Aging and Mental Health Research

LONELINESS AND SOCIAL ISOLATION IN OLD AGE

CORRELATES AND IMPLICATIONS

Edited by
André Hajek, Steffi G. Riedel-Heller
and Hans-Helmut König

Loneliness and Social Isolation in Old Age

This book is a seminal guide to loneliness and social isolation in old age, providing a comprehensive overview of the important correlates of socioeconomic, health, and lifestyle factors upon loneliness and social isolation in old age.

Bringing together contributions from leading authorities, the book showcases expertise from, among other things, medicine, psychology, epidemiology, sociology, economics, and gerontology. It shows the importance of identifying factors associated with loneliness and social isolation among older adults from a broader perspective and includes discussion of a range of topics, including income poverty, physical activity, family care, and frailty. The chapters are evidence-based and offer a mix of empirical studies as well as reviews of international research. The book also discusses policy implications and provides an overview of nationally representative cohort studies around the world available to researchers quantifying loneliness or social isolation.

This book is unique in examining loneliness and social isolation from such wide-ranging perspectives and will be essential reading for researchers and postgraduate students in the areas of e.g., mental health research, social work, and psychiatry. Health professionals involved with gerontology and geriatrics will also find this book of benefit.

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Preface

André Hajek, Steffi G. Riedel-Heller and Hans-Helmut König

In the past decades, various geriatric giants have been identified that determine morbidity and mortality in old age such as immobility, memory decline, or falls. These factors were extensively studied in former research. However, in the last few years, there is an increasing interest in loneliness and social isolation in late life. Actually, loneliness and social isolation have recently been acknowledged as new geriatric giants – or the "new smoking" in geriatrics. Both of these factors can lead to significant declines in health and can also increase mortality. Therefore, it is of great importance to identify factors associated with loneliness and social isolation in old age from a broader perspective – including socioeconomic, lifestyle-related, and health-related factors.

In short: This book will provide a comprehensive overview of these important correlates. Policy lessons will be discussed, and a final chapter will provide an overview of nationally representative cohort studies around the world available to researchers quantifying loneliness or social isolation. To this end, this edition brings together leading expertise from medicine, psychology, epidemiology, economics, public health, sociology as well as geriatrics and gerontology. This edition covers contributions from leading authorities as well as from aspiring young researchers from around the world: Africa, Asia, Europe, North America, and Oceania.

In part 1, this book will first introduce the main terms loneliness and social isolation. In part 2, loneliness and social isolation will be placed in a larger context of challenges in old age. In part 3, the main socioeconomic correlates (sociodemographic, income, and cultural factors) of loneliness and social isolation will be described. In part 4, important lifestyle-related correlates (informal care in later life, grandchild care, pet ownership, social media use, physical activity, smoking and alcohol intake) of loneliness and social isolation will be presented. In part 5, health-related correlates (health comparisons, obesity, frailty, multimorbidity, and mental health) of loneliness and social isolation will be described. In part 6, policy implications regarding loneliness and social isolation in old age will be presented and the future of loneliness and social isolation research will be discussed. Lastly, in part 7, an

overview of nationally representative cohort studies around the world available to researchers will be provided.

In light of the ongoing demographic change (i.e., low birth rate and increasing life expectancy) in various countries, loss of spouse, relatives, and friends in late life, mobility impairments, the often long distance to friends and relatives and several global challenges (such as the COVID-19 pandemic or wars on our planet), it appears plausible that the prevalence rates of both loneliness and social isolation may even increase in the upcoming decades. We hope that this present work may contribute to a deeper understanding of these new giants which may assist in developing strategies aimed at reducing loneliness and social isolation in late life. Moreover, we sincerely hope that this work may encourage researchers from around the world to conduct their own research related to loneliness and social isolation in late life. Furthermore, we humbly hope that all readers interested in the area of loneliness and social isolation in late life will enjoy this edited book.

Hamburg and Leipzig, July 2023
André Hajek, Steffi G. Riedel-Heller, Hans-Helmut König

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Part I

Concepts

Loneliness and social isolation

Van Tilburg and de Jong Gierveld present the concepts and measurement of loneliness and social isolation in Chapter 1. This can help to better understand the similarities and differences between these factors.

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Chapter 1

The concepts and measurement of social isolation and loneliness

Theo G. van Tilburg and Jenny de Jong Gierveld

A brief description of the two concepts

Social isolation describes individuals as being separated from others and the community. Persons with a near absence of relationships with others are, by definition, socially isolated. The central question here is: to what extent is he or she alone? There is a continuum ranging from social isolation at the one hand to social connectedness at the other, where one is fully integrated in the community and in a network of close personal relationships. In his seminal work on loneliness, Weiss (1973) distinguished social isolation as an objective state from the evaluation of the social network and loneliness feelings associated with these situations. Loneliness is but one of the possible outcomes of the evaluation of a situation characterized by a small number of relationships. Loneliness is thus subjective and is a negative experience of an imbalance between realized relationships and the level of desired relationships.

Socially isolated individuals are not necessarily lonely, for example, because they amuse themselves just fine alone, possibly because they have adapted after a period of loneliness. People can be lonely even when they are amid others, for example, because they do not feel at home in that company or because they find the contact too superficial. They are thus not socially isolated in the objective sense, although the likelihood of loneliness in well-socially integrated people is low.

Social isolation

The concept and definition

Social isolation encompasses both quantitative and qualitative dimensions. Quantitative approaches count the number of social ties a person maintains, whereas qualitative approaches consider the nature of one's social ties, such as their level of closeness. Social isolation means the absence of any (meaningful) contact with other people, such as having no friends, relatives, and other significant relations or maintaining only infrequent or superficial

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contact with them (Nicholson, 2009). Beyond the relationship level, social isolation means the lack of integration of individuals in their social environment (Courtin and Knapp, 2017). Others point to specific aspects such as a lack of communion between individuals (Victor et al., 2009), a lack of engagement with others (Nicholson, 2009), and having only superficial or instrumental contact with some people, while having no or a small number of meaningful and supportive ties. Living alone or the number of household members is additionally used as relevant to social isolation (Holt-Lunstad et al., 2015 and Swader, 2019). When we summarize these different aspects, we define social isolation as the lack of meaningful contact with other people, with social connectedness as the opposite (Cornwell and Waite, 2009).

The measurement of social isolation

Different aspects of social isolation can offset each other. It may be that there is a hierarchy, such as that living alone or lacking a partner relationship contributes more strongly to social isolation than if there is no contact with neighbors. The conceptualization of social isolation therefore does not lead to a single measurement model of an instrument with equivalent indicators. It is therefore unlikely that a measuring instrument for social isolation has satisfactory psychometric properties that are usually based on a homogeneous and interrelated set of indicators. The sum of the scores is called an index, that is, a composite statistic that aggregates several indicators. We present some approaches to the measurement.

Approaches to the measurement of social isolation

Eckhard (2018) pointed out that indicators of social isolation are often constructed in secondary data analysis, thus after data are collected. Consequently, instruments are often constructed ad hoc. From a methodological point of view, the measurement model is often postulated and not tested. In many cases, it is not advisable to add up the scores on various indicators in a single scale score for social isolation to increase reliability. Eckhard (2018) identifies persons who live alone, go without a couple relationship, get together with friends, relatives, or neighbors less than monthly, and help out friends, relatives, or neighbors less than monthly. A person is socially isolated when all four criteria are met. This is a satisfactory procedure if one wants to identify only the socially isolated but falls short if one wants to measure a degree of social isolation.

The Social Network Index (Berkman, 1983 and Berkman and Syme, 1979) was developed in 1965 and measures structural features like marital status, contact with friends and relatives, church membership, and informal and formal group associations. In contrast, the Social Network Scale developed by Lubben (1988) focuses on the functional characteristics of social connectedness, that is, the purpose of relationships, and regards, for example, the

exchange of emotional and instrumental support. The scale includes questions about the functional characteristics of relationships with family members, friends, and confidants, such as the number of friends with whom one feels comfortable, with whom one can talk about private matters, or to whom one can turn for help. Because these functional features can be present in equal amounts in different relationships, the homogeneity and reliability of such a scale are usually satisfactory. Inspired by the Social Network Index and the Social Network Scale, Nicholson et al. (2020) developed an instrument including three items: the number of face-to-face interactions with family, friends, and neighbors that occurred monthly; connecting with others through phone, email, internet, and video chat; and how many individuals the older adults had a close connection with.

The instruments discussed measure globally by asking questions about all personal relationships together. An example is "How many of [your family, friends, or neighbors] do you see face to face at least once a month?" (Nicholson et al., 2020). More advanced approaches to examine social connectedness delineate social networks on the basis of individual persons identified by their name (Broese van Groenou and van Tilburg, 2007). Name generators vary in content and may focus on people to whom the respondent feels so close that it is hard to imagine life without them (Antonucci and Akiyama, 1987) or on those who are seen as important and are frequently contacted (van Tilburg, 1998). The most commonly used indicator of social connectedness derived from these procedures is the network size, that is, the number of unique persons identified. This variable combines quantitative aspects (the count of persons) and qualitative aspects (only close or important relationships are counted).

Conclusion

The concept of social isolation is often used, but its definition and measurement are not well established. There is a lack of theoretical embedding and elaboration of the concept, and in many studies, the concept is used and measured ad hoc. While there seems to be an agreement on what constitutes social isolation, it is often not seen as a position on a continuum. There is little agreement on what to contrast social isolation with – what we call social connectedness – and what constitutes a sharp distinction between being socially isolated and not.

Loneliness

The concept and definition

Loneliness is "the unpleasant experience that occurs when a person's network of social relations is deficient in some important way, either quantitatively or qualitatively" (Perlman and Peplau, 1981, p. 31). This includes situations in which the number of existing relationships is smaller than is

considered desirable as well as situations in which the quality or intimacy one desires has not been realized. Loneliness is sometimes also addressed under the term perceived social isolation (Cacioppo et al., 2009). Feeling lonely is accompanied by feeling emptiness and rejection. Loneliness, then, unlike social isolation, is subjective. It is a negative experience of an imbalance between realized relationships and the number and quality of desired relationships (Russell et al., 2012) and opposed to a sense of belonging.

Discrepancy between realized and desired relationships

The discrepancy subjectively experienced between the desire for personal relationships and actually realized relationships – feelings of missing certain personal relationships – is of crucial importance for understanding the onset and continuation of loneliness. Using the cognitive discrepancy approach makes it understandable that some people with few connections are not lonely – their standards for number and content of their ties are probably low. An example of the latter is a person who opts for (personal) individualism assuming the importance of one's own decisions about what one does in the sense to be free and not dependent on others. Conversely, people can also have very high and possibly unrealistic standards, so that with many and good ties, they still feel lonely. Similarly, people in countries with individualistic preferences are less likely to be lonely than those in countries with more collectivistic preferences (Swader, 2019).

Emotional and social loneliness

Most people wish to have at least one social contact to whom they can confide their personal worries and feelings. A romantic partner, an adult child, or a best friend is most frequently identified as such an intimate figure. If such a confidant is missing, the risk of loneliness increases. This type of loneliness is designated by Weiss (1973) as emotional loneliness. Feelings of missing related to a broader group of contacts or an engaging social network (e.g., peripheral kin, casual friends, colleagues, and neighbors) is named as social loneliness. Some people are especially prone to emotional loneliness, others to social loneliness, but it is the combination of emotional and social loneliness that leads to the most intense feelings of loneliness.

Loneliness as a negative experience

Loneliness is a negative feeling these days. In ancient times, philosophers wrote primarily about loneliness as a voluntary withdrawal from the daily hassles of life and oriented toward higher goals, such as reflection, meditation, and communication with God. In more recent times, philosopher Moustakas (1961) distinguished a positive type of loneliness as an inevitable part

of human life itself, involving periods of self-confrontation, but at the end providing an avenue for self-growth, power, and inspiration. When people want to be alone with positive intentions, the term "solitude" is used (Lay et al., 2020). By extension, the negative experience is distinguished as existential loneliness: "an intolerable emptiness, sadness, and longing, that results from the awareness of one's fundamental separateness as a human being" (Ettema et al., 2010, p. 142). van Tilburg (2021) investigated the contribution of "existential loneliness in relationships" to the broad conceptualization of loneliness and concluded that the existential dimension does not yet contribute sufficiently to the conceptualization of loneliness. Meaninglessness is perhaps a more appropriate term.

Contextual conceptualization of loneliness

In the conceptualizations of emotional, social, and existential loneliness, loneliness is primarily an experience tied to the individual. A more contextual conceptualization is found in cultural loneliness. Someone is then lonely when he is in a foreign culture which he does not understand, and vice versa, he feels not understood by people of that other culture (van Staden and Coetzee, 2010). Another contextual approach is labeled political loneliness or estrangement: people are socially hidden from each other and do not see each other as part of a common world (Gaffney, 2020 and Macready, 2021). A rare application of a contextual approach is the study in post-totalitarian and other European countries by Rapolienė and Aartsen (2022) of the relationship between low trust in other people and loneliness.

The measurement of loneliness

In research, the concept of emotional and social loneliness has been widely accepted. Three instruments are often used. First, loneliness is measured with a single, direct question. Such a question, for example, "Do you feel lonely?", is simple to use, appears to be acceptable to respondents, reflects loneliness as understood by the respondent, and provides an easy way to assess the prevalence of loneliness (Jylhä and Saarenheimo, 2010 and Victor et al., 2005). However, the use of a direct question presupposes that the respondents have a common understanding of the term "loneliness" and that their understanding encompasses the whole theoretical concept. A single item does not provide information on the relevance of social and emotional aspects of loneliness; research showed that scores are primarily related to emotional loneliness (van Tilburg, 2021). Because of the social stigma of loneliness (Lau and Gruen, 1992), people who are not seen as lonely by others may find it difficult to admit their loneliness as an answer to a direct question. Finally, the psychometric quality of a single question cannot be determined.

Alternatively, loneliness can be measured with a scale including statements that relate to aspects of loneliness but avoid the term "loneliness" or similar wording. The UCLA scale (Russell, 1996) and the de Jong Gierveld (DJG) scale (de Jong Gierveld and Kamphuis, 1985) are based on a conceptual framework of loneliness, in which different relational aspects and emotions relevant to the experience of loneliness are distinguished. McWhirter (1990) and Hawkley et al. (2005) found various dimensions in the 20 items UCLA scale, but it is often considered a unidimensional measure. The DJG scale was developed as a unidimensional loneliness scale with both the emotional (six items) and social (five items) aspects of loneliness in mind. The homogeneity of the unidimensional scale proved to be modest at best. When searching for more homogeneous subscales, emotional and social loneliness factors emerged (van Baarsen et al., 2001 and de Jong Gierveld and van Tilburg, 1992). The UCLA and DJG scales have rarely been studied in one sample. In a Dutch study, de Jong Gierveld and van Tilburg (1992) observed that the measurement of social loneliness was similar to that of the core dimension of the UCLA scale, which includes seven items. Another study (Penning et al., 2014) indicated that both scales were multidimensional, but the correlation between the scale scores was not reported. For both the UCLA and DJG scales, translated versions were shown to be reasonably parallel to the versions in the original language (de Jong Gierveld and van Tilburg, 2010, Goossens et al., 2013, Lasgaard, 2007, and Uysal-Bozkir et al., 2017).

Conclusion

Loneliness is a well-developed theoretical concept that describes an individual, negative evaluation of the personal relationship network. There are concepts such as meaninglessness that describe negative experiences of a different kind, which are close to emotional and social loneliness. There is insufficient evidence that these concepts should be subsumed under an overarching concept of loneliness. Because a limited number of loneliness instruments are used in the many research studies, much convergent knowledge about loneliness is available.

Is it desirable to use the two concepts separately?

The terms social isolation and loneliness are both about social embeddedness. Therefore, sometimes, it does not seem to be of great importance to use the terms separately. However, they are different. They are respectively objective and subjective and hardly theoretically elaborated versus embedded in an underlying theory (namely, the cognitive approach). Moreover, the statistical correlation is often low. For example, the "connectedness" scale developed by Nicholson et al. (2020) as a measurement of social isolation was in a conceptual and empirical sense different from the feeling of loneliness. Finally, the use of the two concepts has distinctive consequences. We have given some examples.

Differential outcomes of social isolation and loneliness

There are negative effects of both social isolation and loneliness on health, in addition to each other. Holt-Lunstad et al. (2015) have shown that both are associated with an increased risk of premature death. However, their health consequences may also be specific. For example, loneliness, rather than being socially isolated, can indicate a prodromal stage of dementia and leads to an increased risk of clinical dementia later in life (Holwerda et al., 2014). A study of substance use also demonstrated differential effects. Farmer et al. (2022) grouped respondents according to loneliness and four indicators of structural and functional social isolation. They found that in the "connected and active" group, substance use was low; in the "alone but not lonely" group, smoking and drinking were high; and in the "alone and lonely" group, nonmedical drug use was high. These point to several mechanisms (Ong et al., 2016). Social control by people around you can prevent smoking and alcohol use, and so, the behavior is regulated. Nonmedical drug use, on the other hand, can reduce loneliness by regulating emotions.

Differential determinants of social isolation and loneliness

In looking for possible interventions, the determinants of social isolation and loneliness are different, and the two problems require different approaches. An example is the strategy used in many loneliness interventions. These often focus on improving social contact by, for example, organizing meetings or increasing the social skills of the lonely (Bouwman and van Tilburg, 2020). This addresses social isolation, which does not necessarily fit with the inherent nature of a person's loneliness problem. A loneliness problem can be characterized by a lack of realistic expectations of personal contact, for example, an elderly parent who likes the children to visit very often or a young person who expects a beginning contact to be able to discuss heavy personal problems. In such a situation, an intervention aimed at improving social contacts is unlikely to be successful, even if properly implemented. The high relationship expectations can lead to reluctance by, or even rejection by, others, thus reinforcing feelings of loneliness (Cacioppo et al., 2006). A loneliness intervention should then focus on an adjustment (possibly temporary) to excessive desires.

Conclusion

In sum, while the concept of loneliness is used consistently in research and practice, there are many different approaches to social isolation. The two concepts present different views of people's lives, indicate different vulnerabilities, and must receive their own treatment.

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Part II

Correlates of loneliness and social isolation in old age

Overview

In Chapter 2, Lian, Chu, and Chen place loneliness and social isolation in a larger context of challenges in old age (such as sarcopenia or cognitive decline), which helps to understand the great importance of loneliness and social isolation in late life.

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Chapter 2

Impacts of loneliness and social isolation on healthy longevity in older adults

Chih-Kuang Liang, Che-Sheng Chu and Liang-Kung Chen

Definitions and prevalence of social isolation and loneliness

The World Health Organization (WHO) defines healthy aging as the process of developing and maintaining functional abilities that enable well-being in older age and emphasized the importance of intrinsic capacity and functional ability in promoting healthy aging. In 2017, the WHO introduced Integrated Care for Older People, which proposed five components, locomotion, cognition, psychological, sensory, and vitality, as the construct of intrinsic capacity. However, the components of intrinsic capacity are influenced by many other factors, including a wide variety of social determinants.

Of them, social isolation and loneliness are two key factors that have attracted extensive research attention, especially during the COVID-19 pandemic. Social isolation and loneliness, representing the objective and subjective experiences of social disconnection, are two well-known social constructs with strong impacts on human health. Both conditions are considered important public health challenges and growing evidence supports their associations with adverse health outcomes, especially in older age. Loneliness is defined as the internal, unpleasant, and subjectively perceived loss of social network or the subjective feeling of being alone caused by the lack of or limited social contacts with others; for example, a divorced older person or those who live alone. Compared to loneliness, social isolation occurs when people have no or limited social connections with others, that is, the actual loss of social relationships.

Residents living in long-term care facilities are found to experience higher levels of loneliness than older adults living in communities (Simard and Volicer, 2020). In 2021, the prevalence of loneliness in European countries, the United States, Latin America, India, and China ranged from 20% to 34% (World Health Organization, 2021). On the other hand, the prevalence of social isolation varied much more across countries, such as 12.5% in Japan, 24% in the United States, 10–43% in North America, and 21% in Germany (Röhr et al., 2021 and Ejiri et al., 2019).

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Health impacts of social isolation and loneliness in older adults

Owing to multimorbidity and age-related declines in physical and/or mental functions, older people are more susceptible to adverse outcomes related to social isolation and loneliness. Better social connection status was associated with better survival, and the associations remained consistent across age, sex, initial health status, cause of death, and follow-up (Holt-Lunstad et al., 2010). Nevertheless, loneliness has been reported to shorten healthy and active life expectancy in older adults (Malhotra et al., 2021).

Lower social relationships and loneliness increased the risk of developing coronary heart disease, acute myocardial infarction, and stroke and also increased the risk of death and health-care utilization in persons with acute myocardial infarction, stroke, or heart failure (Barth et al., 2010, Valtorta et al., 2016, Cacioppo et al., 2010, and Hakulinen et al., 2018). Lower social relationships were also significantly associated with cognitive declines in both structural aspects (the structure of social networks and activities) and functional aspects (sources of support and social integration) (Wei et al., 2021).

In addition, loneliness was also associated with more rapid motor and functional declines in older adults (Buchman et al., 2010 and Perissinotto et al., 2012). Several associated factors of loneliness and social isolation have been identified, such as sociodemographic (older, gender, living arrangement, marital status, income, and social networks), behavioral, environmental, and poorer health conditions (self-rated health, multimorbidities, and disability) (World Health Organization, 2021). In addition to these well-recognized factors, the extent to which loneliness and social isolation are associated with frailty, sarcopenia, dementia, cognitive impairment, and depression has attracted extensive research attention.

Impacts of social isolation and loneliness on frailty

Frailty, characterized by declines in multiple organ systems and reduced physiological reserve, is a typical geriatric syndrome that is often complicated by multiple comorbid conditions (Clegg et al., 2013). As people age, frailty becomes critically important because of its strong associations with falls, cognitive declines, hospitalizations, mortality, and institutionalizations (Vermeiren et al., 2016). In addition, social isolation and loneliness may play important roles in frailty development and related clinical outcomes, such as declines in gait speed, decreased mobility function, difficulties in performing activities of daily living, and development of physical frailty (Perissinotto et al., 2012, Shankar et al., 2017, and Davies et al., 2021). However, evidence supporting the causal relationships between social factors and frailty development is limited.

People with loneliness are more prone to be dissatisfied with social relationships and are generally less active and less likely to engage in social activities that aggravate the risk of functional declines and the development of frailty. Social isolation, typically defined as having few social contacts or social activities, differs from loneliness in that associations between social isolation and frailty are inconsistent. The results of the English Longitudinal Study of Ageing indicated that both loneliness and social isolation increased the risk of frailty development in older adults (Davies et al., 2021), and dose–response relationships between loneliness, social isolation, and frailty development were observed. Moreover, higher levels of loneliness substantially also prevented the reversion of prefrailty or frailty to healthy conditions (Jarach et al., 2021). Compared to loneliness, social isolation represents a lack of social interaction and support and is therefore more likely to result in reduced physical function, nutritional deficiency, decreased cognitive stimulation, and risk of frailty.

The development of frailty may gradually affect physical function, vitality, and resilience, thereby possibly reducing the social activities and social networks of older people. An early cross-sectional study using stratified random sampling to enroll 2,032 people aged 70 years and over in Hong Kong in 1990–1991 disclosed that older people with a higher frailty index were more likely to have smaller social networks (Woo et al., 2005). Similar findings were found in the Longitudinal Aging Study Amsterdam (LASA), in which older adults with frailty had a smaller social network size and felt higher levels of loneliness compared to their non-frail counterparts (Hoogendijk et al., 2016).

Furthermore, the combined effects of frailty and social isolation (or loneliness) on poor health outcomes were significantly increased. An analysis of longitudinal data from the LASA revealed that older adults who were frail with loneliness or socially isolated had significantly higher risk of mortality compared with those with frailty only or non-frail subjects with loneliness or social isolation (Hoogendijk et al., 2020). Based on the abovementioned findings, the interrelationships between frailty and social isolation or loneliness appear to be bidirectional. Therefore, interventions aiming to promote healthy aging should consider both components at the same time. For an in-depth discussion of the association between frailty and loneliness (or social isolation), see the chapter by Kojima and Tanabe.

Impacts of social isolation and loneliness on sarcopenia

Sarcopenia, proposed by Rosenberg in 1989, consists of two words from Greek: sarx (sarco) and penia, which mean "loss and reduction" (Rosenburg, 1989). Sarcopenia is known as a geriatric syndrome and is diagnosed as loss of skeletal muscle mass, loss of muscle strength, and/or reduced physical performance. A great body of evidence has shown that sarcopenia increases the

risk of physical frailty, functional decline, mortality, institutionalization, and poor quality of life in older adults. The association between sarcopenia and social isolation and loneliness is also bidirectional, like frailty.

Decreasing social engagement, less family function, and the feeling of loneliness are associated with faster rates of motor decline, fatigue, and physical inactivity in the development of sarcopenia (Hai et al., 2017, Tanaka et al., 2022, Giné-Garriga et al., 2021, and Buchman et al., 2010). Reduced physical activity and decreased motor function also substantially increase the risk of sarcopenia. Moreover, the increased risk of falls, fear of falling, loss of muscle mass, and decline in physical function related to sarcopenia may further limit the chances for social engagement in daily social activities or obtaining adequate social support, subsequently resulting in loneliness and social isolation. Although conceptual relationships between sarcopenia, loneliness, and social isolation are clear, evidence supporting the hypothesis has been limited and inconsistent.

In Japan, a study of 2,957 community-dwelling older adults showed that sarcopenia significantly predicted the incident homebound state (Uemura et al., 2018). However, data from the ELSA, an ongoing prospective cohort study of people aged 50 years and older living in England, showed that reduced handgrip strength was associated with modestly increased loneliness in men younger than 80 years (Vingeliene et al., 2022). In addition, the Leiden 85-plus study reported no association between handgrip strength and loneliness in older persons aged over 80 years (Taekema et al., 2010). On the other hand, associations between handgrip strength and the risk of incident mobility impairment or disability in women are still under debate (Hicks et al., 2012 and Onder et al., 2005). Hence, the associations between loneliness, social isolation, and sarcopenia remain questionable despite the framework being conceptually sound.

Impacts of social isolation and loneliness on dementia

Dementia is a neurodegenerative disorder characterized by loss of memory, language, and problem-solving and thinking abilities that are severe enough to impair the daily life of an individual. The prevalence of dementia continues to grow, and dementia has been recognized as one of the major causes of disability and dependency in older populations worldwide. Meanwhile, dementia also increases the mortality risk of older adults (Liang et al., 2021).

There is growing interest in exploring the relationship between loneliness and cognitive decline, especially in dementia, although current evidence is inconsistent (Rafnsson et al., 2020, Sutin et al., 2020, and Chen et al., 2011). The discrepancy may result from differences in sociodemographic characteristics and the methods of assessing loneliness. An example is the sex-specific associations between dementia and loneliness, in which men showed stronger associations than women (Zhou et al., 2018). Furthermore, one study

examined the association between loneliness and dementia using group-based trajectory modeling and showed that those with persistent loneliness were at higher risk of developing dementia but not other groups (Akhter-Khan et al., 2021). Nonetheless, loneliness has recently been reported to increase the relative risk of incident dementia by 26% (Lara et al., 2019b).

Several pathways have been proposed to link loneliness and dementia, including health-risk behaviors, physiological dysregulation, and psychological distress. Lonely individuals are more likely to engage in physical inactivity and have greater sedentary time, substance abuse, and unhealthy diets, all of which have been implicated in dementia risk (Sutin et al., 2020). Moreover, loneliness may stimulate neuroendocrine dysregulation, for example, prolonged activation of the hypothalamic–pituitary–adrenal axis), autonomic dysfunction, and impairments in inflammatory responses (overexpression of proinflammatory cytokines and oxidative stress), which may directly influence the development of neurodegenerative conditions. Moreover, individuals feeling lonely also tend to have certain depressive symptoms; early-life depression has been reported to be a risk factor for late-life dementia, and late-life depression may be considered a prodrome of dementia (Bennett and Thomas, 2014). Therefore, the association between loneliness and dementia may be mediated or moderated by depressive symptoms. The underlying mechanisms in the association between loneliness and dementia are complex and may vary from person to person. Despite moderate heterogeneity and publication bias in current evidence, aggressive interventions aimed at reducing loneliness or enhancing good social engagement may be clinically effective in reducing loneliness and reducing dementia risk (Penninkilampi et al., 2018). For an in-depth discussion of the association between dementia and loneliness as well as social isolation, see the chapter by Stein and Riedel-Heller.

Impacts of social isolation and loneliness on cognitive impairment

Mild cognitive impairment (MCI) represents a minor cognitive problem between normal cognitive decline and dementia, which has attracted extensive research interest because of its prevalence (approximately 19%) and potential reversibility (Sun et al., 2014). Compared to dementia, few evidence demonstrated conflicting results about the association between loneliness and MCI. In contrast to loneliness, a 3-year longitudinal study including a nationally representative population found a significant association between higher social isolation and poorer cognitive performance (Lara et al., 2019a). A sex-specific association between social isolation and cognitive decline was observed among older women with depression but not men (Guo et al., 2021). Additionally, baseline cognitive reserve moderates the association between social isolation and cognitive decline, based on a longitudinal study (Evans et al., 2018).

Therefore, maintaining a socially active lifestyle throughout life, even in later life, can enhance cognitive reserve and benefit cognitive function (Chen et al., 2020).

Impacts of social isolation and loneliness on depression

Depression is a common mental illness worldwide, with an estimated prevalence of 4–9% among older adults, greatly contributing to the global burden of disease (Rodda et al., 2011). As a reported risk factor for depression, loneliness is common among people aged over 65 years, and 40% of people feel lonely at least at times (Hawkley and Cacioppo, 2010). Since loneliness and depression share similar perceived feelings, it is difficult to differentiate them in research and in clinical settings.

Loneliness and depression interact with each other. Individuals feeling loneliness had a significantly increased risk of subsequent depression, and depressed patients were ten times more likely to feel lonely than the general population (Achterbergh et al., 2020). The largest longitudinal investigation with multiple waves of a 12-year follow-up study of a nationally representative sample of 9,171 adults aged 50 years and older showed that baseline loneliness was associated with greater depressive severity after adjusting for other social experiences (i.e., social network size and frequency of social contacts) (Lee et al., 2021). The effects of loneliness on depression decreased over time but were still associated with 11% of incident cases of depression after 12 years of follow-up.

Several potential mechanisms have been proposed to explain the association between loneliness and depression. Loneliness is associated with hypervigilance in response to negative social expectations, which may elicit behaviors from others that confirm their rejection expectations (Hawkley and Cacioppo, 2010). The self-reinforcing loop is accompanied by feelings of hostility, stress, anxiety, and major depressive disorder (van Winkel et al., 2017). Loneliness may be related to biological effects with altered neuroendocrine response, such as elevated cortisol awakening response as well as inflammatory responses, including elevated response to interleukin-6 (IL-6) and IL-1 receptor antagonist (IL-1RA) to constitute potential pathways linking loneliness and depression (Hackett et al., 2012).

The bidirectional relationship between loneliness and depression has been reported because both loneliness and depression share similar symptomology and underlying mechanisms. Therefore, an intervention program for loneliness, a potentially modifiable risk factor for depression, may prevent or ameliorate subsequent or comorbid depressive symptoms. A meta-analysis of 100 eligible studies found that social support, particularly from spouses, family, and friends among older adults, would be an effective intervention to protect against depression with a small effect size (Gariepy et al., 2016). In addition, participating in meaningful activities (e.g., volunteer effort, chess game, and

other activities being enjoyed), building peer support, and community programs were also the proposed intervention strategies, but the efficacy of these interventions has been rarely evaluated.

Social isolation has strong negative impacts on depression. Irrespective of cultural background, social isolation was associated with depression onset among 36,458 older adults ≥65 years without baseline depression from England and Japan (Noguchi et al., 2021). Social disconnectedness significantly predicted the occurrence of perceived isolation, which further predicted the development of symptoms related to depression and anxiety (Santini et al., 2020). Furthermore, a survey of mental health among 7,127 older adults during the early COVID-19 pandemic showed that 12.8% and 12.3% of participants had worsening depression and anxiety, respectively (Robb et al., 2020).

A 5-year longitudinal population-based study examining the complex interrelationships between loneliness, social isolation, and depression indicated that loneliness predicted subsequent changes in depressive symptomatology, and temporal association was not attributable to many other factors, including social isolation (Cacioppo et al., 2010). Conceptually, social isolation may result in poor physical and mental health outcomes, but the enhanced exploratory and social behavior following isolation may protect against subsequent cognitive decline and psychological distress.

Interestingly, in an animal study, late-life social isolation in female mice did not develop depressive symptomology, altered social interaction behavior, impaired memories, or alterations in inflammatory cytokines or microglial activation within the hippocampus (Sullens et al., 2021). The associations between social isolation and depression differ by sex and education, as education moderates the association in Chinese men compared to women (Luo et al., 2021). Although social isolation has been widely reported to be associated with depression, the association and causal relationship require further study for clarification. Personality traits and responses to isolation may greatly modify the course of subsequent depression development. For an in-depth discussion of the association between depression and loneliness as well as social isolation, see the chapter by Stein and Riedel-Heller.

Conclusions

Loneliness and social isolation are important social determinants of healthy aging and late-life well-being. Studies have demonstrated bidirectional influences between loneliness and social isolations and frailty, sarcopenia, dementia, cognitive impairment, and depression; however, intervention studies to confirm the causal relationships between these associations are scarce (see the chapter by Hawkley regarding efforts to reduce loneliness and social isolation). Despite the lack of sufficient supporting evidence, actions to reduce loneliness and social isolation should be taken due to many other potential benefits for the well-being of older people.

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Part III

Correlates of loneliness and social isolation in old age

Socioeconomic factors

The third part refers to the socioeconomic correlates of loneliness and social isolation. More precisely, in Chapter 3, Kaiser and Luhmann describe several socioeconomic correlates of loneliness and social isolation. Subsequently, Cudjoe specifically explores the link between poverty and loneliness as well as social isolation in Chapter 4. After that, Burholt discovers the role of culture in loneliness and social isolation in Chapter 5. Overall, this part may help to better understand the socioeconomic correlates of loneliness and social isolation.

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Chapter 3

Socioeconomic correlates of loneliness and social isolation in late life

Till Kaiser and Maike Luhmann

Introduction

People are socially isolated when they have no or very small social networks and few social interactions in their everyday lives (Wang *et al.*, 2017). If the quantity or quality of their existing social relationships is less than what they desire, people feel lonely (Peplau and Perlman, 1982). Although social isolation and loneliness are conceptually and empirically distinct and only moderately correlated (Coyle and Dugan, 2012 and de Jong Gierveld and van Tilburg, 2016), they share several common causes. Both are directly affected by the characteristics of people's social connections such as the number of close friends, the frequency of social contact with family or neighbors, or the satisfaction with different relationships. Beyond these direct causes, loneliness and social isolation are also correlated with more distal factors such as age, gender, marital status, or socioeconomic status. In this chapter, we provide a brief overview of these kinds of socioeconomic correlates of loneliness and social isolation.

But why do we need to look at the socioeconomic correlates of loneliness and social isolation at all? After all, both loneliness and social isolation are most directly impacted by the quantitative and qualitative characteristics of people's social connections. We argue that a sound understanding of the socioeconomic correlates of loneliness and social isolation is important for both conceptual and practical reasons.

Socioeconomic correlates of loneliness and social isolation in theoretical frameworks

Conceptually, a theoretical framework on the sources and correlates of loneliness and social isolation is incomplete if it only includes the most direct causes of these phenomena. Most theoretical frameworks on loneliness and social isolation (Hawkley *et al.*, 2008 and de Jong Gierveld and Tesch-Römer, 2012) encompass both the direct and indirect sources of loneliness. For example, Hawkley *et al.* (2008) introduced a filtration model in which distal

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factors such as socioeconomic variables operate through proximal factors such as the quantitative and qualitative aspects of people's social connections. Similarly, de Jong Gierveld and Tesch-Römer (2012) proposed that loneliness is directly caused by a perceived lack of social integration which in turn is partly influenced by a poor quality of living conditions (e.g., lower income, deprived neighborhoods). Hence, socioeconomic variables are included in most theoretical models of loneliness and social isolation.

Socioeconomic correlates and the identification of risk groups

From a practical point of view, a deep understanding of the socioeconomic correlates of loneliness and social isolation is necessary to identify subgroups within a population that may be particularly at risk of experiencing social isolation and/or loneliness. The number of programs designed to prevent or combat loneliness is constantly growing (Bessaha *et al.*, 2020; Fakoya *et al.*, 2020; and Eccles and Qualter, 2021), but all of these initiatives have to deal with two well-recognized challenges. First, not all programs work equally well in all populations. For example, an intervention that can successfully reduce loneliness in individuals of old age might not work at all among adolescents. Second, people who are lonely and/or socially isolated are often reluctant to seek help themselves. So, to effectively combat loneliness and social isolation on a societal level, programs must proactively reach out to those sociodemographic subgroups who are, statistically, most at risk for social isolation and loneliness.

A detailed overview of individual socioeconomic correlates and geographical socioeconomic correlates of loneliness and social isolation

In this chapter, we give a brief overview of the current state of research on the most important socioeconomic correlates of loneliness and social isolation. In addition to socioeconomic correlates reflecting the characteristics of individuals (e.g., age, gender, socioeconomic status), we also briefly discuss socioeconomic correlates that reflect the broader geographical context (e.g., region, country).

Age

Loneliness and social isolation are sometimes equated with old age, but empirical studies from multiple countries indicate that this relationship is much more complex. On the one hand, social contact frequency does indeed decrease with increasing age (Sander *et al.*, 2017) and loneliness levels are often highest among the oldest old (Yang and Victor, 2011; Luhmann and

Hawkley, 2016; and Hawkley *et al.*, 2020). On the other hand, loneliness levels among younger older adults (approximately 60–75 years) are often lower than those among younger age groups (Luhmann and Hawkley, 2016; Hawkley *et al.*, 2019; and Hawkley *et al.*, 2020). Moreover, a recent meta-analysis of longitudinal studies found that loneliness levels are, on average, quite stable across the lifespan (e.g., a recent meta-analysis by Mund *et al.*, 2020). Finally, cross-national studies found substantial national differences in the relationship between age and loneliness (Yang and Victor, 2011). Together, these studies suggest that it is not age per se but rather the physical and social changes that are associated with aging (e.g., increasing health issues, shrinking social networks) that explain the increasing levels of loneliness and social isolation among the very old (for reviews, see Qualter *et al.*, 2015; Cohen-Mansfield *et al.*, 2016; and Dahlberg *et al.*, 2022).

Gender

In most societies, women live longer than men. Older women are therefore more likely to be widowed and to live alone, two factors associated with a higher risk of loneliness and social isolation (Pinquart and Sörensen, 2001). In addition, older married women are more likely to be caregivers than older married men, which restricts their opportunities for social interactions in daily life (Pinquart and Sörensen, 2001). However, women also tend to have more frequent social contact (Sander *et al.*, 2017) and larger social networks (Wrzus *et al.*, 2013) than men, which may protect them from social isolation and loneliness (Pinquart and Sörensen, 2001). Overall, these contrary effects appear to cancel each other out: a large meta-analysis examining gender differences in loneliness found no significant differences between men and women in old age (Maes *et al.*, 2019).

Relationship status und marital status

On average, people who are in a relationship are less lonely than people who are single. Being divorced and particularly being widowed are correlated with stronger feelings of loneliness and are risk factors for social isolation (Dahlberg *et al.*, 2022). Conversely, being married acts as a protective factor against loneliness and social isolation (Cohen-Mansfield *et al.*, 2016). A limitation of cross-sectional studies examining the association between relationship/partner status and loneliness/social isolation is that they are mute on the directionality of the relationship: in principle, loneliness and social isolation can be both a predictor and a consequence of a specific marital status. For example, an individual person might feel lonely because they are unmarried, but they might also be unmarried because their loneliness makes them less-appealing romantic partners (Tsai and Reis, 2009). Longitudinal studies that examine changes in loneliness or social isolation before and after changes in

marital status (e.g., divorce, widowhood) are therefore particularly interesting. In such studies, partner loss has been associated with shrinking social networks (Wrzus *et al*., 2013) and with an increased risk of loneliness among older adults (Dahlberg *et al*., 2022).

Household composition and living situation

Living alone is a risk factor for loneliness and social isolation in old age (Cohen-Mansfield *et al*., 2016 and Dahlberg *et al*., 2022). Among those who do live with others, household size was not systematically related to loneliness in a representative German sample (Luhmann and Hawkley, 2016). In this sample, it does not seem to matter whether people live with one or many others, as long as they do not live alone. It should be noted, however, that different countries vary with respect to familial norms, that is, to what extent it is normal or even expected that the elderly live with and are cared for by their adult children (e.g., de Jong Gierveld and Tesch-Römer, 2012). In summary, the effect of household composition and living situation on loneliness and social isolation probably depends on the cultural context.

A living situation that is particularly relevant for older adults is residential care. Most studies on loneliness and social isolation exclude people living in residential care homes, often for pragmatic reasons because a substantial number of residents of care homes are physically or cognitively unable to participate in scientific research. The few studies that have included residents of care homes have found increased levels of loneliness in this population (e.g., Dykstra *et al*., 2005 and Brittain *et al*., 2017), suggesting that residents of care homes might be a particularly important risk group for loneliness that deserves more attention in future research.

Socioeconomic status

Socioeconomic status comprises income, education, and occupational status (Baker, 2014). Occupational status is generally associated with loneliness and social isolation (e.g., unemployment increases the risk for loneliness; Luhmann and Hawkley, 2016). Among older adults, however, the large majority are retired and occupational status is therefore less relevant in this age group.

This is different for income and education: among older adults, lower income and lower educational status are both related to higher loneliness levels (Cohen-Mansfield *et al*., 2016 and Hansen and Slagsvold, 2016) and higher social isolation (Stewart *et al*., 2009 and Eckhard, 2018). Low income may contribute to social isolation and loneliness because financial resources are often needed to participate in social activities and to use paid services that could reduce the burden of informal caregivers and can help to maintain a better relationship quality (Pinquart and Sörensen, 2001, 2003). In addition, low income and poverty may contribute to social isolation and loneliness

through perceived stigmatization and a reduced sense of belonging (Stewart *et al*., 2009). For an in-depth discussion of the association between income poverty and loneliness/isolation, see the chapter by Cudjoe.

Higher education tends to be negatively related to loneliness and social isolation; however, once other variables such as income or occupational status are controlled for, this correlation is typically reduced or even reversed (Luhmann and Hawkley, 2016). The effect of education on loneliness and social isolation is therefore most likely more indirect than the effect of income. Educational level may determine with whom people seek social contact and in which activities they engage (Pinquart and Sörensen, 2001 and Bourdieu *et al*., 2021). It may also protect from loneliness and social isolation via its effects on income and occupational status.

Ethnic and sexual minority status

Loneliness and social isolation may also be related to belonging to a minority such as an ethnic or sexual minority group. Overall, research on this particular topic is relatively rare, but some preliminary patterns can be deduced from the available literature. Regarding *ethnicity and migration status*, several studies found above-average loneliness levels among immigrants, refugees, and members of ethnic minorities (for a review, see Salway *et al*., 2020). Regarding *sexual minority status*, a meta-analysis of four empirical studies found higher levels of loneliness among individuals identifying as sexual minority compared to individuals identifying as heterosexual (Gorczynski and Fasoli, 2021). Together, these studies suggest that belonging to a minority group may be an additional risk factor for loneliness and social isolation that deserves more attention in future research.

Region and country of residence

Loneliness and social isolation are also related to the broader socioeconomic context. Most cross-national studies on loneliness among older adults come from European countries. They consistently find that loneliness levels are higher in Southern and Eastern European countries than in Northern and Western European countries (Yang and Victor, 2011; Hansen and Slagsvold, 2016; and Chawla *et al*., 2021). Theoretical explanations for these cross-national differences have focused on national differences in the quality of living conditions, the demographic composition of a particular population, and differences in cultural norms and values (de Jong Gierveld and Tesch-Römer, 2012; Fiori *et al*., 2020; and Heu *et al*., 2021). In Europe, national loneliness levels tend to be higher in countries with more collectivistic (vs. individualistic) values (Fokkema *et al*., 2012 and Lykes and Kemmelmeier, 2014), with a higher percentage of older adults who live alone and/or were never married (Hansen and Slagsvold, 2016), and in countries with higher

average wealth (Fokkema *et al.*, 2012 and Hansen and Slagsvold, 2016). For an in-depth discussion of the association between cultural factors and loneliness as well as social isolation, see the chapter by Burholt.

Geographical differences in loneliness and social isolation can also be found within countries (Beer *et al.*, 2016; Menec *et al.*, 2019; and Buecker *et al.*, 2021). For example, a study examining geographical differences in Germany found that loneliness levels were higher in more remote regions, in regions with a higher population fluctuation, and in regions with longer distances to public parks and leisure activities (Buecker *et al.*, 2021). Interestingly, no systematic differences between rural and urban regions were found in this study. Other characteristics of the region or neighborhood that have been linked to loneliness and social isolation among older adults include perceived neighborhood walkability, perceived safety, and socioeconomic characteristics of the neighborhood (Beer *et al.*, 2016; Yu *et al.*, 2017; and Menec *et al.*, 2019). However, it is important to note that the number of studies investigating the link between regional characteristics and loneliness and social isolation among older adults is still small, and results do not always replicate (Timmermans *et al.*, 2021).

Summary and discussion

Loneliness and social isolation are serious risk factors for individual and public health of older adults (Cacioppo and Cacioppo, 2018). To understand how these risk factors can be mitigated, it is important to understand why some older adults become isolated and lonely and others do not (National Academies of Sciences, Engineering, and Medicine, 2020). Beyond rather obvious proximal factors such as health, stress, or social roles that are predictive of relationship quality and social network size (de Jong Gierveld and Tesch-Römer, 2012), distal factors such as the socioeconomic correlates that we described in this chapter need to be considered as well. Theoretical models of loneliness and social isolation propose that socioeconomic correlates such as age, gender, relationships status, or socioeconomic status may affect social isolation and loneliness indirectly through their impact on more proximal factors that lead to differences in quality and frequency of social relationships (Hawkley *et al.*, 2008 and de Jong Gierveld and Tesch-Römer, 2012). For instance, old age is correlated with loneliness and social isolation, but this relationship is mainly due to increasing health problems and shrinking social networks that come along with rising age (Luhmann and Hawkley, 2016). In addition to well-known socioeconomic correlates such as age, gender, and relationship status, we also examined factors for which research is still scarce, like ethnic and sexual minority status, region, and country of residence (Salway *et al.*, 2020; Chawla *et al.*, 2021; and Timmermans *et al.*, 2021). Preliminary evidence suggests that these factors may be correlated with social isolation and loneliness.

Open questions and future research

Overall, previous research has identified a number of socioeconomic correlates that are robustly associated with loneliness and social isolation. However, we also see two big questions that should be addressed in future studies. First, as we argued above, a sound understanding of the socioeconomic correlates of loneliness and social isolation may help in identifying subgroups that could be targeted by interventions aimed at preventing and combating loneliness and social isolation. Most research, however, has examined the associations between socioeconomic correlates and loneliness and social isolation on a bivariate level (e.g., what is the correlation between income and loneliness) or on a multivariate level, controlling for other variables (e.g., what is the correlation between income and loneliness after holding other correlates such as age or gender constant). Much less is known about how specific constellations of multiple factors act together to predict loneliness and social isolation. For example, the risk for loneliness might be higher for an elderly gay man than the additive effects of age and sexual minority status would predict (Carnaghi *et al*., 2022). Future research should study the additive and multiplicative effects of multiple socioeconomic factors on loneliness and social isolation more systematically (for an examplatory study on perceived stress among older adults, see Scott *et al*., 2011).

Second, the mechanisms linking socioeconomic factors to loneliness and social isolation are still unclear. This is true not only for those socioeconomic factors for which empirical research is generally scarce (e.g. minority status, regional factors) but also well-studied variables like age or gender (Courtin and Knapp, 2017 and National Academies of Sciences, Engineering, and Medicine, 2020). A deeper understanding of how different mechanisms link these distal factors to loneliness and social isolation is necessary to design more effective interventions to tackle loneliness and social isolation.

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Chapter 4

Social connection, aging and poverty

Thomas K.M. Cudjoe

Introduction

English poet, John Donne in 1624 published his *Devotions upon Emergent Occasions Meditation XVII*, "No man is an island, entire of itself; every man is a piece of the continent…" He penned these words during a trying time in his life during a period of sickness. Similar, to Donne, older adults may experience periods of sickness whereby they are socially isolated or lonely wherein such situations progress from periods of disability to death alone. A news story that made international headlines exemplifies this – *Mummified body of Italian woman found sitting at a table, 2 years after her death*. The reporter noted that "The real sadness is not that the others did not notice her death. It is that they did not realize Marinella Beretta was alive."("Mummified body of Italian woman found sitting at a table, 2 years after her death - CBS News," 2022). This is the reality for older adults who live with limited financial means on the brink of a crisis; these older adults may have no one to call on and limited to no resources to meet their basic needs.

In general, social isolation and loneliness are thought to be burdensome experiences that lead to worse outcomes for older adults regardless of who they are. Older adults who have strained socioeconomic circumstances may find themselves in a precarious position whereby many aspects of their lives are challenged due to the nature of societal pressures relating to all things associated with finances. Monetary resources are not the be-all and end-all but can enable older adults to navigate late life in different ways. Arguably, reliance on financial resources has not always been the societal *modus operandi*, but in our modern society, the scale often tilts toward financial rather than social resources.

The broad challenge of social isolation and loneliness combined with the challenges of poverty are increasingly relevant for practitioners and policymakers. An individual's economic status – wealth or income that is higher – enables them to procure needed goods and services in a manner that is different than those that have financial limitations. Readily available

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financial resources enable individuals to make decisions about basic needs and leisure that are not encumbered by limitations in money. Additionally, amid increases in cost of living or inadequate savings along with increasing longevity, many older adults struggle to survive. An older adult's social connections – their network and relationships with friends, family, or other acquaintances that provide social support – may be the only buffer they have from difficult realities. Practitioners may encounter these older adults in times of crises and are challenged in their ability to provide recommended services that supplement or support individuals with lower incomes who have no one else to provide support. The impact of poverty compounded in individuals as they reach older ages whereby their risk for cognitive and functional decline is greater poses a unique challenge for policymakers.

Income is highly correlated with individual physical environment. Socioeconomic status may also influence the social environments which may result from certain physical environments – studies have highlighted the intersection between poverty and environmental hazards including crime, pollution, and community disorder (Hajat et al., 2015). Other studies have also found that income has a role in social cohesion and belongingness among older adults (Angel, 2009 and Epps et al., 2018). Despite continued economic growth around the world and amid ongoing advancements in technology and information exchange as well as strategic investments in certain geographies, targeting various factors while not considering place (e.g., local context) has not led to beneficial outcomes across population groups. Place has a strong influence on the social connection and well-being of individuals across the life course. Furthermore, practitioners and policymakers are increasingly developing programs that provide additional financial support to older adults to support health; however, clarifying the intersection of social connection is an area brimming with need for further efforts. Bright spots include health systems and payers in the United States that are leveraging electronic health record information and address (e.g., zip code) data at the aggregate population level to direct resources and services to organizations that provide services to individuals who live in certain areas that are challenged by factors due to their socioeconomic status. Lastly, amid constantly evolving social dynamics due to geographic migration, a decline in social group participation and religiosity, changes in family structures relating to divorce rates, death, or disability among social network members, and decline in birthrates or childlessness, individuals reaching older ages and their social support and relationships are not always aligned with the needs and desires of the individual. Increasingly in our current society, this complex plight – the experience of social isolation and loneliness – goes unnoticed and this can be particularly apparent for low-income older adults.

The American scholar, Kimberlé Crenshaw in the late 1980s described the theory of intersectionality which is relevant to considerations of aging, social connections, and socioeconomic status (Crenshaw, 1989). Intersectionality has

been described as a state in which two or more oppressions or discriminations overlap, creating multiple levels of injustice. In public health, the focus is often on populations; however, these larger groups are often made up of subpopulations that exist at the intersections of one another (Cohen, 2021). So, it is that individuals who are chronologically older and experience social isolation or loneliness and poverty make up a subpopulation that is of particular interest due to the potential risk that converges at the nexus of these three experiences. The burden of being old, isolated/lonely, and in poverty carries with it more than the inability to buy groceries, have secure housing, or engage in leisure activities. It carries with it a psychological strain and uncertainty amid having no or limited friends or family. It is common to humanity that we age; however, our social and economic systems and structures have led to there being people who experience poverty. So, it is the intersection of these three that we see as poor health. Improving the health of this subpopulation requires clear data coupled with funding for policies and programs that engage specific communities. Furthermore, focusing on this subpopulation while acknowledging its heterogeneity helps avoid the pitfalls of a one-size-fits-all approach. Unfortunately, in our society, these individuals are often unnoticed and left to their own demise. In this chapter, we will focus on conceptual framing of this intersection, definitions/measurement, existing evidence, and COVID-19 considerations.

Conceptual considerations

Social connections are modifiable and can influence the physical and mental health of older adults (Cohen, 2004 and National Academies of Sciences Engineering and Medicine, 2020). For example, a socially isolated older adult may not have contact with family or friends who encourages them to eat healthy foods, exercise, and adhere to medical guidance. The absence of this social influence or information could lead to detrimental behaviors, including poor dietary decisions, sedentary lifestyle, or continued tobacco or alcohol use which have biological manifestations that lead to poor health (Berkman et al., 2000 and Mendes de Leon and Glass, 2004). Overlay poverty and these pathways become even more strained. Consider the challenge and impact of an older adult like Ms. Smith, a 74-year-old divorcee living alone. She has heart problems and is obese. Her children live far away. She does not know her neighbors because she is concerned that they might harm her. She spends most of her time in her apartment watching television. She rarely leaves her apartment in her motorized wheelchair because she has limited funds to engage in activities thatshe previously enjoyed like going out to eat or to the movies with friends. She is also hesitant to meet new people. She frequently called 911- the emergency response service and presented to the Emergency Department with complaints that often did not require hospitalization. Her primary care doctor noted that she was very

talkative during routine visits. Ms. Smith reported she had no one to talk to about the things that matter to her.

Social isolation and loneliness pose an important health burden. The mechanism for this health burden requires more research. Existing frameworks propose that upstream factors, including social–structural conditions at the macrosocial level, including demographics, culture, and political forces, create the conditions that impact networks, engagements, and supports (Mendes de Leon and Glass, 2004). This further manifests via downstream mechanisms or pathways that are associated with stress, physical activity, access to resources or care, and perception about connection to family or community. This then impacts biological processes and behavior which lead to certain outcomes that range from cognitive and physical function to mortality. In this process lies the role of socioeconomic status or poverty. Financial limitations may exist due to internal and external factors which may be influenced by present and past circumstances. These macrosocial factors, including poverty, may lead to or result from social stratification, social exclusion, structural racism, discrimination, immigration, or labor market forces (Berkman et al., 2000). Think about the older adults who were descendants of enslaved people who left the segregated south only to have to rebuild all connections and resources upon moving from this geographic location. Or consider the plight of an older immigrant who was a leader in their home country, moved because of an oppressive regime, and started over in a new country without a family or career, living on government subsidies. These are possibly rare examples but represent the experience of various individuals who are aging, have low incomes, and may experience social isolation or loneliness. This highlights some of the circumstances or influences of one's socioeconomic status on how one's social networks develop or decay and how individuals engage or choose not to and the type of support these individuals receive. This is the older adult who cannot afford to maintain relations because of the cost associated. My intent isnot to suggest that low-income older adults are a monolith or to further marginalize them or that these factors are the only factors that matter in their journey. The goal is to highlight how factors culminate or accumulate in one's life and potentially lead to the outcomes in the aforementioned pathways. Financial resources are relevant for older adults and their social connection for reasons that include how the presence or absence of the resources may impact how one copes or is resilient; considerations about how choices can be different depending upon financial status, the role of financial resources can be different depending on the context.

Measurement and definitions

The examination of social connection, aging, and socioeconomic status is an important pursuit, though it has layers of complexity due to variability in definition and measurement. The goal here is not to offer a unifying

definition or describe a gold standard measure but to note concepts that have been previously described. These measures and definitions may vary by time, culture, context, and theoretical foundations. Though social connection has been described or measured in a variety of ways, a useful approach considers social connection as an umbrella term that represents the many ways that individuals interact: based on the structure, function, and quality of interactions (Holt-Lunstad, 2018). Additionally, consider social isolation as an objective circumstance whereby an individual lacks social contact with others, whereas loneliness is a subjective circumstance, wherein an individual perceives that they are isolated, report the feeling of being lonely and that there is a mismatch between actual and desired relationships. Despite these varying characterizations, epidemiological evidence consistently demonstrates that social isolation and loneliness are highly prevalent among older adults (Cudjoe et al., 2020; Kotwal et al., 2021; and National Academies of Sciences Engineering and Medicine, 2020). Aging is a natural, inevitable process, commonly utilizing time – chronological age. Many conventional approaches at least in the United States context refer to persons aged 65 and older as an "older adult". This definition does not acknowledge the nuance and heterogeneity associated with differing genetics, behaviors, environments, or resources over the life course.

The pursuit of this chapter to characterize socioeconomic status is also an imprecise science. Defining income, wealth, or poverty as a measure of socioeconomic status is intertwined with context. Income is generally thought of as money received on a regular basis from work or investments. Wealth reflects the accumulation of assets across the life course and is relevant in individuals with or without active income. Poverty is a state of having few material possessions or low-income levels relative to what is essential to fulfill basic needs (food, clothing, shelter, and healthcare). Many people around the world live in poverty. Approximately, 85% of the world lives on less than $30 US dollars per day and almost two-thirds live on less than $10 per day. Poverty rates among older individuals vary widely across countries. These individuals tend to experience disproportionately higher rates of chronic conditions and mortality. Narajan et al. described it this way, "Poverty is pain it feels like a disease…It eats away one's dignity and drives one in to total despair" (1999).

Others have noted that utilizing income as the sole measure of poverty is too narrow and that considering the multidimensions of poverty offers a holistic understanding of these circumstances (Samuel et al., 2017). This is to say that approaches that account for resources that are both tangible and intangible yield the fullest picture of poverty. The aforementioned financial terms largely account for actual amounts of resources, whereas financial strain considers perception and context. It is defined as insufficient income to meet basic needs. Financial strain is an indicator of socioeconomic disadvantage representing a lack of access to the resources needed to avoid or

ameliorate chronic illness and disability. It is informed by one's perception of their resources and what one can do with the resources they have. Notably, individuals experience financial strain if they report lacking money to pay the rent/mortgage, utility bills or medical/prescription bills, or skipping meals because of insufficient money to buy food (Samuel et al., 2019). There is a parable that goes if you give a man a fish he will eat it for a day but if you teach a man to fish he will eat it for a lifetime. This lesson is relevant in the consideration of how education and income are two highly correlated concepts that inform one's socioeconomic status. Income typically decreases significantly when individuals reach older ages, whereas the benefits of education can extend into late life. However, years of formal education can be understood across municipalities and nations, whereas understanding the role of financial characterizations of socioeconomic status can be more challenging.

Much of the aforementioned terminology focuses on individuals. Approaches that leverage community context (i.e., area deprivation index) or classify the economic state of nations also provide characterizations that can be useful for policymakers. Naito et al. examined social isolation and mortality but classified participants by residence in high-, middle-, and low-income countries. This is important because of the global viewpoint; however, it should not allow us to lose sight of the experience of individuals who may be socially isolated and living in poverty in high-income countries or the resilience of older adults in low-income countries (2021).

Current findings

In the United States, approximately 1 in 4 older adults are socially isolated; this group likely accounts for an additional $6.7 billion in annual Medicare spending (Cudjoe et al., 2020 and Flowers et al., 2017). Low-income older adults have two times the odds of experiencing social isolation compared to those with higher incomes (Cudjoe et al., 2020). Amid current aging projections and reports that the current cohort of older Americans have high debt and insufficient savings, the demand for low-income housing has increased. Low-income older adults are more likely to live alone, have higher rates of chronic conditions, and fewer social support compared to their higher-income counterparts (Office of the Assistant Secretary for Planning and Evaluation, 2014). This loss of social connections and resulting emotional distress can combine to affect the physical and mental health of low-income older adults.

Though data examining the intersection of financial resources or circumstances is limited, investigations are increasingly pursuing expanded understanding of the burden and impact of these issues collectively. Notably, many studies have either included a social isolation or loneliness measure or a brief screener. In the National Health and Aging Trends Study (NHATS), social isolation is characterized using a multidomain approach that includes social networks, living arrangements, social participation, and religious attendance.

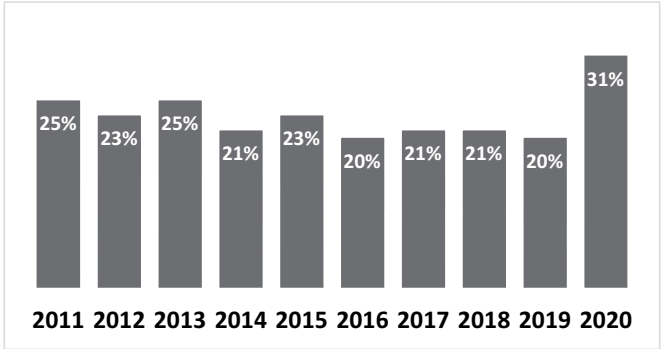

Figure 4.1 Prevalence of Social Isolation, National Health and Aging Trends Study (2011–2020)

NHATS leverages complex statistical procedures that facilitate population estimates of US older adults. Using ten years of data from NHATS, there are more than 20% (20% to 31%) of older adults who experience social isolation (Figure 4.1). Older adults who are socially isolated make up a higher percentage of individuals in the lowest-income groups. Older adults who reported incomes less than $15,000 or $15,000 to $29,999 (USD) account for 34% and 30% of individuals who are socially isolated compared to only 19% and 22% of those who are not, respectively. As income increases to levels greater than $30,000, this relationship reverses, and among these higher-income groups, there are a lower percentage of older adults in the social isolation groups compared to those who are not socially isolated. Financial strain was also assessed in NHATS. Of older adults who were noted to experience financial strain, approximately 8% reported also experiencing social isolation compared to 5% who did not experience social isolation. Lastly, as it relates to health insurance, in the US context, more (17% vs 9%) older adults who are socially isolated are on Medicaid (US public insurance for individuals with low incomes) than older adults who are not socially isolated (Cudjoe et al., 2020).

A study utilizing data from the Health and Retirement Study (2006–2016) collects data on a nationally representative cohort of adults ≥51 years old who are interviewed biennially until death offers insights about finances and social connections. Study participants completed a leave-behind questionnaire that included household and core contacts, social network engagement, community engagement, and loneliness as measured by the UCLA Loneliness three-item measure. The authors found that individuals with the lowest incomes had the highest percentage of social isolation and loneliness. More specifically, 34% and 29% of study participants who were socially isolated and lonely, respectively, had incomes of <$6,000 compared to 14% and 13% of study participants who had incomes >239,000 (Kotwal et al., 2021). Data

from an international study stratified participants by gender and examined loneliness and social participation by wealth quintile. They found that individuals in the lowest wealth quintiles had the higher percentage of loneliness and the lowest percentage of social participation (Naito et al., 2021).

A key challenge of understanding or research related to the intersection of social connection, aging, and socioeconomic status lies in the fact that this is a hard-to-reach population that is difficult to identify and include in efforts to support them. A key caveat to the aforementioned work is that it is hampered by the reality that individuals who are socially isolated, older, and have limited financial resources are rarely included in research. In addition, there are other important gaps to note which include the fact that few studies include populations from the developing world, thus insights from these nations are missing from discussions about this topic. Additionally, focusing on societies where socioeconomic resources can be assessed may cause us to miss out on insights from societies that are not anchored or dependent on an economic system. Lastly, a major challenge in this examination is the absence of a longitudinal perspective that acknowledges the life course of individuals – their social connections or financial resources overtime.

COVID-19 considerations and future opportunities

The COVID-19 pandemic has led to unprecedented changes in our social connections. The imposed physical distancing protocols and resulting behavioral changes have impacted societies around the world. This experience has increased awareness about the plight of older adults as well as given the masses a taste of what physical isolation is (Cudjoe and Kotwal, 2020). The COVID-19 pandemic has brightened the existing spotlight on social isolation and the disproportionate burden the impact of societal inequity has on older adults, certain racial and ethnic groups, and individuals with limited financial resources. Similar to other times of crisis, individuals whose basic needs are challenged fare worse than those with more social or financial resources. Understanding this impact has led to broader discussions about social determinants of health as well as increased interest in the assessment and alignment of resources to target communities in need. Coalitions have also formed around the world to work together to target these issues. This experience offers a unique opportunity for practitioners, researchers, and policymakers to have a lasting impact that could change the trajectory of social connections for all groups for decades to come.

Conclusion

Older adults with limited financial resources have a high likelihood of experiencing social isolation and loneliness in countries around the world. These individuals cannot be forgotten as we consider advances in practice, research,

and policy. Increasing awareness about the challenge that exists at this intersection is an important step toward improving this subpopulations' health. No man is an island and so we are all in need of social connection regardless of our station in life or financial resources.

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Chapter 5

Culture, social isolation and loneliness in later life

Vanessa Burholt

Introduction

This chapter provides an overview of the influence of culture on social isolation and loneliness. It draws together the evidence to theorise a pathway to loneliness that is influenced by culture. While there is a large body of evidence to demonstrate that individual characteristics or life events impact on customary levels of social interaction for older people, and loneliness, there is less evidence concerning the impact of macro-level cultural factors such as values, norms, and beliefs on these outcomes.

Social isolation is defined as a lack of or low levels of meaningful social contact through social relationships (Lubben et al., 2006). Loneliness is defined as a negative emotional experience that is the reaction to a mismatch between expectations concerning the quality and quantity of social relationships and those that are achieved (Fried et al., 2020 and Prohaska et al., 2020). A subjective negative evaluation of romantic relationships or relationships with a significant other can result in emotional loneliness. Deviation from an internalised "ideal" social network of family and friends can result in social loneliness. Thus, an older person may be isolated but not lonely, lonely but not isolated, both lonely and isolated, or neither. This chapter describes how culture influences achieved social relations, desired social relations, and loneliness.

Different academic disciplines and ideologies define culture differently. In this chapter, culture refers to a set of norms, beliefs, values, customs, and traditions that are shared by a nation, region, community, or group. Culture is "learned" through the social environment and is transmitted through language, rituals, religion, institutions, art, music, and literature. Culture is dynamic: it can be passed from one generation to another but is also subject to change over time (Winter and Burholt, 2018). Cultural heritage is forged within the culture of the family of origin or the place or places in which one lives or has lived, whereas cultural identity is expressed through self-categorisation into cultural group(s) (Burholt et al., 2016a). A culturally defined position in society can be ascribed by others according to age, gender or

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gender identity, ethnicity, social class or economic position, sexuality or sexual identity, and disability or disease.

Cultural exclusion is defined as the extent to which people are able and willing to conform to prevailing cultural trends (Winter and Burholt, 2018). Cultural exclusion is the most under-explored domain of social exclusion (Lysgård, 2008).

Dominant Cultural Norms, Cultural Variation, and Social Isolation

In the social sciences, there is a long history of associating cultural variation with the demographic transition between traditional and modern societies (Triandis, 1993; Durkheim, [1893] 1997; Tönnies, 1957; and Weber, 1947). For example, cross-cultural differences may be examined by contrasting high-income countries and low- and middle-income countries or urban and rural societies.

In simplistic terms, traditional societies are often referred to as collectivist cultures: bound together by territorial tribalism, economic interdependence, and family solidarity. In a collectivist culture, the needs and goals of the kinship group, family, or community have greater value than the desires of an individual. Community cohesion is important and is maintained through social control: sanctions are applied to those who deviate from the culturally prescribed norms.

Modern, industrialised societies are often referred to as individualistic cultures. These are typically characterised by geographic separation, diffuse social ties, and independence of nuclear units across generations. In individualistic cultures, the needs of the individual have primacy, rather than the common good.

Considering cultural variation and social isolation in later life, collectivist and individualist cultures are each associated with more or less normative restrictions or freedoms around forming and maintaining social relationships (Lykes and Kemmelmeier, 2013). From this perspective, conforming to restrictive norms in collectivist cultures decreases the likelihood of physical isolation for older people when compared to individualist cultures. For example, conforming to collectivist cultural norms comprising relational stability, intergenerational co-residence, or a high frequency of visits to older parents contributes to a lower likelihood of social isolation in later life. On the other hand, individualistic cultural norms for social relationship are less restrictive: relationship dissolution (divorce, separation), family dispersion, and infrequent parental visits are socially acceptable but increase the risk of social isolation for older people (Lykes and Kemmelmeier, 2013).

Despite the persuasiveness of this argument, with the exception of Fokkema et al. (2012), few studies have used indicators of social isolation to explain cultural variation in the distal outcome of loneliness. The limited

number of studies drawing on culture to explain social isolation may be because the association between "collectivist culture–traditional society" and "individualist culture–modern society" is a gross over-simplification of cultural differentiation. Although family or social solidarity patterns are often described in terms of a gradient from individualistic tradition to collectivistic tradition, there are significant cultural variations in norms governing social relationships that are more nuanced than the collectivist–individualist gradient or dichotomy suggests. In this respect, the status that a cultural group holds or the perceived transgression of cultural norms by an individual or cultural group both have consequences for social relationships and social isolation (Figure 5.1).

Cultural Identities, Culturally Defined Social Position, and Social Isolation

Social identity theory (Tajfel and Turner, 1986) and self-categorisation theory (Turner, Hogg, Oakes, Reicher, and Wetherell, 1987) suggest that the degree of identification with a particular group in society is based on perceived shared characteristics or cultural attributes, including norms, values, beliefs, and/or behaviours. Groups may be based on a variety of factors such as nationality, political affiliation, religion, gender, geographical location, social status, and so on, or based on combinations of these categories. Sociocultural identities "both describe and prescribe one's attributes as a member of that group […] that is, what one should think and feel and how one should behave" (Hogg, Terry, and White, 1995, p. 206).

Social identity theory also focuses on inter-group relationships and comparison. Comparisons with other cultural groups are influenced by subjective belief structures concerning the perceived legitimacy of the status of the group (Hogg et al., 1995) which is often contrasted to dominant cultural

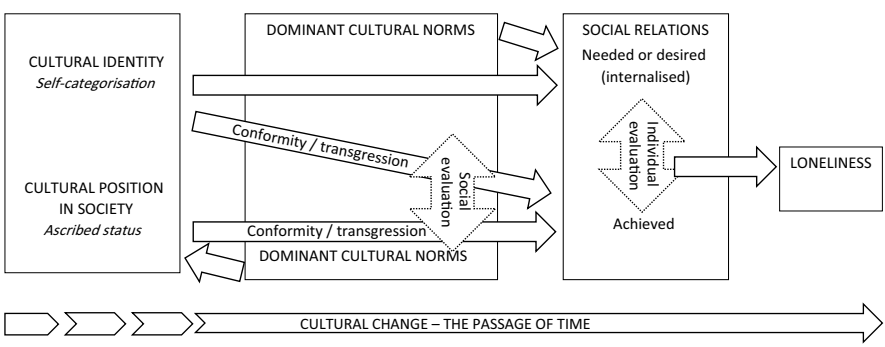

Figure 5.1 Hypothesised pathway to loneliness indicating the influences of cultural identity, cultural position in society, and dominant cultural norms

norms. For example, with regard to particular ethnic or migrant groups, outgroup social categorisation is usually associated with some identifiable cultural attributes such as skin colour, accented speech, and apparel. Prejudice and discrimination directed at members of the outgroup can lead to exclusion from opportunities for social interaction or participation and isolation.

Regardless of how someone self-identifies with a particular cultural group or groups, an older person's culturally defined position in society can be ascribed by others according to age, gender or gender identity, ethnicity, social class or economic position, sexuality or sexual identity, disability or disease (e.g. dementia) that confer a particular cultural stigma.

The perceived conformity to or transgression of dominant cultural norms by individuals who locate a particular culturally defined position in society can have the same outcome as self-identifying with a particular cultural group that is "othered": it can influence access to social relationships, social participation and can result in discrimination or exclusion from social relationships and social isolation (Burholt et al., 2020b).

Research in various cultures and contexts has demonstrated that the transgression of cultural norms by older people can result in social isolation. For example, in mainland China, the social connections of lesbian, gay, bisexual, and transgender (LGBT) older adults are influenced by the intersection of LGBT stigma and cultural values (familial responsibility, filial piety – respect and obligations towards parents). Non-conformity or unfilial behaviour by older LGBT Chinese is visible to others because they are less likely to have a child to maintain the continuity of their heritage. Hua et al. (2019) argue that this results in the loss of moral standing, weakening of social ties, and social isolation: social sanctions comprise separation within (families) and loss of interpersonal social connections in the community.

Cultural non-conformity or transgression of norms for social relationships (i.e. when an older person's social or family network deviates from the social ideal) as demonstrated by LGBT older adults in China creates a vicious circle entailing further social ostracisation. For example, Burholt et al. (2020a) describe the situation of a childless unmarried older woman in India. As an unmarried woman, she was reliant on social relationships with her younger brother who was the closest male family member. She was not permitted to visit other people because it was socially undesirable, and non-conformity would result in disgrace for her brother's family. Eventually, her poor health and incontinence conferred a particular cultural stigma on the household and her brother moved her to a care home. She was labelled a socially undesirable relative and perceived as *"trouble"* to his family. For this older woman, non-conformity to Indian cultural norms (i.e. unmarried, without children to provide support, and incontinent) resulted in social isolation.

Older people may be "othered" because they are perceived to transgress dominant cultural norms of independence and/or youth. A medical or

"deficit" model of ageing often portrays older people using negative stereotypes, for example, as living with disabilities and in poor health. This contributes to the dominant discourse and cultural norms that spawn ageism (i.e. older people as a socially undesirable "outgroup"). Similarly, identification or labelling with a particular disease such as dementia influences the way in which older people are treated: public attitudes, stigma, and discrimination create barriers that influence access to social resources, impacting on social isolation (Burholt et al., 2016b). The degree to which the medical model of ageing dominates a culture's discourse contributes to the belief or value system that, in turn, influences the extent to which an older person is provided with the opportunities to engage in fulfilling social activities.

Overall, social mores – social norms that are widely observed within a particular society or culture – can have the effect of either increasing or decreasing social isolation of older people. The effect is dependent on the prevailing dominant cultural norms that intersect with the cultural identity or sociocultural position of the older person.

Migration, Cultural Change, and Social Isolation

Cultures differ between geographic locations and under different economic and political contexts over time. Older people may experience cultural change because they have moved between places with different dominant cultures. Inglehart and Baker (2000) suggest that basic "values" are fixed by adulthood. In this respect, older people's cultural norms may endure from an earlier period or a different place; they may feel excluded from practicing older traditions or values that are important to them but that form part of their cultural identity.

Cross-cultural studies exploring cultural exclusion and social isolation often focus on comparisons, for example, between indigenous populations and transnational migrants or ethnic minority groups (Torres, 2012 and Burholt et al., 2016a). Migrants have often left behind a cultural context which gave meaning to their lives, and Torres (2012) argues that in a new home country, migrants live "in between" cultures. In this respect, cultural exclusion or inclusion is often assumed to be associated with acculturative demands (Berry, 2006).

Acculturation was defined by Redfield et al. (1936: 149) as, "those phenomena which result when groups of individuals having different cultures come into continuous first-hand contact, with subsequent changes in the original cultural pattern of either or both groups". Thus, "successful acculturation" of older migrants was assumed to result in the adoption of some cultural conventions in the new home country and social integration. Acculturation has generally been rejected because of the failure to address plurality of cultural identities, complexity, and context, especially when examining human development and the ageing process.

There is a paucity of research on the cultural exclusion of older migrants. The evidence that exists is implicit rather than explicit. For example, migrant settlement and relocation patterns often result in areas with a single predominant ethnic group (sometimes referred to as an "ethnic enclave"). While cultural or ethnic clustering results in a strong connected social network, that may be advantageous, for example, in seeking work, we do not know the extent to which settlement patterns of older adults are due to the desire for cultural inclusion: living in close proximity to others with similar norms, values, and beliefs and where the trappings associated with one's culture (e.g. food, clothing, places of worship) are easily accessible.

Despite the potential positive impacts on cultural inclusion and social connectivity, ethnic clustering may have the effect of decreasing older people's inclusion and interaction with other cultural groups in society (Burholt, 2004). Cultural clustering versus dispersed settlement patterns of cultural groups is likely to influence the ways in which social relationships are organised and thus have an indirect effect on loneliness (Rokach et al., 2001).

Ageing in Place, Cultural Change, and Social Isolation

There is very little research that considers how cultural change impacts the cultural exclusion of older people. As noted earlier in this chapter, cultures are not static, they follow different trajectories over time. Adoption of a particular culture (e.g. local, regional, or national) varies between individuals and may be related to personal factors such as age or generation (Higgs and Gilleard, 2010 and Keating et al., 2015). As noted in the previous section of this chapter, cultural change and its impact on social isolation may be especially pertinent to older migrants who have relocated to places with different dominant cultures but is also relevant to older people ageing in place who have experienced cultural change related to a specific period or place. These cultural changes may also contribute to social isolation and loneliness (DiMaggio, 1994 and Inglehart and Baker, 2000).

Historically, many indigenous populations have been subjected to colonialisation and oppression which has contributed to cultural change and cultural exclusion. For example, kaumātua (older Māori) in New Zealand (Hokowhitu et al., 2020), Aboriginal people in Australia (Sivertsen et al., 2019), Canada (Employment and Social Development Canada, 2018), and the USA (Spring, 2016) were historically compelled to dissociate with their cultures. These period effects (historical events that affect an entire population at a specific time) have an enduring effect on the cultural exclusion and social isolation of older people. For example, the lack of integration of indigenous (and other) cultures into care services (e.g. aged residential care) means that older indigenous peoples may not be provided with culturally safe environments that allow social connections to flourish in later life.

Aside from the rapid effects of colonisation, the pace of cultural change may be influenced by structural changes such as improved communication networks, immigration policies, or policy initiatives that select certain areas for investment in business, education, or leisure and that lead to population mobility. Winter and Burholt (2018) have argued that "cultural values often leave their imprint on subsequent generations, long after the material conditions responsible for those values have altered" (p.7).

In rural Wales (UK), Winter and Burholt (2018) found that period effects influenced culture. The demise of local industries (e.g. coal mining), language and educational policy developments, and population change were underpinned by a trajectory from collectivist to individualistic cultural values. Place effects varied between rural areas, but on the whole, population stability, local services, and employment opportunities transitioned to population churn, remote services, and few employment opportunities. Consequently, the cultural identity of local older Welsh people shifted from being in harmony with collectivist cultural norms to in conflict with individualistic cultural norms of in-migrants and younger cohorts. There were fewer opportunities to socialise with people with common cultural values and who spoke Welsh. However, older people were not necessarily passive, and to offset or prevent cultural exclusion, some set up heritage groups to encourage an appreciation of the areas of cultural history and to initiate new social connections.

In summary, in our model of the pathway to loneliness, cultural change (period effects and place effects) can lead to the cultural exclusion of older people. Cultural exclusion influences the opportunities for social connections and relationships, contributing to social isolation.

Cultural Ideals, Relationship Evaluation, and Loneliness

Differences in average levels of loneliness for older people between cultures would be expected as expectations concerning ideal relationships are shaped by cultural norms (van Staden and Coetzee, 2010). Earlier in this chapter, I described how cultures with more restrictive norms concerning social relationships could lead to lower levels of social isolation for older people. However, in these cultures, there is also a greater likelihood that social relationships deviate from the contemporary or historical normative ideal internalised by older people. In turn, a negative evaluation of social relationships that fail to meet these high expectations contributes to loneliness. This notion is supported by a body of evidence that demonstrates greater average levels of loneliness for older people in collectivist cultures compared to individualistic cultures (Lykes and Kemmelmeier, 2013 and Dykstra, 2009), although there is some evidence to the contrary (Barreto et al., 2021).

Table 5.1 Summary of positive and negative effects from loneliness regressed on personal characteristics (omitted) and network type (Burholt et al., 2017)

Network type	*Loneliness*
Multigenerational household: older integrated	+
Middle-aged friends	+
Restricted non-kin	+
Multigenerational household: younger family	-

Drawing on the individualism–collectivism gradient, but reflecting a more nuanced difference between cultures, some studies have demonstrated how cultural dissonance contributes to loneliness. Burholt et al. (2017) established the "ideal" social network for six collectivist ethnic groups in the UK. They demonstrated that "Multigenerational: Younger Family Networks" were the most common network type and typically comprised three or more generations living in the same house. Deviation from this network configuration resulted in greater levels of loneliness for older people, even for those with other types of multigenerational households who were not socially isolated (Table 5.1). Similarly, Hansen and Slagsvold (2016) demonstrated that the association between living alone and loneliness varied according to cultural expectations, with less loneliness identified in European countries moving from North to South. In Northern European countries, living alone is concordant with expectations, whereas in Southern European countries, intergenerational co-residence is the norm and living alone contributes to the experience of loneliness.

The subjective evaluation of whether one's achieved relationships match the internalised desire, expectation, or ideal concerning the quality and quantity of relationships is the final process in the hypothesised cultural pathway to loneliness (Figure 5.1).

Conclusions

There is little theorising underpinning the small body of research evidence on the influence of culture on isolation and loneliness in later life. Many of the potential relationships between elements of the hypothesised model require further investigation. Despite the limitations, the hypothesised pathway provides a good starting point for further investigation. In this model, dominant cultural norms define the ideal range of relationships that are acceptable for an older person. Dominant norms are subject to change over time and vary between places. An older person's cultural identity or cultural position in society determines the extent to which they are perceived to conform or transgress the norms concerning social relationships. The "reaction" of the dominant culture to the cultural group/cultural position can result in cultural

exclusion or inclusion and in turn impact achieved social relationships. The subjective evaluation of achieved social relations is influenced by cultural values concerning the normative expectations for the "ideal" levels and types of relationships. A mismatch between the internalised ideal and achieved relationships leads to loneliness.

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Part IV

Correlates of loneliness and social isolation in old age

Lifestyle-related factors

The fourth part refers to the lifestyle-related correlates of loneliness and social isolation. In further detail, Rafnsson delves into the role of informal caregiving in loneliness and social isolation in Chapter 6. Thereafter, Tsai and Chen explore the link between grandchildren care and loneliness as well as social isolation in Chapter 7. Subsequently, Kretzler, König, and Hajek provide an overview about the association between pet ownership, loneliness, and social isolation in Chapter 8. In Chapter 9, Hajek and König investigate the association between online social media use, loneliness, and perceived social isolation. Lastly, Gyasi, Langat, Adam, and Philips clarify the role of alcohol, smoking, and physical activity in loneliness and social isolation in Chapter 10. In sum, this part may provide a comprehensive overview about the lifestyle-related correlates of loneliness and social isolation.

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Chapter 6

Loneliness and social isolation among older informal caregivers

A review of the evidence from longitudinal investigations

Snorri Bjorn Rafnsson

Population ageing and long-term care needs

As the world's population ages, the proportion of older adults will continue to grow over the coming years and decades. In consequence, more people are expected to live and age with multiple age-associated chronic illnesses, leading to greater demands for long-term care and higher health-care costs (de Meijer *et al.*, 2013). Increasingly, the policy response of Western governments has been to steer away from formal care while emphasizing the importance of informal care arrangements; older adults are encouraged to stay home longer instead of moving into long-term care facilities (Lindt, van Berkel, and Mulder, 2020). As people grow older, the possibility of remaining in familiar environments is related to the availability of home care which depends on older adults having access to a network of family and friends to provide the personal care and support without which the older person (i.e., care recipient) is unlikely to cope, including administrative help or domestic and personal care (Schulz *et al.*, 2020). It should be stressed that informal caregiving is unpaid, results from personal rather than professional relations, and often entails long-term care and support for a spouse or partner in need, other family members, or friends.

Informal caregiver health and well-being

While caregiving can bring satisfaction and reward to some individuals, for many caregivers, it is an onerous experience that involves negative appraisals and perceived stress. Not only may caregivers feel as if the care demand never eases but many also concomitantly struggle with maintaining their social and financial well-being and become overstrained. As expected, current theoretical frameworks thus commonly view the burden associated with caregiving from the psychological perspective of stress and coping which has been widely applied in investigations of caregiver well-being (Myers, 2003). Specifically, as reviewed in detail in the next sections, there is growing longitudinal evidence on the potential contribution of informal caregiving to the

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development of social isolation and feelings of loneliness, two moderately related but distinct constructs indicating social needs that also differ in their determinants and health consequences (Newall and Menec, 2019). While loneliness refers to the subjective feeling that one's social relationships are of poorer quality (e.g., lacking emotional closeness or are fewer in number) than desired, social isolation indicates an objective lack of contact with others in one's social network (Holt-Lunstad *et al.*, 2015). On the one hand, a causal link between informal caregiving, social isolation, and loneliness is plausible given that informal caregiving can significantly limit the time and resources available for interactions with family and friends or participation in social and leisure activities, which may contribute to social isolation and loneliness. Becoming an informal caregiver, however, might also allow some individuals to counteract social isolation or feelings of loneliness by offering their help and assistance to those in need or through enhancing their social contact with people in similar circumstances (e.g., other caregivers).

Prospective evidence on loneliness and social isolation among informal caregivers

An overview of the study design, data collection methods, and main findings reported in the ten studies reviewed here is provided in Table 6.1. In sum, three of the studies came from the USA, two from the UK, two from Germany, and one each from Canada, the Netherlands, and France. Seven studies recruited representative population-based samples; in the remaining three, the study samples were generated through non-probabilistic sampling methods. The overall reported sample sizes ranged from 129 to 8658; the study by Hajek and König (2019) was based on 21762 observations pooled over 12 years. The studies mainly involved middle-aged and older individuals (average age ranged from 49.4 years to 71.0 years across the studies; the proportion aged 65 year and older ranged from about 6.3% to 77.2%). The proportion of women in the samples ranged from approximately 42.9% to 70.3% with two studies not providing this information. Only five studies reported on the ethnic group composition of the study samples; the proportion of ethnic White participants ranged from 71.1% to 98.0%.

Seven studies used a dichotomous variable to quantify the presence of informal caregiving; two studies investigated the psychosocial impact of transitioning into a caregiving role; one study distinguished between current caregiving, former caregiving, and non-caregiving. Six studies examined spousal caregiving alone or in combination with other relationship types, and one study examined adult caregiving daughters of widowed parents, whereas three studies did not specify the caregiver–care recipient relationship type. The number of data collection waves used ranged from two to eight; however, the time between data collection points varied from as little as 2 months to 5 years. The overall follow-up period ranged from 6 months to 12 years.

Table 6.1 Characteristics and key findings from longitudinal studies of informal caregiving, loneliness, and social isolation

	Study design characteristics			*Longitudinal results*				
Reference; Country, sample type	*Caregiver (CG) relationship with care recipient and baseline CG sample size (n)*	*Baseline caregiver (CG) age (mean, SD, or % 65+), sex (% females), and ethnicity (% White or Majority population)*	*Baseline caregiving (CG) hours per week (mean, SD)*	*Psychosocial domain(follow-up period, years)*	*A*[a]	*B*[b]	*C*[c]	*D*[d]
Li *et al.* (2021); Canada, population-based	Spouse (n=1293); Adult child (n=3933)	Spousal CGs (65+=56.5%; female=42.9%; White/ Majority=94.0%); Adult-child CGs (65+=6.3%; female=55.5%; White/ Majority=92.4%)	Spousal CG (mean=20.4, SD=39.5); Adult-child CG (mean=4.4, SD=10.7)	Social isolation (3 years)	yes	yes[e]	no	yes[j]
Gallagher and Wetherell (2020); UK, population-based	Undefined (n=1349)	Mean age=52.8, SD=14.8; female=61.5%; White/ Majority=93.6%	NR	Loneliness (1–3 years)	no	NR	NR	NR
Zwar *et al.* (2020); Germany, population-based	Undefined (n=551)	Male CGs (mean age=66.4, SD=11.10; Ethnicity NR); Female CGs (mean age=65.48, SD=10.2; Ethnicity NR)	NR	Loneliness and social isolation (3 years)	no	yes[f]	NR	NR
Ross *et al.*, 2020; USA, clinic-based	Spouse, parent, adult child, friend/other (n=129)	All CG types combined (mean age=48.6, SD=11.78; female=67.4%; White and non-Hispanic=71.1%)	NR	Loneliness (0.5 years)	NR	yes[g]	NR	yes[k]

(*Continued*)

Table 6.1 (Continued)

	Study design characteristics			*Longitudinal results*				
Reference; Country, sample type	*Caregiver (CG) relationship with care recipient and baseline CG sample size (n)*	*Baseline caregiver (CG) age (mean, SD, or % 65+), sex (% females), and ethnicity (% White or Majority population)*	*Baseline caregiving (CG) hours per week (mean, SD)*	*Psychosocial domain(follow-up period, years)*	*A*[a]	*B*[b]	*C*[c]	*D*[d]
Hawkley *et al.* (2020); USA, population-based	Spouse (n=83)	Male CGs (65+=77.2%; White and other=85.6%); Female CGs (65+=58.9%; White and other=86.6%)	NR	Loneliness (5 years)	no	NR	NR	NR
Smith *et al.* (2020); UK, population-based	Spouse, parent, parent-in-law, other relative, friend or neighbour (n=1375)	All CG types combined (mean age=62.0, SD=9.9; female=62.9%; White=98.0%)	All CG types combined (n=375, mean=56.8, SD=70.2)	Loneliness (8 years)	yes	NR	NR	NR
Hajek and König (2019); Germany, population-based	Undefined (n=3148)	NR	NR	Loneliness (12 years)	no	NR	NR	NR
Joling *et al.* **(2018)**; Netherlands, clinic-based	Spouse (94.3% of n=192)	All CGs types combined (mean=69.5, SD=10.4; female=70.3%)	NR	Loneliness (2 years)	yes	NR	NR	NR

van den Broek and Grundy (**2018**); France, population-based	Adult daughters of a widowed parent (n=557)	Adult daughter CGs (mean age=49.4, SD=9.9)	NR	Loneliness (6 years)	no	yes[h]	yes[i]	NR
Robinson-Whelen *et al.* (2001); USA, clinic-based	Spouse (n=91)	Current CGs (mean age=71.0, SD=7.5); Sex NR; Ethnicity NR; Former CGs (mean age=70.8, SD=10.1); Sex NR; Ethnicity NR	NR	Loneliness (4 years)	yes	NR	NR	NR

Note:
[a] Significant adverse effect of informal caregiving role on loneliness and/or social isolation relative to a comparison group after full statistical adjustment;
[b] Significant adverse effect of caregiver background characteristics (e.g., demographics, health status) on loneliness and/or social isolation relative to a comparison group/reference level after full statistical adjustment;
[c] Significant adverse effect of care recipient characteristics (e.g., demographics, diagnosis) relative to a comparison group/reference level after full statistical adjustment;
[d] Significant adverse effect of caregiving level/intensity on loneliness and/or social isolation relative to a comparison group/reference level after full statistical adjustment;
[e] Male sex, older age, low personal income, worse general and mental health;
[f] Male sex;
g Being single/not married, unemployment, worse mental health;
h Being single/not married;
i Parental health limitation;
j Caregiving hours per week;
k Perceived stress, higher caregiving burden.

Four studies used versions of the De Jong Gierveld scale to quantify loneliness, two used the three-item UCLA loneliness scale, one used a shortened form of the New York University loneliness scale, and one used the NIH Toolbox loneliness scale. Two studies used different single item measures to quantify feelings of loneliness. On the other hand, one study only included in this review assessed self-perceived social isolation using the Social Isolation Index which combines structural/objective and functional/objective dimensions across several different domains, including community participation, social network size, living arrangement, and availability of social support. Among these longitudinal studies, two used specific panel regression models to exploit the longitudinal data structure and to reduce the challenge of unobserved heterogeneity. Based on these panel regression statistical models, consistent estimates can be generated.

Informal caregiving, loneliness, and social isolation

Most of the studies reviewed here provide longitudinal information on the relative psychosocial impact of current caregiving per se, former caregiving, or transitioning into a caregiving role. However, the results appearing from these investigations are both diverse and inconsistent. Specifically, utilising data from the English Longitudinal Study of Ageing (ELSA), Smith *et al.* (2020) observed greater levels of loneliness among informal caregivers compared to non-caregivers over an 8-year follow-up after adjusting for potential confounding by gender, ethnicity, and multiple psychosocial factors. These findings seem to contrast the findings from three other population-based longitudinal studies, including one by Gallagher and Wetherell (2020) which examined the difference in the proportion of participants reporting being lonely often at baseline and follow-up; although significantly more caregivers, compared to non-caregivers, reported being often lonely at baseline, at follow-up, the difference between caregivers and non-caregivers proved to be statistically non-significant. Zwar *et al.* (2020) reached a similar conclusion when reporting that, for men and women combined, the potential influence associated with entry into a caregiving role on social isolation and loneliness turned out to be non-significant following full statistical adjustment. Lastly, although drawing on 12 years of follow-up data from the German Ageing Survey (DEAS), Hajek and König (2019) also failed to observe an association between informal caregiving and loneliness; specifically, transitioning into caregiving proved not to be associated with changes in the level of loneliness in the total sample (or either sex) after the analysis statistically controlled for participants' demographic characteristics, marital and employment status, as well as the presence of chronic health conditions.

A similarly variable picture emerges for findings on loneliness and social isolation in longitudinal samples involving specific caregiver relationship types, most often spousal caregivers. In this context, Li *et al.* (2021) found

that spousal caregivers had a steeper increase in Social Isolation Index scores compared to adult–child caregivers in the Canadian Longitudinal Study of Aging (CLSA). Similarly, Joling *et al.*'s (2018) investigation of caregiving and social context showed that spousal caregivers who reported suicidal thoughts experienced more feelings of loneliness than those without suicidal thoughts. Another study by Robinson-Whelen *et al.* (2001) observed that both current and former spousal caregivers experienced greater loneliness than non-caregiving participants over a 4-year follow-up. In contrast to these studies, however, no associations were reported between spousal caregiving and loneliness for either husbands or wives in a population-based study undertaken in the USA by Hawkley *et al.* (2020). Similarly, van den Broek and Grundy (2018) failed to observe any statistically significant effects on loneliness of care provision by adult daughters of widowed parents, thus their analysis did not provide support for the hypothesis that the provision of personal care to widowed parents is associated with raised feelings of loneliness.

Caregiver characteristics, loneliness, and social isolation

The psychosocial influences of different sociodemographic and health characteristics among informal caregivers have been examined in several of the studies reviewed here, although the current evidence appears to be patchy and even inconsistent at times. Thus, in their analysis of population data from the CLSA, Li *et al.* (2021) observed that family caregivers aged 65 years and older at baseline experienced comparatively greater social isolation over the 3-year follow-up compared with both participants aged 45–54 years old and 55–64 years old. When social isolation was examined by sex, male caregivers were found to experience relatively greater increase in social isolation compared to female caregivers (Li *et al.*, 2021). These results partly corroborate earlier findings by Zwar *et al.* (2020) who reported that transitioning into caregiving was significantly associated with increased loneliness scores among male caregivers but not female caregivers. Further to this, *Li et al.* (2021) also reported an inverse relationship between personal income level and social isolation over time, but differences in social isolation scores over time by ethnic group (visible minority versus not) and education attainment (low versus high) proved to be statistically non-significant. In contrast, worse self-reported general and mental health were associated with comparatively more long-term social isolation in participants in the CLSA (Li *et al.*, 2021) and loneliness among family caregivers of individuals undergoing cancer treatment (Ross *et al.*, 2020). Similarly, Ross *et al.*'s (2020) study observed that unemployed family cancer caregivers experienced higher levels of loneliness compared to employed caregivers which contrasts an earlier finding reported by van den Broek and Grundy (2018) that change in employment status had non-significant influences on change in feelings of loneliness

among adult daughters providing care for a widowed parent. However, the presence of a spouse or partner was found to be protective against loneliness, whereas the presence of children in the household was not (van den Broek and Grundy, 2018). This is partly in line with the findings reported by Ross *et al.* (2020) that, for any given time point across the 6-month follow-up period, family caregivers who were not married experienced higher levels of loneliness.

Care recipient characteristics and caregiver loneliness and social isolation

Just two of the studies reviewed here prospectively investigated the influence of specific care recipient characteristics on caregiver feelings of loneliness. Drawing on representative data from the Family and Intergenerational Relationships Study (ERFI, the French component of the Generations and Gender Surveys), van den Broek and Grundy (2018) noted that, in a fixed effects regression model adjusting for age, cohabitation, the presence of children in household, employment status, and parental health limitations (i.e., limitations in performing everyday activities such as dressing or bathing due to physical or mental health disability) were significantly associated with daughters' raised sense of loneliness (as measured by the shortened De Jong Gierveld loneliness scale) over a 6-year period. The inclusion of personal care provision in the regression model did not materially attenuate the effect of parental health limitations; the effect of parental health limitations remained significant, suggesting that parental health limitations affect daughters' feelings of loneliness regardless of whether (only 4.5% of the sample provided personal care to their widowed parent) or not daughters provide personal care. In a final step, further adjustment for depressive symptoms in the analysis did not materially change the observed effects of parental health limitations, suggesting changes in daughters' feelings of loneliness (irrespective of whether they provided care or not) during follow-up were unlikely to be mediated by low affect. In contrast, a more recent analysis of data from the CLSA failed to observe statistically significant effects of care recipient's gender on family caregiver's social isolation over a 3-year follow-up; the analysis adjusted for a range of potential confounding factors, including the number of care hours per week albeit not the health condition of care recipient due to lack of available information in the CLSA (Li *et al.*, 2021).

Caregiving intensity, loneliness, and social isolation

The evidence reviewed here points to a limited yet consistent association between indicators of caregiving level, or intensity, and psychosocial stress in informal providers of care. Thus, Li *et al.* (2021) observed a statistically significant, positive, linear relationship between the number of family

caregiving hours per week at baseline and level of social isolation over three years in their representative population sample after adjusting for caregiver's sociodemographic characteristics, ethnic group, self-rated general and mental health, and the care recipient's gender. Similarly, in an earlier clinic-based study involving 129 family caregivers of individuals undergoing cancer treatment, Ross *et al.* (2020) reported significantly higher levels of loneliness over a 6-month period in caregivers who experienced greater perceived stress and more caregiver burden as indicated by low caregiver esteem, a negative impact of caregiving on personal finances, health, and schedule, and the caregiver's perceived lack of family support. These psychosocial influences of caregiver stress and burden were found to be independent of potential confounding by the caregiver's sex, his/her marital and employment status, mental health, participation in health-promoting behaviours, the quality of the caregiver–care recipient relationship (e.g., their shared values), and whether the care recipient was hospitalised or not for their cancer treatment.

Potential explanatory pathways

Informal caregiving is a complex adult life-course role activity which may bring satisfaction, rewards, and enjoyment for some assuming this role, yet for others, it is associated with a high burden and responsibilities (Lindt, van Berkel and Mulder, 2020). The extent to which many caregivers may end up socially isolated or feeling lonely is likely to depend on different moderating factors (e.g., the caregiver–care recipient relationship type, the caregiver's gender, state of health) and mediating biopsychosocial pathways (e.g., psychobiological processes of stress and coping) operating alone or in combination (Lindt, van Berkel, and Mulder, 2020 and McAuliffe, Ong and Kinsella, 2020). For example, strain resulting from prolonged caregiving may culminate in psychological morbidity, including symptoms of distress and depression (Del-Pino-Casado *et al.*, 2019) which can affect the quality of personal relationships and engagement in social activities, thus contributing to social isolation and loneliness. Specifically, spousal caregiving is related to particularly high stress levels; spousal caregivers tend to be older, are most likely to live with the care recipient, tend to provide more hands-on care and for longer hours, and find less respite (Schulz *et al.*, 2020). Spouses are also more likely to care for a person with dementia than adult children; the care recipient's decline in cognitive and functional status, behavioural disturbances, and care dependency are important risk factors for adverse emotional reactions, including anger, grief, and loneliness in these caregivers (Cheng, 2017). Especially among older caregivers, intense feelings of loneliness and social isolation may also result from poor physical health and long-term conditions that limit daily functioning and frequent social contact with others (Lindt, van Berkel and Mulder, 2020). Moreover,

informal caregivers' decreased engagement in health-promoting behaviours is related to less physical activity, greater likelihood of smoking, drinking alcohol, and poor sleep patterns; poor sleep quality may induce feelings of loneliness and reduce social engagement (Byun *et al.*, 2016 and Kim and Woo, 2022). If sedentary behaviour, smoking, and excess body weight induce negative self-evaluations in informal caregivers or make them more susceptible to negative stereotyping, their ability to form or maintain quality relationships with others might be further compromised (Hajek and König, 2021 and Jung and Luck-Sikorski, 2019).

Quality of findings, gaps in the evidence, and recommended future research

This review reveals that the available longitudinal evidence on social isolation and loneliness in informal caregivers is still limited in extent and methodologically heterogeneous. Reported findings are patchy and invariably conflicting. Not only does this diversity in research design hamper any meaningful synthesis of findings across studies, accounting for the apparent discrepancies in results remains challenging. Overall, although with clear exceptions, the quality of the evidence is compromised by the lack of detailed information available in several studies on specific caregiving contextual, moderating, and mediating factors, such as those outlined in established stress–process models; the lack of concomitant measurement of social isolation and loneliness; the potential impact of selection (e.g., in non-probabilistic samples) and attrition (e.g., in population-based samples) biases; the possibility of reverse causality in studies with limited follow-up periods; and potential residual confounding attributed to poorly measured or unaccounted confounding factors.

Partly as a result, several gaps may be identified in the current evidence that should be addressed in future investigations. For example, it is not clear how, or to what degree, any long-term effects of informal caregiving on social isolation and feelings of loneliness maybe moderated by the caregiver and care receiver relationship or other contextual factors and characteristics (e.g., the caregiver's health or available socioeconomic resources, length of time spent in the caregiving role, the care recipient's diagnosis, needs, or behaviours). Moreover, it is unclear how the impact on social isolation and loneliness maybe further shaped by different caregiving transitions (e.g., entry into, or exit from, caregiving).

Where possible, future investigations need to make more explicit use of available conceptual frameworks, such as stress and coping models, for aligning the study focus with the study design, methods, and analysis. The utilisation of these models would also allow researchers to systematically assess where further analyses may be needed and plan accordingly. For example,

diverse sociocultural factors, including social norms that dictate spouses to take on caregiving responsibilities before others, may influence entry into an informal caregiving role (Phillips and O'Loughlin, 2017) and shape caregivers' experiences of social isolation or feelings of loneliness. However, few of the investigations reviewed here were able to generate meaningful evidence on the caregiving experiences of different cultural groups within European and North American multicultural contexts due to small sample sizes. Thus, it is imperative that further investigations based on both underrepresented societal groups (e.g., different minority ethnic groups within Western societies) and samples from other parts of the world (the latter would also facilitate cross-country comparisons) are undertaken using adequate population samples and culturally validated outcome measures, including established and widely used instruments, such as the De Jong Gierveld or the UCLA loneliness scales (Penning, Liu, and Chou, 2014).

In conclusion, this chapter reviewed the evidence from available European and North American longitudinal studies investigating social isolation and loneliness in both representative and non-probabilistic samples of informal caregivers. Despite important shortcomings, and the significant need for better-designed studies, the evidence suggests that informal caregiving may be independently associated with greater subsequent feelings of loneliness and social isolation. These findings add to growing evidence on the psychosocial challenges experienced by informal caregivers and have the potential to contribute to the development of effective policies and interventions that aim to prevent or reduce the negative impact of this vital role on those assuming it.

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Chapter 7

Grandchild care and loneliness

Feng-jen Tsai and Tuo-Yu Chen

Background of intergenerational contract and lifestyle change of elders

The global phenomenon of rapidly aging populations has triggered low fertility rates and longer life expectancy (Pantazis and Clark, 2018 and Wang et al., 2020). To promote global sustainable development, a key strategy is "to protect the old and invest in the young while keeping a balance between financial sustainability and the principles of social justice and fairness" (Albertini et al., 2007, Dugarova, 2017, and Organization, 2021). The generational contract may play an important role in this strategy.

The private (family) dimension of the generational contract refers to the transfer of money and help between generations in the family. One of the important perspectives of the private generational contract was "childcare provided by the grandparent". And this perspective played an important role in the loneliness/social isolation of elders' life (Kohli, 2004).

Individuals of old age are more likely to be lonely or socially isolated due to life transitions, lifestyle changes, and health (Silverstein and Giarrusso, 2010). In the later life stage, individuals might shift their focus from work to family and retirement (Dadswell et al., 2017, Vrkljan et al., 2019, and Shin et al., 2020). Besides, elders might feel that they are no longer the center of their family because their children have grown up and started their own families (Roberts et al., 1991a, and Szydlik, 2004). When shifting the daily focus from work to family in old age, the impact of intergenerational interaction plays a more important role in elders' life. With growing evidence regarding the negative health impact of loneliness and social isolation, the impact of taking care a grandchild on elders' mental health and loneliness is of growing research interest than ever (Hawkley and Cacioppo, 2010, Courtin and Knapp, 2017, Holt-Lunstad et al., 2015b, and Ong et al., 2016).

Loneliness and social isolation are distinct but related concepts. "Loneliness" is the subjective distressing feeling of being separate from others, and which results from a discrepancy between desired and actual social

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connections (Gardiner et al., 2018, Poscia et al., 2018, and Shvedko et al., 2018). "Social isolation" is the objective state of lacking social contacts and having few or infrequent interactions with others. While how lonely a person feels depends partly on their own and their culture's expectations of relationships, the impact of feeling loneliness on elders' mental health is more direct (Gardiner et al., 2018, Poscia et al., 2018, and Shvedko et al., 2018).

The form of grandchild care

As family becomes the main focus in old age, relationships with family members became more important for an older person's mental health and feelings of loneliness. The role of grandparents was central to the model of intergenerational solidarity, and taking care of their grandchildren has been identified as a particularly important form of multigenerational family support. With increased life expectancy, individuals now have more years to spend with grandchildren than ever (Szydlik, 2004 and Roberts et al., 1991b).

The common arrangements for child care provided by grandparents are babysitting over the weekend or during the evening, looking after children when their parents are at work, or taking care of grandchildren under other circumstances on a regular or irregular basis (Vandell et al., 2004). The provision of grandchild covers both physical and mental perspectives. Physical forms of grandchild care can include taking grandchildren to school and picking them up again or cooking and doing the laundry for them. Taking an active interest in their lives and reading books for their grandchild represents support from a mental perspective. And older people are also rewarded mentally from such a company.

Theory for connecting grandchild care and elders' loneliness/social isolation

In general, recent studies around grandchild care provision can be divided into two categories. One category considers the impact of intensive care provision to grandchildren on elders where older adults replace the role of parents. Another category is the study considering elders who provide supplementary parental care (Noriega et al., 2020). Although most of the studies have focused on intensive care, studies regarding supplementary grandchild care attract more attention recently due to the fact that more elders provide supplementary grandchild care around the world. In the United States, there are around 50% of grandparents who provide some degree of childcare. In Europe, the proportion of grandchild care provision ranged from 15% to 52% in different countries (Igel and Szydlik, 2011 and Noriega et al., 2020). In Asia, there are also 50% of grandparents living with and providing informal care for at least one of their grandchildren (Hoang and Kirby, 2020).

Theoretically, the association between grandchild care and elders' mental health and loneliness/social isolation can be explained by the social exchange theory (Grundy et al., 2012 and Blau, 1964) or role strain and role enhancement theory (Kim et al., 2017, Goode, 1960 and Di Gessa et al., 2016). The social exchange theory proposes that an individual's social behavior is the result of an exchange process with the purpose of maximizing benefits and minimizing costs from economical, psychological, and/or social perspectives. Since most relationships are made up of a certain amount of give-and-take, people weigh the potential benefits and risks of social relationships (Blau, 1964). According to this theory, when the risks outweigh the rewards, people will terminate or abandon the relationship. From this perspective, grandchild care is a social behavior that involves the relationships between elder and their adult child and grandchild. If the benefits of providing grandchild care are less than the risks to elders, they will stop providing grandchild care.

However, the social behavior of grandchild care is comparatively complicated in that individuals cannot easily terminate or abandon the social relationship within the family. Also, the role of grandparent within the family is a kind of social role in a social institution. Therefore, role strain and role enhancement theories (Goode, 1960 and Sieber, 1974) are often used by studies to explain the psychosocial implications of grandchild care on elders. The central notion of both role strain and role enhancement theory (Goode, 1960 and Sieber, 1974) is the multiple obligations and rewards brought about by the multiple social roles individuals play in daily life. Role strain theory (Goode, 1960) focused on the negative health implications with the rationale that multiple social roles require the individual to juggle conflicting and demanding obligations, which lead them to be overloaded or strained and then lead them to develop negative health symptoms. On the other hand, role enhancement theory addresses the positive health implications with the rationale that multiple social roles enhance individuals' personality and positive self-esteem, which can be beneficial to their health (Sieber, 1974).

Study overview

Research on the effects of grandparental care on loneliness/social isolation is scant. To date, there are eight studies investigating such a relationship (Zhang et al., 2021, Szabó et al., 2021, Quirke et al., 2021, Islam, 2021, Quirke et al., 2019, Tsai, 2016, Tang et al., 2016 and Tsai et al., 2013). Seven of these studies used nationally representative data of adult or older adult populations in China, Germany, Taiwan, or the United States (Zhang et al., 2021, Szabó et al., 2021, Quirke et al., 2021, Quirke et al., 2019, Tsai, 2016, Tang et al., 2016 and Tsai et al., 2013); one study used data from grandparents in a city in Bangladesh (Islam, 2021). The operationalization of grandparental care varies across studies but in general is based on the self-reported provision of supervised or supplementary care to respondents' own grandchildren.

For the conceptualization of loneliness, three studies used the six-item De Jong Gierveld Loneliness Scale (Szabó et al., 2021, Quirke et al., 2021, and Quirke et al., 2019), two studies used the three-item Revised UCLA Loneliness Scale (Islam, 2021 and Tang et al., 2016), two studies used the single item of loneliness from the Center for Epidemiological Studies Depression Scale (CES-D; Tsai, 2016 and Tsai et al., 2013), and one study used survey items to assess loneliness (Zhang et al., 2021).

The effect of grandparental care on loneliness

The beneficial effect of grandparental care on loneliness may start before providing actual care. One study showed that compared to individuals without grandchildren, those with grandchildren are less likely to feel lonely (Zhang et al., 2021). This might be because of a bigger social network size that mitigates the feeling of loneliness (van den Broek et al., 2019). This effect, however, seems to only affect grandfathers and not grandmothers (Zhang et al., 2021). Among grandparents, evidence shows that providing care to grandchildren is significantly associated with lower odds of loneliness compared to those who are not providing care (Zhang et al., 2021, Szabó et al., 2021, Islam, 2021, Quirke et al., 2019, Tang et al., 2016 and Tsai et al., 2013). Both grandfathers and grandmothers experience the same benefits of grandparental care with regard to loneliness (Zhang et al., 2021). Moreover, the positive effects of grandparental care are not limited to one's own grandchildren, such that taking care of non-kin grandchildren or children can exert similar benefits (Szabó et al., 2021 and Quirke et al., 2021).

The frequency of providing grandparental care also matters. Compared to grandparents who provide regular but not intensive care (i.e., full-year non-full-time care, spent ≥48 weeks per year but <40 hours per week), individuals who provide occasional care (non-full-year, spent <48 weeks per year) have a higher likelihood of experiencing loneliness (Zhang et al., 2021). This finding suggests that providing care regularly may be more beneficial in reducing the feeling of loneliness than providing care periodically. Such finding holds true for grandmothers, whereas for grandfathers, providing regular and intensive grandparental care (i.e., full-year non-full-time care, spent ≥48 weeks per year and ≥40 hours per week) is associated with higher risks of loneliness than providing regular but not intensive care (Zhang et al., 2021).

The transition in and out of grandparental care may also affect loneliness, but the current findings are inconsistent. Although one recent study showed no relationship between the changes in grandparental care status (i.e., begin or cease to provide care) and loneliness (Quirke et al., 2021), another study revealed that providing care to grandchildren, despite changing grandparental care status, is associated with lower odds of loneliness (Zhang et al., 2021). In another study, the results showed that individuals who cease to take care of grandchildren at baseline experience a significantly higher level

of loneliness at follow-up (Tsai, 2016). However, the level of loneliness is not different between baseline and follow-up among grandparents who continuously provide or do not provide care, as well as among those who begin to provide care (Tsai, 2016). Similarly, inconsistent findings are also observed upon sex-stratified analysis. Among grandmothers, one study showed that beginning or ceasing to provide care is not related to loneliness (Quirke et al., 2021). But in another study, continuously providing care and beginning to provide care were significantly associated with lower odds of loneliness compared to never providing care (Zhang et al., 2021). Among grandfathers, beginning to provide care was related to an increased level of loneliness (Quirke et al., 2021), whereas it was significantly associated with lower risks of loneliness in another study (Zhang et al., 2021).

The evidence supporting the longitudinal impact of grandparental care on loneliness is scarce. Among the eight studies that investigated the relationship between grandparental care and loneliness, only four studies employed a longitudinal design (Zhang et al., 2021, Szabó et al., 2021, Quirke et al., 2021 and Tsai, 2016). Of the four studies, only the study by Szabó et al. (2021) directly examined the longitudinal relationship between grandparental care and loneliness over a 2-year follow-up. Other studies either had different research objectives (e.g., investigating the impact of transition in grandparental care status) or used pooled analysis that blurred the temporal effects of grandparental care (Zhang et al., 2021, Quirke et al., 2021 and Tsai, 2016). Hence, more investigations on the longitudinal association between grandparental care and loneliness are recommended. Longitudinal investigations are also needed to disentangle the relationship between grandparental care and the temporal stability of loneliness. The current literature is limited because most studies consider loneliness as static. Just like individuals can transition in and out of grandparental care, loneliness among some individuals could be brief and vary across time (i.e., transient loneliness), while others experience persistent loneliness (i.e., chronic loneliness; Peplau and Perlman, 1982). Grandparental care might provide different effects on loneliness depending on whether it is transient or chronic. Understanding this relationship is important for social services or respite programs in order to allow them to step in at the right time.

Future directions

There are also issues worth following up regarding the health impact of grandchild care on elders.

Loneliness or depression

Loneliness and depression are strongly correlated but are two separate constructs (Weeks et al., 1980). Recent evidence supports the bidirectional relationship between loneliness and depression (Hsueh et al., 2019, Vanhalst

et al., 2012 and Van den Brink et al., 2018) and that the strength of directionality is inconsistent (Vanhalst et al., 2012 and Hsueh et al., 2019). Because of the strong covariance between loneliness and depression and the high prevalence of depression in older age (Kok and Reynolds, 2017), it is important to differentiate loneliness from depression when studying the effects of grandparental care on loneliness. Currently, among the eight studies, only two studies considered the potential impacts of depressive symptoms using the CES-D scale (Quirke et al., 2019 and Quirke et al., 2021). Hence, further investigations on whether grandparental care affects loneliness beyond the influences of depression are warranted. It is also worth noting that loneliness is one of the dimensions in the CES-D scale. To reduce the circularity between loneliness and depression and provide a more accurate estimate of the impacts of grandparental care on loneliness, the item assessing loneliness in the CES-D should not be included when calculating the total score (e.g., Chen et al., 2017 and Chen and Saito, 2021).

Grandparental care on loneliness: sex matters?

Previous research has shown that there are no differences in the ways in which women and men cope with similar role stressors, but that women tend to utilize more social support than men in similar role situations (Rosario et al., 1988). Evidence also reveals that more social support is associated with a lower level of loneliness, whereas a heightened social strain (e.g., frequent contact of negative or conflicting social relationship) escalates the feeling of loneliness (Chen and Feeley, 2013). Considering grandparental care as a stressor, the abovementioned sex differences in the utilization of stress-relieving strategies and the relationships of social support and social constraint with loneliness revealed that increasing social support and reducing social constraint among grandfathers who are taking care of grandchildren is important. Nevertheless, although inconclusive (Maes et al., 2019), previous studies have shown that women report loneliness more frequently than men (Nicolaisen and Thorsen, 2014), whereas men might experience a higher level of loneliness than women when they express it (Borys and Perlman, 1985). Hence, to provide sex-specific interventions for grandparents, more investigations on the effect of grandparental care on loneliness within each sex group are needed.

Does grandparental care moderate the negative impact of loneliness on health?

The negative consequences of loneliness among older adults have been studied extensively (Hawkley and Cacioppo, 2010, Hawkley et al., 2010, Ong et al., 2016, Cacioppo and Hawkley, 2009, Cacioppo et al., 2014, Holt-Lunstad et al., 2015a, and Kanai et al., 2012). At a fundamental level,

loneliness is related to poor health behaviors, such as drinking, smoking, poor nutritional intake, lower level of physical activity, and poor sleep quality (Hawkley and Cacioppo, 2010 and Hawkley et al., 2010). Evidence on the negative impacts of loneliness on neurobiological responses (Cacioppo et al., 2014), brain images (Kanai et al., 2012), and cognitive processes (Cacioppo and Hawkley, 2009) have also been documented. More importantly, loneliness is linked to a shortened life expectancy (Holt-Lunstad et al., 2015a). To date, effective interventions to improve loneliness are questionable (Findlay, 2003) and how these interventions buffer the negative impacts of loneliness on health outcomes is unclear (Ong et al., 2016). An in-depth discussion of potential interventional strategies is also given in the chapter by Hawkley. Given that providing care to kin or non-kin grandchildren seems to have the potential to alleviate loneliness (Szabó et al., 2021), further well-designed studies to examine whether providing care to children could buffer the negative impact of loneliness on health are needed.

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Chapter 8

Pet ownership, loneliness, and social isolation

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Loneliness and social isolation

It is not without any reason that the World Health Organization chose social isolation – a state in which an individual has a limited social network and a low number of social interactions – and loneliness – a subjective feeling being caused by a discrepancy between desired and actual social connection – as a major feature of the "Age-friendly environments" and "Combatting Ageism" action areas in the UN Decade of Healthy Ageing collaboration (World Health Organization, 2021). In recent years, the prevalence rates of both conditions have risen dramatically in various countries such as Germany (Hajek and König, 2022), China, and the United States (World Health Organization, 2021). Due to the increasing longevity and the general aging of the global population, the number of lonely or socially isolated older individuals could further climb in the coming years. That is especially problematic because both loneliness and social isolation were found to be associated with adverse health outcomes by previous research: for example, a state of loneliness or social isolation may increase morbidity (Leigh-Hunt et al., 2017) and mortality (Pantell et al., 2013) and seems to be associated with poorer physical and mental health in general (Ong et al., 2016).

For their rising prevalence and these negative outcomes, research is making considerable efforts to tackle both the general issue of loneliness and social isolation, and their adverse effects on human health. On the one hand, several interventions, such as improving the social capacities of lonely or socially isolated individuals or building age-friendly communities by facilitating transportation, are being discussed, although it remains to be seen how effective these measures are (World Health Organization, 2021). On the other hand, fundamental research tries to identify the mechanisms that lead to loneliness or social isolation and explore factors that protect against these issues. This chapter will discuss a widespread phenomenon that has been shown to be associated with both conditions by several research works (e.g., Hajek and König, 2020; Ratschen et al., 2020): pet ownership. In the United

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States, approximately two out of five households possess one or more dogs, and a quarter of all households shelter at least one cat (American Veterinary Medical Association, 2018). These numbers have further increased during the COVID-19 pandemic, in which an all-time high of 70% of American households owning a pet was reached (American Pet Products Association, 2021).

The "pet effect"

Public health professionals may interpret this development as a positive sign in terms of physical, psychological, and social health, as pets have been shown to foster these domains among their human owners by various studies carried out in the past (Smith, 2012). For example, Taniguchi et al. revealed that pet ownership is associated with decreased levels of frailty and increased physical activity among community-dwelling older adults living in Japan (Taniguchi et al., 2018, Taniguchi et al., 2019). Furthermore, having a companion animal was related to a lower likelihood of depression among the same population (Taniguchi et al., 2018). Finally, a study from Australia showed that pet owners had a higher probability of having regular contact with their neighborhood (Wood et al., 2015). Taken together, these benefits of companion animals on the health of their human owners can be called the "pet effect" (Allen, 2003).

Moreover, it seems possible that companion animals also decrease loneliness and social isolation among their owners. The so-called Attachment Theory often lays the theoretical ground for that assumption: According to this framework, human beings have a need to be attached or belong to someone (Bowlby, 1977). Though there are significant differences between human-to-human and human-to-pet interactions, these needs may at least partly be satisfied by animals as well (McNicholas et al., 2005). That may be particularly relevant for individuals of older age. For example, in a telephone survey conducted among a randomly chosen population from the United States, individuals who were living alone or who were divorced or widowed reported elevated levels of attachment to their pets and had an over-average tendency to anthropomorphize them. On the other hand, precisely these groups – widowed individuals and empty-nesters – were less likely to own pets than the average American household (Albert and Bulcroft, 1988).

Considering the number of publications about the relationship between pet ownership, loneliness, and social isolation, the Attachment Theory apparently formed a reasonable basis for research to engage with that topic. However, taken together, the evidence is quite unclear, with some studies reporting relief of loneliness through companion animals (Black, 2012, Rhoades et al., 2015), some others not detecting any significant effect (Bennett et al.,

2015, Zasloff and Kidd, 1994), and some even revealing poorer outcomes in terms of loneliness among individuals owning a pet (Pikhartova et al., 2014). Moreover, this somewhat confusing impression is reinstated by a recent systematic review that synthesized the evidence on this association without coming to any definitive conclusion about the general effect of pet ownership on loneliness and social isolation (Kretzler et al., 2022). Hence, to identify populations that could benefit from a companion animal, it seems necessary to differentiate between types of pets, such as cats and dogs, and to look at subgroups, for instance, by referring to gender or social inclusion.

Sex differences

Concerning sex differences, there may be some reasonable arguments for assuming that a possible impact of pets on loneliness or social isolation is different among women and men in higher age groups: women may be particularly vulnerable, as they are more affected by widowhood and relocation, which have been shown to be significant barriers to social inclusion in the past (World Health Organization, 2021). Perhaps referring to such differences, Hajek and König speculate about a higher willingness of older women to replace contact with human beings through contact with pets as an explanation for their finding that elderly women had stronger benefits from their pets in terms of loneliness and social isolation than their male contemporaries in a representative survey of the German population aged 40 years and above (Hajek and König, 2020). On the other hand, a study that was carried out by Stanley et al. among a sample of primary care patients did not reveal any significant results in terms of sex differences (Stanley et al., 2014), and two studies that were solely focusing on female samples did not reveal any significant impact of companion animals on their owners' loneliness at all (Gulick and Krause-Parello, 2012, Zasloff and Kidd, 1994). However, yet again, the number of studies pertaining to sex differences is too small, and the evidence derived from these research works remains too mixed to draw any conclusion on a gender effect among the association between pet ownership, loneliness, and social isolation.

Types of companion animals

With respect to different types of companion animals, it would not be surprising if some animals, such as dogs, are more suitable for reducing loneliness or social isolation than other pets, such as cats or birds. Beyond a certain kind of attachment that they could provide to an individual, dogs have to be walked every day, requiring their owners to leave their home and enter social spaces. Therefore, dog owners may be more likely to interact with other people, which may foster their social inclusion. On the other hand, animals like cats do not provide these opportunities to get in touch with one's

environment. The significance of this pathway may be supported by findings from Powell et al. (2018) and Hajek and König (2020), who both revealed that dog owners were significantly less likely to be lonely or socially isolated than non-pet owners among adult populations, while studies that compared cat owners to non-cat owners did not detect any significant results (Bennett et al., 2015, Branson et al., 2019, Hajek and König, 2020, Rijken and Beek, 2011). Moreover, there are also a few studies that do not find any significant differences between dog owners and non-dog owners in terms of loneliness (Antonacopoulos, 2017, Bennett et al., 2015, Rijken and Beek, 2011). Finally, one study even pointed out that dog owners were more likely than non-dog owners to feel lonely. However, it could not preclude reverse causality, and indeed, it is also possible that lonely individuals are more likely to acquire a dog so that higher dog ownership only appears to cause higher levels of loneliness (Pikhartova et al., 2014). In turn, that explanation may be supported by findings about an expectation of many potential dog owners that their future companion animal will decrease their loneliness (Powell et al., 2018). Eventually, direct comparisons between dog owners and owners of other companion animals carried out among adult populations did not reveal any significant differences (Bennett et al., 2015, Gulick and Krause-Parello, 2012, Rijken and Beek, 2011).

Altogether, dogs have been shown to have a greater effect in relieving symptoms of loneliness and social isolation among adult populations in some research works. Still, it is not possible to rely on this effect, as there are too many opposing results from other investigations. Besides, it has been shown that animatronic pets (i.e., lifelike robot pets) can reduce symptoms of loneliness among older individuals as well (Tkatch et al., 2021). Results such as these may further complicate the relationship between pet ownership, loneliness, and social isolation because they neglect the frequently named pathway that a pet facilitates contact with other individuals and therefore contributes to better social inclusion. Thus, future research is required to clarify the association between (animatronic) pets and loneliness and social isolation.

The repeated failure to make definitive statements about the impact of different types of pets and possible sex differences may, however, point towards a general problem among the existing research. Although a considerable number of studies examined this association, most of them only looked at a general population, and among the remaining research works, it was mostly differentiated in terms of the type of companion animals or in terms of gender differences. The results of these works point in many different directions, and unluckily, this confusing variety makes it difficult to practically exploit the effort that was spent on conducting these research works. Even though it would not be unreasonable to stop at this point and conclude that an effect of pets on loneliness and social isolation may just be based on random nature and not on a direct pathway between the companion animal and

the social inclusion of its owner, it is equally reasonable to argue that other differentiations are needed to reveal more valuable results. For instance, studies conducted by Antonacopoulos and Pychyl and by Stanley et al. found that social support moderated the significant association between pet ownership and decreased levels of loneliness among individuals living alone (Antonacopoulos and Pychyl, 2010, Stanley et al., 2014). In addition, McConnell et al., who explored factors such as belongingness and self-esteem in connection with the benefits that pet owners perceive for themselves when it comes to their animal housemates, revealed that individuals felt less lonely when their pet was successfully fulfilling those social needs (McConnell et al., 2011). Hence, diving into the details may be helpful and required to identify the target groups whose loneliness or social isolation can be reduced by pet ownership.

Influence of the COVID-19 pandemic

Finally, the COVID-19 pandemic, which is of genuine interest for research on loneliness and social isolation in general, should also be considered regarding the relationship between these global health issues and pet ownership. Apart from the increased demand for companion animals, the pandemic also induced appreciable changes in everyday life that may have concerned the relationship between pet owners and their animal housemates. For example, a study by Applebaum et al. that considered older adults during the COVID-19 pandemic reported that pet owners strongly benefited from their companion animals regarding company and support. The researchers suggested that pets provided emotional support during this period, which was marked by lockdown policies and self-isolation, especially among the elderly (Applebaum et al., 2021). These findings foster the application of the Attachment Theory on animals, and go hand in hand with other studies on the relationship between pet ownership, loneliness, and social isolation, which have been carried out since the beginning of the pandemic. In an online survey compiled by Kogan et al., two-thirds of all pet owners stated that their companion animal decreased their feelings of loneliness and social isolation (Kogan et al., 2021). A positive effect of pet ownership on loneliness was also explored in a study by Ratschen et al., which was carried out among the general population living in the United Kingdom (Ratschen et al., 2020). Furthermore, a report by Oliva and Johnston among individuals living alone revealed that dog ownership was related to decreased levels of loneliness (Oliva and Johnston, 2021). Though, once more, there are also studies that did not yield any significant results regarding a pet effect (Carr et al., 2021, Phillipou et al., 2021). Nonetheless, studies that were executed after the outbreak of COVID-19 seem to deliver more promising results than the studies that were conducted before the pandemic. Future research is required to test the longevity of these changes.

Conclusion

In closing, one cannot clearly state that pets reduce loneliness and social isolation among older populations. However, a couple of studies indicate that individuals who live together with a pet tend to feel less lonely than individuals who do not own a companion animal, which may point towards a potential benefit of pet ownership when it comes to social inclusion among the elderly. Yet, the practical exploitation of this potential may be difficult based on the current state of research, as most of the existing work focuses on general populations and does not account for specific sub-groups that may particularly benefit from pet ownership. That could be a weakness because certain groups, for instance, empty-nesters or widowed or divorced individuals may have other attitudes towards pets, especially in terms of a stronger attachment. However, to date, there seem to be almost no investigations that explore the effects of pet ownership among these target groups. Besides, the COVID-19 pandemic may have altered the relationship between pet ownership and loneliness or social isolation. People spent more time with their animal housemates, the demand for pets strongly rose, and most of the studies that were conducted since the start of the pandemic detected a significant positive effect of companion animals in reducing feelings of loneliness. However, their number is too small to draw any distinct conclusions yet.

Future research

Thus, besides looking at various subgroups and different types of companion animals, research could also investigate pandemic-related changes regarding a pet effect on loneliness and social isolation. However, concerning the formulation of practical suggestions, the danger of decreasing interest in one's pet that may lead to its abandonment should be considered (Syzdlowski and Gragg, 2020). Finally, as its counterpart in various other fields, the overwhelming part of pet effect research relies on samples from Western high-income countries. Hence, the current state of knowledge neglects apparent differences between these regions and other localities, which is problematic, given that animals may hold differing roles in different cultures, especially among low- and middle-income countries where their instrumental skills could be held in higher esteem (Morris, 1998). Targeting these shortcomings may assist in unleashing the helpful potential of a relatively accomplishable way to reduce the global problem of loneliness and social isolation.

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Chapter 9

Online social media use, loneliness and perceived social isolation in later life

A short overview and some empirical evidence

André Hajek and Hans-Helmut König

Introduction

Social media use in later life

Social media use on the internet (hereafter also named as "social media use") such as Facebook has gained popularity in the past few years. While it was initially mostly popular among adolescents and younger adults, its popularity has also considerably increased among individuals in later life. Since an increasing share of future cohorts of individuals in late life will be used to the internet and social media use, we assume that the proportion of individuals in later life using social media will rise further in the next decades.

Short overview: Social media use, loneliness, and perceived social isolation

Prior research, however, has shown that using social media can contribute to perceived social isolation (feeling that one does not belong to society) among young adults in the United States (Primack et al., 2017). Similar results – also for loneliness (perceived discrepancy between actual and desired social relations) – were observed by other studies among younger samples (Lemieux et al., 2013 and Skues et al., 2012). However, the existing evidence regarding the association between social media use and loneliness as well as perceived social isolation among individuals in later life is largely inconclusive (Hajek and König, 2021 and Wiwatkunupakarn et al., 2021).

Our aim and importance

In light of the restricted knowledge, the aim of this chapter was to provide a short overview and to give some empirical evidence for the association between online social media use, loneliness, and perceived social isolation among individuals aged 65 years and over using data from a nationally

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representative sample. Knowledge about such an association is relevant since loneliness and social isolation can lead to chronic conditions and reduced longevity (Holt-Lunstad et al., 2015 and Luanaigh and Lawlor, 2008).

Possible mechanisms

One may assume that frequent users of social media may use these sites to substitute real-life contacts. Furthermore, frequent use of social network sites may give the impression that others are better off, for example, in terms of social relationships (because of unrealistic portrayals on social media (Primack et al., 2017)). Thus, social comparisons (e.g., related to income or health) may be important in the association between social media use and loneliness as well as perceived social isolation. This may contribute to feelings of social isolation or loneliness. On the other hand, individuals who perceive themselves to be socially isolated may feel less isolated when using social media because such usage may ease relationship building by enhancing social ties (Ellison et al., 2007).

Our empirical example: methods

Sample: German Ageing Survey

The data for this chapter came from the German Ageing Survey ("Deutscher Alterssurvey", DEAS). The Federal Ministry for Family Affairs, Senior Citizens, Women, and Youth (BMFSFJ) funds it. The first wave of this survey was conducted in 1996. The German Centre of Gerontology (DZA) in Berlin is in charge of the DEAS study. The fieldwork was carried out by the Institute for Applied Social Sciences (infas). The cohort-sequential design of the DEAS study combines a large cross-sectional sample with longitudinal samples. There is more information available elsewhere (Klaus et al., 2017).

For this chapter, we used data from the sixth wave (2017). In this wave, the response rate was 63%. Individuals were interviewed using computer-assisted personal interviewing (CAPI), which, for example, included questions about sociodemographics. Following that, the participants were asked to fill out a standardized questionnaire covering topics like loneliness and perceived social isolation. In the sixth wave, 6,626 people were interviewed and 5,608 of them completed the standardized questionnaire (including items regarding loneliness and perceived social isolation). For our current analysis, we restricted our sample to older individuals 65 years and over, resulting in an analytical sample of 3,242 individuals.

Prior to the interview, written informed consent was obtained. An ethics vote was not required since the criteria for such a vote were not fulfilled (e.g., use of invasive methods).

Dependent variables

Bude and Lantermann (2006) developed a tool to assess perceived social isolation. There are four items in this tool (with four options). A score was calculated

by averaging the items. This score ranges from one to four, with higher values indicating higher social isolation levels. In our study, Cronbach's alpha was .87.

To quantify loneliness, the de Jong Gierveld six-item loneliness tool was used (de Jong-Gierveld et al., 2006 and de Jong-Gierveld and Kamphuls, 1985). The loneliness scale is a condensed version of the 11-item de Jong Gierveld Loneliness Scale. A scale of 1 to 4 was calculated by averaging the items. Higher values indicate higher loneliness levels. This tool has been shown to have favorable psychometric characteristics (Gierveld and Van Tilburg, 2010). In our study, Cronbach's alpha was .84.

Independent variables

Regarding our main independent variable: the frequency of social media use was quantified (exact wording: "How often do you use social networks like facebook, stayfriends, 'feierabend.net'?"). Individuals should refer to the average engagement in the preceding 12 months. Answer possibilities were 1 = daily, 2 = several times a week, 3 = once a week, 4 = 1–3 times a month, 5 = less often, 6 = never. In regression analysis, "never" was used as the reference category.

Sex, age, education (Internationally Standard Classification of Education (ISCED-97): low, medium, and high education) (Matthews et al., 2017), marital status (married, living together with spouse; married, living separated from spouse; widowed; single; and divorced), major city with at least 100,000 inhabitants (no; yes), self-rated health (from 1 = "very good" to 5 = "very bad"), and number of chronic diseases (ranging from 0 to 11 chronic diseases; diseases were as follows: cardiac and circulatory disorders; bad circulation, joint, bone, spinal, or back problems; respiratory problems, asthma, shortness of breath; stomach and intestinal problems; cancer; diabetes; gall bladder, liver or kidney problems; bladder problems; eye problems, vision impairment; ear problems and hearing problems) were adjusted for in the analysis.

Statistical analysis

Sample characteristics are first displayed stratified by social media use (daily; several times a week; once a week; 1–3 times a month; less often; and never). Thereafter, multiple linear regressions were used to investigate the association between social media use and loneliness and social isolation among individuals aged 65 years and above. In our study, the statistical significance was determined as $p < 0.05$. For data analysis, we used Stata 16.1 (StataCorp, College Station, TX, USA).

Results

Sample characteristics

The sample characteristics (stratified by social media use) of our analytical sample are shown in Table 9.1. In this sample, the average age was 74.5

Table 9.1 Sample characteristics stratified by social media use (German Ageing Survey, wave 6, n = 3,242)

	Daily	*Several times a week*	*Once a week*	*1–3 times a month*	*Less often*	*Never*
Sex: N (%)	N = 1235	N = 449	N = 128	N = 64	N = 160	N = 1206
Men	797 (64.5%)	228 (50.8%)	59 (46.1%)	37 (57.8%)	72 (45.0%)	538 (44.6%)
Women	438 (35.5%)	221 (49.2%)	69 (53.9%)	27 (42.2%)	88 (55.0%)	668 (55.4%)
Age: Mean (SD)	72.4 (5.7)	73.0 (5.8)	73.2 (5.5)	73.5 (4.9)	73.0 (5.5)	77.5 (6.4)
Educational level: N (%)						
Low (ISCED 0–2)	29 (2.3%)	16 (3.6%)	4 (3.1%)	3 (4.7%)	9 (5.6%)	142 (11.8%)
Medium (ISCED 3–4)	466 (37.7%)	190 (42.3%)	69 (53.9%)	33 (51.6%)	88 (55.0%)	721 (59.8%)
High (ISCED 5–6)	740 (59.9%)	243 (54.1%)	55 (43.0%)	28 (43.8%)	63 (39.4%)	343 (28.4%)
Marital status: N (%)						
Married, living together with spouse	895 (72.5%)	321 (71.5%)	88 (68.8%)	48 (75.0%)	119 (74.4%)	717 (59.5%)
Married, living separated from spouse	13 (1.1%)	5 (1.1%)	1 (0.8%)	1 (1.6%)	3 (1.9%)	8 (0.7%)
Divorced	121 (9.8%)	30 (6.7%)	13 (10.2%)	2 (3.1%)	15 (9.4%)	87 (7.2%)
Widowed	170 (13.8%)	75 (16.7%)	22 (17.2%)	8 (12.5%)	20 (12.5%)	334 (27.7%)
Single	36 (2.9%)	18 (4.0%)	4 (3.1%)	5 (7.8%)	3 (1.9%)	60 (5.0%)
Major city						
No	824 (66.7%)	319 (71.0%)	84 (65.6%)	46 (71.9%)	111 (69.4%)	883 (73.2%)
Yes	411 (33.3%)	130 (29.0%)	44 (34.4%)	18 (28.1%)	49 (30.6%)	323 (26.8%)
Self-rated health: Mean (SD)	2.4 (0.8)	2.4 (0.7)	2.4 (0.7)	2.7 (0.9)	2.6 (0.9)	2.7 (0.8)
Number of chronic conditions: Mean (SD)	2.7 (1.9)	2.9 (1.9)	2.8 (1.8)	3.2 (2.1)	3.0 (2.0)	3.6 (2.2)
Perceived social isolation: Mean (SD)	1.5 (0.5)	1.6 (0.5)	1.5 (0.5)	1.5 (0.5)	1.6 (0.5)	1.7 (0.6)
Loneliness: Mean (SD)	1.7 (0.5)	1.7 (0.5)	1.7 (0.5)	1.6 (0.5)	1.7 (0.5)	1.7 (0.5)

years (SD: 6.4 years), with the age ranging from 65 to 97 years; about 54.4% were male. In total, 38.1% of the individuals were daily users, 13.9% of the individuals used social media several times a week, 3.9% of the individuals used it once a week, 2.0% of the individuals used it 1–3 times a month, 4.9% of the individuals used it less often, and 37.2% of the individuals were never users. For example, daily and never users markedly differed in terms of age, educational level, marital status, and the number of chronic conditions. Further details (e.g., levels of social isolation and loneliness) are given in Table 9.1.

Regression analysis

The results of multiple linear regressions are given in Table 9.2 (second column: loneliness as the outcome; third column: perceived social isolation as the outcome).

Adjusting for various covariates, regressions revealed that compared to individuals never using social media, individuals with some use consistently reported lower perceived social isolation scores (except for individuals reporting "once a week"). For example, individuals with daily use reported lower perceived social isolation scores compared to never users (β = –.12,

Table 9.2 Correlates of loneliness and perceived social isolation among individuals aged 65 years and above (German Ageing Survey, wave 6)

	Loneliness	*Perceived social isolation*
Independent variables		
Social media use: - Daily (Ref.: Never)	0.00	−0.12***
	(0.02)	(0.02)
- Several times a week	0.01	−0.07*
	(0.03)	(0.03)
- Once a week	0.02	−0.08
	(0.05)	(0.05)
- 1–3 times a month	−0.13*	−0.12*
	(0.06)	(0.06)
- Less often	−0.01	−0.09*
	(0.04)	(0.04)
Potential confounders	✓	✓
Constant	1.92***	1.42***
	(0.14)	(0.15)
Observations	3,242	3,209
R^2	0.05	0.08

Beta-coefficients (unstandardized) are displayed; robust standard errors in parentheses;

***p < 0.001, **p < 0.01, *p < 0.05, +p < 0.10; Potential confounders include sex, age, marital status, educational level, major city, self-rated health, and number of chronic conditions

Results of multiple linear regressions

p <.001). But also individuals with only "less often" use (than 1–3 times a month) reported lower perceived social isolation scores compared to never users (β = –.09, p <.05).

Furthermore, regressions showed that – compared to individuals never using social media – individuals using social media 1–3 times a month reported lower loneliness scores (β = –.13, p <.05). With regard to covariates, only adverse health-related factors (i.e., worse self-rated health and a higher number of chronic conditions) were both associated with higher perceived social isolation and higher loneliness scores.

Discussion

Key findings

The purpose of this chapter was to examine whether social media use is associated with loneliness and perceived social isolation among community-dwelling individuals 65 years and above in Germany. Regressions showed that compared to those who have never used social media, almost every frequency of social media use was associated with lower perceived social isolation scores. Moreover, compared to those who have never used social media, individuals using social media 1–3 times a month reported lower loneliness scores.

Prior research and possible explanations

Previous research showed that there is inconclusive evidence regarding the association between social media use and loneliness as well as social isolation in the past years (e.g., Hajek and König, 2021 and Wiwatkunupakarn et al., 2021). For example, using data from the Health and Retirement Study (individuals aged 50 years and above in the United States), a previous study showed an association between social media use and higher levels of connectedness, whereas this study did not find an association with emotions of social isolation (Yu et al., 2016). Another study examined community-dwelling individuals ≥ 60 years in the Netherlands (Aarts et al., 2015). This study did not reveal an association between social media use and loneliness levels. A further study determined an association between social media use and lower perceived social isolation levels among community-dwelling individuals aged 40 years and over in Germany (DEAS study, wave 5) (Hajek and König, 2019). We add to this evidence by demonstrating an association between social media use and both loneliness and perceived social isolation among community-dwelling individuals aged 65 years and over in Germany.

At first glance, one might expect that time spent using social media may (incompletely) substitute experiences in real social life and may thus be associated with higher social isolation levels. Additionally, such use of social media may lead to negative comparisons (e.g., comparing oneself with

idealized representations of others) – which could lead to feelings of social isolation (Primack et al., 2017). However, when individuals share their stories of suffering (e.g., health deteriorations or loss of relatives/friends) via such social media sites, this can lead to an opposite reaction from the user. Such users may think that they are better off (i.e., positive comparisons) than others never using social network sites. Such participation in social media may lead to the awareness that one is healthy enough for such social media use (Hajek and König, 2016 and Hajek and König, 2017). Moreover, such use may actually assist in staying in regular contact with friends or relatives living in more distant regions in Germany or even living abroad. Additionally, Leist stated that such social media use may reflect "places where people can get together and engage in social contact, for example, overcome loneliness at nighttime" (Leist, 2013).

Strengths and limitations of our empirical example

Some strengths and limitations of this work are worth acknowledging. Data were taken from a nationally representative sample of community-dwelling older adults. Valid tools were used to quantify both loneliness and perceived social isolation. Cross-sectional data were used. The DEAS study also has a small selection bias (Klaus et al., 2017). The key independent variable gives first insights into the use of social media. However, future studies are required to gain further insights into this topic. Additionally, future studies examining this link among individuals living in institutionalized settings are of importance.

Concluding remarks and guidance for further research

In conclusion, this chapter provided a short literature overview and showed that social media use may be beneficial for both loneliness and perceived social isolation among individuals aged 65 years and above. Upcoming studies should particularly pay attention to the exact time spent using social media. Moreover, factors such as personality characteristics or cultural background may be of importance when examining the link between social media use and loneliness/perceived social isolation in late life. As far as data are available, such factors can be included in upcoming research dealing with this topic.

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Chapter 10

Lifestyle-related factors in loneliness and social isolation of older persons

A Ghanaian study

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Background

Healthy social relationships have an important protective function in the health and well-being of all age groups. However, social isolation and loneliness are growing issues of concern among older persons globally, with far-reaching implications for health and global social policy discourse. Social isolation is objectively measured as having insufficient or little social contact. Loneliness denotes a subjective dissatisfaction with the gap between the desired and actual level and quality of interpersonal relationships (Holt-Lunstad et al., 2015). These two constructs are related but distinct; someone can be isolated socially but not lonely or some may feel lonely in the company of many.

As persons reach older age, their social networks have often been seen to shrink and rates of loneliness increase, mainly due to life-course events such as bereavement, retirement, higher incidence of chronic conditions, and physical or sensory impairments (Antonucci et al., 2014; Gyasi et al., 2020a; and Feng et al., 2019). About 40% of older adults feel lonely, and nearly one-third of adults aged ≥60 are socially isolated (WHO, 2021). Loneliness and social isolation increase the risk of cardiovascular diseases and premature mortality (Smith, 2019), and the relationship may be linked to lifestyle behaviors (Gyasi et al., 2021a; Malcolm et al., 2019).

Previous cross-sectional and longitudinal studies have shown that loneliness and social isolation in old age are associated with unhealthy lifestyles, including smoking (Sreeramareddy et al., 2015), problematic drinking (Kobayashi and Steptoe, 2018), and physical inactivity (Robins et al., 2016). Schrempft et al. (2019) analyzed the English Longitudinal Study of Ageing (ELSA) data and found greater social isolation associated with reduced physical activity (PA) and greater sedentary time. A review revealed that alcoholics feel lonelier and socially isolated (Åkerlind and Hörnquist, 1992), perhaps due to less exposure to social contexts where healthy behaviors may be encouraged. Although the

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associations of unhealthy lifestyles with loneliness/social isolation may be bidirectional (Wootton et al., 2020), whether health behaviors predict loneliness/social isolation remains unclear. Our previous study shows a link between PA and decreased loneliness, but the analysis did not consider social isolation (Gyasi et al., 2021a). Research involving 8,780 adults ≥50 years found that smoking increased the risk of social isolation and loneliness (Philip et al., 2022). Van Cauwenberg et al. (2014) indicate that sedentary lifestyles were associated with limited social participation, limited contact with neighbors, and higher loneliness levels. The theoretical mechanisms suggested may include increased lifestyle-related illnesses, limitations in mobility leading to the inability to interact, and changing social norms around unhealthy behaviors (Cummings and Proctor, 2014 and Feng and Phillips, 2022).

The long-term future pace of demographic aging in sub-Saharan Africa (SSA) will likely be higher than in most other global regions. Consequently, the epidemiology of social isolation and loneliness along the aging profile will be salient in the following decades (WHO, 2021). Therefore, there is the need to characterize the impacts of lifestyle behaviors on isolation in old age in SSA and later compare this with other regions and low- and middle-income countries (LMICs). This chapter discusses the effects of lifestyle on subjective and objective deficiencies in social relationships in a representative sample of older adults in Ghana. It was expected that unhealthy lifestyle behaviors are associated with increased social isolation and loneliness among older adults.

Data sources

Data came from the Aging, Health, Psychological Well-being, and Health-seeking Behavior study, which examines the health and health-seeking-behavior dynamics of community-dwelling adults ≥50 years (Gyasi, 2018 and Gyasi et al., 2021b). The study involved six rural and urban districts in Ghana using a multistage stratified cluster sampling procedure. The sample size was calculated using the WHO's estimation model (Lwanga and Lemeshow, 1991) assuming a 5% margin of error, 95% confidence interval, 1.5 design effect, 5% type 1 error, 15% type 2 error, and 50% conservative prevalence. Considering the loss and refusal to participate and for improving the generalizability of findings, we oversampled by 38%. We achieved a sample of 1,247 for this study. The model reached a statistical power of 85% and a 5% (two-sided) significance level to detect an odds ratio of ≥2. Subsequently, 28 (2.3%) participants declined to participate, 15 (1.2%) questionnaires had missing essential data, and 3 (0.2%) contained outliers. We analyzed 1,201 individuals (42% male and 58% female) who provided complete data with a response rate of 96.31% (Figure 10.1). Participants completed informed consent and interviewer-administered questionnaires. The Institutional Review Board, the Committee on Human Research and Publication Ethics (CHRPE),

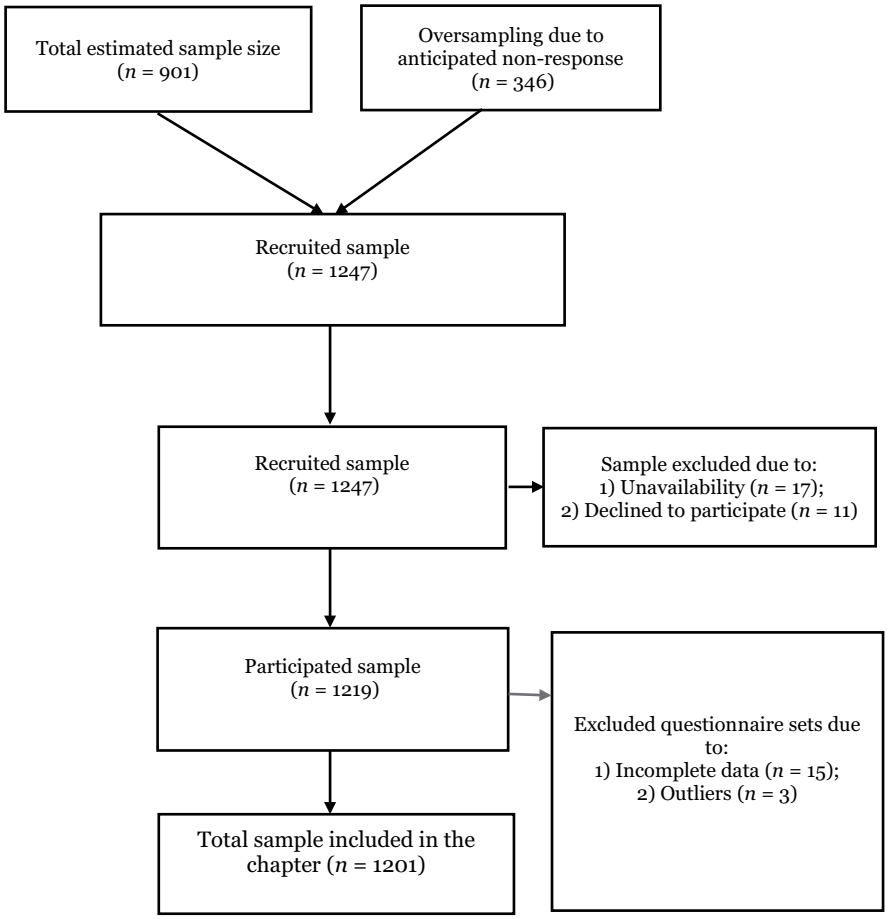

Figure 10.1 Flowchart of the selection of study participants

School of Medical Sciences, Kwame Nkrumah University of Science and Technology and Komfo Anokye Teaching Hospital, Kumasi, Ghana approved the study protocol (Ref: CHRPE/AP/507/16).

Definitions and operationalization

Social isolation was measured using an adapted comprehensive Social Network Index (Berkman and Syme, 1979). We included six domains as indicators for social isolation: marriage or partnership, contact with friends and relatives, social participation, availability of someone to take you to the hospital, availability of someone to share secrets/concerns/fear, and feeling a strong emotional bond with others. A score of 1 was assigned for never

married/widowed/separated/divorced and 0 otherwise. For family/friends contact and social participation over the past year, we assigned 1 point each for never/once/twice per year and 0 for once/twice per month/once/twice per week/almost every day. For the availability of someone to take the participant to a hospital, someone to share secrets/concerns/fear, and feeling a strong emotional bond with others, we assigned 1 point each for completely false/somewhat false/neutral and 0 for partially true/completely true. We then calculated the total continuous score for the six variables as an indicator for social isolation, ranging from 0 to 6, where higher values represent more social isolation (M = 10.794; SD = 1.462; and $\propto$ = .891).

Loneliness was measured using three questions from the UCLA Loneliness Scale (Hughes et al., 2004). The items include "How often do you feel that you lack companionship," "How often do you feel left out," and "How often do you feel isolated from others." The scale has sound psychometric characteristics with reliability of .790 (Hughes et al., 2004) ($\propto$=.819 in the present chapter). Responses were scored on a three-point Likert-type scale: hardly ever or never = 1, some of the time = 2, and often = 3 and summed, creating a score that ranges from 3 to 9, with higher scores indicating more frequent feelings of loneliness (M = 5.280; SD = 2.448).

Physical activity (PA) was assessed using the International PA Questionnaire short form (IPAQ-SF), a validated screening tool measuring three dimensions of PA intensity over the past seven days. We calculated total PA in metabolic equivalent (MET) energy expenditure-min per week (Craig et al., 2003). Respondents were asked:

> During the last seven days, on average, how many days 1) …did you walk for at least 10 minutes, including walking at work, at home, and travel from place to place? 2) … did you do moderate PA like gardening, cleaning, bicycling regularly, swimming, or other fitness activities? 3) … did you do vigorous PA like heavy lifting, digging, gardening/construction work, chopping woods, jogging/running, or fast bicycling?

The responses were taken on a continuous scale, with higher scores indicating higher levels of PA. The IPAQ-SF has been validated in the older African population with good reliability and validity (Kolbe-Alexander et al., 2006).

Current smoking was measured by the item: "Have you ever smoked tobacco or used smokeless tobacco?" It was categorized as 1) never, 2) yes but not now, and 3) yes and currently smoking. These options were dichotomized into 0 = not current smokers vs 2 = current smokers. The "not current smokers" included participants who quit smoking long before data collection (i.e., ex-smokers) and those who never smoked. *Current alcohol intake* was assessed with the question: "Have you ever consumed a drink that contains alcohol such as beer, wine, spirits, etc.?" The response options included 1) never, 2) yes but not now, and 3) yes and currently. We collapsed the "never"

and "yes but not now" options into 0 = non-alcohol consumers and 1 = alcohol consumers.

Analysis plan

Descriptive statistics were computed for the variables using counts and proportions for the categorical variables and means and standard deviations for the continuous variables. We conducted zero-order correlations examining the associations between relevant variables for this chapter. The *p*-values were adjusted for multiple correlations by a Bonferroni correction to avoid the risk of a type I error. Separate OLS regression models were constructed to estimate the hypothesized relationships of lifestyle factors with social isolation and loneliness as outcomes. Models were built in steps with covariates entered sequentially. In regression tables, coefficients were displayed, indicating the change in the dependent variable associated with a one-unit change in the independent variable. Precisely, Models 1a and 2a were adjusted for age. Models 1b and 2b were additionally adjusted for demographic and health-related covariates, including gender, residential type, educational attainment, income, sleep duration, self-reported health, comorbidity, emotional distress, and functional limitations. Models 1a and 2c added the interaction terms (PA × gender; smoking × gender; and alcohol use × gender) to test whether the associations of lifestyles with social isolation and loneliness differ by gender. SPSS 25.0 (SPSS, Inc., IBM, Armonk, NY, USA) analyzed the data with $p < .05$ as the significant level.

Results

Characteristics of the sample are presented in Table 10.1. The mean age was 66.14 (*SD* =11.85), and 63.28% were females. The majority lived in urban areas (55.04%) and attained up to primary education (86.18%). About 31.50% were current consumers of alcohol, 11.10% were current smokers, and the mean income was 307.98 (*SD* =338.79). Our participants reported 3.32 chronic conditions, and the mean self-rated health was 3.01. The average hours of sleep (5.97, SD = 2.33), social isolation (1.79, SD = 1.45), loneliness (5.28, *SD* = 2.45), and mental distress (11.17, *SD* = 4.28) were revealed. The zero-order correlation matrix for the core variables is shown in Table 10.2. Social isolation ($r = .302$, $p < .001$) and smoking ($r = -.174$, $p < .001$) were significantly and positively interrelated with loneliness. Loneliness ($r = -.174$, $p < .001$) and social isolation ($r = -.214$, $p < .001$) were negatively correlated with PA. Smoking also correlated positively with alcohol intake ($r = .361$, $p < .001$).

Table 10.3 shows the estimated coefficients for loneliness and social isolation across various models according to lifestyle-related factors. In the age-adjusted models (Models 1a and 2a), PA was significantly associated with

Table 10.1 Sample characteristics

Variable	%	*M(SD): Range*
Age		66.14(11.85): 50–111
Gender	63.28% Female	
	36.72% Male	
Setting	44.96% Rural	
	55.04% Urban	
Education	86.18% None/basic	
	8.66% Secondary	
	5.16% Tertiary	
Income (Ghanaian Cedi)		307.98(338.79): 100.00–4000.00
Sleep duration		5.97(2.33): 1–12
Self-reported health		3.44(0.84): 1–5
Chronic disease count		3.32(3.97): 0–5
Emotional distress		11.17(4.28): 6–24
Functional limitations		8.91(2.15): 7–28
Current alcohol use	31.50%	
Current smoking	11.10%	
PA index		3.01(1.47): 0–7
Loneliness index		5.31(3.90): 3–9
Social isolation index		1.80(1.46): 0–6

Table 10.2 Pearson's zero-order correlations between core variables with Bonferroni Correction for multiple comparisons

	Variable	*1*	*2*	*3*	*4*	*5*
1	Loneliness	1				
2	Social isolation	.302***	1			
3	PA	−.174***	−.214***	1		
4	Smoking	.057**	−026	−.035	1	
5	Alcohol use	−.018	.011	.018	.361***	1

***p <.001; **p <.05.

decreasing loneliness (b = −.078, 95% CI = −.113 to −.044) and social isolation levels (b = −.214, 95% CI = −.276 to −.152). After full adjustment, PA significantly decreased loneliness (Model 1b: b = −.048, 95% CI = −.114–.017) and social isolation (Model 2b: b = −.077, 95% CI = −.197 to −.043). We found an insignificant interaction effect between PA and gender.

In terms of smoking status, current smokers were more likely to be lonely than non-smokers in the age-adjusted model (Model 1a) (b = .134, 95% CI = .021 −.289). After full adjustments (Model 1b), the significant association between current smoking and loneliness remained robust (b =.218, 95% CI = .062–.375). Current alcohol consumption was associated with increases in social isolation in the age-adjusted (Model 2a: b = .111, 95% CI = .077–.299)

Table 10.3 Multivariable adjusted associations of lifestyle-related factors with loneliness and social isolation indices: OLS Regressions

Variables	*Loneliness index*						*Social isolation index*					
	Model 1a		*Model 1b*		*Model 1c*		*Model 2a*		*Model 2b*		*Model 2c*	
	B	*(95% CI)*	*B*	*(95% CI)*	*B*	*(95% CI)*	*B*	*(95% CI)*	*B*	*(95% CI)*	*B*	*(95% CI)*
PC	√		√		√		√		√		√	
PA	−.078***	(−.113 to −.044)	−.055***	(−.089 to −.021)	−.048	(−.114 to .017)	−.214***	(−.276 to −.152)	−.165***	(−.227 to −.103)	−.077	(−.197 to .043)
Smoking	.134**	(.021 to .289)	.218**	(.062 to .375)	−.029	(−.446 to .387)	−.059	(−.338 to .220)	.233	(.055 to .521)	.694	(−.073 to 1.461)
Alcohol intake	−.027	(−.131 to .078)	.066	(−.041 to .173)	.052	(−.162 to .267)	.111**	(.077 to .299)	.414***	(.218 to .610)	.549**	(.159 to .939)

B, unstandardized regression coefficients; CI, confidence interval; PC, potential confounders; PA, physical activity; √, potential confounders.

Models 1a and 2a are age-adjusted models.

Models 1b and 2b are adjusted for age, gender, residence, education, income, sleep duration, self-reported health status, chronic disease count, emotional distress, and functional limitations.

Model 1c and 2c added the interaction terms (PA × gender; smoking × gender; alcohol use × gender).

***p <.001; **p <.05.

and full-adjustment models (Model 2b: b =.414, 95% CI =.218–.610). There was also evidence of a significant interaction effect between alcohol use and gender (Model 2c: b =.549, 95% CI =.159–.939).

Lifestyle, loneliness, and social isolation

This chapter provides a statistical analysis of the effects of lifestyle-related factors on loneliness and social isolation levels among older adults in Ghana. Regressions demonstrated that individuals who engaged in PA were less likely to be lonely and socially isolated than their counterparts with lower levels of PA. Our results revealed that smokers have higher loneliness levels than non-smokers, but this association was not present for social isolation. Also, alcohol consumption was significantly associated with an increased chance of social isolation, but alcohol intake was not related to changes in loneliness. Notably, the associations were more prominent for social isolation than loneliness. These observations mostly affirm our hypotheses. The additional analysis found a significant interaction between alcohol consumption and gender, with social isolation serving as the outcome measure. Older men who consumed alcohol were highly socially isolated than those who did not drink alcohol. This chapter, thus, indicates that interventions to improve social integration and healthy relationships in old age should consider ensuring healthy lifestyle dynamics.

Several previous studies have acknowledged the associations between lifestyle, social isolation, and loneliness, where the last two named have influenced unhealthy lifestyle behaviors (Choi and DiNitto, 2014 and Shankar et al., 2011). However, this relationship is potentially bidirectional given that most people, particularly in SSA, shun the company of those with unhealthy lifestyles, including smokers and alcoholics. Those with solitary lives or who feel lonely may be more likely to smoke (Sreeramareddy and Pradhan, 2015). This chapter is consistent with previous studies in showing the influence of lifestyle-related factors on interpersonal/psychosocial dysregulation, such as loneliness and isolation (Dyal and Valente, 2015 and Gyasi et al., 2021a) despite contextual and sociocultural diversities. For example, a recent analysis found that smoking was related to the risk of social isolation and loneliness in older English adults (Philip et al., 2022). Delerue Matos et al. (2021) found that highly socially isolated in Europe were vulnerable to being physically inactive and having an inadequate diet. However, these studies did not comprehensively and synchronously account for the effects of multiple lifestyle behaviors. There are inconsistent observations too. For example, an analysis of German data found that more frequent alcohol intake leads to a lower likelihood of social isolation (Hajek and König, 2022). Crucially, the evidence on this topic is limited. This chapter extends the limited body of published SSA and LMIC literature by examining how multiple lifestyle-related factors impact loneliness and social isolation in old age.

There are multiple potential theoretical mechanisms through which lifestyle-related factors could be linked with increased levels of loneliness and social isolation in this sample. Unhealthy lifestyle choices, including alcohol consumption and smoking, are highly stigmatized (Evans-Polce et al., 2015), at least partly due to the unacceptability of these behaviors in the SSA context (Hammett et al., 2017). Research has shown that the social norms of many African sociocultural structures and traditions frown upon alcohol use and smoking, particularly in public places (Duvall, 2017 and Nwagu et al., 2017). Smokers, alcoholics, and those exhibiting similar unhealthy behaviors are highly detached and disconnected from social groups and societal engagements by keeping themselves away from social interactions (Cummings and Proctor, 2014). This tends to increase the risk of social isolation and loneliness. Due to social stigma, many people opt to stay at home to be able to smoke or consume alcohol rather than going to social or public spaces where smoking is not socially endorsed. Moreover, given the interconnectedness of problematic drinking and smoking in social networks, smoking- and alcohol-related health conditions and earlier death are likely to decrease the social contact of alcoholics and smokers (Christakis and Fowler, 2008). The guilt, negative affect, and concomitant self-alienation may compound older adults' problems, such as poor agility and reduced socializing capacity, especially where they are vulnerable to functional limitations and limited mobility (Gyasi and Phillips, 2018).

PA decreased the risk of both subjective and objective isolation in this chapter. PA has been identified as effective in alleviating feelings of loneliness via team sports and exercise activities (Lippke et al., 2021). Moreover, participating in sports/exercises may help avoid social isolation through regular social contact with relevant others (Gyasi et al., 2021a). Aspects of PA can create and strengthen social networks and interpersonal relationships. This could mitigate the risk of loneliness and social isolation (Pinto et al., 2019). Moreover, PA is an effective non-pharmacological and non-clinical intervention that reduces low mood and acute stress and improves psychobiological emotions and neuroendocrine functioning (Robins et al., 2016 and Brown et al., 2017). These emotional developments may enhance self-efficacy and a sense of mastery which are important underlying mechanisms for addressing social isolation and loneliness in older age.

Our hypothesis on the effect modification by gender was partially observed. The analysis demonstrated a significant interaction effect between alcohol use and gender in the ambit of social isolation. Previous gender-based studies suggest that excessive alcohol intake is largely male-dominated behavior, particularly in the SSA context, where females who consume alcohol are considered deviants (Flores-Bonilla, 2020). Therefore, the impact of drinking behavior on social isolation is expected to be higher among men than women.

Strengths and limitations

This chapter extends the previous evidence in many ways. First, previous studies have tended to estimate how loneliness and social isolation have impacted increased levels of unhealthy lifestyle behaviors rather than the reverse. This chapter is the first in SSA to attempt to disentangle the association of multiple health behaviors with the likelihood of change in loneliness and social isolation in a representative cohort of older adults. Using three lifestyle measures, this chapter provides a nuanced understanding of how lifestyle factors influence subjective and objective social isolation. The analysis used a robust dataset in a well-established multidisciplinary context, enabling the adjustment for a wide range of sociodemographic and health-related potential confounders.

However, there are inevitably limitations. The research in this chapter employed a cross-sectional design, which does not permit bidirectional analysis and identification of causal relationships. Future research may benefit from analyzing longitudinal data that may reveal causal/temporal conclusions. Second, although validated tools were used to assess the outcomes, core variables were assessed retrospectively via self-reports. Recall and social desirability biases are, therefore, inevitable. Future analysis should usefully employ supplementary qualitative data to detail the nature of health behaviors and how they relate to loneliness and social isolation in old age. The modeling sequentially controlled for theoretically established confounders. However, there could be a challenge of residual confounding that can be common to all observational studies.

Conclusions and implications

In summary, this chapter provides important research-based contributions to the literature on lifestyle and social isolation linkages in aging LMICs, as advocated by Goodman-Palmer et al. (2023). Findings suggest that lifestyle-related factors are associated with increased risks of loneliness and social isolation, independent of confounders. Specifically, we observed that PA participation reduced loneliness and social isolation and that the risk of smoking and drinking, respectively, increased with loneliness and social isolation. The drinking–social isolation association was stronger for men than women, so men who are alcoholics may be highly socially isolated, a potentially potent cause-and-effect spiral. Policy, public health, and practical interventions to improve social integration in later life should subsume health behaviors. Preventing or reducing excessive alcohol intake and smoking and improving PA are meaningful approaches. Crucially, innovative actions and investments may well curtail unhealthy lifestyles in old age. Future research should explore the theoretical mechanisms and potential causal pathways underlying

these relationships. Importantly, as LMICs in many parts of the world are aging, it would be valuable to explore the cross-cultural consistency of these findings with studies in other settings.

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Part V

Correlates of loneliness and social isolation in old age

Health-related factors

The fifth part refers to health-related correlates of loneliness and social isolation. More precisely, Hajek and König explore the role of health comparisons in loneliness and social isolation in Chapter 11. After that, Luck-Sikorski and Jung examine the link between obesity and loneliness in Chapter 12. In Chapter 13, Kojima and Tanabe provide an overview about existing studies regarding frailty, loneliness, and social isolation. Subsequently, Hajek, Kretzler, and König give an overview about the evidence with regard to multimorbidity, loneliness, and social isolation in Chapter 14. Lastly, Stein and Riedel-Heller explore the link between social isolation, loneliness, and mental health in Chapter 15. Overall, this part gives an overview of the health-related correlates of loneliness and social isolation.

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Chapter 11

Health comparisons and loneliness and perceived social isolation

A brief overview and empirical evidence

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Introduction

The underlying idea: Easterlin Paradox, income comparisons and well-being

The idea for the following contribution was derived from the Easterlin Paradox (importance of comparisons) – which can also be relevant for loneliness and perceived social isolation: it is well known that improvements in income over time do not go hand in hand with increases in subjective well-being (SWB) over time. Cross-sectionally, however, there is a well-known association between income and satisfaction. Such a fact is known as the "Easterlin Paradox" (Easterlin, 1995). It is often explained by the importance of relative income. This means that income compared with important reference groups such as colleagues or individuals with the same educational background is important for well-being (Ferrer-i-Carbonell, 2005). When individuals have a negative income comparison (i.e., their income was lower than the income of a comparison group such as colleagues), they often report a lower SWB. In contrast, positive income comparisons (i.e., their income was higher than the income of a comparison group) were often not associated with a higher SWB (Ferrer-i-Carbonell, 2005).

Health comparisons, loneliness, and perceived social isolation

However, comparisons are not limited to *income* but are made in all aspects of life. Individuals can, for example, also compare their *health* with other individuals in their age group. Actually, two of our previous studies showed that (particularly negative) health comparisons are associated with SWB (Hajek and König, 2019 and Hajek and König, 2016). Beyond that, based on the data from the German Ageing Survey (community-dwelling individuals aged 40+; year 2014), one study from us showed that negative health comparisons were also associated with perceived social isolation (i.e., feeling that

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one does not belong to the society) among the total sample and in men but not women (Hajek and König, 2017). Furthermore, this study showed that positive health comparisons were weakly associated with lower levels of perceived social isolation (Hajek and König, 2017).

Our aim and relevance

We assume that health is an important factor for both loneliness (i.e., perceived discrepancy between actual and desired social relationships) and perceived social isolation in later life. Therefore, we believe that health comparisons are particularly important for loneliness and perceived social isolation in this period of life. The chapter will present how negative and positive health comparisons are associated with loneliness and perceived social isolation among women and men aged 40 years and above in Germany. Thus, in contrast to our former study (Hajek and König, 2017), the present chapter uses more recent data and examines both loneliness and perceived social isolation. Knowledge about such an association is important because of the well-known consequences of loneliness and perceived social isolation for both morbidity and mortality (Holt-Lunstad et al., 2015 and Luanaigh and Lawlor, 2008).

Possible mechanisms

A possible mechanism for such an association between health comparisons and loneliness as well as perceived social isolation may be that negative health comparisons can contribute to negative emotions such as frustration or rage (Buunk et al., 1990 and Wills, 1981). Such negative feelings can in turn cause feelings of isolation or loneliness (Hajek and König, 2017). Due to the competitive attributes of men (Gneezy et al., 2003), one can further assume that negative health comparisons are more strongly associated with these outcomes in men (due to feelings of inferiority caused by negative health comparisons).

A practical example: methods

Sample: German Ageing Survey

For this chapter, data were taken from the German Ageing Survey ("Deutscher Alterssurvey", DEAS). It is funded by the Federal Ministry for Family Affairs, Senior Citizens, Women, and Youth (BMFSFJ). This survey's first wave was conducted in 1996. The DEAS study is managed by the German Centre of Gerontology (DZA) in Berlin. The Institute for Applied Social Sciences (infas) conducted the fieldwork. The primary objectives were to

> provide a representative national database containing information describing the living conditions of the country's middle-aged and older population, as well as to study diversity within the older section of the population, the process of ageing as it affects individuals, and processes of social change as they relate to old age and ageing.
>
> (Klaus et al., 2017)

The DEAS study has a cohort-sequential design, which combines a large cross-sectional sample with longitudinal samples. More information is available elsewhere (Klaus et al., 2017).

We used data from the sixth wave (2017) for this chapter. The response rate was 63% in this wave. Individuals were interviewed using computer-assisted personal interviewing (CAPI), which covered variables such as sociodemographics. Following that, participants were asked to complete a standardized questionnaire covering topics such as loneliness and social isolation. In the sixth wave, 6,626 individuals were interviewed and 5,608 of those individuals filled out the standardized questionnaire (including items regarding loneliness and perceived social isolation). In total, n = 5,447 individuals completed the questionnaire and provided data on loneliness and perceived social isolation and the explanatory variables.

Written informed consent was obtained prior to the interview. The German Ageing Survey adheres to the Federal Data Protection Act. Please keep in mind that an ethical statement was not required for this study because the criteria for requiring an ethical statement were not met (risk for the respondents, lack of information about the aims of the study, and examination of patients).

Dependent variables

Perceived social isolation was quantified using a tool created by Bude and Lantermann (Bude and Lantermann, 2006). This tool has four items (with four options). By averaging the items, a score was computed. This score ranges from 1 to 4, with higher values reflecting higher levels of social isolation. Cronbach's alpha was 0.87 in our study.

The six-item tool of loneliness by de Jong Gierveld was used to quantify loneliness (Gierveld and Van Tilburg, 2010). The loneliness scale is a short version of the well-established 11-item de Jong Gierveld (de Jong Gierveld et al., 2006 and de Jong Gierveld and Kamphuls, 1985) Loneliness Scale. The scale ranging from 1 to 4 was calculated by averaging the items. Higher values reflect higher loneliness. Favorable psychometric characteristics of this tool have been demonstrated (Gierveld and Van Tilburg, 2010). Cronbach's alpha was 0.84 in our study.

Independent variables

Our main interest was in health comparisons. Health comparisons were measured with the question "How would you rate your health compared with other people your age" (much better; somewhat better; the same; somewhat worse; and much worse). Regarding potential confounders, we included age, sex, family status (married, living together with spouse; married, living separated from spouse; single; divorced; and widowed), educational level (Internationally Standard Classification of Education [ISCED-97] with low, medium, and high education) (Matthews et al., 2017), and self-rated health (from 1 = "very good" to 5 = "very bad").

Statistical analysis

Stratified by sex, sample characteristics are first shown. Subsequently, multiple linear regressions (total sample and also stratified by sex) were performed to analyze the association between health comparisons and loneliness as well as social isolation among individuals in late life. In a robustness check, full-information maximum likelihood (FIML) was used to address missing data (Von Hippel, 2016). The statistical significance was determined with $p < 0.05$ and marginal significance was set at $p < 0.10$. Stata 16.1 was used for data analysis (StataCorp, College Station, TX, USA).

Results

Sample characteristics

Sample characteristics of our analytical sample are given in Table 11.1. The mean age was 67.1 years (SD: 10.6 years; 43–97 years) and 50.1% were females. While 4.7% of the individuals had low education, 49.5% had medium education and 45.7% had a high education. In sum, 69.4% of the individuals were married and living together with his or her spouse. In total, while 15.3% of the individuals rated their health as "much better" compared to other individuals in their age group, 42.4% of the individuals rated it as "somewhat better" and 29.5% of the individuals rated it as "the same". Additionally, 9.6% of the individuals rated it as "somewhat worse" and 3.1% of the individuals as "much worse". Further details are given in Table 11.1. It may be worth noting that Cramer's V for the association between self-rated health and health comparisons was 0.33 ($p < 0.001$) – which reflects a medium effect size.

Regression analysis

In Table 11.2, results of multiple linear regressions are shown (the second column: with perceived social isolation as the outcome among the total sample and the third and fourth columns among men and women, respectively; the fifth to seventh columns refer to loneliness).

Table 11.1 Sample characteristics (German Ageing Survey, wave 6, n = 5,447)

Variables	*N (%)/Mean (SD)*
Sex: N (%)	
Men	2,720 (49.9)
Women	2,727 (50.1)
Age: Mean (SD)	67.1 (10.6)
Educational level: N (%)	
Low (ISCED 0–2)	257 (4.7)
Medium (ISCED 3–4)	2,698 (49.5)
High (ISCED 5–6)	2,492 (45.7)
Marital status: N (%)	
Married, living together with spouse	3,782 (69.4)
Married, living separated from spouse	70 (1.3)
Divorced	523 (9.6)
Widowed	723 (13.3)
Single	349 (6.4)
Self-rated health: N (%)	
Very good	433 (7.9)
Good	2,530 (46.4)
Medium	1,969 (36.1)
Bad	433 (7.9)
Very bad	82 (1.5)
Health comparisons: N (%)	
Much better	835 (15.3)
Somewhat better	2,312 (42.4)
The same	1,609 (29.5)
Somewhat worse	522 (9.6)
Much worse	169 (3.1)
Perceived social isolation: Mean (SD)	1.6 (0.6)
Loneliness: Mean (SD)	1.8 (0.5)

Even after adjusting for several potential confounders, regressions showed that positive health comparisons (compared to "the same") were associated with lower levels of perceived social isolation among the total sample (e.g., for "much better" with $\beta = -0.08$, $p < 0.01$) and both in women and men. Additionally, negative health comparisons ("much worse" compared to "the same") were quite strongly associated with higher levels of perceived social isolation in the total sample ($\beta = 0.16$, $p < 0.05$) and in women ($\beta = 0.16$, $p < 0.10$).

Moreover, regressions showed that positive health comparisons were not significantly associated with lower levels of loneliness. In contrast, negative health comparisons ("much worse" compared to "the same") were marginally significantly associated with lower levels of loneliness among men ($\beta = 0.12$, $p < 0.10$).

We also performed a robustness check where we used FIML to address missing values (results are available upon request). However, it should be emphasized that we obtained virtually the same results in terms of effect sizes and significance.

Table 11.2 Determinants of perceived social isolation and loneliness

	Perceived social isolation – Total sample	*Perceived social isolation – Men*	*Perceived social isolation – Women*	*Loneliness – Total sample*	*Loneliness – Men*	*Loneliness – Women*
Independent variables						
Health comparison: Much better (Ref.: The same)	−0.08**	−0.07*	−0.08*	−0.03	−0.02	−0.03
	(0.03)	(0.04)	(0.04)	(0.02)	(0.03)	(0.03)
Somewhat better	−0.05*	−0.06*	−0.03	0.01	0.02	−0.00
	(0.02)	(0.03)	(0.03)	(0.02)	(0.02)	(0.03)
Somewhat worse	0.06+	0.04	0.07	0.03	0.03	0.04
	(0.03)	(0.04)	(0.04)	(0.03)	(0.04)	(0.04)
Much worse	0.16*	0.16	0.16+	0.02	0.12+	−0.08
	(0.07)	(0.10)	(0.09)	(0.05)	(0.07)	(0.07)
Potential confounders	✓	✓	✓	✓	✓	✓
Constant	1.28***	1.26***	1.38***	1.87***	1.84***	1.72***
	(0.08)	(0.12)	(0.10)	(0.07)	(0.10)	(0.09)
Observations	5,447	2,720	2,727	5,443	2,725	2,718
R^2	0.08	0.09	0.08	0.07	0.06	0.08

Beta-coefficients (unstandardized) are displayed; robust standard errors in parentheses;

*** p < 0.001, ** p < 0.01, * p < 0.05, + p < 0.10; potential confounders include sex (if appropriate), age, marital status, educational level, and self-rated health.

Results of multiple linear regressions.

Discussion

Key findings

The aim of this chapter was to investigate whether health comparisons are associated with loneliness and perceived social isolation among middle-aged and older community-dwelling women and men in Germany. Actually, even after adjusting for several potential confounders, regressions revealed that negative health comparisons may be important for loneliness among middle-aged and older men. Moreover, both positive and negative health comparisons are particularly important for perceived social isolation.

Prior research and possible explanations

Due to the quite restricted knowledge regarding health comparisons and comparable outcomes, our present findings are difficult to compare with previous research. While our own previous studies particularly demonstrated an association between negative health comparisons for well-being outcomes (Hajek and König, 2016) (which is moderated by self-efficacy, optimism, and self-esteem (Hajek and König, 2019)), another study from us showed an association between negative health comparisons and feelings of social isolation among the total sample and in men but not women (Hajek and König, 2017). Additionally, we showed that positive health comparisons were weakly associated with lower levels of social isolation among men in this former study. We extend this current knowledge by also investigating the association between health comparisons and loneliness.

Interestingly, we currently showed that positive and negative health comparisons are particularly important for perceived social isolation. The thought that one is worse off than others (in terms of health) seems to be important. We think that negative emotions such as inferiority or shame may contribute to perceived social isolation (Kieselbach, 2003). It is worth noting that positive health comparisons were important for perceived social isolation in the total sample and in both sexes. Positive emotions such as feelings of strength, self-confidence, or self-esteem may lead to lower perceived social isolation.

With regard to (negative) health comparisons and loneliness, only a marginal significant association could be identified among men. Thus, future research in this area is required to examine this association (e.g., in other countries). Potential gender differences should also be examined in upcoming studies.

Strengths and limitations of our empirical example

Some strengths and limitations are worth bearing in mind when interpreting our findings. It should be highlighted that data from a nationally representative sample were used. Loneliness and social isolation were both measured

with established tools. Due to the cross-sectional design, causal conclusions should be made with great caution without future evidence from longitudinal studies. In the German Ageing Survey, a small selection bias has been detected (Klaus et al., 2017). It should be noted that the reference group for health comparisons was explicitly set which means that individuals should compare their health to other individuals in their *age group*. Nevertheless, it also appears to be plausible that certain other variables could contribute to comparison processes (such as local societies or circles of friends).

Concluding remarks and some suggestions for further research

In conclusion, this chapter showed that negative health comparisons may be important for loneliness among middle-aged and older men. Moreover, both positive and negative health comparisons are particularly important for perceived social isolation. Future research in this area is required to explore the underlying mechanisms, and longitudinal studies are required to confirm our current findings. More broadly, future studies could clarify the role of comparisons in other life domains (e.g., income comparisons, status comparisons, age comparisons, comparisons regarding leisure time, or comparisons regarding family life) for loneliness as well as social isolation.

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Chapter 12

Obesity and loneliness in old age

Associations with weight stigma

Claudia Luck-Sikorski and Franziska Jung

Increasing trends of obesity for the oldest old

Obesity, defined as a body mass index (BMI) of 30 kg/m^2, has become a major public health concern throughout the last decades. The prevalence rates of obesity have been found to be associated with age in adult populations. Data from Germany suggest that there is an almost linear association between age and obesity prevalence. In women, the prevalence of obesity in the age group 18–29 was 9.6%: an estimated rising to 28.1% is seen in the age group over 70 years old. The same picture can be seen for men: in the youngest adult cohort, 8.6% were obese, while 31.3% of all 70-year-old and older men were affected (Mensink et al., 2013). In this context, recent data comparing how often obesity was diagnosed in 2009 and 2018 suggests that an increasing trend can be observed especially for the oldest old (>80 years of age). Especially in the age group 85–89 years, the prevalence of obesity has risen by 80%. This increase was more prominent in men where the prevalence has even doubled (from 6.4 to 12.9%) (Steffen et al., 2021).

The role and importance of obesity in old age has long been underestimated when studies observing the so-called obesity paradox emerged. Findings implied that overweight or obesity may pose a protective variable in cardiovascular outcomes, especially in older people. However, more recently, a large body of evidence has been collected questioning the validity of these findings. The paradoxical association between BMI and mortality is blunted in studies that are able to control data for potentially underlying variables (such as physical health) (Ades and Savage, 2010). It may therefore be assumed that the somatic effects of obesity in old age are similar to those of younger cohorts and expand to age-specific impairments, such as functional decline and disability (Al Snih et al., 2007 and Schaap et al., 2013).

Obesity and psychological health – cause or effect?

Obesity not only impacts somatic health but also affects psychological health. In light of the COVID-19 pandemic, where lockdown effects are mirrored in obesity rates in younger populations (Brooks et al., 2021) as well as weight

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gain in people with obesity linked to the mental burden during the COVID-19 outbreak, this is of particular interest (Pellegrini et al., 2020). There are numerous studies explicating the bidirectional relationship between obesity and mental health. People with obesity have a higher risk for depression and depressive symptoms, anxiety, disordered eating, lower self-esteem, and impaired body image (Sarwer and Polonsky, 2016). There seems to be a strong shared biological background in mental health problems and obesity, in terms of hypercaloric (high sugar and high fat) diets that affect the neuroendocrinological systems of the body and lead to mental distress (Lavallee et al., 2021). Besides these undisputed biological components, psychosocial factors contribute to mental health outcomes in people with obesity.

The impact of weight-related stigmatization on weight

An important psychosocial determinant of mental health in people with obesity lies in the concept of stigmatization. Numerous studies document that obesity is a stigmatized health condition in which people with obesity are described unfavorably (Puhl and Heuer, 2010). The most common attributions of obesity are a lack of willpower, sloppiness, and laziness. Even younger children with obesity are subject to exclusion and stigmatization, affecting the self-esteem, school performance, depressive symptoms, and social involvement of children (Haqq et al., 2021). A vicious cycle is initiated where these effects are associated with an increased risk of maladaptive eating and unhealthy weight control behaviors, contributing to an exacerbation of obesity. These mechanisms have been found in adults as well: through mediating and moderating variables, weight stigma is associated with higher morbidity and mortality in people with obesity (Puhl and Heuer, 2010). Mediating variables include the direct effects of stigmatization on self-esteem, body image, and coping (Sikorski et al., 2015) on mental health outcomes, as well as mediated effects that follow the internalization of stigma (internalized stigma) on consequences of body shame, body dissatisfaction, exercise behavior, healthcare experiences and behaviors, bodily pain, and parental weight talk (Bidstrup et al., 2021). Internalization of stigma encompasses the integration of negative attribution in one's self-concept. By being part of a society that holds stigmatized attitudes toward people with obesity, they tend to apply these attitudes to themselves when becoming obese. For instance, people with obesity are labeled as sloppy and lacking willpower as part of the public's opinion as to why people become obese. Therefore, when people develop excess weight, these views are continued and self-blame ("I am too weak-willed to maintain my weight/resist over-eating" and so on) is the consequence (Pearl and Puhl, 2018).

Given the emerging importance of social inclusion and contact (and hence the adverse effects of loneliness and social isolation), it is obvious that stigmatized groups may be more prone to loneliness than others. People with

obesity, in particular, may be affected twice: first, excess weight limits mobility and can as such foster loneliness, and second, the feeling of stigmatization and rejection may hinder people with obesity to interact with others.

A systematic review found six studies investigating the association of loneliness in people with obesity. Results were inconclusive since some studies did find an association between obesity and loneliness or social isolation, whereas others did not. The same is true for gender differences. Particularly, studies outside of Europe were lacking (Hajek et al., 2021). There are some studies investigating social isolation and loneliness in older samples particularly. Three studies in particular report findings for Germany.

Based on the German Ageing Survey (DEAS, "Deutscher Alterssurvey"), Hajek and König investigated the role of obesity and different variables of social engagement in adults aged 40 and above. The database is a representative cross-sectional and longitudinal study of the community-dwelling population. The first study (Hajek and König, 2018) chose social exclusion as the dependent variable. Social exclusion refers to the circumstance when people are not engaged in certain areas of life and/or community, for instance, when unemployed or having limited social contacts. The data analysis used data from the fifth wave of the DEAS; thus, being of cross-sectional design. When stratified by age, 65-year-old women with obesity did not report higher social exclusion compared to those without obesity. No other associations were found between social exclusion and obesity in the total sample and in men.

A second analysis of the DEAS involved data from four waves and provides a longitudinal analysis of the impact of loneliness on the onset of obesity. Loneliness was measured by a six-item scale that assesses the feeling of missing relationships (emotional loneliness) and missing a broader social network (social loneliness). The incidence of obesity increased the risk for loneliness in men but not in women. The authors found a significant sex × obesity interaction (Hajek and König, 2019).

A recent study from the same database used the fifth and sixth waves of the DEAS to investigate perceived social isolation and loneliness (Hajek and König, 2021). Four items were used to assess social isolation and the aforementioned six-item Loneliness Scale by de Jong Gierveld was applied. Social isolation was not associated with obesity onset in both sexes, but significant weight reduction (ending the obesity status) was associated with lower social isolation in women. No significant associations were found for loneliness: neither the onset nor the end of obesity was correlated with loneliness. These cross-sectional and longitudinal studies in people aged 40 and older showed very heterogeneous and mixed results. Further studies are therefore warranted to investigate the complex and unclear associations between obesity, loneliness, and social isolation as they may be moderated by variables not assessed in epidemiological studies. One of these variables may be found in the stigmatization of obesity.

Previous research tried to investigate the cross-sectional associations of obesity, loneliness, and measures of stigmatization and internalization of stigma. In 1,000 participants with obesity, it was found that participants with higher levels of depressive symptoms, higher internalized weight bias, and experiences of discrimination reported higher levels of loneliness (Jung and Luck-Sikorski, 2019). There are no comparable studies in older cohorts. As the prevalence of obesity in old age is high and the acceptance of obesity may differ throughout the life span, it is unclear whether social isolation and loneliness in old age are driven by obesity and the associated stigmatization at all. Data for 75-year olds are available from the aforementioned German study and are presented in the following.

Weight stigma among the oldest old

The data were derived from a large representative study of people in Germany living with obesity. Forsa, a research and market institute, conducts a weekly omnibus survey in Germany in which a screening of participants for BMI over 30 kg/m^2 was possible and conducted. The aim of the study was to interview n = 1,000 people with obesity. To obtain this goal, n = 2,192 people had to be contacted, yielding a response rate of 45.6%. In the final sample, 112 participants were of age 75 years and above and are therefore included in this analysis.

The UCLA loneliness scale in its three-item version was used (Hughes et al., 2004). To allow for comparisons with the general public, a five-point Likert scale was given to participants (never to very often). A higher score therefore indicated greater loneliness. In the total sample, Cronbach's alpha was $\alpha = 0.682$, while in the older age sub-sample, reliability was questionable ($\alpha = 0.601$). The mean UCLA score was M = 2.04 (SD = 0.74) in the sub-sample (M = 1.99 in the complete sample).

Two instruments were used to assess the independent variables of interest. The Weight Bias Internalization Scale (WBIS, Hilbert et al., 2014) estimates the magnitude of internalized weight stigma. The German version consists of ten items. Cronbach's alpha in the current chapter was $\alpha = 0.788$ and $\alpha = 0.833$ for the whole sample. Experienced discrimination was determined by the Lifetime Discrimination Scale from the National Survey of Midlife Development in the US (MIDUS) (Williams et al., 1997). The scale asks whether or not participants had experienced unfair treatment because of their weight (for instance, "Have you been treated unfair in health care settings because of your weight?"). For this analysis, ever having experienced weight discrimination was counted via a dichotomous outcome (in either setting). About 40% of the whole sample reported weight-based discrimination, which is almost as many as in the sub-sample of older people (37.5%).

As covariates, sociodemographic variables were assessed (age, gender, living situation: alone or with someone). Additionally, the Patient Health

Questionnaire (PHQ-9) was used to measure depressive symptoms (Kroenke et al., 2001). General health status was determined by an analog scale ranging from 0 (extremely unhealthy) to 100 (perfect health).

STATA 14.0 was used for all analyses. BMI was categorized into three groups, reflecting the severity of obesity (obesity classes I–III). Chi^2 or one-way ANOVAs were used to differentiate results across the obesity classes. The UCLA mean was used as a dependent variable in linear regression models. When possible, continuous scores were used as dependent variables (depressive symptoms, general health, and WBIS).

Table 12.1 shows and summarizes the characteristics of the older age subsample. Most of the n = 112 participants aged 75 and older had obesity class I (BMI < 35 kg/m^2) and only four individuals reported a BMI equivalent to obesity class III (BMI ≥ 40 kg/m^2). No differences across obesity severity were found.

The mean loneliness score was M = 2.04 (SD = 0.070), which is significantly higher than the German general public (M = 0.99 reported from a panel study (Luhmann and Hawkley, 2016)) but not different from the whole sample (M = 1.99 (Jung and Luck-Sikorski, 2019)).

Table 12.2 reports univariate and multivariate regression models. Using the UCLA scale as an outcome, two variables are significant predictors in both uni- and multivariate models. Living with someone (B = −0.979, $p < 0.05$) was associated with lower loneliness, while more depressive symptoms were associated with higher levels of loneliness (B = 0.256, $p < 0.001$). Stigma-related variables were not associated with loneliness in older-aged participants. The adjusted r^2 for the full model was 0.18.

The complex association between weight stigma, loneliness, and age

This chapter set out to investigate whether stigma-related experiences were associated with loneliness in a sample of older-aged individuals with obesity. Unlike the analysis of the whole sample, this chapter did not find a stigma-related association with loneliness but rather known determinants of loneliness in old age, such as depressive symptoms and cohabitation.

Previous research suggests that discrimination based on weight is associated with greater loneliness at baseline (n = 7,622) and follow-up (4 years later, n = 6,450). However, the sample was on average 67 years old (Sutin et al., 2015). In the 2019 analysis, we observed a negative association between loneliness and co-habitation and positive correlations with discriminatory experiences, depressive symptoms, and weight bias internalization. It was interpreted that loneliness can act as a consequence of weight stigma. People with obesity are confronted with the consistent public stigma of excess weight (e.g., negative attitudes that are expressed by the general public) and experience social exclusion. Discrimination experiences are reported by a third of the respondents in

Table 12.1 Descriptive statistics for all variables of the total sample and by the BMI Group

Variable	*Total sample (n = 112)*		*BMI 30–34.5 kg/m² (n = 90)*		*BMI 35–39.9 kg/m² (n = 18)*		*BMI > 40 kg/m² (n = 4)*		*p-value*
	% or M	*SD*	*% or M*	*SD*	*% or M*	*SD*	*% or M*	*SD*	
Gender									0.124
Women	58.0		53.3		77.8		75.0		
Men	42.0		46.7		22.2		25.0		
Living situation									0.339
Alone	58.9		55.6		72.2		75.0		
With someone	41.1		44.4		27.8		25.0		
Discrimination experience (MIDUS)									0.278
Yes	37.5		35.6		38.9		75.0		
No	62.5		64.4		61.1		25.0		
Age	78.8	3.5	79	3	79	4	79	4	n.s
Depressive symptoms (PHQ)	14.8	4.1	14.7	4.1	15.8	3.9	12.5	1.9	n.s
Weight Internalization (WBIS)	27.0	11.7	25.8	11.7	30.7	9.9	37.7	14.2	n.s
Health status (VAS)	55.4	20.6	57.0	19.0	46.0	25.0	55.0	19.0	n.s
Loneliness	2.0	0.7	2.0	0.7	2.2	0.8	1.7	0.8	n.s

p-values from Chi-square test (categorical variables) or one-way ANOVA (dimensional variables). Group comparisons in ANOVA indicated by I (BMI 30–34.9), II (BMI 35–39.9), or III (BMI > 40).

Table 12.2 Regression coefficients of univariate and multivariate regression models (dependent variable: loneliness)

Variable	*Univariate model*		*Full model*	
	B	*SE*	*B*	*SE*
Gender				
Men	—		—	
Women	−0.013	0.143	−0.259	0.443
Living situation				
Alone	—		—	
With someone	−0.292*	0.141	−0.979*	0.453
Discrimination experience				
No	—		—	
Yes	0.0857	0.146	−0.401	0.480
BMI category				
BMI 30–34.9	—		—	
BMI 35–39.9	0.200	0.192	0.113	0.582
BMI > 40	−0.356	0.379	0.046	1.270
Age	0.001	0.020	−0.060	0.063
Depressive symptoms (PHQ)	0.090***	0.016***	0.256***	0.054
Weight Internalization (WBIS)	0.009	0.006	0.003	0.019
Health status (VAS)	−0.001	0.003	−0.001	0.011

* $p < 0.05$. **$p < 0.01$. *** $p < 0.001$., Adjusted r^2 for full model: 0.18

this sample: a higher estimate than in a previous meta-analysis of cross-sectional studies (Spahlholz et al., 2016). Discrimination has been linked to chronic stress and health disparities (American Psychological Association, 2016), again illustrating a vicious cycle of psychosocial effects of obesity (discrimination) that are linked to antecedents of obesity (chronic stress and other chronic illnesses). Loneliness may then result from the so-called "why try" effect that incorporates internalized stigma that stems from the public stigma and discrimination (Corrigan et al., 2009). The why try effect keeps people from pursuing and achieving life goals (such as social inclusion may be one of them). In the older sample of people aged 75 and older, we do not find these associations of stigma-related variables, which may have different reasons.

For one, obesity in older age may be perceived differently by the general public. While we did not assess the onset of obesity in the sample, we observe similar rates of discrimination and weight bias internalization. However, these variables may play an acute role in social isolation in old age. People with obesity of different age groups are perceived quite differently by the general public. In a vignette study, older people with obesity were rated more favorably than children with obesity (Sikorski et al., 2012). The majority of people aged 75 and above are at least overweight, leaving room for the assumption that senior citizens with overweight do not defy a social norm but rather represent a social norm in older age. This having said, weight stigma

may not play a central role for older individuals with obesity, also because other psychosocial explanatory variables gain relevance.

Therefore, second, research has shown that the associations that were found in this chapter are indeed relevant risk factors for loneliness in old age (Berg-Weger and Morley, 2020). Depression, living alone, and not being understood by others are predictors of loneliness. Other variables include income and education, female gender, living in rural areas, widowhood, poor functional status, and subjective causes such as illness, death, and lack of friends. Weight-based stigmatization may therefore play a subordinate role in the development of feelings of loneliness, compared to strong predictors such as depression and living alone. The data presented in this chapter are the first to investigate the association of weight-based stigmatization and loneliness in a sample of the oldest-old aged 75 and above living with obesity. Validated instruments were used to assess weight-based stigmatization and loneliness. Its cross-sectional nature does not allow for assumptions about causality but rather highlights associations of variables. A high selection bias can be assumed as this was a telephone survey in which institutionalized or people with disabilities are most likely not represented.

Conclusion

Older people living with obesity were lonelier than the general public in Germany but did not differ from younger cohorts with obesity. While variables of weight-based stigmatization showed significant associations with loneliness in younger cohorts, loneliness in older people was only associated with depression and living situation. The impact of obesity in terms of functional limitations as well as subjective health impairment has yielded mixed results in previous studies and needs further attention.

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Chapter 13

Frailty and loneliness/social isolation in late life

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The meaning of loneliness and social isolation

In the last decade, numerous studies and articles have shed light on loneliness in late life and how it is also a public health concern with its effect on frailty and its health-related factors. Loneliness, although seemingly timeless in humanity's discourse, is a relatively more modern concept in its intersection with medicine. Fromm-Reichmann, in 1959, published an essay in *Psychiatry* and commented that "loneliness is one of the least satisfactorily conceptualized psychological phenomena, not even mentioned in most psychiatric textbooks".[1]

Social isolation, while it may be present with loneliness, is itself a separate concept. Loneliness is generally considered to be subjective. It is the negative, quietly distressful, and unpleasant sense of awareness of the discrepancy between the desired and actual level and quality of meaningful social relationships and interactions. Social isolation can be more objective as it is quantifiable with the number and frequency of social contacts. Loneliness, on the other hand, typically has a subjective factor such as with respect to the perceived suboptimal social network. Social isolation, being alone, in late life is often circumstantial such as in losing a spouse, network of friends, or becoming kinless, although there may be some who seek being alone, solitude, for a time to reflect, focus on creativity, and be inspired. Loneliness in late life can befall a person but is never really something desired.

Tools in the scientific literature that measure loneliness

Social isolation and loneliness in late life have come to the forefront of discussion and professional conscience with emerging studies. From the perspective of conducting studies, quantitative definitions or measures have been identified. For loneliness, various measures have been used in studies. Two main approaches observed in the literature include a multi-item scale versus a single-item measure.[2,3] Among the multi-item scales, the UCLA Loneliness Scale and the de Jong Gierveld Loneliness Scale have been commonly used.[4–6]

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The UCLA Loneliness Scale was originally published in 1978 by researchers at UCLA. It has been revised in 1980 and 1996, and some shorter versions have also been developed. The revised UCLA Loneliness Scale consists of 20 items, 10 items worded positively toward loneliness and 10 worded otherwise.

An individual is required to choose the frequency of the feeling described in each item from the options: 1 for never, 2 for rarely, 3 for sometimes, or 4 for often for the positively worded items and likewise for the negatively scored items which is reverse scored. The higher scores correspond to a greater degree of loneliness. Despite its popularity as a measure of loneliness, the UCLA Loneliness Scale has been critiqued for being unidimensional, focusing only on the social dimension.[7] Another widely used loneliness scale, the de Jong Gierveld Loneliness Scale, covers two components of loneliness – emotional loneliness and social loneliness. Emotional loneliness is described as the absence of an intimate relationship with partner or best friends, and social loneliness is the absence of a broader engagement of social network with siblings, cousins, friends, or neighbors.[8] The de Jong Gierveld Loneliness Scale contains six emotional loneliness items and five social loneliness items, a total of 11 items.[6] Therefore, it can be used as a complete loneliness scale with 11 items or either emotional (six items) or social (five items) subscales. Scoring of this scale is similar to the UCLA Loneliness Scale, where an individual is required to choose one of the five frequency options: none of the time, rarely, some of the time, often, and all of the time. A shorter six-item version of the de Jong Gierveld Loneliness Scale has also been developed.[4]

Tools in the scientific literature that measure social isolation

Social isolation has been evaluated by studies using various measures, including living alone, being unmarried, residing in rural area, having a small network, having less-frequent contact with family, friends, or other network members, low diversity of social network, low participation in social activities, or combination of these factors.[9,10] Some studies have used the six-item Lubben Social Network Scale (LSNS-6) or components of it, such as responses to the question if there has been contact, seeing or hearing from, at least once a month from relatives/friends.[11] The Friendship Scale (FS), a six-item measure that contributes to social isolation and social connection, has also been used.[12]

Social isolation and loneliness as a risk factor for health

As aptly stated by Freedman in a clinical review article, "Social isolation and loneliness might well be the new geriatric giants".[13] Social isolation and loneliness affect health and well-being and have been associated with frailty in

older adults.[14] A cohesive universal theory unifying associations of social isolation and loneliness with respect to frailty, separately or together, along with definitive risk factors, directionality, and underlying physiological mechanism, is still to be realized. The studies in the literature have been conducted in different countries, have used different databases, and have used different measures of loneliness, social isolation, and frailty. What can be said, however, is that social isolation and loneliness in late life are not desirable elements and measures to reduce this risk in late life are likely to enhance life's well-being.

Accumulating evidence has shown that social isolation and loneliness are associated with various adverse health outcomes. One of the most frequently examined outcomes is all-cause mortality. Most studies have consistently shown that those who are socially isolated or lonely are at a higher risk of premature death.[15, 16] A meta-analysis published in 2015 that analyzed data from 70 studies showed 29% and 26% increased risk of mortality for social isolation and loneliness, respectively.[15] The authors noted that the risk associated with social isolation and loneliness is comparable with well-established risk factors of mortality, such as physical inactivity or obesity.[15] Other health outcomes related to social isolation and/or loneliness are cardiovascular diseases,[17, 18] impaired or worse cognitive function,[19–23] depression,[24] anxiety,[25] and psychosis.[26]

Social isolation and loneliness in relation to frailty

Two series of systematic reviews and meta-analyses were conducted in 2022 exploring currently available evidence on how social isolation and/or loneliness are associated with physical frailty.[27, 28] The search was limited to physical frailty as the frailty phenotype,[29] and the multidimensional frailty criteria, such as the Frailty Index,[30] were not considered since the multidimensional criteria often include social factors closely related to social isolation or loneliness as a deficit. Longitudinal or cross-sectional observational studies that examined the association between social isolation and frailty or between loneliness and frailty in community-dwelling middle-aged or older adults were eligible to be included in the systematic review.

Social isolation and frailty

Among nine studies on social isolation and frailty identified by the literature search, the most commonly used methods to define social isolation were substituting scales for social network, such as with the six-item Lubben Social Network Scale[31] or Berkman-Syme Social Network Index.[32] One study used the FS which was developed as a short user-friendly scale measuring perceived social isolation and consisted of six items covering important dimensions of social isolation and connection.[12] The other studies created original

scales for measuring social isolation using responses to the questionnaires regarding the living situation (unmarried, not cohabiting), frequency of regular contact with children, family, or friends, being a member of organizations, or participating in volunteer or charity activities.[33–35]

A study of community-dwelling older adults 65 years and older from a subset of the Act on Ageing Italian project[36] measured social isolation using the FS, with lower scores indicative of higher degree of social isolation,[12] and the study showed that high degree of frailty is associated with higher degree of social isolation (mean scores of FS of frail, prefrail, and robust individuals were 16.45, 18.25, and 19.82, respectively).[36]

Unadjusted odds ratios of cross-sectional associations between social isolation and frailty were able to be calculated from the data provided in the articles of three studies, although the main topics of the studies were not the association between social isolation and frailty.[34, 37, 38] A fixed-effects meta-analysis combined the odds ratio to find that the socially isolated individuals are 88% more likely to be frail (pooled odds ratio = 1.88, 95% confidence interval = 1.60–2.20, $p < 0.001$).[27]

Four longitudinal studies examined baseline social loneliness and subsequent frailty changes over time with mixed results. In a study of older adults 60 years and older using data from the Survey of Health Ageing Retirement in Europe (SHARE), in which the roles of social isolation and loneliness in and of itself were not studied, it was found that baseline social isolation was significantly associated with risk of worsening frailty (odds ratios ranging from 1.17 to 2.06).[35] Another study from Japan followed 229 robust Japanese older people and found only friendship-related social isolation was associated with higher risk of developing prefrailty over 1 year (odds ratio = 4.58, 95% confidence interval = 2.11–9.92), but family-related social isolation was not.[39] The other two studies did not find any significant associations.[33, 40] One study of note, using the English Longitudinal Study of Ageing (ELSA) for participants greater than 60 years of age, did not find social isolation to be associated with increased risk of becoming physically frail.[33] A study of community-dwelling older adults 60 years and older as participants of the longitudinal Population Health Index Survey conducted in Singapore did not find an association between social isolation and frailty, but it did find that an "increase in social participation was associated with decrease in level of frailty, and this association was independent of living arrangement and social isolation".[40]

Loneliness and frailty

The systematic search of the literature found 12 and 6 studies providing cross-sectional and longitudinal data, respectively, on associations between loneliness and frailty. The UCLA Loneliness Scale[41] or the de Jong Gierveld Loneliness Scale[6] was used in most studies, and the other few studies used single-item measures to assess loneliness. Both the UCLA Loneliness Scale

and the de Jong Gierveld Loneliness Scale have been frequently used in previous studies.[4] The UCLA Scale is based on a conceptualization of frailty as an unidimensional emotional response to a discrepancy between desired and achieved levels of social contact,[4] while the de Jong Gierveld Scale covers multidimensional features, namely emotional loneliness (the absence of an attachment figure) and social loneliness (the lack of a social network).[42]

Six studies provided mean scores of loneliness scales across three frailty statuses (robust, prefrail, and frail). As various scales were used, standardized mean differences were calculated between frailty status. It showed that poorer frailty status was significantly associated with a higher degree of loneliness in a graded manner. The standardized mean differences of the loneliness scores between frail and robust, frail and prefrail, and prefrail and robust were 0.77 (95% confidence interval = 0.57–0.96, $p < 0.001$), 0.37 (95% confidence interval = 0.25–0.50, $p < 0.001$), and 0.30 (95% confidence interval = 0.20–0.40, $p < 0.001$), respectively.[28] Odds ratios of cross-sectional associations between loneliness and frailty from five studies were combined using a fixed-effects meta-analysis model due to low degree of heterogeneity. According to the results, individuals with frailty and prefrailty were 3.5 times and 1.9 times more likely to report loneliness (pooled odds ratio = 3.51, 95% confidence interval = 2.70–4.56, $p < 0.001$ for frailty, pooled odds ratio = 1.88, 95% confidence interval = 1.57–2.25, $p < 0.001$ for prefrailty). Another meta-analysis showed that those who were frail were at more than double the risk of being lonely compared with those who were not (pooled odds ratio = 2.05, 95% confidence interval = 1.76–2.39, $p < 0.001$).[28]

Six studies providing data on longitudinal associations were included in this review. The previously mentioned ELSA study also examined associations between baseline loneliness status and frailty status at follow-up and showed that high degree of loneliness was 1.7 times (odds ratio = 1.74, 95% confidence interval = 1.29–2.34) and 1.9 times (odds ratio = 1.85, 95% confidence interval = 1.14–2.99) higher risk of becoming prefrail and frail, respectively.[33] Another prospective study from China showed that those who answered feeling lonely "sometimes", "often", or "always" were significantly more likely to have a poorer frailty status compared with those who answered never feeling lonely (odds ratio = 1.34, 95% confidence interval = 1.08–1.66).[43] A meta-analysis combining the data from these studies showed that a higher degree of loneliness at baseline significantly predicts worsening frailty at follow-up (pooled odds ratio = 1.41, 95% confidence interval = 1.16–1.72, $p < 0.001$).[28] The other three prospective studies also provided some evidence that baseline loneliness predicts the future risk of frailty.[35, 40, 44] These findings support causal pathways in which loneliness may predict frailty. Some researchers suggested a potential bidirectional association. Only one study was found that examined an association between baseline frailty, which showed that baseline frailty was significantly associated with higher degree of loneliness at 3-year follow-up.[45]

The current status with respect to social isolation, loneliness, and frailty

Two systematic reviews found multiple studies on the association between social isolation and loneliness and frailty. More studies on loneliness were identified than studies on social isolation. The reasons may be that (1) there are more established tools to measure loneliness, such as the UCLA Loneliness Scale or the de Jong Gierveld Loneliness Scale, than social isolation, (2) loneliness can be measured by a single-item question while social isolation cannot be, and (3) some studies examined other related social factors than social isolation, such as social network, social support, social connectedness, without mentioning "social isolation" so that they were not identified by the systematic literature search. As shown by the meta-analyses, social isolation and loneliness seem to have significant cross-sectional associations with frailty. However, causal relationships or directions of pathways are less clear. The meta-analyses suggested that both social isolation and loneliness are significant predictors of frailty, although it should be noted that only a few longitudinal studies were included.

The possible underlying mechanisms

Definitive mechanisms underlying the associations between social isolation/loneliness and frailty are not known. There are several potential hypotheses. One hypothesis is through inflammation. Social isolation and loneliness may induce or enhance inflammation by affecting human physiological responses to social and biological stressors.[46, 47] According to emerging evidence from recent studies, inflammation may play a role in the pathogenesis of frailty through direct and indirect pathways.[48, 49] Another possibility is that those who are socially isolated or lonely are more likely to be involved with unhealthy lifestyles and behaviors, such as smoking, high alcohol use, low physical activity, overweight or obesity, and low fruit and vegetable consumption.[50–52] These high-risk lifestyles and behaviors predispose individuals to the development of frailty.[53] Lastly, social isolation and loneliness have been shown to be associated with a number of comorbidities and conditions, including cardiovascular diseases, stroke,[17, 18] impaired cognitive function,[19–23] and depression.[24] All of these factors may contribute to increased risk of developing and progression of frailty status.[54]

Summary and reflection

There has been mounting evidence that social isolation and loneliness are significantly associated with frailty in older adults. Not only is this contributory from a medical perspective but it also has wider implications from a broader societal planning and policy perspective. Although the exact mechanisms underlying the associations and causal pathways are not clear, a small

number of longitudinal studies have suggested that baseline social isolation and loneliness may predict the future development of frailty. This chapter summarizes the current literature and perspectives on frailty and loneliness and social isolation in late life, and in doing so, highlights the importance of further research in this area. Further research on social isolation and loneliness will enhance our understanding of how social factors affect human health. Crucial understanding in this compelling area would further facilitate the effective translation of scientific research findings into practice, and this would lead to enhanced healthy aging, improved well-being, and better quality of life in older adults.

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Chapter 14

Multimorbidity, loneliness, and social isolation

A systematic review

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1 Introduction

There are several similar concepts concentrating on the social needs of individuals (Bunt et al., 2017). Specifically, social isolation, loneliness, and social frailty exist. While social isolation can be defined as the feeling that an individual does not belong to the society (Wenger et al., 1996), loneliness refers to the feeling that an individual's social network is smaller or of poorer quality than preferred (Wenger et al., 1996), and social frailty refers to the lack of resources to fulfill one's basic social needs (Bunt et al., 2017). Given the fact that traditional family bonds become ruptured, new challenges arise for individuals. It should be emphasized that these social needs are associated with physical frailty and subsequent mortality (Gale et al., 2018, Hoogendijk et al., 2020). In sum, these social needs have been considered as new geriatric giants (Freedman and Nicolle, 2020). Moreover, social needs can also have deleterious consequences for younger individuals.

Previous studies have determined several factors associated with these social needs. For example, it has been shown that they are, among other things, associated with income poverty or experiencing a fall (Hajek and König, 2020a, Petersen et al., 2020). Moreover, it has been shown that they are associated with multimorbidity (e.g., (Cohen-Mansfield et al., 2009, Kristensen et al., 2019b, Stickley and Koyanagi, 2018)).

Multimorbidity is commonly defined as the existence of at least two chronic illnesses (van den Akker et al., 1996). The prevalence of multimorbidity is rather high in adults, especially in very old individuals (Puth et al., 2017, Rijken et al., 2014). According to a systematic review, the prevalence of multimorbidity in older individuals ranges from 55% to 98% (Marengoni et al., 2011). The prevalence also increases in women and people from low

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social classes (Marengoni et al., 2011). Little is known about the genetic and biological risk factors for multimorbidity (Marengoni et al., 2011). In light of the demographic aging in high-income countries, it is projected that the number of individuals with multimorbidity will increase. Multimorbidity is also linked to disability (Marengoni et al., 2011), mortality (Holt-Lunstad et al., 2015), and high health care costs (Lehnert et al., 2011).

While some observational studies exist examining the link between multimorbidity and social needs (in terms of social isolation, loneliness, and social frailty) (Cohen-Mansfield et al., 2009, Kristensen et al., 2019b, Stickley and Koyanagi, 2018), there is a lack of a study systematically synthesizing observational studies investigating these associations. Thus, our objective of this systematic review was to fill this gap in knowledge.

Particularly in times of the COVID-19 pandemic, knowledge about the link between multimorbidity and loneliness, social isolation, or social frailty is of great importance. This can be explained by the fact that the case fatality rate increases considerably with age. Consequently, older adults are quite often forced to avoid physical contact to stay at home.

2 Materials and Methods

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis Protocols guidelines (Shamseer et al., 2015) and is registered with the International Prospective Register of Systematic Reviews (PROSPERO, registration number: CRD42020179918).

2.1 Search Strategy and Selection Criteria

In July and August 2020, a systematic literature search was conducted based on three databases (Medline, PsycINFO, and CINAHL). In Table 14.1, the search query for Medline is depicted.

Two reviewers (AH, BK) evaluated the studies for inclusion/exclusion using a two-step process. First, a title/abstract screening was performed. Second, a full-text screening was conducted. Furthermore, we hand searched the reference lists of studies selected for inclusion. If disagreements occurred, we used discussions to resolve it (and, if required, included a third party (HHK)).

We had the following inclusion criteria:

- Cross-sectional and longitudinal observational studies investigating the association between (Aaby et al., 2020) multimorbidity and social frailty, or (Barlow et al., 2015) multimorbidity and loneliness, or (Brüderl & Ludwig, 2015) multimorbidity and social isolation.
- Studies appropriately quantifying important variables like social isolation.
- Studies published in peer-reviewed journals (English or German language).

Table 14.1 Search strategy (PubMed)

#	*Search Term*
#1	Loneliness
#2	Social exclusion
#3	Social frailty
#4	Social isolation
#5	#1 OR #2 OR #3 OR #4
#6	Multimorbidity
#7	multiple chronic
#8	disease*
#9	condition*
#10	illness*
#11	#7 AND (#8 OR #9 OR #10)
#12	#6 OR #11
#13	#5 AND #12

Notes: Please note that the asterisk ("*": in "disease*" (#8)) in PubMed is a truncation symbol. It can be used at the end of a word to search for all terms that begin with that basic root.

Exclusion criteria were:

- Studies not investigating the association between (Aaby et al., 2020) multimorbidity and social frailty, or (Barlow et al., 2015) multimorbidity and loneliness, or (Brüderl & Ludwig, 2015) multimorbidity and social isolation.
- Studies exclusively investigating samples with a specific disorder.
- Study design other than observational.
- Inappropriate assessment of important variables.

Selection criteria did not include any restrictions regarding place and time during which studies were conducted. Using a sample of 100 titles/abstracts, we conducted a pre-testing of eligibility criteria. Results of this pre-testing did not affect the final eligibility criteria list.

2.2 Data Extraction and Analysis

One reviewer (BK) conducted the data extraction. A second reviewer (AH) cross-checked the extracted data. If disagreements occurred, discussions were held to reach a consensus. If required, a third party (HHK) was included. If clarification was needed, we contacted the study authors.

Data extraction covered study design, measures, analytical approach, description of the sample, and key results. We present the key results as follows (in each case: (i) cross-sectional, and (ii) longitudinal):

(1) multimorbidity and loneliness.
(2) multimorbidity and social isolation.
(3) multimorbidity and social frailty.

2.3 Quality Assessment

The study quality was assessed independently by two reviewers (AH, BK) based on the well-known and widely used NIH Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (National Institutes of Health, 2018). In case of disagreement, discussions were held to resolve the conflict. A third party (HHK) was included in such discussions as needed.

3 Results

This section is divided by subheadings. It provides a concise and precise description of the experimental results, their interpretation as well as the experimental conclusions that can be drawn.

3.1 Overview of Included Studies

The study selection process is shown in Figure 14.1 (Moher et al., 2009). In sum, n = 8 studies were included in the final synthesis of our review. Important characteristics and key results of the studies included are given in Table 14.2. If reported, adjusted results are displayed.

Data stemmed from Europe (n = 6, with two studies from Germany, and one study each from Denmark, Netherlands, Spain and the United Kingdom) and North America (n = 2 studies from Canada). Equally, four cross-sectional and four longitudinal studies were identified. The observation period in the longitudinal studies varied from three to twelve years. It should be noted that while one study used cross-sectional data from the German Aging Survey (year 2014) (Kristensen et al., 2019a), the second longitudinal study used data from 2002 to 2014 from the German Aging Survey (Kristensen et al., 2019b). Multimorbidity was commonly defined as having two or more chronic conditions.

One study reported on data from individuals recruited from a general practice (Renne and Gobbens, 2018), another analyzed data from a heterogeneous sample of community-dwelling older adults (Barlow et al., 2015), and all others conveyed results from large, nationally representative samples of community-dwelling older adults. The sample size ranged from 121 to 36,397 individuals, the proportion of women in the samples ranged from 49% to 56%, and the average age ranged from 60 to 77 years. Further details are given in Table 14.2.

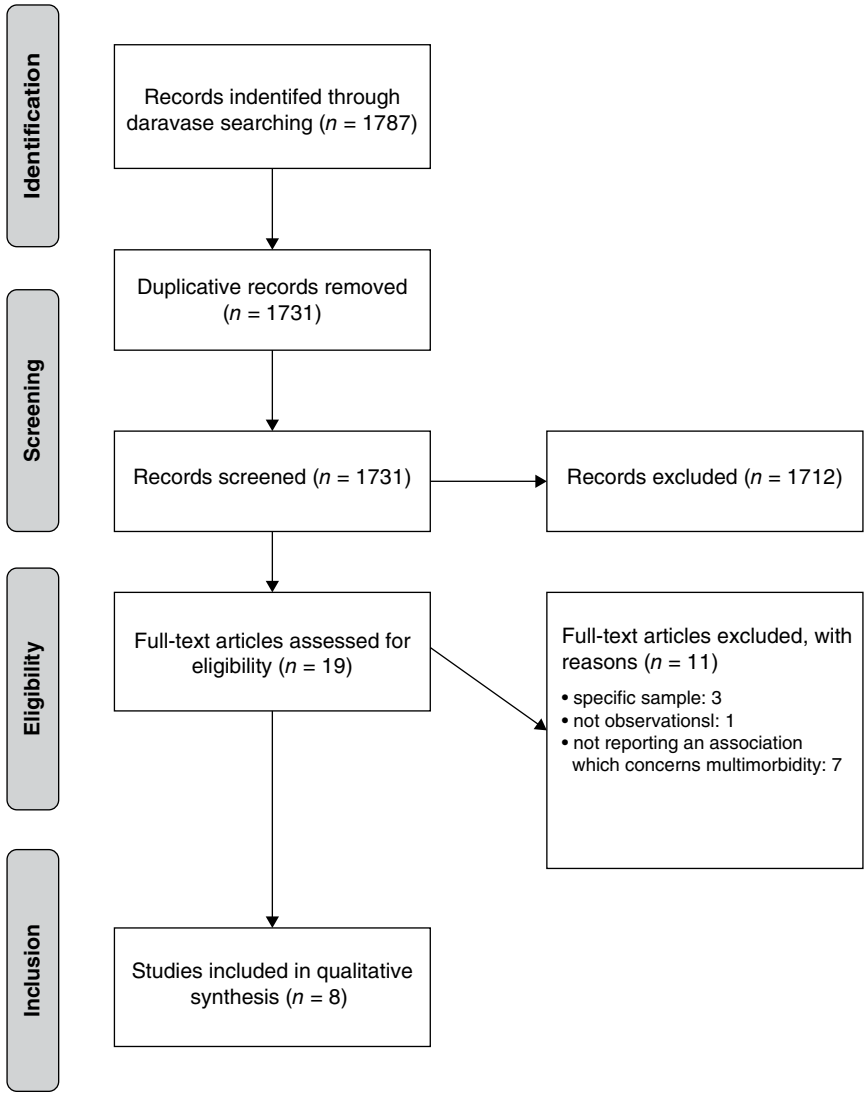

Figure 14.1 Flow Chart

In the next sections, key results are presented as follows (in each case: (i) cross-sectional, and (ii) longitudinal):

(1) multimorbidity and loneliness.
(2) multimorbidity and social isolation.
(3) multimorbidity and social frailty.

Table 14.2 Extracted data

Study	*Study Type/ Time Span*	*Sample Source/Size*	*Age*	*Loneliness Assessment*	*Multimorbidity Assessment*	*Main Results*	*Quality Assessment Score*
Barlow, M et al. (2014)	Longitudinal Five waves, from 2004 to 2012)	Montreal Aging and Health Study (Canada) N = 121 (56.2% females)	M = 71.2 SD = 4.7 64–83	Two items	Number of chronic illnesses (from a list of 17 diseases)	Growth-curve models showed that chronic illness was positively associated with loneliness (yearly change: ß = 0.125, $p < 0.05$).	Fair
Jessen, M et al. (2018)	Cross-sectional	National Longitudinal Survey of Ageing (Denmark) *N* = 9154 (54.3% females)	Not reported	UCLA Loneliness scale (20 items)	Two or more chronic conditions (from a list of eight diseases)	Logistic regression revealed that loneliness was positively associated with multimorbidity (OR = 1.77, 95% CI: 1.20–3.35).	Good
Kristensen, K. et al. (2019a)	Longitudinal Four waves, from 2002 to 2014	German Aging Survey (Germany) *N* = 12,692 (48.9% females)	M = 63.5 SD = 11.4	De Jong Gierveld short scales for loneliness (six items)	Two or more illnesses (from a list of 13 diseases)	Fixed effects regression stated that multimorbidity was associated with increased levels of loneliness (ß = 0.06, $p < 0.001$).	Good
Kristensen, K. et al. (2019b)	Cross-sectional	German Aging Survey (Germany) *N* = 7604 (53.6% females)	M = 59.8 SD = 10.6	De Jong Gierveld short scales for loneliness (six items)	Two or more illnesses (from a list of 13 diseases)	Linear regression detected a positive association between multimorbidity and loneliness (ß = 0.08, $p < 0.001$).	Good
Olaya, B. et al. (2017)	Longitudinal Two waves, from 2011/12 to 2014/15	Edad con Salud (Spain) *N* = 2113 (55.2% females)	M = 71.8 95% CI: 71.4–72.1	UCLA Loneliness scale (three items)	Number of chronic conditions (from a list of eight diseases)	Cox Proportional Hazard models did not find an association between multimorbidity on the one side and high loneliness (ref.: low loneliness) (ß = 0.003, $p = 0.991$) or high social support (ref.: low social support) (ß = 0.69, $p = 0.262$) on the other side.	Good

(*Continued*)

Table 14.2 (Continued)

Study	*Study Type/ Time Span*	*Sample Source/Size*	*Age*	*Loneliness Assessment*	*Multimorbidity Assessment*	*Main Results*	*Quality Assessment Score*
Renne, I & Gobbens, R. (2018)		Recruited from a general practice (The Netherlands) *N* = 241 (48.9% females)	M = 76.5SD = 5.170–90	Assessment of social domain of frailty (TFI (three items))	Number of chronic conditions (from a list of nine diseases)	Linear regression showed that multimorbidity was negatively associated with quality of life (ß = -3.786, $p < 0.001$).	Fair
Singer, L. et al. (2019)	Longitudinal Seven waves from 2002 to 2014	English Longitudinal Study of Ageing (United Kingdom) *N* = 15,046 (55.3% females)	M = 66.0 SD = 10.9	One item	Basic multimorbidity: two or more morbidities (from a list of 25 diseases)Complex multimorbidity: three or more body systems affected	Generalized Estimating Equations revealed that multimorbidity was positively associated with low household wealth (ref.: high) (OR = 1.47, 95% CI: 1.34–1.61), a low subjective social status (ref.: high) (OR = 1.14, 95% CI: 1.04–1.24), a semi/routine occupation (ref.: manager, professional) (OR = 1.07, 95% CI: 1.04–1.24), a low sense of control (ref.: high) (OR = 1.57, 95% CI: 1.41–1.74), having no friends (ref.: very/some supportive friends) (OR = 1.14, 95% CI: 1.02–1.26), having no partner (ref. very/some supportive partner) (OR = 1.15, 95% CI: 1.06–1.26) and loneliness (OR = 1.19, 95% CI: 1.11–1.28).	Fair

Wister, A. et al. (2016)	Cross-sectional	Canadian Community Health Survey (Canada) and Household, Income and Labor Dynamics in Australia (Australia) *N* = 36,397 (51.9% females)	45–54: 38.1%55–64: 29.7%65–74: 17.9%≥75: 14.3%	Hughes et al. 3-item loneliness scale	Number of chronic illnesses (from a list of eight diseases)	OLS regression showed that there was a significant positive association between multimorbidity and loneliness for all combinations of age group, gender and country, except Australian men which were older than 75 (ß = 0.02, 95% CI: −0.14–0.17).	Good

Notes: M = mean; SD = standard deviation; OR = odds ratio; OLS = ordinary least squares; TFI = Tilburg Frailty Indicator; UCLA = University of California, Los Angeles; Barlow et al. (2014): adjusted for age, female, socio-economic status and partnership status, and health engagement strategies as well as health-related self-protection; Jessen et al. (2018): adjusted for sex, year of birth, marital status, cohabitation status, attachment to the labor market, and home ownership; Kristensen et al. (2019a): adjusted for age, BMI, depressive symptoms, monthly net equivalent income, physical activity, self-rated health, marital status, and employment status; Kristensen et al. (2019b): adjusted for sex, age, marital status, monthly net equivalent income, BMI, depressive symptoms, current smoking status, alcohol consumption and physical activity; Olaya et al. (2017): adjusted for social support, loneliness, smoking, age, years of education, marital status, alcohol consumption, and depression; Renne & Gobbens (2018): adjusted for sex, age, marital status, education, and 15 frailty components from the Tilburg Frailty Indicator; Singer et al. (2019): adjusted for participation, sense of control, supportive children, supportive friends, and supportive partner; Wister et al. (2016): adjusted for marital status, foreign-born status, and education level.

3.2 Multimorbidity and Loneliness

With regard to cross-sectional studies, five studies examined the link between multimorbidity and loneliness (Jessen et al., 2018, Kristensen et al., 2019a, Olaya et al., 2017, Renne and Gobbens, 2018, Wister et al., 2016). Three out of these five studies found a positive association between multimorbidity and loneliness. In contrast, one study did not find a bivariate association between multimorbidity and loneliness (Olaya et al., 2017), and another study did not identify such a link using multiple regressions (Renne and Gobbens, 2018).

With regard to sex differences, one cross-sectional study (Wister et al., 2016) showed that loneliness was associated with multimorbidity in middle-aged and older (i.e., 45 to 54 years, 55 to 64 years, 65 to 74 years and 75+) men and women in Canada and Australia (except for Australian men aged 75+). However, this study did not include interaction terms to test whether potential sex differences were significant (Wister et al., 2016). The remaining studies (Jessen et al., 2018, Kristensen et al., 2019a, Olaya et al., 2017, Renne and Gobbens, 2018) only adjusted for sex.

With regard to longitudinal studies, three studies examined this link (Barlow et al., 2015, Kristensen et al., 2019b, Singer et al., 2019). All of these studies found a link between multimorbidity and increased loneliness scores longitudinally. Sex differences were not examined.

3.3 Multimorbidity and Social Isolation

With regard to cross-sectional studies, only one study examined the link between multimorbidity and social isolation (Kristensen et al., 2019a). This study found an association between multimorbidity and increased social isolation. In contrast, there was a lack of longitudinal studies investigating the link between multimorbidity and social isolation. Sex differences were not examined.

3.4 Multimorbidity and Social Frailty

Our systematic review did not identify either cross-sectional or longitudinal studies examining the link between multimorbidity and social frailty.

3.5 Quality Assessment

The evaluation of study quality of the included studies is shown in Table 14.3. While some criteria were fulfilled by all studies (e.g., adjustment for important covariates), some other criteria were only fulfilled by a few studies (e.g., response rate ≥ 50%). However, the general study quality was rather high. More precisely, the study quality of five studies were rated as 'good' and three studies were rated as 'fair', which also means that none of the studies were rated as 'poor'.

Table 14.3 Quality assessment

Questions	*Studies*							
	Barlow (2014)	*Jessen (2018)*	*Kristensen (2019a)*	*Kristensen (2019b)*	*Olaya (2017)*	*Renne (2018)*	*Singer (2019)*	*Wister (2016)*
1. Was the research question or objective in this paper clearly stated?	yes	yes	yes	yes	yes	yes	yes	yes
2. Was the study population clearly specified and defined?	yes	yes	yes	yes	yes	yes	yes	yes
3. Was the participation rate of eligible persons at least 50%?	not reported	yes (73.5%)	no (27.1%–50.3%)	no (27.1%)	yes (69.9%)	no (47.5%)	not reported	not reported
4. Were all the subjects selected or recruited from the same or similar populations (including the same time period)? Were inclusion and exclusion criteria for being in the study prespecified and applied uniformly to all participants?	yes	yes	yes	yes	yes	yes	yes	yes

(*Continued*)

Table 14.3 (Continued)

Questions	*Studies*							
	Barlow (2014)	*Jessen (2018)*	*Kristensen (2019a)*	*Kristensen (2019b)*	*Olaya (2017)*	*Renne (2018)*	*Singer (2019)*	*Wister (2016)*
5. Was a sample size justification, power description, or variance and effect estimates provided?	no	no	no	no	no	no	no	no
6. For the analyses in this paper, were the exposure(s) of interest measured prior to the outcome(s) being measured? (if not prospective should be answered as 'no', even is exposure predated outcome)	yes	no (cross-sectional)	no (simultaneously)	no (cross-sectional)	no (simultaneously)	no (cross-sectional)	no (simultaneously)	no (cross-sectional)
7. Was the timeframe sufficient so that one could reasonably expect to see an association between exposure and outcome if it existed?	yes	no (cross-sectional)	yes	no (cross-sectional)	no	no (cross-sectional)	yes	no (cross-sectional)

8. For exposures that can vary in amount or level, did the study examine different levels of the exposure as related to the outcome (e.g., categories of exposure, or exposure measured as continuous variable)?	dichotomous and continuous	dichotomous	dichotomous	dichotomous	dichotomous	continuous	dichotomous	continuous
9. Were the exposure measures (independent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?	yes	yes	yes	yes	yes	yes	yes	yes
10. Was the exposure(s) assessed more than once over time?	no	no	yes	no	no	no	yes	no

(*Continued*)

Table 14.3 (Continued)

Questions	*Studies*							
	Barlow (2014)	*Jessen (2018)*	*Kristensen (2019a)*	*Kristensen (2019b)*	*Olaya (2017)*	*Renne (2018)*	*Singer (2019)*	*Wister (2016)*
11. Were the outcome measures (dependent variables) clearly defined, valid, reliable, and implemented consistently across all study participants?	yes	yes	yes	yes	yes	yes	yes	yes
12. Was loss to follow-up after baseline 20% or less?	yes	not applicable	no	not applicable	not reported	not applicable	not reported	not applicable
13. Were key potential confounding variables measured and adjusted statistically for their impact on the relationship between exposure(s) and outcome(s)?	yes	yes	yes	yes	yes	yes	yes	yes
Overall quality judgement	fair	good	good	good	good	fair	fair	good

4 Discussion

In sum, eight studies were included in the final synthesis. Some cross-sectional and longitudinal studies pointed to an association between multimorbidity and increased levels of loneliness. However, the associations between multimorbidity and social isolation as well as social frailty remain largely underexplored. The quality of the studies included was rather high. For example, several studies used data from nationally representative samples like the English Longitudinal Study of Aging (Singer et al., 2019) or the German Aging Survey (Kristensen et al., 2019b).

The link between multimorbidity and loneliness appears to be plausible. For example, as stated by Barlow et al. (Barlow et al., 2015), multimorbidity is associated with lower physical functioning, which may affect loneliness. However, this factor was commonly adjusted for in the studies examined. Another possible explanation may be that loneliness is rather associated with the quality of the relationships, but not with the quantity (Pinquart and Sörensen, 2003). This means that multimorbidity may affect loneliness by reducing the relationship quality (Kristensen et al., 2019b). In the same vein, a qualitative study demonstrated that the social networks among individuals with multimorbidity were rather large and diverse (including health care professionals) (McKinlay et al., 2017). These presumably one-sided relationships to health care professionals may reflect a decreased relationship quality among individuals with multimorbidity (Kristensen et al., 2019b). Jessen et al. (Jessen et al., 2018) provided an additional explanation: Individuals with multimorbidity have to cope with symptoms and have frequent contact with the health care system, which can restrict participation in social activities (Caputo and Simon, 2013). Moreover, individuals with multimorbidity may leave the labor market, which can markedly reduce the everyday contact with colleagues (Jessen et al., 2018).

Olaya et al. (Olaya et al., 2017) provided two possible explanations for the association between social needs and multimorbidity. First, according to the buffering hypothesis, social needs can buffer the negative impact of stress on health (Uchino, 2004). Moreover, another explanation may be that social factors can assist in regulating health behavior and can increase the access to health care (e.g., transportation or financial support) (Penninx et al., 1997). Equal explanations are given by Singer et al. (Singer et al., 2019) and Jessen et al. (Jessen et al., 2018). Additionally, Jessen et al. stated that loneliness can cause emotional changes, which in turn affect multimorbidity (Hawkley and Cacioppo, 2010). These emotional changes can activate neurobiological and behavioral mechanisms that can decrease health (Hawkley and Cacioppo, 2010).

Depending on the proposed directionality, conclusions in the included studies varied from (i) proposing efforts to decrease loneliness to reduce multimorbidity (Singer et al., 2019) to (ii) tackling multimorbidity to reduce

loneliness (Kristensen et al., 2019b). Moreover, (iii) the need for future, longitudinal studies (Kristensen et al., 2019a) and (iv) studies elucidating the underlying mechanisms was stressed (Kristensen et al., 2019b).

The comparability of the included studies was somewhat restricted. Different tools were used to assess loneliness scores. For instance, while some studies used the De Jong Gierveld scale (Gierveld and Tilburg, 2006), other studies used the UCLA scale (Russell, 1996). Both scales conceptualize loneliness as subjective. Nevertheless, while the UCLA scale views loneliness mainly as affective, the De Jong Gierveld scale views it as cognitive (Penning et al., 2014). A previous study concluded that the latter scale might be a better choice for cross-sectional and longitudinal studies when focusing on middle-aged and older adults (Penning et al., 2014).

Both German studies used the 6-item version of the De Jong Gierveld loneliness scale (Kristensen et al., 2019a, Kristensen et al., 2019b). These studies showed that multimorbidity was associated with increased loneliness both cross-sectionally and longitudinally. Apart from these studies, different tools (or different versions of the UCLA loneliness scale) were used to quantify loneliness.

Moreover, with regard to comparability, while multimorbidity was very consistently defined as the presence of two or more chronic conditions, the list of diseases ranged from eight to 25 diseases, which may have an impact on the results. Moreover, the assessment of chronic conditions mostly refers to self-ratings in the studies examined. The samples included were quite comparable with regard to the proportion of female individuals and age bracket (mainly including individuals in middle- and old age). Furthermore, there were some differences in the analytical approach used (for example, fixed effects regressions vs. the use of generalized estimating equations (GEE)), which in turn can have quite a large impact on the results (Brüderl and Ludwig, 2015). For example, using fixed effects strategies when panel data are present may assist in identifying the link between the onset of multimorbidity and loneliness, social isolation, and social frailty (Brüderl and Ludwig, 2015).

Our systematic review identified possible gaps in knowledge. More precisely, there is a general gap in knowledge regarding the associations between (i) multimorbidity and social isolation (including tools to quantify "objective social isolation" (Chatters et al., 2018)) and (ii) multimorbidity and social frailty. Moreover, as, for example, proposed by Kristensen et al. (Kristensen et al., 2019b), the directionality between these factors should be further explored. It appears plausible that the onset of multimorbidity may increase feelings of e.g., social isolation. However, it also appears plausible that feelings of social isolation reduce, among other things, physical activities, which can in turn contribute to the occurrence of chronic illnesses or multimorbidity (Kristensen et al., 2019b). Future longitudinal studies using advanced methods like dynamic panel data estimation strategies (Moral-Benito et al., 2019) may assist in clarifying this issue. This knowledge may have important

policy implications and, for example, may assist in reducing the social and economic burden caused by loneliness, social isolation, and social frailty. Furthermore, most studies used data from European countries. Therefore, future research is needed from other regions (like Asian, South American, or African countries). It may be the case that the link between multimorbidity and social needs is moderated by cultural background. Wister et al. (Wister et al., 2016) also proposed that future research should focus on different age group cohorts. Moreover, they proposed that the role of sex should be clarified (Wister et al., 2016), since men tended to be more stoic (Clarke and Bennett, 2013). Furthermore, factors such as health literacy (Friis et al., 2019) (including social support for health (Aaby et al., 2020)) or coping strategies such as flexible goal adjustment (Hajek and König, 2021, Hajek and König, 2020b) may act as a moderator of the relationship between multimorbidity and social needs.

Additionally, the link between multimorbidity patterns or clusters (i.e., combination of (i) mental health problems, (ii) musculoskeletal disorders as well as (iii) cardiovascular and metabolic diseases) and social needs should be further explored in future studies (Prados-Torres et al., 2014).

Some strengths of our systematic review are worth highlighting. This is the first systematic review focusing on the link between multimorbidity and loneliness, social isolation, and social frailty. Key steps were performed by two reviewers (e.g., steps like study selection or data extraction). Furthermore, we conducted a quality assessment. Due to study heterogeneity, a meta-analysis was not performed. Due to the restriction to peer-reviewed articles, which ascertains a rather high quality, at least some previous findings (e.g., from grey literature) might be lacking. Moreover, due to the restriction to studies published in English or German language, relevant studies published in other languages (e.g., French language) were not included in this work.

5 Conclusions

Most of the included studies showed a link between multimorbidity and increased loneliness. However, there is a lack of studies examining the association between multimorbidity and social isolation as well as social frailty. Future studies are required to shed light on these important associations. This is particularly important in times of the COVID-19 pandemic. Upcoming studies should explore the role of factors such as social distancing or perceptions of safe practices in the link between multimorbidity and social needs.

Author Contributions

The study concept was developed by A.H., B.K., and H.-H.K. The manuscript was drafted by A.H. and critically revised by B.K. and H.-H.K. The search strategy was developed by A.H. and H.-H.K. Study selection, data

extraction, and quality assessment were performed by A.H. and B.K., with H.-H.K. as a third party in the case of disagreements. A.H., B.K., and H.-H.K. contributed to the interpretation of the extracted data and writing of the manuscript. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

The authors declare no conflicts of interest.

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Chapter 15

Social isolation, loneliness, and mental health in old age

Janine Stein and Steffi G. Riedel-Heller

Social isolation and loneliness

To define the terms, social isolation is more of an objective measure and indicates the lower extent of the social network. Loneliness is more of a subjective view and reflects people's experience and their evaluation of a situation. Loneliness thereby arises from a perceived discrepancy between actual vs. desired social integration. Of course, social isolation and loneliness are correlated, with social isolation being more of a predictor of loneliness than vice versa (Hawkley et al., 2008 and Peplau et al., 1982).

Loneliness and social isolation have been a recognized problem in Europe and worldwide. Many reasons are discussed: increasing number of single households, fewer large families, rising divorce rates, lower birth rates, dispersed social networks due to occupational migration, and population aging. However, care must be taken because loneliness and social isolation have only been systematically recorded in representative studies in recent years (Riedel-Heller, 2022).

Causes for social isolation and loneliness

There is usually no single cause for loneliness, but rather we are dealing with a set of causes at different levels. There are factors that are more individual or have to do with closer relationship constellations but also affect neighborhoods or other social contexts, society, and cultural norms. Examples of individual factors are, for example, biological factors such as genetic endowments and abilities of social cognition, psychological factors, personality factors (e.g., openness to experience, neuroticism) as well as physical functioning. In the case of closer relationships, early childhood experiences and a resulting bonding ability, but also social control, play a role. In larger social contexts, such as neighborhoods and communities, opportunities for education, healthcare, and work can promote or inhibit social integration: so can built environments. Finally, social and cultural norms in society play an important role (Holt-Lunstad, 2018). Maike Luhmann developed a model to

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describe individual risk and protection factors for loneliness. The model distinguishes more distal risk factors (e.g., age and gender) and proximal risk factors (e.g., poor health status, social media) as well as general and group-specific ones (e.g., personality factors like being neurotic or introverted, unemployment, migrant background, being unmarried). Also, the model includes life events as triggers for becoming lonely (Luhmann, 2021).

Social isolation and loneliness in old age around the world

Worldwide, social isolation and loneliness have been studied in various fields and settings. Considering age, gender, and cultural differences in loneliness, Barreto et al. provided an overview of loneliness across 237 countries around the world differing in terms of individualism and collectivism. Based on the BBC Loneliness Experiment, these authors assessed 46,054 participants across the lifespan (16–99 years) regarding their experienced levels of loneliness as measured by questions from the UCLA Loneliness Scale. Contrary to the findings of other research, this study showed that loneliness decreased with age. However, this decrease in loneliness seemed to be associated with the range of individualism–collectivism cultures; loneliness increased with individualism and was greater in men than in women (Barreto et al., 2021).

Social isolation and loneliness across Europe

In Germany, data from a large, nationally representative German study (N = 16,132) that seeks to describe and explain age differences in loneliness from late adolescence to oldest-old age showed that between 5 and 10% suffer from loneliness. Elevated loneliness levels were not only found among young adults but also among the oldest old. In particular, loneliness levels strongly increased after the age of 75 years. This late-life increase in loneliness is well understood and can be explained by lower income, higher functional limitations, and higher proportion of singles in this age group (Luhmann and Hawkley, 2016).

Other research also reported evidence for the specific distribution of loneliness levels across the lifespan. For example, in the population-based Norwegian NorLAG study (N = 5,555; age 40–80 years; 51% women), it was shown that loneliness followed a U-shaped curve, with the highest loneliness levels at ages 40 and 80. The authors suggest that the development of loneliness with increasing age is associated with individual differences in characteristics such as levels of emotional stability and extraversion. Furthermore, aspects of social embedding and disability, no spouse/cohabiting partner, widowhood, or little contact with friends turned out to be risk factors for increasing loneliness in older age groups (Soest et al., 2020).

Across Europe, largely unexplained differences between countries exist with respect to rates of social isolation and loneliness. The European Quality

of Life Survey (EQLS) from 2016 conducted by the European Foundation for the Improvement of Living and Working Conditions revealed that the percentage of respondents who felt lonely mostly or all the time was between 3 and 15%. Albania, Turkey, and Greece showed highest rates and Finland, Denmark, and Slovenia rather low rates. In this context, loneliness is often assessed with a single item, for example, "How often did you feel lonely in the last 4 weeks?". This has proven to be prone to bias. For example, some measures asking about loneliness are likely to elicit socially desirable responses. However, there are established instruments available, such as the UCLA Loneliness Scale or the de Jong Gierveld Scale. However, instruments used to assess loneliness differ across countries, limiting the solid comparison of findings (Eurofound, 2022).

Social isolation and loneliness in the USA

For the representative U.S. adult population, a recent study showed how loneliness is distributed across the age range. In the U.S., the age distribution of loneliness followed a nonlinear trajectory with elevated loneliness levels in oldest old (>70 years) and young adults (<30 years). This U-shaped distribution of loneliness was found in many previous studies all over the world. Furthermore, the authors found no evidence for age-specific predictors of loneliness. Factors like household income, household size, marital status, health, and frequency of socializing were "universal" predictors of loneliness; their associations with loneliness did not differ in strength according to age (Hawkley et al., 2022).

Social isolation, loneliness, and mental health outcomes in old age

Social isolation and loneliness in old age are linked to several negative health conditions and represent a serious public health risk. Even if the precise measurement of social isolation and loneliness is challenging, there is strong evidence that many older adults are socially isolated or lonely in ways that put their general health and especially their mental health at risk.

Social isolation, loneliness, and mortality

First, loneliness not only makes older people ill, it even kills them. Accordingly, recent research showed that deprived social relationships (characterized by social isolation or loneliness) were linked to a 29% increased risk of heart disease and a 32% increased risk of stroke. Loneliness among heart failure patients was associated with a 68% increased risk of hospitalization, a 57% increased risk of emergency department visits, and a nearly four times increased risk of death. Altogether, social isolation significantly increased an

older person's risk of premature death from all causes, a risk that may rival those of obesity, physical inactivity, and smoking (National Academies of Sciences, Engineering, and Medicine et al., 2020). Furthermore, Holt-Lundstad et al. presented a meta-analysis in the year 2015 that received much attention, in which they showed that loneliness and social isolation are associated with increased mortality across the lifespan (Holt-Lunstad et al., 2015).

Social isolation, loneliness, and affective disorders

Second, recent findings suggest that loneliness is strongly accompanied by higher rates of depression, anxiety, and suicide (National Academies of Sciences, Engineering, and Medicine et al., 2020). Recently, Park et al. published a meta-analysis regarding loneliness and morbidity. In this study, health outcomes broadly included measures of mental health (i.e., depression, anxiety, suicidality, and general mental health), general health (i.e., overall self-rated health), well-being (i.e., quality of life, life satisfaction), physical health (i.e., functional disability), sleep, and cognition. Based on 114 identified studies, they were able to show that loneliness had moderate to large effects on all health determinants, with the largest effects observed on mental health and general well-being (Park et al., 2020). Moreover, van As and colleagues published a systematic review based on longitudinal studies in older people (60+ years) and were able to show a significant and positive relationship between loneliness and depressive symptoms. Regarding the longitudinal effect of loneliness on depressive symptoms in older adults, the authors concluded that loneliness was by far a strong stressor on depressive symptoms. Furthermore, the authors identified a variety of age-related factors (e.g., cognitive impairment, impaired physical mobility and activities of daily living [ADL]), difficulties in financial and living conditions, and personality traits such as lack of mastery and neuroticism that may cause difficulties in the care of relationships and act as potential covariates that moderate the link between loneliness and depression. Based on these findings, the authors emphasized the temporal sequence – first loneliness, then depressiveness (van As et al., 2022). Not surprising is the finding of McClelland et al. who examined loneliness, suicidal thoughts, and behavior in their meta-analysis. They were able to identify loneliness as a relevant predictor of suicidal thoughts and behavior; depression acted as a mediator here. Regarding the age of participants, studies in which participants were aged >55 years at baseline were more likely to report a significant relationship (McClelland et al., 2020).

Social isolation, loneliness, and cognitive disorders

Third, social isolation and loneliness were found to be associated with about a 50% increased risk of dementia (National Academies of Sciences, Engineering, and Medicine et al., 2020). A recent meta-analysis by Lara et al. included

longitudinal studies of the older general population aged 50+ years. Based on 37,339 participants with an average age range between 64.9 and 83.1 years, the authors showed a significant association between loneliness and an increased risk of dementia. Evidence also suggests a potential effect of loneliness on mild cognitive impairment (MCI) which constitutes a major risk factor for developing dementia (Lara et al., 2019). This is in line with our own findings from the Leipzig long-term study in the elderly population (Leila75+). This study investigated the extent to which social embedding influences the risk of developing dementia. In this context, 1,050 participants aged 75+ years without dementia at baseline assessment were surveyed over a span of several years regarding their cognitive status and their social network type. Results showed that the risk of developing dementia over the follow-up period was significantly higher among individuals with restricted networks than with integrated social networks. These findings suggest that social context and loneliness in the elderly are crucial indicators for dementia risk (Rodriguez et al., 2018).

Explanations for the negative effects on mental health

There are two basic explanations for these detrimental effects, based on the notion that acute and chronic stress are thought to have physical effects with negative health consequences. Loneliness itself is an enormous stressor and has a direct effect – this is described as the main-effect model. On the other hand, we know that social inclusion is a resource and buffers the effect of any stress, stemming from illness, critical life events, or other factors. This explanatory approach is called the stress-buffer hypothesis. Long-term loneliness seems to lead to a maladaptive chronic stress response that triggers downstream inflammatory pathways and adverse health behaviors, ultimately culminating in negative health outcomes. This is a simplified representation; the relationships are complex and partly bidirectional (Park et al., 2020).

Social isolation and loneliness in old age during the COVID-19 pandemic

Humans are social beings. Human development is necessarily linked to the social context. The relevance of social inclusion is particularly evident in the current COVID-19 pandemic. The necessary health protection measures, such as limiting social contacts, lead to increased loneliness. It is probable that never before have so many people been lonely at one time in Europe. As shown by research in this area, loneliness has negative effects on both physical and mental health, and COVID-19 measures may even have increased the dangerous consequences among the already vulnerable group of older people. So, the lockdown may have increased the mental distress for older people by enforcing isolation and heightening perceptions of risk of illness and

death. It was shown that social isolation is strongly associated with several mental health outcomes such as depression, anxiety, and cognitive decline. At the same time, it reduces resilience factors such as self-worth, sense of purpose, and feeling valued (Webb, 2021). Consequently, the development and implementation of evidence-based and tailored interventions for the older population is more urgent than ever. However, loneliness and social isolation did exist to a concerning extent before the COVID-19 pandemic. Regarding the time before the COVID-19 pandemic, the socioeconomic panel, a large population-representative study in Germany, showed that between 5 and 10% of adults suffer from loneliness. In this study, 16,132 participants with a mean age of 53.3 years were included. If those who sometimes feel lonely are included in the analyses, the proportion rises to 10–15%. The data also showed that the amount of those feeling lonely raised with increasing age (Luhmann and Hawkley, 2016). Recent results from the LIFE Health Study showed that 12.3% of almost 10,000 participants aged 18–69 years (mean age 45.2 years) were socially isolated. The age distribution showed that social isolation increases with age: among the participants aged 60–69 years, the amount raised to 20.7% and among participants aged 70–79 years to 21.7%. This situation worsens among the very old (Röhr et al., 2022). Furthermore, results from the AgeCoDe/AgeQualiDe study (n = 942, mean age 86.4 years) showed that among those participants over 80 years, 32.3% were socially isolated. Older women in particular showed high levels of social isolation compared to older men (71.7% versus 28.3%). Also, this study revealed significantly lower cognitive function in the oldest old with smaller social networks. The authors argue that the high levels of social isolation and its detrimental effects on cognitive function in the oldest-old population represent a crucial factor to be targeted in dementia prevention (Röhr et al., 2020). Similar rates were observed in Europe; however, largely unexplained differences between counties do exist (Eurofound, 2022).

The increase in loneliness during the COVID-19 pandemic is a clear-cut finding. However, the public health significance of social isolation and loneliness is still underestimated, and the COVID-19 pandemic also acts like a burning glass here. Existing problem areas have been intensified and made more visible. Furthermore, there are major concerns that after the pandemic, the level of social integration of individuals will not reach the pre-pandemic level. Those concerns are based on the known phenomenon that when people feel lonely for extended periods of time, they run the risk of falling into a downward spiral in which their thought patterns change permanently and reinforce such behaviors that even increase their loneliness (Cacioppo and Hawkley, 2009).

Media and technology during the COVID-19 pandemic

Nevertheless, social isolation and loneliness during the COVID-19 pandemic also seemed to have a highly relevant effect on the use of new media and

modern technology in older age groups. Facing the fact that various social restrictions have been introduced in the COVID-19 era, recent results showed that the use of commercially available artificial intelligent virtual home assistants (VHAs; e.g., Amazon Echo, Google Nest) as well as modern information and communication technology (ICT, e.g., robots, wearables, and smart homes) during the COVID-19 pandemic may, on the one hand, help to detect and predict older peoples' loneliness. On the other hand, modern technology may enhance social connectedness and help to reduce feelings of social isolation and loneliness in older individuals to some extent. However, some factors were identified that may reduce possible advantages of older adults' modern technology adoption and use such as privacy concerns, other ethical issues, and costs associated with ICT and VHA use. Also, the use of technology requires a certain level of cognitive functioning and conditions for access. Older individuals probably most in need, for example, those with cognitive deficits, poor digital skills, or low socioeconomic level, are a priori excluded from using this technology. Furthermore, a high need and desire for more structured training on older adults' device use was observed in order to enhance the application of modern technology in the older population (Corbett et al., 2021 and Latikka et al., 2021).

Summary

Loneliness describes the feeling of being alone, regardless of the amount of social contact. Social isolation is more a lack of social connections and can lead to loneliness in some individuals, while others can feel lonely without being socially isolated. Social isolation and loneliness in older adults are serious public health risks affecting a significant number of people worldwide and putting them at risk for several serious medical conditions, including higher risk of morbidity, depression, anxiety, dementia, mortality, and suicide. There is robust evidence that the COVID-19 pandemic worsened the level of social isolation and loneliness among older individuals, which is associated with an elevated risk of negative health conditions and serious mental health outcomes.

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Part VI

Policy implications and future of loneliness and social isolation

This sixth part refers to policy implications as well as the current and upcoming topics in this area. Hawkley deals with public policy as well as the reduction and prevention of social isolation and loneliness in Chapter 16. After that, Dahlberg discusses loneliness during the COVID-19 pandemic and gives some guidance for future research in this area in Chapter 17. This part can help to better understand ways to reduce and prevent social isolation and loneliness and can also help to understand loneliness and social isolation during (and after) the pandemic.

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Chapter 16

Public policy and the reduction and prevention of loneliness and social isolation

Louise Hawkley

The COVID-19 pandemic and health guidelines to "isolate," "quarantine," and practice "social distancing" have sensitized people the world over to the pain of social isolation. Young and old alike have experienced the disorienting effects of social disconnection on feelings of loneliness, anxiety, and depression and overall lower quality of life. Although this has been a painful way to learn the lesson of the importance of social connections, it may accelerate progress in developing and implementing policies to prevent and reduce loneliness and social isolation in the future.

Calls to treat social connection and loneliness as public health issues began shortly before the COVID-19 pandemic (Holt-Lunstad, Robles, and Sbarra, 2017 and Prohaska et al., 2020) and have been mounting since then. Much of the impetus behind these efforts has been a robust literature documenting the adverse health effects associated with loneliness in older age (Hajek, Kretzler, and König, 2020; Hawkley, 2022; and National Academies of Sciences, Engineering and Medicine, 2020), including premature mortality (Holt-Lunstad et al., 2015), suicidal ideation and attempts (Stickley and Koyanagi, 2016), depression (Cacioppo et al., 2010 and Martin-Maria et al., 2021), cardiovascular disease (Valtorta, et al., 2016), and higher healthcare costs (Meisters et al., 2021).

Loneliness in older adults: heterogeneity at the individual and national levels

Older adults face a unique range of challenges to staying connected that reflect the types of losses often experienced with aging: widowhood, loss of family members and friends to death or geographic distance, disability and loss of independence, and loss of health, among other losses. Indeed, the oft-assumed increase in loneliness frequency or intensity with aging does not become evident until older adults experience the significant losses of a spouse, health, and independence. Also, population estimates have indicated that adults who survive into oldest old age with a spouse and good physical and

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functional health are not lonelier than young adults (Hawkley et al., 2022 and Luhmann and Hawkley, 2016).

Social isolation, itself a risk factor for loneliness, manifests differently within the older adult population (Machielse, 2015) and calls for a multifaceted approach to address diverse root causes of loneliness. For instance, individuals whose isolation is attributable to a lack of transportation may benefit from interventions that provide transportation to local social activities and events, whereas individuals with disabilities that prevent them from leaving the house may benefit from interventions that take place in the home – in the form of friendly phone calls and/or video calls if not in-person visits. Of course, in some cases, multiple causes may need to be addressed simultaneously to achieve loneliness prevention or reduction. Knowing the diversity of older adults in a community is needed to devise a range of intervention strategies that target the specific root causes of loneliness in that community (Marczak et al., 2019).

At the national level, estimates across 113 countries have shown that, on average, 13–19% of adults over the age of 60 are lonely (Surkalim et al., 2022), and that loneliness prevalence differs significantly among countries; in Finland, for example, only 6% of older adults are lonely, whereas estimates range from 15 to 19% in England, 10 to 18% in the United States, and as high as 43% among countries in Eastern Europe. Again, this variability calls for a multifaceted approach to loneliness reduction, in this case for interventions attuned to the national context. Consider, for example, that higher levels of loneliness in southern and central European countries (relative to the loneliness average across 14 countries) were related to higher rates of financial and health problems in these countries (Fokkema, De Jong Gierveld, and Dykstra, 2012). Unique demographic characteristics of a country (e.g., higher rates of financial hardship) may need to be considered when designing loneliness interventions. Moreover, interventions that address the economic health of the entire country (e.g., by increasing GDP) or reducing gross inequity in the distribution of income across the country (Yan et al., 2014) may be as effective as or more effective than interventions that seek to improve the financial status of individuals. More research is needed to evaluate this proposition.

National loneliness prevention and reduction policies and services

National policies to reduce or prevent loneliness are few in number but may be increasing. In fact, researchers have observed that traditional health promotion policies (i.e., focused on the prevention of chronic disease) are "gradually disappearing from the national agenda" in Germany, Italy, the Netherlands, and Poland, whereas policies aimed at improving how older adults are included in society and able to stay socially active seem to be growing in these countries (Arsenijevic and Groot, 2022). The effectiveness of

national policies remains understudied, but it is worth exploring examples of promising approaches that could be adopted or adapted for use in other countries. In the United Kingdom (UK), the establishment of a Loneliness Minister in 2018 led to the implementation of a "social prescribing approach" by the National Health Service (https://www.england.nhs.uk/personalisedcare/social-prescribing/) that encouraged doctors to direct presumed at-risk patients to subsidized community social activities. Also, in the UK, the "Let's Talk Loneliness" campaign was launched to help reduce the stigma around loneliness by providing a safe space for people to talk about loneliness and learn how to help themselves and others who are lonely (https://www.nhs.uk/every-mind-matters/lifes-challenges/loneliness/). In Australia, the Ending Loneliness Together initiative (https://endingloneliness.com.au/) seeks to provide evidence-based approaches to reducing loneliness for use by community organizations and health professionals.

Societal-level actions are not limited to the government. In the United States (U.S.), the Humana Foundation supports "Far From Alone," an interactive online resource tool that also provides a call number for those who want to talk with someone (https://farfromalone.com/). Non-governmental organizations, such as the Foundation for Social Connection in the U.S. (https://www.social-connection.org/), raise awareness at the national level. Multinational organizations, such as the World Health Organization and the United Nations, can set the international agenda on social isolation and loneliness through, among other strategies, public awareness and education (https://www.who.int/multi-media/details/3-things-to-do-globally-to-reduce-social-isolation-and-loneliness).

Loneliness interventions and health outcomes

As noted above, data are needed to understand whether national policies and community-level interventions have their intended effect. Public health measures of effectiveness traditionally rely on improvements in the proportion of a population or sub-population that reports or is diagnosed with a health condition; shows decreased rates of injury, disability, and mortality; or has lower healthcare costs (Thacker et al., 2006). Notably, these are all negative outcomes. Alternative or new measures should target positive outcomes by building on the WHO's definition of health as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity." Thacker et al. (2006) recognized the challenge of measuring social relationships and their impact on health and stated that for older adults, "measures are needed for activity, independence, and satisfactory social leisure activities" (p. 21). The need for appropriate public health measures is just as critical now as it was then and should be a priority to assess improvements in the public's social health. In that regard, measures of social inclusion and connectedness may be as important as measures of social isolation and

loneliness. The development of reliable and valid population measures of social inclusion, belonging, and connectedness is an important area for future research.

Importantly, although social isolation and loneliness have been targeted because of their adverse and costly implications for health, very little research has examined whether such interventions actually reduce the likelihood and severity of various health outcomes. In the U.S., the Agency for Healthcare Research and Quality released a rapid review with the explicit goal of evaluating "the effect of interventions targeting social isolation/loneliness in community-dwelling older adults (60 years and older) on outcomes of social isolation/loneliness, health and health care utilization" (Veazie, et al., 2019). Their findings revealed "no clear relationship between effects on social isolation and effects on health or health care utilization" (p. ii).

Several factors must be taken into consideration when assessing the impact of a social isolation/loneliness intervention on a health outcome. First, the follow-up period must be long enough to detect an intervention effect. Improvements in physical health may take months if not years to become evident, whereas mental health outcomes, such as depressive symptoms and anxiety, are typically more quickly responsive to changes in loneliness and social isolation. Second, the impact may differ depending on whether the goal is prevention versus remediation. For instance, physiological processes that are responsible for regulating blood pressure may be irreversibly altered by long-term exposure to loneliness, rendering these pathways impervious to loneliness interventions. It may be more relevant to monitor the impact of a loneliness intervention on hypertension prevention (or delaying its onset) in those with normal blood pressure and not yet diagnosed with hypertension. Third, the intensity, frequency, and duration of the intervention are also expected to matter. If an intervention has a short-term impact that reduces loneliness, but the loneliness effect does not persist, then there may be no detectable effect on health or an initial positive health impact may regress to a pre-intervention state. More research is needed to understand the optimal intervention intensity, frequency, and duration for specific health outcomes (Prohaska et al., 2020).

Loneliness: a marker of an unhealthy society?

Challenges to assessing the impact of social isolation/loneliness interventions on health outcomes should not blind us to the broader importance of social connectedness to our society. Even if loneliness had no health effects, loneliness is still relevant to the broader society because its prevalence may signify that something is unhealthy in a nation's polity. This is perhaps most evident when comparing loneliness levels among sub-groups in the population; for example, loneliness levels are higher in racial minorities (e.g., African American older adults in the U.S.; Hawkley et al., 2019) and sexual and gender

minority groups (Gorczynski and Fasoli, 2021 and Hsieh and Liu, 2021) than in the majority population. Also, immigrants tend to be lonelier than native-born individuals, differences that have been demonstrated in Canada (Wu and Penning, 2015), Germany (Fokkema and Naderi, 2013), and the Netherlands (Visser and Fakiri, 2016), among other countries. These findings have been directly or indirectly linked to the degree to which people in minority groups experience discrimination and exclusion (Sutin, Stephan, Carretta, and Terracciano, 2015 and Visser and Fakiri, 2016). Moreover, an unhealthy country, as gauged by high levels of institutional distrust and suspicion, contributes to distrust in relationships with strangers and within groups (Van Prooijen, Spadaro, and Wang, 2022) and circumstances that perpetuate and exacerbate loneliness (Rotenberg et al., 2010) which, in turn, can lead to dehumanization of others (Haslam, 2022) and exacerbate distrust if not outright social exclusion and rejection.

In contrast, a sense of belonging is an indicator of collective connectedness and inclusion (Hawkley, Browne, and Cacioppo, 2005). The relevance of belonging to feelings of loneliness (and its opposite, social connectedness) is illustrated in a study of older adults in Spain; results showed that satisfaction with their place of residence – whether in the community or in residential care facilities – was associated with a greater sense of belonging and lower loneliness, and a sense of belonging mediated the association between residential satisfaction and loneliness (Prieto-Flores et al., 2011).

Interestingly, the importance of a sense of inclusion and belonging has been implicated in research showing the loneliness-reducing power of sharing positive experiences with others (Gable and Reis, 2010). Even when the experience is negative, implicit sharing reduces its influence on feelings of loneliness. Data from the Health and Retirement Study showed that older adults who lost at least 75% of their income in any given 2-year interval between 2006 and 2016 showed an increase in loneliness but only during non-Recession periods when such financial shocks are rare. During the Great Recession (2008–2010), when financial shocks were prevalent, the effect of a 75% loss of income was associated with a *reduction* in loneliness (Hawkley, Zheng, and Song, 2020). That is, sharing a common albeit unpleasant experience with others may increase a sense of belonging which, in turn, ameliorates the impact of the experience on loneliness. (This pattern of effects has also been observed for depressive symptoms and suicide; see Hawkley et al., 2020.)

Recent theoretical work has provided a more nuanced approach to the relationship between the sense of belonging and loneliness and points to individual differences in the *need* to belong as a critical factor in their association (Kim et al., 2021). Specifically, improving a sense of belonging will decrease loneliness more in those with a high and unsatisfied need to belong. However, public health targets the population, not the individual. To improve population health, public policies need to support – through public awareness, advocacy, education, and funding – local and broader efforts

toward inclusion and belonging that target those subpopulations most peripheralized and prone to experiencing feelings of loneliness and isolation not only to prevent any possible downstream effects on health but also, and importantly, to minimize harm to the fabric of society.

Loneliness and public health

One of the first principles of public health is prevention (Radden, 2016). In the case of loneliness, prevention means, first, reducing the likelihood of becoming lonely, and second, reducing the severity or duration of loneliness when it occurs or recurs. A common practice in intervention research is to identify an at-risk population and either forestall or decrease the intensity of loneliness in that population. However, the practice of singling out a particular population presumed to be at risk, as advocated above, may ironically reduce the likelihood that individuals in that population will agree to participate in the intervention since doing so may be seen as stigmatizing. A qualitative study of older adults conducted in England revealed that community resources that described support "as being for loneliness and specific to older people" were viewed unfavorably, whereas group-based activities around shared interests were preferred strategies to reduce loneliness (Kharicha et al., 2017).

An alternative to focusing on at-risk populations is to enact policies that "protect all for the sake of some" (Radden, 2016). Policies that advance a solidarity mindset serve to normalize loneliness and reduce stigma. Dawson and Jennings (2012) refer to this population-wide approach as "starting with us" (as opposed to starting with you or me), a focus that draws attention away from the individual and toward shared and common causes of loneliness, including the many social determinants of health (and loneliness) that are shaped by public policy (e.g., poverty, unemployment, limited access to healthcare). People's experiences of social isolation and loneliness during the COVID-19 pandemic may in fact move us in the direction of solidarity: loneliness and social isolation can no longer be relegated to so-called vulnerable populations (e.g., older adults) but can be understood as universal human experiences that can be relieved or exacerbated by policies as well as by individual behaviors and preferences.

An expert public policy group recently proposed an integrated approach to loneliness prevention that highlights the importance of population-level primary prevention strategies to address fundamental causes of loneliness (Crowe et al., 2022). These researchers outlined a two-factor matrix of loneliness interventions that crosses three levels of prevention (from the primary level that involves facilitating social connections to the secondary level that involves screening for progression to chronic loneliness and the tertiary level that involves treatment for chronic loneliness) with a tier of public health impact (from high population-level impact and low individual

effort to low population impact and high individual effort). Primary prevention at the population level has a large impact because it involves the elimination of determinants of loneliness throughout the population, whereas primary prevention at the individual level prevents or remediates loneliness in high-risk individuals without removing underlying structural causes of loneliness. For instance, improving housing stability was seen to have a wide range of mental and social benefits in a meta-analysis of 100 studies from eight countries (Carnemolla and Skinner, 2021). As discussed above, population-level primary prevention does not preclude the need for individual prevention efforts, however. Among people with mental illness, living in supported housing was insufficient to ensure residents had opportunities to connect socially that respected their idiosyncratic preferences (Watson, Fossey, and Harvey, 2018). Both population (e.g., national) and individual strategies are important, but additional research is needed to strengthen the evidence base for both approaches and particularly for population-level approaches.

Conclusion

There is no need to "end" loneliness per se. Loneliness does not need to be cured, just as hunger does not need to be cured. Both serve an important and adaptive function. Just as hunger signals a need for nutrition and motivates efforts to locate and eat something, loneliness signals a need for connection and motivates efforts to locate and connect with someone (Hawkley, Cacioppo, and Correll, 2013). However, just as nutrient-depleted foods will not satisfy our hunger drive, unsatisfactory relationships and interactions will not satisfy our need for connection. A pressing issue for contemporary western society is that a lack of systemic structural support for social connection hampers individuals from finding the social "food" that satisfies their need to belong. Indeed, structural factors can actively work against satisfying the need to belong (e.g., structural racism).

Every community and every nation jeopardizes its stability, prosperity, and peace to the extent that some individuals and sub-groups are more "equal" and included than others. Fostering equity, inclusion, and belonging is a step toward creating a society that can benefit all. In this regard, Jeremy Wright, MP, and Tracey Crouch, MP, the first Minister of Loneliness in the UK, neatly encapsulated both the limits and the promise of national policy:

> Government can't make our friends for us, and ultimately the challenge of creating a more connected society lies with each of us in our families, neighbourhoods and workplaces. But what government can do is help strengthen the foundations of society so that it becomes more natural and easy to chat, to share and to trust each other.
>
> (Department for Digital Culture, Media and Sport, 2018, p. 3)

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Chapter 17

Loneliness during the COVID-19 pandemic

Lena Dahlberg

Reprint of Dahlberg, L. (2021). Loneliness during the COVID-19 pandemic. *Aging & Mental Health*, 25(7), 1161–1164.

Introduction

The COVID-19 pandemic has direct effects on people's health and the number of deaths due to the virus has reached more than a million (WHO, 2020a). In addition, the pandemic and society's response to the pandemic have indirect effects on people's lives – sometimes discussed in terms of collateral damage. Loneliness is one potential indirect effect. This editorial aims to consider how loneliness among older adults can be understood in the light of the COVID-19 pandemic and interventions to reduce loneliness.

Loneliness is a negative feeling arising from a perceived discrepancy between a person's desired and achieved social relations (Perlman & Peplau, 1981), e.g., their number, frequency or quality. By comparison, social isolation is an objective state measured via indicators such as living alone, few or infrequent social contacts and low levels of social activity. Numerous studies have shown that social isolation is a risk factor for loneliness (Dahlberg, McKee, Frank, & Naseer, 2022), which itself is associated with an increased risk of poor health, low well-being and mortality (Holt-Lunstad, Smith, Baker, Harris, & Stephenson, 2015; Leigh-Hunt et al., 2017; Rico-Uribe et al., 2018).

In order to minimise the spread of COVID-19 many governments have enforced restrictions on physical social contacts, ranging from recommendations to keep a physical distance from others to lockdowns of communities and even whole societies. Older adults have been identified as being at higher risk of poor outcomes if infected (WHO, 2020b) and in many countries have been subjected to greater restrictions on their physical contacts with others.

Loneliness during the pandemic

Several studies of the general population have found an increase in loneliness since the outbreak of COVID-19 (e.g., Ausin, Gonzalez-Sanguino, Castellanos,

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& Munoz, 2021; Bu, Steptoe, & Fancourt, 2020; Elran-Barak & Mozeikov, 2020), especially among younger people (Bu et al., 2020; Li & Wang, 2020), although there are also reports of fairly stable levels of loneliness (Luchetti et al., 2020; McGinty, Presskreischer, Han, & Barry, 2020).

Regarding older adults, most evidence points towards an increase in loneliness during the pandemic. Studies focusing on older adults in the United States (US), the Netherlands and Austria have found an increased or high level of loneliness during the pandemic (Emerson, 2020; Kotwal et al., 2020; Krendl & Perry, 2021; Stolz, Mayerl, & Freidl, 2021; van Tilburg, Steinmetz, Stolte, van der Roest, & de Vries, 2020). Similar results have been reported in studies of specific groups of older adults in a number of countries, including psycho-oncology patients (Schellekens & van der Lee, 2020) and residents of long term care facilities (Van der Roest et al., 2020) in the Netherlands, people with multimorbidity in Hong Kong (Wong et al., 2020), and members of an organisation for older adults in the US (Gaeta & Brydges, 2020). There are contrasting findings: a study of older adults in Israel found low levels of loneliness (Shrira, Hoffman, Bodner, & Palgi, 2020) and a study of younger older adults (aged 65–71 years) in Sweden found no change in levels of loneliness (Kivi, Hansson, & Bjälkebring, 2020).

However, there are limitations to most studies on COVID-19 and loneliness published to date. First, the majority use convenience sampling and/or collected data online, which is likely to underrepresent the oldest old, older adults with low or no Internet usage, and those in poor health. Studies with more representative samples include those by Kivi et al. (2020; albeit with a younger age group) and van Tilburg et al. (2020). Second, the studies tend to not have a prospective design including data collected before the pandemic, with consequently limited potential to attribute changes in loneliness to factors related to the pandemic. Third, many studies were undertaken a short time into the pandemic, thus limiting their contribution to understanding how loneliness develops over the course of a pandemic and its effects on health and well-being. Finally, with few exceptions (e.g., Whatley, Siegel, Schwartz, Silaj, & Castel, 2020) the studies lack an explicit theoretical foundation. To ensure that policy during this and future pandemics is guided by reliable evidence, more studies are needed that have a solid theoretical foundation, of prospective design with representative samples of older people and of sufficient duration to examine both short- and long-term effects of the pandemic.

Understanding loneliness during the new normal

There are several theoretical perspectives on loneliness (see, e.g., de Jong Gierveld & Tesch-Römer, 2012; Perlman & Peplau, 1982). Two key perspectives are the cognitive perspective and the resource perspective.

From a *cognitive perspective*, loneliness can be understood as a result of unmet standards of social relations and activity, i.e., a discrepancy between

desired and achieved social relations (Tesch-Römer & Huxhold, 2019). One study carried out during the pandemic found that emotional loneliness increased in those who had experienced a loss of social contacts and activities, but found no effect on social loneliness when contact frequency decreased (van Tilburg et al., 2020). The authors suggest that physical distance measures may have lowered the expectations of frequency and exchange in social relations. It has also been argued that such measures might induce a feeling that "everyone is in this together" (Luchetti et al., 2020, p. 10), which may buffer against an increase in loneliness as long as the measures are adhered to collectively.

People vary in their social standards, which partly explains why the level of loneliness varies between individuals with objectively the same level of social contacts (Tesch-Römer & Huxhold, 2019). From this perspective, people whose standards include a socially active life would be expected to experience a greater increase in loneliness during enforced physical distancing than would people whose standards for a socially active life are lower. However, to date there has been no test of this hypothesis in research during the pandemic.

Social standards are also related to the culture in which people live. For example, it has been found that loneliness is more common in collectivistic societies in Southern and Central Europe than in individualistic societies in Northern Europe (Fokkema, Gierveld, & Dykstra, 2012; Lennartsson, Rehnberg, McKee, & Dahlberg, 2020). One would expect a greater increase in loneliness during the pandemic in collectivistic cultures with higher desired levels of social relations than in individualistic cultures. However, while studies have been carried out in different countries, no comparative research on loneliness in older adults during the pandemic has yet been published. This also means that the effect of different governmental responses to the pandemic has not been examined.

The *resource perspective* may contribute further to the explanation of loneliness during the pandemic. According to this perspective, an individual's access to resources affects loneliness directly but also via its influence on social relations and social activities (Tesch-Römer & Huxhold, 2019). Resources can be divided into individual and contextual material resources (e.g., socio-economic status, health and socially responsive neighbourhoods) and individual non-material resources (e.g., communication and social skills) (Tesch-Römer & Huxhold, 2019).

In line with this perspective, older adults with access to more resources would be expected to manage restrictions during the pandemic better and be less prone to increased loneliness. Although this hypothesis has not been explicitly tested, loneliness during the pandemic has been found to be associated with material resources such as lower income (Whatley et al., 2020) and poor physical and mental health (Kotwal et al., 2020; Krendl & Perry, 2021; Parlapani et al., 2020; Robb et al., 2020; Shrira et al., 2020; Wong et al., 2020). Furthermore, loneliness is more common in individuals living alone

(Parlapani et al., 2020; van Tilburg et al., 2020; Wong et al., 2020), with infrequent social contacts (Gaeta & Brydges, 2020; van Tilburg et al., 2020), and whose support needs are not being met (van Tilburg et al., 2020).

Reducing loneliness during the pandemic

So, how can we prevent increases in loneliness due to the pandemic? Unfortunately, reviews of interventions targeting loneliness in older adults have repeatedly noted that there is little evidence for what interventions and what elements of interventions are effective (for an overview of reviews, see Victor et al., 2018). In addition, a recent evidence map of social services for older adults found that there is a lack of research regarding how social services meet social needs (Dahlberg, Ahlström, Bertilsson, & Fahlström, 2019).

Many interventions to reduce loneliness are based on group activities, which in the current uncertain situation are not easily arranged and often cancelled or even forbidden. While keeping physical distance does not mean that it is impossible to have social contacts, there are barriers to creating safe conditions for social interactions inclusive for all. For example, physically frail individuals may require support to meet outdoors, and the use of personal protection equipment may be confusing and distressing for those with cognitive impairments.

From a theoretical perspective (Carstensen, Fung, & Charles, 2003; Freund & Baltes, 1998), older adults who during the pandemic are best able to focus on and optimise key social relations and compensate in some way for the loss of social contacts should be best equipped to adapt to the prevailing conditions. One way that older adults could compensate for the loss of physical social contacts is via technology. There is evidence that social technologies have the potential to reduce loneliness in older adults (Poscia et al., 2018), particularly if used as a means to enhance existing and form new relationships rather than replace offline relationships and activities (Fan, 2016; Nowland, Necka, & Cacioppo, 2018). Relations at a distance do not, however, provide the same significance and value as face-to-face or tactile contacts in all situations, for example when a person is emotionally distressed. From the resource perspective a narrow focus on technology-based interventions is also problematic. There are digital divides, with evidence that some older adults experience digital exclusion (Seifert, Hofer, & Rossel, 2018) and with structural barriers in terms of internet and/or broadband access in some regions (Spoor, Tasciotti, & Peleah, 2014). Limited economic resources will hinder the use of social technology, as will cognitive and physical impairments and poor health (Fan, 2016; Tavares, 2020). Barriers to deliver interventions remotely also include, e.g., older adults' attitudes and skills regarding technology as well as the involvement of other individuals for interaction, training and support (Gorenko, Moran, Flynn, Dobson, & Konnert, 2021). Traditional methods of maintaining social relations at a

distance, such as telephones, are of course still available and have been used in interventions during the pandemic (van Dyck, Wilkins, Ouellet, Ouellet, & Conroy, 2020).

There has been less focus on non-technological ways of combating loneliness during the pandemic. The outdoor environment is an important venue for social contacts (see Burholt et al., 2020). In societies with physical distancing recommendations but without orders to stay at home, supporting neighbourliness and community use of local open spaces could help to prevent increases in loneliness. Again, a resource perspective on loneliness is relevant, as loneliness is less common among people living in better resourced, safer and physically accessible neighbourhoods (Gibney, Zhang, & Brennan, 2020)and the likelihood of living in a deprived neighbourhood is higher among people with less financial means (see Tesch-Römer & Huxhold, 2019).

Finally, on a policy level, the imposition by many countries of greater restrictions on physical contacts for older adults than for other members of the population reveal an ageist view of older adults as a homogeneous group. While the risk of negative outcomes if infected with COVID-19 is correlated with higher age, resources such as health and access to care vary in the older age group and result in divergent risk profiles. A more nuanced and ageist-proof policy response to the pandemic is needed in order to avoid unnecessary collateral damage such as increased loneliness in older adults.

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Part VII

Overview

Longitudinal aging studies around the world available to researchers

In Chapter 18, Hajek and König provide an overview of representative cohort studies around the world available and how these studies included loneliness or social isolation. Such knowledge may inspire future research in this area.

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Chapter 18

Overview

Loneliness and social isolation in longitudinal aging studies around the world

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Introduction

Based on various well-known and inspiring datasets from around the world, the authors of the previous chapters identified various interesting correlates of loneliness and social isolation. To further inspire future research and to assist the interested researcher in his or her *own* future research in the field of loneliness and social isolation in late life, the aim of this chapter is as follows: to provide an overview of (in most cases, nationally representative) cohort studies around the world available to researchers, such as the English Longitudinal Study on Ageing (ELSA), the Health and Retirement Study (HRS), or the China Health and Retirement Longitudinal Study (CHARLS), and how these studies included loneliness or social isolation. These cohort studies will be briefly described and an overview will be provided – including time points when loneliness/social isolation was quantified and the tools used to quantify loneliness/social isolation.

Overview

Preliminary remarks

It should be noted that we focused on exploring studies available at the Gateway to Global Aging (i.e., all longitudinal Health and Retirement studies around the world) plus the country of origin being Germany (i.e., German Ageing Survey (Klaus et al., 2017)). For an overview of the included studies, see Gateway to Global Aging (2022).

We would like to emphasize that other similar studies (publicly available) that are not currently part of the Gateway to Global Aging also exist (e.g., Health, Aging, and Retirement in Thailand [HART], Indonesia Family Life Survey [IFLS], New Zealand Health, Work, and Retirement Study [NZHWR], or the Brazilian Longitudinal Study of Aging [ELSI]). An excellent overview of the tools used to quantify loneliness in these studies is given by Newmyer et al. (2021). In short, it may be worth noting that most of the other longitudinal aging studies not listed here mostly included the loneliness item

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included in the Center for Epidemiological Studies Depression (CES-D) scale (see below for further details). The NZHWR was the only study that also included the de Jong Gierveld tool (six-item version) to quantify loneliness (Gierveld and Tilburg, 2006).

It should be noted that while the eligible studies included *community-dwelling* older individuals in the respective countries, they failed to include older individuals residing in *institutionalized* settings (e.g., nursing homes or old age homes). Thus, future research in the field of loneliness and social isolation in late life is also urgently required in such groups. These individuals residing in institutionalized settings are sometimes included in multicenter prospective cohort studies (e.g., "Study on needs, health service use, costs and health-related quality of life in a large sample of oldest old primary care patients (85 +)" in Germany (Luppa et al., 2012)), but it should be acknowledged that more recent studies focusing on individuals in old age also included individuals in institutionalized settings (e.g., "Survey on quality of life and subjective well-being of the very old in North Rhine-Westphalia (NRW80+)") (Hansen et al., 2021). We sincerely hope that upcoming studies focusing on individuals in old age include both community-dwelling and institutionalized individuals.

Loneliness

A full overview of longitudinal aging studies around the world examining loneliness and social isolation is given in Table 18.1.

Table 18.1 shows only multi-item scales (if possible). For example, while the LASI also included a single-item measure and a single item from the CES-D, we only included the multi-item scale for LASI in Table 18.1.

With regard to loneliness tools, various studies included at least a single item (or an item related to loneliness as part of the CES-D) to quantify loneliness. The CES-D loneliness item refers to feelings of loneliness during a certain time period (such as the previous week). In some studies (e.g., SHARE), a single-item question was used to quantify loneliness ("How often do you feel lonely?" without referring to a specific time period).

With regard to multi-item scales, the "Three-Item Scale" (Hughes et al., 2004) – a shortened derivation of the Revised University of California, Los Angeles (R-UCLA) Loneliness Scale (Russell et al., 1980) – was used in some studies such as the HRS or ELSA. Only the German Ageing Survey included the de Jong Gierveld tool (six-item version) to quantify loneliness.

Social isolation

With regard to perceived social isolation, solely the German Ageing Survey included a tool to quantify perceived social isolation. This tool was developed by Bude and Lantermann and included four items (Bude and

Table 18.1 Study overview: Loneliness and perceived social isolation in longitudinal aging studies around the world

Cohort study	*Sample*	*Time points where loneliness/perceived social isolation was quantified*	*Tool used*
China Health and Retirement Longitudinal Study (CHARLS)	Community-dwelling individuals aged 45 years or older in China	From wave 1 onward: Loneliness	Loneliness: Single item (from the CES-D)
English Longitudinal Study on Ageing (ELSA)	Community-dwelling individuals aged 50 and older in England	From wave 2 onward: Loneliness	UCLA (three-item version)
German Ageing Survey (DEAS)	Community-dwelling individuals aged 40 years and over in Germany	From wave 1 onward: loneliness From wave 5 onwards: Perceived social isolation	Loneliness: De Jong Gierveld (six-item version) Perceived social isolation: Bude and Lantermann tool
Health and Retirement Study (HRS)	Community-dwelling individuals aged 51 years and over in the United States	From wave 6 onward: Loneliness	UCLA (three-item version)
Japanese Study of Aging and Retirement (JSTAR)	Community-dwelling individuals aged 50 to 75 years in Japan	From wave 1 onward: Loneliness	Loneliness: Single item (from the CES-D)
Korean Longitudinal Study of Aging (KLoSA)	Community-dwelling individuals aged 45 years and older in Korea	From wave 1 onward: Loneliness	Loneliness: Single item (from the CES-D)
Longitudinal Aging Study in India (LASI)	Community-dwelling individuals aged 45 years and older in India	Wave 1 (only wave 1 exists thus far)	Loneliness: Single item (from the CES-D)
Mexican Health and Aging Study (MHAS)	Community-dwelling individuals aged 50 and older in Mexico	From wave 1 onward: Loneliness	Loneliness: Single item (from the CES-D)
Survey of Health, Ageing and Retirement in Europe (SHARE)	Community-dwelling European citizens (plus Israel) aged 50 or older	From wave 5 onward: Loneliness	UCLA (three-item version)
The Irish LongituDinal study on Ageing (TILDA)	Community-dwelling individuals aged 50 and older in Ireland	From wave 1 onward: Loneliness	UCLA (three-item version)

Note: We only included multi-item scales (if possible). For example, while the LASI also included a single-item measure and a single item from the CES-D, we only included the UCLA-3 for LASI.

Lantermann, 2006). The other studies did not include comparable measures. We thus hope that the existing longitudinal aging studies will pay more attention to perceived social isolation in the future.

In contrast, the existing cohort studies commonly included various factors directly related to objective social isolation (such as social activities, contact with children/other family members, social engagement or living situation or marital status (Dahlberg, 2021 and Steptoe et al., 2013) in multiple waves. Consequently, we refrained from displaying the items included in each study for reasons of readability.

Such aforementioned items were proposed for quantifying objective social isolation (Dahlberg, 2021) and were also used in various previous studies (e.g., Ejiri et al., 2021). Thus, the interested researcher could definitely examine objective social isolation and its correlates with existing cohort studies around the world.

Concluding remarks for this chapter

This chapter revealed that several nationally representative cohort studies from around the world frequently (and increasingly) included valid short tools to quantify loneliness and (particularly related to objective questions) social isolation in their questionnaires. This may reflect the fact that the areas of loneliness and social isolation are becoming increasingly acknowledged as challenges in late life – not only in research but also in society as a whole.

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