications for certain sub-groups of older people. For example, LGBTQ+ older people may experience additional vulnerability to social isolation as a result of victimization, discrimination, and other life course factors (Perone, Ingersoll-Dayton, & Watkins-Dukhie, 2020). Additionally, language barriers among language minorities can present significant access issues in terms of both formal and informal support (Scharf, Shaw, Bamford, Beach, & Hochlaf, 2017). It is therefore critical that program developers and researchers alike consider ways in which social isolation interventions can be adapted to

support varying levels of risk and need. Developing best practices for matching volunteers and clients in friendly visiting programs could help to ensure that these types of programs are safe, accessible, and inclusive of older people with a variety of identities and backgrounds.

Similarly, the findings pose questions related to gender diversity and participation. The studies in this sample tended to include more women than men in both the evaluation component (i.e. subsample) and the full study population (when applicable). This is in many ways representative of wider trends in social programming whereby older men are less actively involved than older women (Golding, Brown, Foley, Harvey, & Gleeson, 2007). A portion of this participation discrepancy may also be due in part to the reality of life expectancy differences between men and women, although it is likely that this difference accounts for only a small part of the discrepancy. As evidence mounts pertaining to the rise of isolation and loneliness among older men (Beach & Bamford, 2014), it is more important than ever for program developers and researchers alike to re-double their efforts to include greater gender diversity in program design and related research and evaluation. Furthermore, the active inclusion of other gender minorities (e.g. transgender men/women, non-binary older people) is a critical next step in the development of all social isolation interventions. Gender diversity and inclusion is necessary for the well-being of all older people.

The findings also raise several questions about temporal aspects of friendly visiting programs. The sample of studies included in the analysis varied greatly in terms of both duration of the friendly visiting program (e.g. six months, one year), and frequency of visits (e.g. weekly, bi-weekly). As such, we were unable to identify any significant demi-regularities or contextual factors linking program duration to outcome. Likewise, studies in this sample

conducted evaluations, both surveys and interviews, at different points in time (e.g. one-month post-program, three months into active program) rendering it nearly impossible to draw meaningful conclusions about the lasting effects of these programs. Although it may not be feasible in all cases due to practical constraints, we recommend that future evaluations of friendly visiting programs include outcome measurements at various points in time, particularly post-intervention in order to clarify these outstanding questions.

The findings from this review flag critical questions about evaluation and outcome measurement as well. Across the studies included in the sample, several different outcome measures were used to determine program "success", in addition to qualitative outcomes that did not rely on scales or objective measurements. This is commonplace in realist syntheses but can pose a challenge in certain scenarios. Within the broader social isolation literature there exists significant dialogue and debate related to objective isolation, perceived isolation, loneliness, and how these various experiences intersect and/or potentially overlap (Smith & Victor, 2018). When comparing quantitative studies using different outcome measures (i.e. quality of life, social support scales), it can be challenging to compare various instances of success, particularly when scale or quantitative outcome measures are built to measure distinct constructs or experiences.

This problem can be further exacerbated when one considers that many studies articulate a goal to ameliorate one problem (e.g. social isolation) but benchmark their success on the outcome of a different experience (e.g. life satisfaction). In principle, the connection between the two concepts may not be so far-fetched, and there may in fact be a theoretical justification for why a change in one experience may bring about a measurable change in another experience. Yet, if researchers fail to provide adequate detail regarding the proposed

underlying mechanism through which this may occur, knowledge users may overlook critically important connections. Indeed, O'Rourke and colleagues conducted a scoping review of social connection interventions for older people and found that there were many inconsistencies in the literature "regarding the mechanisms by which the interventions have been conceptualized to affect loneliness/social connectedness" (O'Rourke, Collins, & Sidani, 2018, p. 10). They then go on to conclude that in many of these programs, it may not be possible to determine the extent to which a given intervention actually achieved what it set out to achieve (O'Rourke et al., 2018). We raise this consideration due to the fact that social isolation is often conflated with associated concepts such as loneliness despite continued efforts to build a unified typology (Smith & Victor, 2018). Future friendly visiting programs should consider methods of avoiding the conceptual confusion amongst these related social concepts and outcomes.

The last consideration relates to the optimal time to intervene in the trajectory of social isolation. We have seen in this study that friendly visiting programs hold great promise for improving the lives of older people who are isolated due in part to the fact that they are cost-effective and replicable across a variety of settings. And yet, social isolation remains a highly complex and harmful social outcome that can reduce life expectancy, increase risk of suicide and contribute to depression (Holt-Lunstad et al., 2010; Nicholson, 2012). Evidence has also suggested that the longer someone lives in a state of social isolation, the more difficult the task may be to re-socialize them (Andrews et al., 2003; Machielse & Duyndam, 2020), Likewise, there is no universal intervention that will serve as a cure-all for social isolation in later life (Machielse & Duyndam, 2020). However promising friendly visiting programs and other interventions may be, the literature clearly points to prevention as being

the primary means through which to tackle the ongoing concern of social isolation. As such, we encourage program developers, researchers, and policymakers alike to consider ways in which older people may be supported and empowered, particularly individuals who may be experiencing multiple forms of risk and/or vulnerability. Governing bodies and service providers must consider novel methods for identifying those who are at-risk in order to intervene and prevent the onset of social isolation when possible. This is a considerable task, and yet necessary if the goal is to tackle late life social isolation directly.

Limitations

The realist synthesis presented in this paper is subject to several limitations. First, many studies of friendly visiting/befriending programs were not included in the final sample due to the fact that sufficient detail regarding process, methods, participants, or other important factors was not included. Due to the nature of realist reviews, studies may only be included in the analysis if authors provide detailed information about the intervention and how it was conducted. This can often present challenges for researchers undertaking realist syntheses. In fact, other realist evaluations (see Wong et al., 2010) have also found that many primary studies did not include sufficient detail pertaining to process and implementation of their respective interventions or programs. It is therefore our recommendation that those conducting evaluations of social programming take care to provide detailed accounts of how the programs were implemented when publishing outcome studies. This information likely holds the key to learning from past failures and successes. Without it, evaluators and program developers may be inadvertently experiencing similar pitfalls or barriers time and time again.

Second, several studies were excluded from the final sample due to the conflation and/or lack of separation between loneliness and isolation. Many of the studies included in the analysis discuss both social isolation and loneliness, although distinctions were made to recognize the crucial differences between the two interrelated concepts. However, other studies that conflated the terms "social isolation" and "loneliness" were not included. This particular problem is longstanding within the social isolation literature and is exceedingly problematic. As it stands, there is no universal definition of social isolation, but most scholars tend to agree that it involves objectively low social support and/or few social contacts, whereas loneliness is typically described as a subjective feeling (Smith & Victor, 2018; Victor et al., 2000). Unfortunately, many scholars continue to confuse the two terms and use them interchangeably (Fakoya et al., 2020). This ongoing dilemma has impeded progress in social isolation research and will likely continue to pose a challenge until clear boundaries are drawn between the two concepts by those conducting the research and evaluation.

CONCLUSION

Friendly visiting programs have the potential to provide effective social support to socially isolated older people in a variety of contexts. The results of this realist synthesis begin to unravel the mechanisms that may be responsible for the success of these programs. It is our hope that the mechanisms identified in this review will be tested and refined. It is through this process of testing and refining that we may be able to further assist those who conduct friendly visiting programs, and those who come to rely upon them for social connection. As there is a wide variety of social isolation interventions following different

program theories not covered in this synthesis (e.g. arts-based programs, support groups), it is also our recommendation that others conduct additional syntheses. More evidence is needed to determine when, where, and for whom interventions may be most beneficial, and relist reviews can begin to address these gaps.

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CONCLUSION

The first two papers presented as part of this doctoral thesis investigated the relationships between social isolation and place in later life. The third and final paper applied a critical realist lens to uncover the underlying mechanisms and contextual factors that contribute to the success (and failure) of friendly visiting programs. Each of these three papers uncovered findings that push forward the field in different ways. In this section I briefly summarize these main findings and consider avenues for future research and application.

SUMMARY OF FINDINGS

Paper One broadly addresses the research question, *To what extent to neighbourhood characteristics contribute to social isolation in later life among people who live alone and people who do not live alone?* Within the scope of this paper, four neighbourhood characteristics came into focus for analysis: sense of belonging within the local environment, social and material deprivation, and active living environments. Because the Canadian Longitudinal Study on Aging does not directly measure social isolation with any validated scales or surveys, our analyses utilized social participation, functional social support, and loneliness as facets (i.e., dimensions) of social isolation. These analyses found that sense of belonging, neighbourhood deprivation, and active living environments account for very small amounts of variation in the three dimensions of social isolation. Likewise, no major differences were identified across those who live alone and those who do not live alone despite the fact that those who live alone are significantly more likely to experience social isolation than those who live with others (Wenger et al., 1996; Smith & Victor, 2018).

While these findings fail to identify any substantial links, they nonetheless contribute to the literature in several ways. These findings reinforce the need to directly measure social isolation and its various components in longitudinal research in order to more effectively determine the nature its relationships with neighbourhood characteristics. This paper was limited by our need to operationalize social isolation using three separate social outcomes. It remains unclear whether or not and to what extent these four neighbourhood characteristics contribute to social isolation. It may also be that other factors at the neighbourhood level (e.g. crime, perceived safety) are more impactful in shaping isolation than active living environments, neighbourhood deprivation, or sense of belonging in the local area. Nonetheless, these findings provide a stepping stone for future research by reporting this preliminary data.

Paper Two addresses two research questions: 1) *How do place-based factors contribute, either negatively or positively, to risk of social isolation in later life?*; and 2) *How does a place-based exclusion lens illuminate our understanding of late life isolation risk?* These questions were investigated by conducting qualitative interviews with 17 older people living in Hamilton, Ontario, and applying Walsh's (2018) conceptualization of place-based exclusion to the findings. In doing so, this paper approaches a similar line of inquiry as Paper One but with an emphasis on the subjective experiences of older people and their definitions of place, neighbourhood, social isolation, and risk. By approaching these research questions from a critical and constructivist perspective, I was able to highlight to the voices of those who live alone and hear detailed experiences and points of view that cannot be captured in large quantitative survey data.

The interviews revealed five major themes. Participants described feeling vulnerable and at times invisible in their homes and communities, and articulated concerns related to living in neighbourhoods without a strong sense of community. Participants also described the immense benefits gained through accessible programming and resources in their respective neighbourhoods or local areas. Transportation infrastructure arose as a significant determinant of social connection, particularly in that car-dependent neighbourhoods may stifle opportunities for social participation if or when driving a personal vehicle is no longer a viable option. Lastly, participants described a powerful desire to not live in an age-segregated neighbourhood or community. When these themes were studied through the lens of place-based exclusion, it became immediately clear that aspects of both place and social exclusion ought to be included in the current conceptualizations of social isolation risk.

While Paper One failed to uncover strong statistical links between neighbourhood characteristics and three dimensions of social isolation, Paper Two found that older people perceive their risk of becoming socially isolated and/or their experience of isolation to be closely tied to their neighbourhoods and immediate residential environments in several ways. These findings were used to re-imagine and re-configure the model of known risk factors for social isolation that is often drawn upon by scholars and partitioners when identifying 'at-risk' individuals. As mentioned in Paper Two, discussions of social isolation risk within the scholarly literature seldom consider place or exclusion as risk factors. Yet, results from this paper indicate that both are of great importance. The goal of this adapted model is to urge discussions of isolation risk to consider a more holistic viewpoint – one that views the individual as experiencing relative risk tied to different levels of their environment and communities. Our hope is to continue to move away from the individualized approach to

social isolation which has permeated much of the literature (Weldrick & Grenier, 2018) and towards one that that more accurately understands it as a community and societal problem requiring interventions at the community and societal levels.

Paper Three undertook a realist synthesis to address the following three research questions: 1) *How (e.g. theoretical foundations) are friendly visiting programs successful?;* 2) *For whom (e.g. age, gender) are friendly visiting interventions effective?*; and 3) *Under what conditions (e.g. research design, isolation measures, program location) are friendly visiting interventions successful?* A subset of studies examining established friendly visiting programs were reviewed using a realist synthesis approach in order to build a functional program theory of how and why this type of intervention may bring about positive impacts in the lives of socially isolated older people.

The results of this synthesis indicate that there are three primary mechanisms which appear to underly the success of friendly visiting programs. First, successful programs enable the isolated or at-risk participant to form a meaningful relationship with a new social contact that was previously unknown to them. Several contextual factors, such as client-volunteer matching, client training, and support for the volunteer, seem to influence whether or not this mechanism is initially "triggered". Second, successful programs create an environment whereby the client is able to receive mediated formal support from a host organization or agency. This mechanism may "trigger" multiple times throughout the duration of the intervention and is likely to be influenced by several key contextual factors, including volunteer training, volunteer supervision, and service access assistance. Lastly, successful programs enable the client to receive informal social support via the volunteer. This mechanism may also be "triggered" multiple times throughout the duration of the program and is thought to be influenced by client-volunteer matching, and volunteer training.

This paper takes inspiration from a growing body of work aimed at dissecting complex social interventions to shed light on how they create successful outcomes. The findings uncovered valuable information about friendly visiting programs and can help to inform the development of new programs and potential refinement of existing programs. Friendly visiting programs hold immense potential for reconnecting socially isolated people, and the mechanisms identified in this paper serve as a guide for organizations that host such programs. In reality, friendly visiting programs and other one-to-one, volunteer-based programs will never eradicate social isolation from our communities. They do, however, occupy an important place in the mosaic of isolation interventions and will likely continue to do so. Friendly visiting programs are easily replicable across myriad settings and contexts, and the program theory established in this review can help to ensure that these programs incorporate the most critical building blocks for success.

Together, the results of the three studies presented in this thesis make several contributions to the literature. A great deal of work remains for those who are invested in this issue, and the findings presented here advance the knowledge base. Together, the quantitative and qualitative investigations into place, neighbourhoods, and social isolation, were able to make both substantive and theoretical contributions to the literature concerning how isolation and isolation risk are understand and conceptualized. The realist synthesis was able to make contributions to the applied social isolation literature concerning programs and interventions. By illuminating these aspects of isolation through these three studies, this thesis uncovered valuable information that will apply to researchers and practitioners alike.

SUMMARY OF RECOMMENDATIONS

As outlined above, the results of the three papers make several contributions to the literature, thereby opening up new areas for future consideration. Upon review and reflection, there are several key recommendations for those conducting social isolation research. First, it is recommended that future research pay particular attention to the role of place-based factors and neighbourhood characteristics among sub-groups of older people. Both Paper One and Paper Two placed an emphasis on older people living alone in order to tease apart key differences in risk and experience among across those who live along and those who do not. While the regression models in the first paper failed to find strong links between the neighbourhood characteristics of interest, the second paper found that several characteristics of places and neighbourhoods were perceived as being important determinants of isolation risk. It is therefore recommended that studies of place and isolation risk take further steps to consider how these relationship(s) may be unique to those occupying diverse social locations and identities. These diverse identities, linked to life course experiences, will surely intersect with place and isolation in ways that have yet to be captured.

Second, it is recommended that future studies apply the adapted model of risk factors (Paper Two) and use it as a foundation for further conceptual development. This adapted model was developed through a process of merging existing literature with findings from seventeen qualitative interviews. Although this model is a strong representation of the current state of knowledge concerning isolation risk factors, it is certainly possible that additional risk factors remain unaccounted for. Students and investigators alike are

encouraged to use this revised model as the basis for investigations into risk and consider how additional items may fit be incorporated.

Third, it is recommended that future research consider the relative role(s) of neighbourhood characteristics not included in Paper One. This paper placed emphasis on sense of belonging within the local environment, social and material deprivation, and active living environments, and findings failed to provide clear insights into their relationship with social isolation and risk. While these neighbourhood characteristics may in fact play a significant role in shaping isolation and risk, it is nonetheless recommended that future research consider other neighbourhood characteristics such as crime, perceived safety, and intergenerational makeup. The results of Paper Two suggest that the immediate residential environment and neighbourhood do in fact impact isolation, and future studies are encouraged to consider both qualitative and quantitative means of replicating and/or furthering this knowledge through the investigation of additional neighbourhood characteristics.

Fourth, it is recommended that additional realist syntheses be carried out to determine how, why, and under what circumstances other isolation interventions may be successful. Due to the nature of the method, only programs or interventions with the same underlying program theory are able to be synthesized within the same review (Pawson, 2002). In other words, gatekeeper or social prescribing interventions could not be included in the realist synthesis of friendly visiting programs. It is our position that realist syntheses are invaluable and provide insights that cannot be captured through other review methods. As such, scholars interested in social isolation interventions are encouraged to undertake

realist syntheses with emphasis on other promising approaches. These findings can then be applied to the development and refinement of future interventions.

Fifth, it is recommended that future research take steps to explicitly develop the concept of place-based inclusion. This has been called for in previous work (Walsh, 2018), and the findings of both Paper One and Paper Two highlight the need for development in this area. The majority of the work in this thesis is directed at the concepts of social isolation (and exclusion) and how places can contribute to these experiences. The findings from Paper Two, however, re-affirm the notion that places can have protective properties in terms of encouraging social inclusion over exclusion. It is recommended that studies continue to push forward this agenda and work towards the development of a place-based inclusion framework. How and why neighbourhoods may be able to actively promote social inclusion and prevent social isolation among older people is a critical consideration for this recommended research and has the potential for far-reaching implications.

Sixth, it is recommended that practitioners and program hosts apply the results from Papers Two and Three to develop effective interventions that address risk factors at various levels of risk. The conceptual model re-configured in Paper Two can not only serve to inspire future research but can also be used as a map to guide applied intervention efforts. Programs and interventions are often developed within the confines of specific funding schemes and/or organizational mandates, and it is not necessarily feasible for host agencies to immediately apply the findings of this thesis to their interventions. We are nonetheless hopeful that this thesis will inform the work of community agencies and programmers when possible. These findings can assist with the planning and implementation of interventions

within specific contexts by bringing into focus specific risk factors (e.g. lack of transportation infrastructure) that may be relevant to the experience of isolation.

Lastly, it is recommended that any studies aiming to evaluate interventions take care to include detailed accounts of program details including but not limited to participant characteristics, evaluation measures, timelines, and other critical data. As described in Paper Three, the lack of detail was the primary justification for the exclusion of many studies that could have otherwise informed the realist synthesis. Without detailed contextual information it is challenging for those conducting realist reviews (and other forms of research) to draw meaningful conclusions about how and why a given program theory may be successful, and under what conditions. This is a vital recommendation for anyone conducting program evaluations in the future. Effective long-term knowledge resolution (Pawson, 2002) is only possible when we provide the necessary ingredients to those who endeavour to build upon our work in the future.

CONCLUDING THOUGHTS

As I critically reflected on this project – its conception, its methods, and its outcomes to date – I am struck by how much remains unknown. I have spent the past five years working to make advancements in the field of gerontology by conducting research, participating in conferences, collaborating with other scholars on various publications and projects. It has been incredibly rewarding, and yet the more I learn the more I feel there is to learn. I feel as though Aristotle's famous and often-misquoted words speak directly to me: *The more you know, the more you know you don't know.*

Particularly as a "younger" person conducting work with "older" people, I feel this process has been valuable and insightful in ways that extend far beyond the research. As a "younger" person, I maintained outsider status (Corbin Dwyer & Buckle, 2009) throughout the research process. In practical terms this means that I arrived at the research from a social location that differed significantly from my participants. While I was afforded valuable opportunities to enter the private spheres of my participants in the qualitative study and hear their words, I can only comprehend their experiences from my position and perspective as an outsider (i.e. "younger" person). My outsider status is also relevant to the quantitative and realist investigations in that my age and social position are likely to have influenced how I conceived of the research and how I brought it into practice. I raise this because it has been posited by critical scholars that age has the potential to impact all aspects of intergenerational research encounters (Grenier, 2007). It is likely that these encounters impact the researcher, as well. I have grown as a person throughout this project and have learned a great deal about what it means to live and age with purpose. These learnings have arisen out of years of engagement with people and ideas older than I am.

While I objectively understand more about the intersection of aging, social isolation, and place than I did when I began this project, I have unearthed countless questions that remain unanswered. I hope that some of these questions can be addressed in future research by either myself and/or others, and that some of the recommendations will be used to build up this work.

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