Economic implications of the asocial society: a scoping review of loneliness among young adults across the life course
Knowledge Synthesis Report

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Executive summary

Background

Loneliness — the subjective experience of social isolation — is a pervasive social issue, negatively impacting individuals across the life course. Loneliness and its consequences have primarily been studied in older populations. Yet, recent data indicates that loneliness is on the rise among young adults globally, including in Canada. The economic consequences of loneliness among young adults are increasingly being recognized. In this scoping review, we asked what the existing research tells us about the economic impacts and dimensions of loneliness among young adults in Canada and internationally. This review mapped and synthesized the available evidence on the economic impacts of loneliness and interventions targeted to reduce loneliness in young adults (15-35 years) in Canada and globally, highlighting gaps and areas for future research.

Objectives

To review literature regarding (1) the economic impacts of loneliness as well as (2) interventions to alleviate loneliness among young adults (15-35 years) in Canada and internationally.

Results

- **Research assessing the economic implications of loneliness is at an infancy stage**. Despite the economic implications of loneliness being increasingly recognized across research fields, there is a dearth of empirical research assessing it among young populations. This scoping review identified six studies measuring the impacts of loneliness on economic outcomes among young adults.
- **There is a lack of Canadian literature on the economic impacts of loneliness in young adults.** There are significant research gaps on the economic implications of loneliness in Canada. Six loneliness-economic impacts studies were found in this review process. Of the six, we identified no Canadian study that assessed the impacts of loneliness on economic outcomes among young adults. Thus, there is an urgent need to collect Canadian data to investigate the effects of loneliness and its impact on economic outcomes — both among young adults and the general population.
- **Loneliness is associated with negative economic outcomes among young adults**. From the six studies included in this review, loneliness was found to be directly associated with fewer employment opportunities, lower income, a higher rate of university attrition and lower academic achievement. The indirect consequences of loneliness include increased use of community/university services, general practitioner visits, and hospitalizations.
- **Interventions to tackle loneliness among young adults fall into four categories**. This scoping review identified 17 studies focused on interventions reducing loneliness among young adults. Over half of the intervention studies (65%) used in-person delivery methods, while about a third (29%) used online/digital technology methods, and one intervention study (6%) used a mixed-approach. Overall, interventions can be categorized as follows:
    1. Psychology based (e.g., changing maladaptive social cognition messaging, cognitive therapy, cognitive-behavior skills, cognitive behavioural skill-building exercises, mindfulness, mindfulness messaging, mindfulness-based self-compassion, and positive psychology).

2. Skills development (e.g., coping behaviors, and education and enrichment of relational skills).
3. Social support (e.g., social identification, psychosocial school program, social participation, and group work)
4. Stress management (e.g., social-emotional skills, and vitality intervention).

Key Messages

Support policy with scientific evidence. There is a need for more evidence on loneliness and its economic consequences among young Canadians, to evaluate and inform future interventions. Steps towards achieving this goal may include:

- Harnessing the power of existing data to see the big picture and develop new surveys using standardized tools to measure loneliness and economic outcome indicators and monitor the trends and patterns across regions in Canada.
- New research is needed to investigate the mechanisms through which loneliness affects direct and indirect economic outcomes within Canada. The design and implementation of a Canadian longitudinal study can address our gap in knowledge on the effects of loneliness across the life course and economic consequences linked to loneliness among young Canadians.
- Government bodies can play a role by funding research/intervention programs. Further supporting research on loneliness will help inform best practices and policies on how to manage the increase of loneliness exacerbated by the COVID-19 pandemic.
- **Develop programs that encourage prosocial behaviour.** Effective interventions to address loneliness among young people require a holistic approach and multilevel partnerships, involving all levels of governments, organizations, communities, and education sectors.
- **Appoint a high commissioner of loneliness to coordinate actions**.

Methodology (search methods, selection criteria, data collection and analysis)

This scoping review followed the five-step methodological framework by Arksey and O'Malley (2005): (1) identify the research question; (2) identify relevant studies; (3) study selection; (4) categorize the studies; and (5) summarize and report findings. A systematic search was conducted for quantitative and qualitative evidence in peer-reviewed journals and grey literature published in English or French between January 2012 and June 2022 in PubMed, Web of Science, Eric, EconLit, PsycINFO, CINAHL Plus, ProQuest Dissertations and Theses, and Google Scholar. The search was informed by the population, concept, context framework, and was limited to literature that included direct and indirect effects of loneliness on economic outcome measures, as well as interventions designed to reduce loneliness among young people in Canada and other Organization for Economic Cooperation and Development (OECD) countries. This process was implemented in accordance with the preferred Reporting Items for Systematic Reviews and Meta-Analyses. Standardized data was extracted, and results were analyzed thematically and categorically.

1.0 Background

Loneliness has become an increasingly important problem and a growing social issue around the world, negatively impacting not only older people but also young adults (Batsleer & Duggan, 2020; Cacioppo & Cacioppo, 2018; Newmyer et al., 2022; Surkalim et al., 2022; Victor & Yang, 2012). Importantly (and particularly for younger Canadians) such issues can trigger effects at the immediate time, but also across the life course (Alberti, 2019; Asghar & Iqbal, 2019; Luhmann & Hawkley, 2016; Qualter et al., 2015; Rokach et al., 2003; Slater, 1990; Victor & Yang, 2012). The COVID-19 pandemic and resulting policy responses (including national lockdowns and social distancing), may have also exacerbated loneliness (Bu et al., 2020; Buecker et al., 2020; Kung et al., 2023). Loneliness is often defined as a subjective state of negative feelings resulting from a discrepancy between an individual's desired and achieved levels of social relation (Perlman & Peplau, 1981; Perlman & Perlman, 1982; Weiss, 1973). Given that loneliness is closely linked to the quality of social interactions and relationships, a person may experience loneliness without physical and/or social isolation (Morrish & Medina-Lara, 2021; Wigfield et al., 2022).

Young adults are currently the loneliest demographic in Canada and other Western countries (Alberti, 2019; Barreto et al., 2021; BBC Loneliness Experiment, 2018; Luhmann & Hawkley, 2016; Statistics Canada, 2021; Surkalim et al., 2022; Twenge et al., 2021). Existing research has reported loneliness among young adolescents/adults to range from 5% to 71% (Barreto et al., 2021; Qualter et al., 2015; Surkalim et al., 2022). In 2021, the *Canadian Social Survey* indicated that young people expressed experiencing loneliness more frequently than older people: almost 1 in 4 (23%) people aged 15 to 24 years report feeling lonely always or often, compared with 15% of those who were slightly older (between the ages of 25 and 34) and 14% of those aged 75 and older. Beyond age-based differentiation, younger women are particularly afflicted by loneliness, as nearly twice the share of women aged 15 to 24 (29%) reported always or often being lonely compared with women in the next decade of life (16%). Among men, the differences in loneliness were less dramatic by age group, as 18% of men aged 15 to 24, and 15% of men aged 25 to 34, said that they always or often felt lonely (Statistics Canada, 2021). Similar patterns have been reported by the United Kingdom Office for National Statistics (Pyle & Evans, 2018) where women, younger people, and those who are not married or living common-law express greater degrees of loneliness.

Within this "loneliness epidemic," (Alberti, 2019) several questions arise and need to be addressed to both better understand, and respond to, loneliness and its impacts on quality of life in Canada. In this project, we focus on **the economic consequences of loneliness for young Canadians and internationally, and how do those effects manifest through the life course.** Starting from the position that loneliness has both direct and indirect economic consequences for individuals, families, and society, we define economic dimensions broadly to include labour market outcomes, education, and other indirect economic costs, including but not limited to, healthcare expenditures (Braveman et al., 2005; Creed & Reynolds, 2001; Grundy & Holt, 2001; Luhmann & Hawkley, 2016; McDaid & Park, 2021; Mihalopoulos et al., 2020; Morrish & Medina-Lara, 2021; Niedzwiedz et al., 2016; Shavers, 2007; Victor & Yang, 2012). Loneliness can lead to decreased productivity and increased healthcare costs, as people who are lonely are more likely to suffer from chronic conditions such as heart disease and depression (Cruwys et al., 2018; Holt-Lunstad et al., 2015; Matthews, Danese, et al., 2019; Naito et al., 2021; von Soest et

al., 2020). The emphasis upon young is particularly important on two fronts: (1) most loneliness research focuses on older populations (Andersson, 1998; Bessaha et al., 2020; Boss et al., 2015; Kung et al., 2021; Kung et al., 2022; Mihalopoulos et al., 2020; Raymo & Wang, 2022; Wright-St Clair et al., 2017), and (2) loneliness among youth adults raises additional concerns due to spillover effects between social variables, training opportunities, and educational attainment (Matthews, Danese, et al., 2019).

Although recent work has highlighted the importance of loneliness as an economic issue, systematic research on the economic dimensions and impact of loneliness is rare (Mihalopoulos et al., 2020; Morrish & Medina-Lara, 2021; Niedzwiedz et al., 2016; Victor & Yang, 2012), despite evidence of longitudinal effects. For example, Luhmann and Hawkley's (2016) study reports that higher income is associated with lower loneliness for all age groups, but this association is strongest in mid-adulthood. In the same line, Kung, Kunz, and Shields's (2021) recent review shows that full-time employment is associated with lower loneliness for the middle-aged, this is not significant for older adults (Hansen & Slagsvold, 2016; Luhmann & Hawkley, 2016), whereas among younger adults, full-time employment is associated with higher loneliness (Creed & Reynolds, 2001; Luhmann & Hawkley, 2016). As a result of these dynamics, and the potential for innovative and meaningful synthesis that can inform intersectoral policies, programs, and practices, we ask a cascade of key questions of the peer-reviewed and grey literatures, starting in Canada but extending internationally:

- What is the pattern of loneliness among young people in Canada?
- To what extent is loneliness linked to economic outcome among young people?
- Do loneliness and its economic impacts differ according to the area of residence (rural, remote, and urban settings), gender status (state of being male, female, neuter, or LGBTQIA2S+), and other designated minority communities and population groups including Indigenous Peoples?
- What is the evidence regarding the effectiveness of interventions to reduce loneliness in young Canadian adults across the life-course?
- What are the policy recommendations to reduce loneliness across the life course based on existing literature?

Documenting the economic impact of loneliness in youth can help provide a stronger understanding of the immediate and long-term economic consequences of perceived relationship deficits in younger populations, negative impacts on youth economic progression (Morrish & Medina-Lara, 2021), and differential impacts across population subgroups. This synthesis can also identify potentially effective socio-economic interventions for mitigating the loneliness pandemic. This may include results that are applicable across multiple sectors, including education, economic development, technological innovation, media, infrastructure (including broadband programming), planning, and socio-cultural initiatives.

Moreover, the synthesis and questions driving this project are inherently consistent with the need to address the recent challenge identified, "Emerging Asocial Society," one of The Next Generation of Emerging Global Challenges to be considered by the Social Sciences and Humanities Research Council (SSHRC) as part of its Imagining Canada's Future (ICF) initiative

(Policy Horizons Canada, 2018). Any effective intervention to control or reduce the detrimental effect of loneliness (Gauthier et al., 2020; Masi et al., 2010) requires a rigorous assessment of the state of literature on the current patterns of loneliness and its economic implication (Eccles & Qualter, 2021; Kung et al., 2021; Kung et al., 2022). The growing economic costs of loneliness will persist without interventions (Masi et al., 2010; Mihalopoulos et al., 2020; Osborn et al., 2021). The pathways linking economic inequalities are multifactored. It is possible that an asocial society could lead to several social issues including the rise of antisocial behaviour. As Policy Horizons Canada (2018) states, a rise in lonely isolation could, for example, *increase the number of young people who establish connections with antisocial or hostile groups for their social validation, posing risks to public and national security*. Preventing lonely people from turning into anti-social actors could become a significant future challenge. Within this context, beyond the aim to inventory, catalogue, and assess both Canadian and international literature on the economic implications of loneliness and interventions to address loneliness, this scoping review will be a starting point in improving, developing, and implementing robust policies, best practices, and tools.

2.0 Project objectives

This scoping review aimed to provide an overview of academic and grey literature on the impact of loneliness on economic outcomes among young adults (15-35 years), as well as interventions that target loneliness.

As a part of the Knowledge Synthesis Emerging Asocial Society, the objectives of this review were to:

1. Critically assess the state of knowledge on the economic impact of loneliness as well as interventions that target loneliness, from a variety of sources.
2. Identify strengths and gaps in the quantitative and qualitative literature assessing the economic impact of loneliness, as well as interventions to alleviate loneliness.
3. Identify and recommend promising interventions to reduce loneliness across the life course based on existing literature.

It is necessary to understand the ways in which people have established and continue to maintain connections in the past and the related consequence across sectors to develop new tools and approaches that can foster and support relationships in the rapidly changing socio-economic landscape currently defined by technology, the COVID-19 pandemic, and demographic change. Social science advances in understanding the consequences of loneliness on economic inequalities are, therefore, crucial to establish appropriate policy design and responses for key populations (Bobrow & Dryzek, 1987). Loneliness research and its consequences has largely been concentrated in older populations, though loneliness is becoming an increasing concern among young adults (Barreto et al., 2021; Surkalim et al., 2022). Our scoping review is unique from previous loneliness reviews (Eccles & Qualter, 2021; Marangoni & Ickes, 1989; Mihalopoulos et al., 2020; Morrish & Medina-Lara, 2021), by specifically focussing on the broader socio-economic impacts of loneliness among young adults from a life course perspective (McDonald, 1979). This scoping review covered peer-reviewed journals and grey literature published between 2012 and 2022 in Canada and other Organization for Economic Co-operation

and Development (OECD) countries relevant to our key questions. While this project focused on Canadian materials (as per the SSHRC Guidelines for these grants), data was also collected regarding comparator states, defined as OECD countries with similar economies to Canada, and the broader international community.

3.0 Methods

This scoping review used the methodological framework by Arksey and O'Malley (2005). The five stages followed were: (1) identify the research question; (2) identify relevant studies; (3) study selection; (4) categorize the studies; and (5) summarize and report findings. Each step of the review is described below.

Step 1: Identifying research questions

We aimed to map existing evidence on the economic implication of loneliness and interventions targeting loneliness among young adults (15-35 years) in Canada and other OECD countries. This review asked: (1) What is the influence of loneliness on economic outcomes among young adults (15-35 years)? (2) What evidence exists on interventions targeted at reducing loneliness among young adults (15-35 years)? Loneliness was defined as the subjective experience of negative emotions based on the perception of unmet intimate and social needs (Courtin & Knapp, 2017; Wigfield et al., 2022). The experience of feeling lonely is involuntary and can occur at varying degrees, frequencies, and durations (Matthews, Odgers, et al., 2019; Qualter et al., 2013). Both quality and quantity of social interactions can influence loneliness (Perlman & Peplau, 1981). Given that loneliness is possible despite the presence of others (Yanguas et al., 2018), this review excluded studies focused on social isolation (defined as the objective lack of social integration) (Berkman & Syme, 1979; Greenfield et al., 2002; Perlman & Peplau, 1998; Wigfield et al., 2022). Given that loneliness has direct and indirect economic consequences for individuals, families, and society, a comprehensive range of economic measures were included in this review (Peytrignet et al., 2020). Economic outcomes were defined broadly and included income, employment status, labour market participation, occupation, financial stress/insecurity, job performance, job stress/strain, productivity, work-family conflict, housing access, transportation, working class, and other indirect economic costs, including but not limited to, healthcare expenditures (Chamberlain, Bronskill, et al., 2022; Chamberlain, Savage, et al., 2022; Creed & Reynolds, 2001; Gabbard et al., 1997; Hounsome et al., 2017; Majmudar et al., 2022; McDaid et al., 2017; McDaid & Park, 2021; Morrish & Medina-Lara, 2021; Niedzwiedz et al., 2016).

Step 2: Identification of literature sources

This scoping review identified, retrieved, and synthesized peer-reviewed articles and grey literature that examined (1) the impacts of loneliness on economic outcomes or (2) interventions targeted at loneliness among 15 to 35-year-olds in Canada and other OECD countries. The following electronic databases were searched PubMed, Eric, EconLit, PsycINFO, CINAHL Plus, Web of Science and grey literature sources, namely Google Scholar, ProQuest Dissertations and Theses Abstracts and Indexes. A combination of keywords identifying country of origin, loneliness, economic indicators, intervention strategies and relevant age group terms were searched (Table 1). Our keyword search was informed by the population, concept, and context (PCC) framework recommended by Joanna Briggs Institute (The Joanna Briggs Institute, 2015). See Table 1 for a full list of keywords used. A search string was first developed in PubMed and

then adapted for each database (the primary search string can be found in Appendix 1). Additionally, a manual search of government websites and government statistic agencies from Canada, including all provinces and territories, United States, Australia, United Kingdom, and New Zealand was conducted to ensure our search is comprehensive. Our search was conducted in June 2022.

Table 1. Keywords used in the search strategy to describe population, concept, and context

PCC element	Determinant	Associated search terms
Population	Young adults ages 15-35	Young adult, Young adulthood, Young, Young, Youth, Adolescent, Emerging adulthood, Teenager, Teenage, Teen
Concept	Loneliness	Loneliness, Lonely, Disconnectedness, Emotional loneliness, Social isolation, Social loneliness, Perceived social isolation, Sobering, Solitude, Subjective social isolation, Absenteeism
	Economic outcome	Cost, Cost consequence, Cost of living, Debt, Doctors visit, Drug costs, Earning, Economic, Economic conditions, Economic status, Economic burden, Economic costs, Economic evaluation, Economic hardship, Economic model, Economic wellbeing, Employment, Employment income, Employment status, Expenditures, Family income, Financial cost, Financial insecurity, Financial strain, Financial stress, Food insecurity, Home ownership, Hospitalization, Household income, Housing access, Income, Job, Job motivation, Job performance, Job satisfaction, Job strain, Job stress, Job turnover, Job loss, Labor participation, Labor, Labour, Livelihood, Material deprivation, Mediation costs, Money expenses, Occupations, Performativity, Poverty, Productivity, Socioeconomic factor, Socioeconomic status, Socioeconomics, Transportation, Unemployment, Utilisation/utilization, Wealth, Welfare, Work, Working class, Working day, Work-family conflict
	Intervention	Intervention, Coping, Empower, Evaluation, Implement, Policy, Prevention, Program, Psychology, Psychotherapy, Recommendation, Resilience, Therapy, Trial
Context	OECD countries, all socioeconomic and social contexts considered	Australia, Austria, Belgium, Canada, Chile, Columbia, Costa Rica, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Republic of Korea, South Korea, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States*

* PCC stands for population, concept, and context.

Step 3: Selection of studies

We applied the following inclusion criteria for title and abstract screening, as well as a full-text screening:

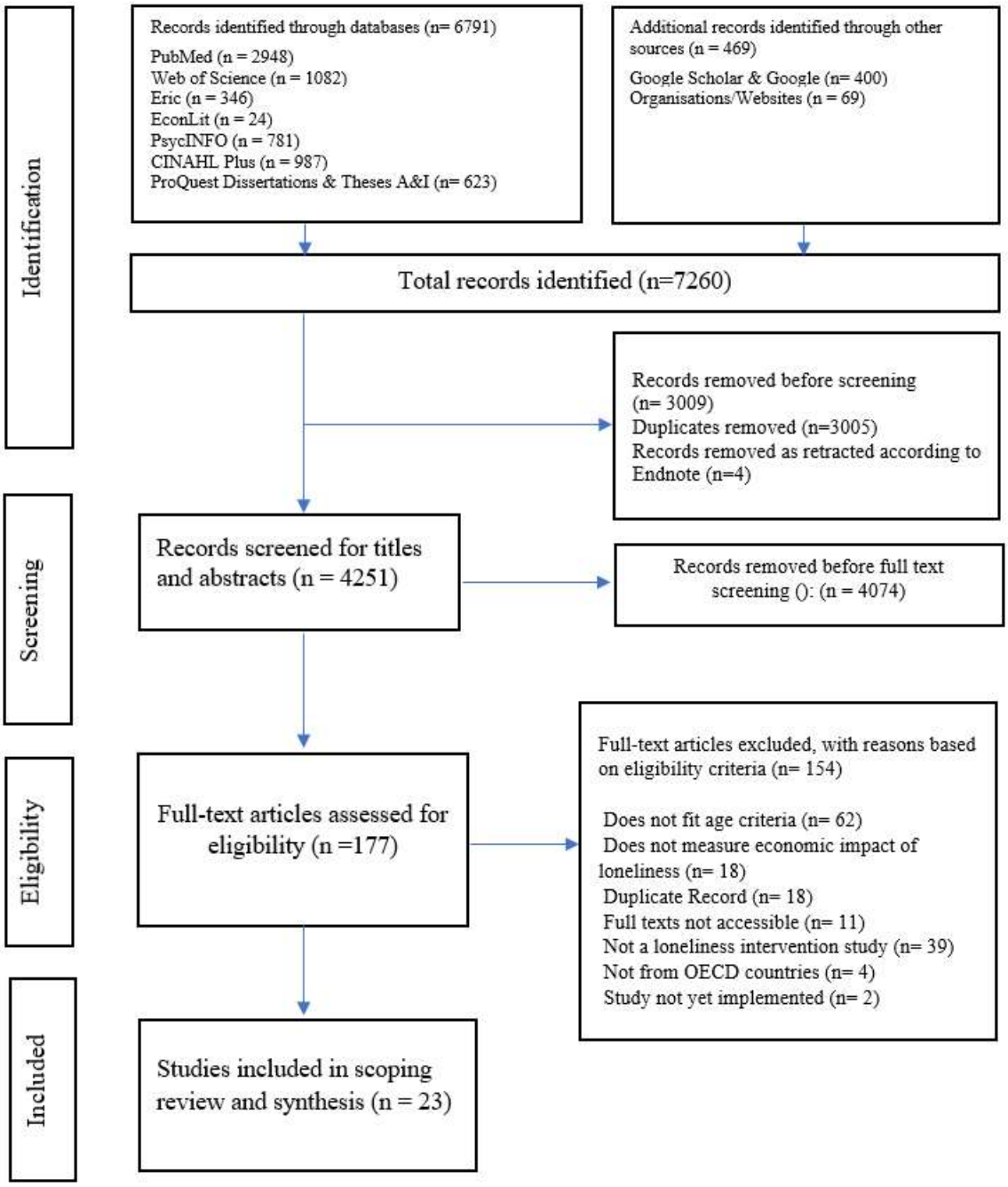
1. The concept of loneliness is specifically mentioned in the title and/or abstract and is defined in the text as the subjective perception that intimate and social needs are not being met (Courtin & Knapp, 2017; de Jong-Gierveld, 1998; Houghton et al., 2021; Penning et al., 2014; Wigfield et al., 2022). Examples of expected measures for loneliness include the 11-item de Jong Gierveld Loneliness Scale (de Jong-Gierveld & Kamphuls, 1985), the 20-item Revised University of California at Los Angeles Loneliness Scale (R-UCLA) (Russell, 1996), the shortened versions of R-UCLA, including 11-item (Lee & Cagle, 2017), 8-item (Roberts et al., 1993; Wu & Yao, 2008), 6-item (Neto, 2014; Wongpakaran et al., 2020), and 3-item versions (Hughes et al., 2004). We also considered single-item measures that directly asked individuals whether they are feeling lonely or not (Elovainio et al., 2017; Newmyer et al., 2022; Raymo & Wang, 2022; Valtorta, Kanaan, Gilbody, & Hanratty, 2016).
2. Loneliness is the independent variable for studies measuring economic impact and the dependent variable for studies measuring interventions.
3. Studies that reported the effect of loneliness on economic outcome measure (e.g., labour market outcome, education, healthcare expenditures).
4. Studies that focused on strategies or interventions implemented to reduce loneliness among young adult populations.
5. Research participants between 15 and 35 years of age, using Statistics Canada's classification: 15-20 years, 20-24 years, 25-29 years, 30-35 years; see Statistics Canada (2019). When data on age was not explicitly reported in a study, studies were only included if it was clear that the sample comprised of a population group that would meet our age criteria (e.g., Norwegian upper-secondary students) (Morin, 2022).
6. Study conducted in any OECD countries.
7. Peer-reviewed articles or grey literature.
8. Studies published in the past ten years (January 2012 to June 2022).
9. Written in English or French.

We excluded results that were focused on social isolation or living alone, those that did not report the main outcome-of-interest (i.e., association between loneliness and economic outcome measure) and did not report original data (e.g., review or protocol registration articles). The screening team consisted of two trained research assistants (ES, BW) and the PI (AB), additionally the PI cross-checked results from each screener to mitigate human error. Team meetings were held to deliberate conflicts and were resolved through consensus. Studies that did not meet the criteria were excluded, with reason for exclusion documented. The Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) were followed during this stage (Page et al., 2021). Figure 1 illustrates the selection process of this scoping review, including reason for exclusion.

Step 4 & 5: Data extraction, charting, summarizing, and reporting

Data were extracted using the citation management software, EndNote20. Results were presented in a tabular form in Microsoft Excel. Standardized data were extracted from each study that met the inclusion criteria, including title, author, year of publication, grey literature or peer-reviewed article, language of publication, study design, country, sample size, age, ethnicity, gender status, area of residence, key predictor variable, outcome variable, study categorization (loneliness-economic outcome or loneliness-intervention study), loneliness measurement tools, economic measures, intervention category, intervention delivery modes, intervention structure, and main findings. The findings from the included studies are categorized according to emerging narrative themes based on the research question.

Figure 1. PRISMA flow diagram of study selection



4.0 Results

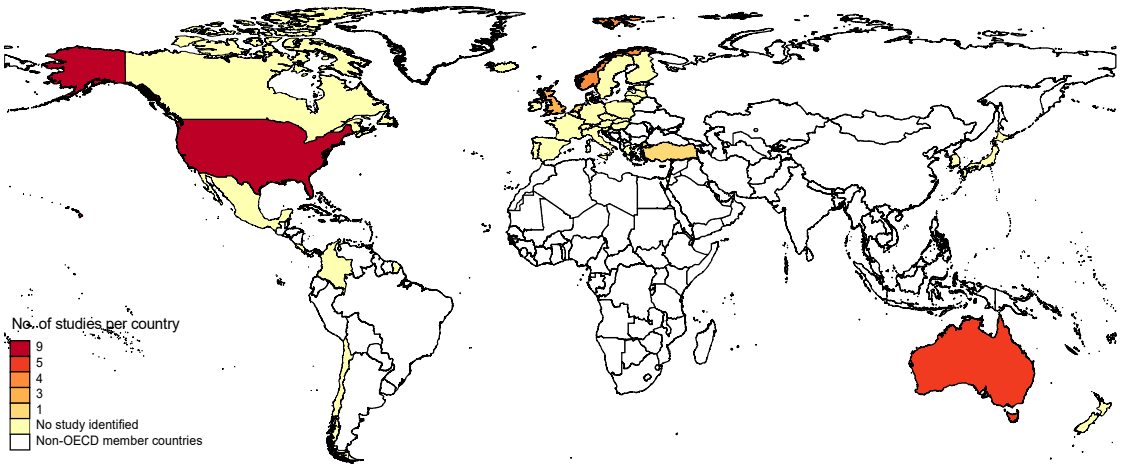
Our search yielded 7,260 results. After removing 3,009 duplicates, 4,251 results remained for title and abstract screening. Following title and abstract screening, 177 results were considered for full-text review. A total of 23 papers met our criteria and were selected for inclusion. Table 2 provides an overview of the characteristics of included studies.

Table 2. Overview of the characteristics of all studies (N=23)

	No.	%
Year of publication		
2012	2	8.7
2013	1	4.3
2016	1	4.3
2019	3	13
2020	5	21.7
2021	6	26.1
2022	5	21.7
Country		
Australia	5	21.7
Netherlands	1	4.3
Norway	4	17.4
Turkey	1	4.3
United Kingdom	3	13
United States	9	39.1
Reference type		
Journal article	20	87
Thesis	3	13
Language		
English	23	100
French	0	0
Study design		
Mixed methods	3	13
Qualitative	1	4.3
Quantitative	19	82.6
Loneliness measurement tools		
UCLA Loneliness Scale Version 3	8	34.8
R-UCLA Loneliness Scale short form	4	17.4
R-UCLA Loneliness Scale (20-item)	2	8.7
LSDQ-Norwegian (6-item)	2	8.7
R-UCLA Turkish	1	4.3
Loneliness Scale Norwegian	1	4.3
SELSA	2	8.7
LACA (48-item)	1	4.3

Projective Technique	1	4.3
Self-created (3-item)	1	4.3
Sample size		
0 - 100	9	39.1
100 - 200	5	21.7
200 - 300	3	13.0
300 - 400	1	4.3
400 - 3500	5	21.7
Study objective		
Loneliness-economic impact study	6	26.1
Loneliness intervention study	17	73.9
Economic dimension (n=6)		
Education	2	33.3
Education, Labour market outcomes, Health service utilization	2	33.3
Health service utilization	2	33.3
Category of intervention (n=17)		
Psychology based	6	35.3
Psychology based & social support	2	11.8
Psychology based & skills development	1	5.9
Skills development	2	11.8
Social support	4	23.5
Stress management	2	11.8
Gender identity reported		
No	2	8.7
Yes	21	91.3
Ethnic/racial identity reported		
No	8	34.8
Yes	15	65.2
Urban rural place of residence reported		
No	15	65.2
Yes	8	34.8
Data collected prior COVID-19 pandemic		
No	5	21.7
Yes	16	69.6
Unknown	2	8.7

Figure 2. Map of included studies

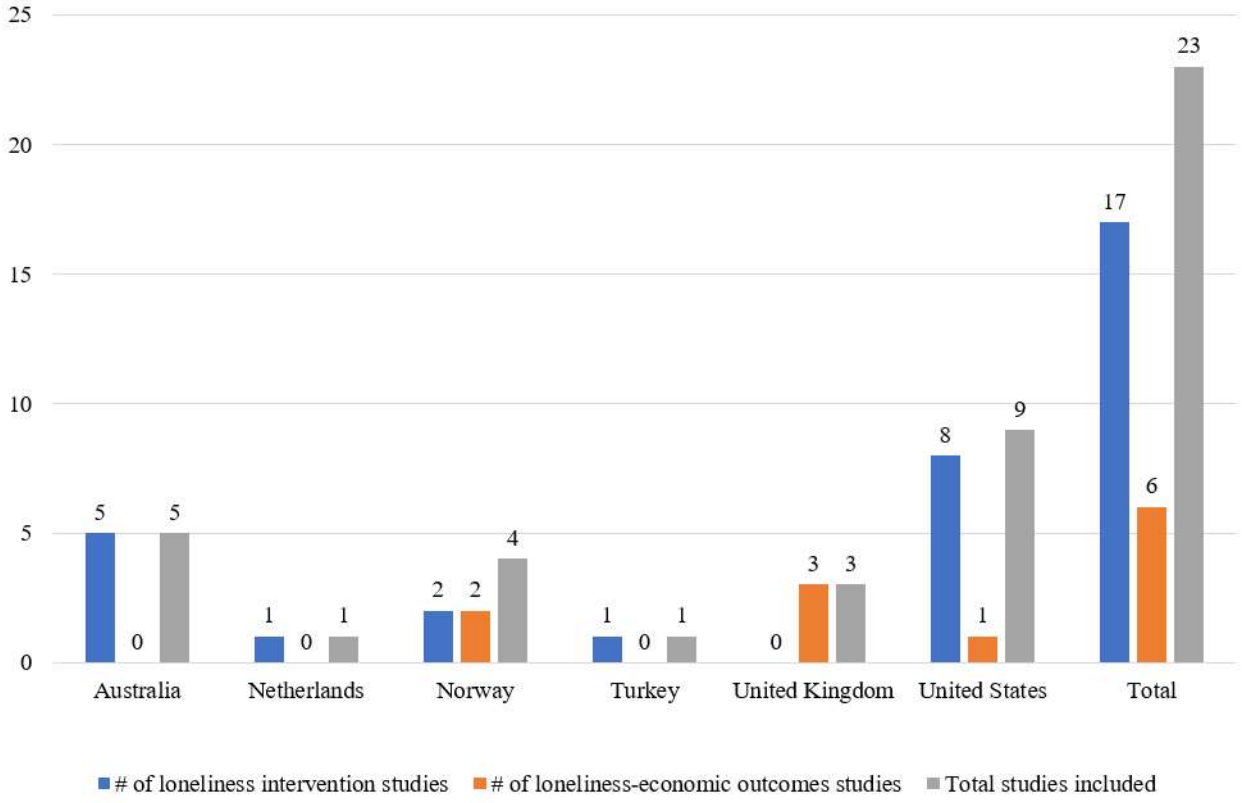


Note: Geographical location of studies on economic impacts of loneliness and interventions targeting loneliness among young adults in OECD countries, January 1st, 2021- June 30th, 2022.

4.1 Country of studies

Studies in this project feature populations from six different OECD countries: United States, Australia, Norway, United Kingdom, Netherlands, and Republic of Turkey. This project did not identify any Canadian studies. Six studies examined the direct impact of loneliness on economic outcomes in three different countries, including the United Kingdom (3/6, 50%), Norway (33%) and the United States (17%). The number of intervention studies (74%) included in this project nearly tripled that of the loneliness-economic outcome studies, as demonstrated in Figure 3. The 17 intervention studies took place in five different countries: United States (47%), Australia (29%), Norway (12%), Netherlands (6%), and Republic of Turkey (6%). See Figure 2 for the geographic distribution and Figure 3 for a bar chart stratified by countries of the studies in this project.

Figure 3. Number of included studies by country



Note: Number of included studies by country stratified study type; loneliness intervention study or loneliness-economic outcome study among young adults in OECD countries, January 1st, 2021- June 30th, 2022.

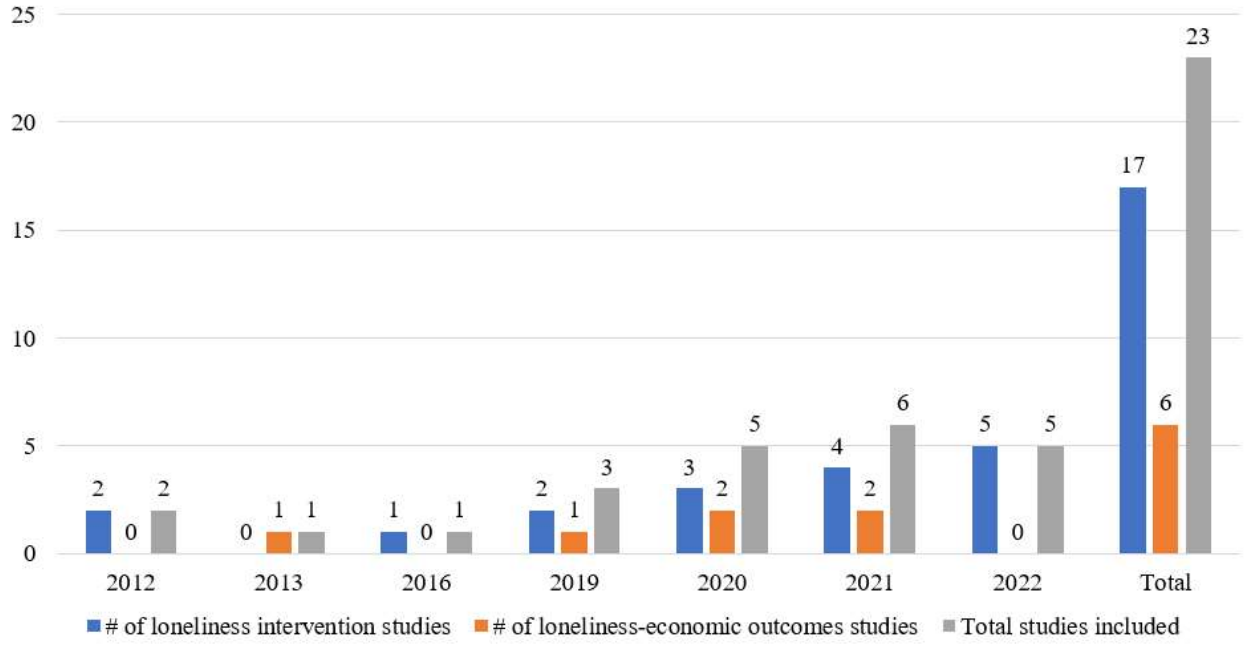
4.2 Publication year

This project examined articles published over the past ten years (January 2012 and June 2022). There were no loneliness-economic impact studies published in 2012, the first study was published in 2013, followed by 1, 2, and 2, in 2019, 2020, and 2021, respectively. Loneliness intervention studies published ranged from 2 in 2012 to 5 in 2021. Over time there has been an increasing trend in loneliness research as demonstrated in Figure 4.

4.3 Study design and objective

Of the 23 studies included, 20 (87%) are peer-reviewed articles, and three (13%) are grey literature documents. The 20 peer-reviewed articles are comprised of one (5%) qualitative, three (15%) mixed methods and 16 (80%) quantitative studies. Grey literature consists of three theses, all of which used quantitative methods. In this project, we identified six (26%) studies aimed to investigate the association between loneliness and economic outcomes, where the remaining 17 (74%) studies were focused on targeting loneliness via interventions.

Figure 4. Number of included studies by year of publication



Note: Number of studies by publication year stratified by study type; loneliness intervention study or loneliness-economic outcome study among young adults in OECD countries, January 1st, 2021- June 30th, 2022.

4.4 Characteristics of study sample

Data on gender, ethnicity/race and area of residence are reported in 91% (21/23), 65%, and 35% of all studies, respectively. Some studies utilized broad age ranges, such as 18-31 years old (Lim, Penn, et al., 2020) while some confined its study population to a single age (e.g., 18 years old) (Matthews, Danese, et al., 2019). From gender data reported, women represented 25% to 82% of study participants. Further, 13% of studies noted non-binary participants, and one (4%) study noted the inclusion of gender queer/non-conforming and trans people, with the proportion of gender diverse participants ranging from 1% to 4% among studies that collected gender diversity related data. Caucasian participants comprised a large (86%) proportion of the collective study samples that reported race. In terms of area of residence reported (35%), most included urban regions. Three studies (16%) utilized nationally or regionally representative samples, likely comprising of both urban and rural regions. Study sample sizes were wide-ranging, the lowest study sample size was 12 and highest 3,116 participants. Over a third (40%) of studies included had a sample size below 100 participants, 22%, 13%, 4% and 22% had sample sizes of 100-200, 200-300, 300-400 and 400-3,500, respectively. Sample sizes were generally larger among loneliness-economic impact studies, where smaller sample sizes were among intervention studies. Close to 70% of studies reported findings from data collected prior to COVID-19 pandemic. See Appendix 2 for a detailed breakdown of study characteristics.

4.5 Measurements of loneliness

Several tools were used to measure loneliness. Most studies used a derivative of the University of California, Los Angeles (UCLA) Loneliness Scale (Russell, 1996). The most popular UCLA

derivative was the UCLA Loneliness Scale-Version 3 (8/23, 35%). Followed by the Revised-UCLA (R-UCLA) Loneliness Scale (9%), shortened versions of the UCLA Loneliness Scale (17%), Social and Emotional Loneliness Scale for Adults (SESLA) (9%), Loneliness and Social Dissatisfaction Questionnaire (LSDQ) Norwegian adapted (9%), Loneliness and Aloneness Scale for Children and Adolescents (LACA) scale (4%) and a Norwegian adapted Loneliness Scale (4%). The remainder (13%) of the studies used self-developed techniques to measure loneliness (Besse et al., 2022; von Soest et al., 2020). von Soest et al. (2020) compared different measures of loneliness using an indirect measure (emotional and social, as measured by a shortened versions of the UCLA Loneliness Scale) as well as a direct measure (single-item question) to quantify a variety of loneliness-economic implications and found varying results dependent on the measurement tool. See Table 3 for a complete overview of the loneliness measurement tools used per study.

Table 3. Loneliness measurement tools used in studies (N=23)

Measurement tool	**Original Author**	**Description**	**Citations**
UCLA Loneliness scale, version 3 (n=8)	Russell (1996)	20-item scale measuring emotional and social loneliness. 11 statements negatively worded (lonely) and 9 positively worded (non-lonely). Response options fell on a 4-point Likert scale: 4 “I never feel this way” to 1 “I often feel this way.”	(Cruwys et al., 2021; Iyer et al., 2022; LeBlanc, 2019; Lim, Gleeson, et al., 2020; Lim, Penn, et al., 2020; Lim et al., 2019; Matthews, Danese, et al., 2019; Smith, 2021)
R-UCLA Loneliness scale, short form (n=4)	Russell et al. (1980)	8-, 6-, and 4-item scales equally measuring emotional and social loneliness on 4-point scale, derived from the R-UCLA scale.	(Bruehlman-Senecal et al., 2020; Cruwys et al., 2022; Hahn, 2021; von Soest et al., 2020)
R-UCLA Loneliness scale (n=2)	Russell et al. (1980)	20-item scale measuring emotional and social loneliness. 10 items are positive statements and 10 negative statements on emotions and thoughts related to social relationships Each item is rated on a 4-point scale ranging from 1 (never) to 4 (often).	(Loucks et al., 2021; Mattanah et al., 2012)

R-UCLA Loneliness scale, Turkish version (n=1)	Russell et al. (1980)	20-item scale, 10 items are positive statements and 10 negative statements on emotions and thoughts related to social relationships. Response options were on a Likert scale from 4 "I never feel this way" to 1 "I often feel this way." This scale (R-UCLA, 1980) used was translated to Turkish by Demir (1989).	(Yildiz & Duyan, 2022)
Adapted scale based on the modified Norwegian version of the LSDQ (n=2)	Asher et al. (1984),Valås (2001)	6-item scale covering lack of social participation with peers in school, feelings of social isolation and loneliness measured on a 6-point scale ranging from 1 (absolutely not true) to 6 (absolutely true).	(Fandrem et al., 2021; Morin, 2022)
SELSA (n=2)	DiTommaso and Spinner (1993)	37-item scale that measures romantic, and familial emotional loneliness measured on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree).	(Gantman et al., 2012) (McVey et al., 2016)
Norwegian adapted Loneliness Scale (n=1)	Derived from Mittelmark et al. (2004)	6-item scale measured on a 5-point scale ranging from not at all (1) to 5 (very much).	(Larsen et al., 2021)
LACA (n=1)	Marcoen et al. (1987)	48-item multidimensional measure of loneliness with 4 subscales (12 items each) measuring family loneliness (LACA-Parents), (b) peer-related loneliness (LACA-Peers), (c) aversion to aloneness (LACA-Negative), and (d) affinity for aloneness (LACA-Positive) measured on a 4-point scale ranging from never (1) to often (4).	(Qualter et al., 2013)
Qualitative projective technique (n=1)	Boddy (2020)	Participants were asked to complete a speech and thought bubble drawing. Participants and researchers discussed written comments.	(Boddy, 2020)

Self-created (n=1)	Besse et al. (2022)	3-items: "How lonely did you feel in the past week?"; "How long did the loneliness last?"; and "How intense were your feelings of loneliness?" Response options for each question fell on a 7-point Likert scale.	(Besse et al., 2022)
Single direct measure of loneliness (n=1)	von Soest et al. (2020)	Participants were asked to respond to the item, "I feel lonely" on a 4-point Likert scale from "never" to "often."	(von Soest et al., 2020)

4.6 Studies on the impact of loneliness on economic outcomes and key economic dimensions identified

This project identified six studies (6/23, 26%) that examined the economic impact of loneliness. These studies were grouped based on the impacted sector and context; therefore, economic outcome dimensions included education, health services utilization, and labour market outcomes. For instance, education included highest level achieved and attainment, intention to dropout, and dropout rates. Labour market outcomes encompassed several indicators pertaining to an individual's ability to participate in the labour market ranging from indirect to direct measures such as career optimism, job searching activities, and annual income. Lastly, health service utilization comprised of indicators such as general practitioner utilization, mental health service visits, and antidepressant prescriptions. This project generally found loneliness to have a negative impact on all economic outcomes (Boddy, 2020; Fandrem et al., 2021; Matthews, Danese, et al., 2019; Qualter et al., 2013; von Soest et al., 2020). A few studies reported non-significant findings (Matthews, Danese, et al., 2019; Smith, 2021; von Soest et al., 2020). Matthews, Danese, et al. (2019) tested loneliness against multiple different economic outcomes; and found non-significant findings reported between loneliness and practical skills for job preparedness and effort to seek employment. Smith (2021) found loneliness unrelated to university/community service utilization. von Soest et al. (2020) found social and emotional loneliness to not be associated with education, employment, and antidepressant prescriptions. See Table 4 for a detailed breakdown of economic indicator measures and key findings.

Table 4. Summary of economic indicator measures and main study findings of loneliness on economic outcomes

Author (year)	Economic dimension	Economic indicator measure	Main finding
Fandrem et al. (2021)	Education	Intention to quit education: assessed students' serious considerations about dropping out of school using 5 questions (e.g., "I often consider quitting school," "I really feel that I am wasting my time in school," "I have concrete plans to quit school").	Loneliness could be a serious risk factor intentions to quit upper-secondary schoo and the association between loneliness a intentions to quit was stronger for first-generation immigrant students than Norwegian born students.
Boddy (2020)	Education	Intentions to quit education: participants describe their external (speech) and internal (thoughts) reasons for intending to quit university in empty speech and thought bubbles. In combination with an interview about the written comments followed.	Loneliness was considered a common re students considered leaving. Loneliness students' internal response for intending leave university, however, they were less likely to verbalize this intention.
von Soest et al. (2020)	Education	Highest level of education: national registered data were used to obtain information about respondents' highest level of education at age 35, with categories ranging from 1 (junior high school or lower education) to 5 (higher university degree).	A direct measure of loneliness was negatively associated with education (e.g higher loneliness levels predicted lower levels of education). Emotional and soci loneliness was not significantly associate with education outcome.
	Labour market	Income: registered data were used to compute mean annual income from age 32 to age 35. Income was then recorded into 10 equally sized groups ranging between 0 (lowest income) and 1 (highest income).	A direct measure of loneliness, emotiona and social loneliness were all negatively associated with income (e.g., higher loneliness levels predicted lower levels o income).

		Unemployment status: a dummy variable was created to indicate whether respondents had received social or unemployment benefits when they were between 32 and 35 years.	A direct measure of loneliness was positi and significantly associated with higher midlife unemployment. Emotional and s loneliness was not significantly associate with unemployment.
	Health service utilization	Prescription of antidepressants: national registered data were obtained about whether respondents had been prescribed antidepressants at least once when they were between 32 and 35 years old.	A direct measure of loneliness was associated with higher midlife antidepres prescription use. Emotional and social loneliness was not significantly associate with prescriptions of antidepressants.
Matthews, Danese, et al. (2019)	Education	Education qualifications: data were obtained from the General Certificate of Secondary Education (GCSE), taken by UK students aged 14–15. Participants with no qualifications or GCSEs at grades D–G were coded as having low qualifications.	Lonelier participants had lower educatio qualifications by age 18.
	Labour market	Job preparedness: self-rating of professional and technical skills, e.g., writing and computer programming.	Lonelier participants rated themselves significantly lower in terms of their pers attributes (e.g., teamwork), but not their practical skills (e.g., computer programming).
		Career optimism: self-rated perceptions of participants' ability to get ahead in their careers.	Lonelier participants reported significant lower optimism about their ability to suc in life.
		Job search activities: total number of job-seeking activities participants have undertaken, e.g., applied for a job or looked at job vacancies pages.	Loneliness was not significantly associat with efforts to seek employment.

	Labour market/Education	Education or employment status: participants were asked to report whether they were currently employed or studying.	Lonelier participants were significantly m likely to be unemployed, or not in an education or training program.
	Health service utilization	Health care visits: participants were asked if they had seen a general practitioner, psychiatrist, counsellor, or psychotherapist for mental health problems in the past year.	Lonelier individuals were significantly m likely to have sought help for mental hea problems from a GP, psychiatrist, counse or psychotherapist for mental health problems in the past year.
Smith (2021)	Health service utilization	University/community service utilization: "Have you sought help for mental health or emotional challenges since attending your University/College?" Participants who indicated they did not utilize services were asked about reasons why participants did not use available services. If participants selected yes, they asked if they "...received help from any of the following services for mental health or emotional challenges in the last 12 months."	Loneliness was not related to health serv utilization, but participants with high lev of loneliness reported more barriers to ca
Qualter et al. (2013)	Health service utilization	General practitioner utilization and frequency: (1) "How would you describe your health generally?" (2) "When did you last consult your GP about your own health, other than for a check-up required for work or insurance, or for a vaccination?" (3) "If you had a consultation with your doctor or with a specialist within the last year, how many consultations did you have?"	Loneliness was significantly associated w increased general practitioner utilization, frequency of doctors' visits and reported concerns about health status.

4.6.1 Education

Four economic-impact studies examined the impact of loneliness on education and generally found loneliness to negatively impact education as an economic outcome. A Norwegian study found loneliness associated with intention to dropout of post-secondary education, with the association being stronger among first-generation immigrants (Boddy, 2020; Fandrem et al., 2021). Boddy (2020) qualitative study revealed that among United Kingdom students, loneliness was not described as an initial reason for leaving university, but it is evident through projective interviewing techniques that loneliness played a role in a student wanting to leave university. Consistent with these findings, Matthews, Danese, et al. (2019) reported lonely young adults to be at greater risk of not being enrolled in post-secondary or having low qualifications. Lastly, von Soest et al. (2020) reported a direct measure of loneliness to be negatively associated with educational attainment, meaning higher loneliness was associated with lower education. von Soest et al. (2020) did not find an association between emotional and social loneliness and education.

4.6.2 Labour market outcomes

Two economic-impact studies used longitudinal data measuring labour market outcomes and reported loneliness to adversely impact labour market outcomes (Matthews, Danese, et al., 2019; von Soest et al., 2020). More specifically, Matthews, Danese, et al. (2019) found a link between loneliness and unemployment, lower job market preparedness, and optimism regarding career advancement, however loneliness was not associated with employment seeking efforts. von Soest et al. (2020) found loneliness significantly associated with higher midlife unemployment when utilizing a direct measure, but no association was for emotional and social loneliness. Beyond employment status, von Soest et al. (2020) also found all measures of loneliness (direct, emotional, and social) to be associated with significantly lower income.

4.6.3 Health service utilization

Three economic-impact studies measured the impact of loneliness on health service utilization (Matthews, Danese, et al., 2019; Qualter et al., 2013; Smith, 2021). One study found loneliness was not linked to university and community health service utilization, however individuals with higher levels of loneliness reported greater barriers to accessing services (Smith, 2021). Matthews, Danese, et al. (2019) found lonely young adults more likely to utilize general practitioner, psychiatrist, counsellor, and psychotherapist services. Additionally, a greater frequency of doctor visits among lonelier individuals were reported by Qualter et al. (2013). One study found that a direct measure of loneliness resulted in higher antidepressant usage (von Soest et al., 2020).

4.7 Intervention studies targeting loneliness

This project identified 17 intervention studies targeting loneliness among young adults. Intervention categorization was based on study intent, theoretical underpinnings, and the intervention categorization outlined in previous reviews (Masi et al., 2010). The four categories include: psychology-based, social support, skills development, and stress management. Intervention studies were categorized as psychology-based if it used strategies focused on addressing cognition patterns through building on or adapting existing thought processes; social support if it aimed to decrease loneliness by facilitating social interactions or providing

companionship; and skills development if it included a variety of educational components and exercises to enrich practical, social, and emotional skills. Stress management departs from Masi et al. (2010) popularized categorization because rather than pre-emptively alleviating loneliness directly, stress management interventions aim to reduce the unpleasant emotional responses produced by loneliness (stress). This project identified six (35%) psychology-based studies, four (24%) social support, two (12%) skills development, and two (12%) stress management interventions. Note, three (18%) studies used multiple approaches with two comparing psychology-based approaches to social support, and one comparing psychology-based approaches with skills development. Intervention study characteristics varied in sample size, level of delivery (group or individual), mode of delivery (digital or in-person), length of intervention, and follow up period. Table 5 provides a summary of each intervention study.

Table 5. Summary of intervention studies to reduce loneliness among young adults (n=17)

Author (year)	No. of intervention arms & categories	Intervention subcategories & description	Level of delivery	Mode of delivery	Main finding
Bruehlman-Senecal et al. (2020)	1. Psychology based	Positive psychology, mindfulness-based self-compassion, and cognitive behavioral skill-building exercises: App, Nod, incorporates positive psychology, mindfulness, self-compassion, and cognitive behavioral skill-building exercises.	Individual	Digital (App)	There was no significant of Nod on overall sampl loneliness scores; howev participant who had heig baseline loneliness score showed significant bene Vulnerable groups engag the app more often.
Lim, Penn, et al. (2020)	1. Psychology based	Positive psychology: A group program based on promotion of positive emotion and social interactions.	Group	In-person	Loneliness decreased significantly compared t baseline scores.
Lim, Gleeson, et al. (2020)	1. Psychology based	Positive psychology: Gamified intervention promoting positive emotion and social interactions among individuals with psychosis by providing audio video material and a corresponding question.	Individual	Digital (App)	Loneliness scores decrea result, and most particip found the app feasible.
Lim et al. (2019)	1. Psychology based	Positive psychology: Gamified app that delivered daily positive psychology modules to improve relationship quality.	Individual	Digital (App)	Mean loneliness scores w significantly lower after intervention.
Loucks et al. (2021)	1. Psychology based	Mindfulness: Participants received mindfulness related practice recordings (e.g., meditation, yoga, self-awareness, attention control and emotion regulation).	Group	In-person	Loneliness scores after t interventions were signi lower than at baseline.

LeBlanc (2019)	1. Psychology based	Cognitive-behavioral skills: Negative affect treatment (NAT) modules that taught reappraisal, avoidance reduction.	Individual	Mixed[a]	Both PAT and NAT wer successful in reducing lo when compared to the co group.
	2. Psychology based	Cognitive-behavioral skills: Positive affect treatment (PAT) taught positive thinking and encouraged positive actions.			
Besse et al. (2022)	1. Psychology based	Mindfulness message: Participants received messages and instructions pertaining to mindfulness and scripted exercises.	Group	In-person	Participants in the mindf intervention felt most eq to deal with loneliness in future, compared to the c intervention groups.
	2. Psychology based	Changing maladaptive social cognition message: Participants received intervention based on reframing maladaptive social cognition through reading messages and reflection related to loneliness.			
	3. Skills development	Coping behaviors: Participants received messages focused on coping skills and behavioural strategies to manage loneliness.			
Cruwys et al. (2022)	1. Psychology based	Cognitive behaviour therapy: Cognitive behavioural therapy group.	Group	In-person	Loneliness significantly decreased for both interv groups; however, betwee and T4 the CBT group's loneliness scores stabiliz where the loneliness sco the psychohterapeutic gr based program continue decrease.
	2. Social support	Social identification: Psychotherapeutic group-based belonging program, G4H, focused on social identity.			

Cruwys et al. (2021)	1. Psychology based 2. Social support	Cognitive behaviour therapy: Cognitive behavioural therapy group. Social identification: Psychotherapeutic group-based belonging program, called Groups 4 Health (G4H), focused on social identity.	Group	In-person	Group based belonging t showed more promising for protecting loneliness the COVID-19 pandemi compared to the cognitiv behavioural therapy grou
Yildiz and Duyan (2022)	1. Social support	Group work: University students engaged in loneliness group work. Activities included reflections on their feelings of loneliness, relationships, and education on cognitive behavioural skills.	Group	In-person	Loneliness scores were significantly lower after intervention compared to baseline loneliness score
Morin (2022)	1. Social support	Social participation: VIP partnership universal prevention and promotion program for mental health.	Group	In-person	There was no significant of the VIP partnership p on loneliness scores.
Larsen et al. (2021)	1. Social support 2. Social support	Psychosocial school-based program: A universal school program involving staff and students as peer mentors in effort to promote social connection, belonging and mental health. The program relies on the peer leaders (single tier). In addition to the aforementioned intervention arm, this one includes the support of counselors, school nurses and follow-up services staff (multi-tier).	Group	In-person	There was no significant difference in loneliness p post-intervention.
Mattanah et al. (2012)	1. Social support	Social support: Social support group program discussing social relationships, balancing work, residential issues, and college life.	Group	In-person	Social support program w associated with lower lo scores.

McVey et al. (2016)	1. Skills development	Education and enrichment of relational skills: Social skills & etiquette training for individuals with Autism through didactic lessons, role-playing, behavioural rehearsal exercises, performance feedback and weekly socialization assignments.	Group	In-person	There was no significant in loneliness scores.
Gantman et al. (2012)	1. Skills development	Education and enrichment of relational skills: Social skills & etiquette training for individuals with Autism through didactic lessons, role-playing, behavioural rehearsal exercises, performance feedback and weekly socialization assignments.	Group	In-person	Loneliness significantly improved after the interv
Iyer et al. (2022)	1. Stress management	Stress management and social-emotional skills: Participants received a program called Heartfulness Self Care. Participants received advice on self-care activities (e.g., sleep, exercise) and guided practices focused on relaxation, meditation, affirmations, rejuvenations, and self-observe, positive mindset and goal setting strategies.	Group	Digital	Program significantly re loneliness scores in all r of United States with eff greatest among high sch seniors.
Hahn (2021)	1. Stress management	Vitality intervention: Self-made vitality intervention based on physical and mental relaxation exercises.	Individual	Digital	Level of loneliness was statistically different bet the pre- to post-test scor

[a] The primary focus for intervention delivery was through an App, however paper format was also offered.

4.7.1. Psychology based

This project identified six intervention studies aimed at reducing loneliness based on established psychological strategies. This project identified three positive psychology-based interventions (Lim, Gleeson, et al., 2020; Lim, Penn, et al., 2020; Lim et al., 2019), one cognitive-behavioral skills (LeBlanc, 2019) and one mindfulness (Loucks et al., 2021). The intention of the three positive psychology interventions by Lim et al. (2019), Lim, Penn, et al. (2020), and Lim, Gleeson, et al. (2020) was to promote positive emotions, and meaningfulness of existing relationships, and identifying inherent positive psychological trains. In two studies by Lim et al. (2019) and Lim, Gleeson, et al. (2020), interventions were delivered in-person and in a group setting for individuals who have been diagnosed with social anxiety and psychosis, respectively. Recognizing that technology could help those with a psychotic disorder in unique ways, Lim, Gleeson, et al. (2020) most recent study utilized a gamified app (+Connect) to deliver their positive psychology intervention to individuals diagnosed with a psychotic disorder. Lim, Gleeson, et al. (2020), Lim, Penn, et al. (2020); Lim, Gleeson, et al. (2020) reported positive results with lower loneliness scores post-intervention for all three studies. Bruehlman-Senecal et al. (2020) intervention study delivered a combination of positive psychology, cognitive behavioural and mindfulness strategies via an app that delivered skill building exercises such as social challenges, reflections, and written student testimonials and found the app to buffer loneliness. LeBlanc (2019) tested an app that delivered two opposing cognitive behavioural strategies, namely positive affect treatment (encouraged positive thinking and positive actions) and negative affect treatment (which taught reappraisal and avoidance reduction). Neither strategy was effective in combatting loneliness. One study examined the impact of mindfulness-based practices on loneliness. These mindfulness-based practices focused on various health components, such as awareness of diet, physical activity, sleep, alcohol use, stress, social relationships, social support, and performance. It was reported that the mindfulness-based intervention significantly lower loneliness scores compared to baseline scores (Loucks et al., 2021).

Three studies compared mixed intervention approaches, with two comparing a psychology-based intervention with social support (Cruwys et al., 2021; Cruwys et al., 2022), and one comparing two psychology-based strategies with an intervention arm focused on skills development (Besse et al., 2022). Cruwys and colleagues tested cognitive behavioural therapy against a psychotherapeutic group, called *Groups 4 Health* (G4H) (Cruwys et al., 2021; Cruwys et al., 2022). The cognitive behavioural therapy intervention arm relied on psychology-based strategies, where the psychotherapeutic group (G4H) focused on social identity. The first study conducted in 2021 found the G4H to be superior to the cognitive behaviour therapy group during the COVID-19 pandemic (Cruwys et al., 2021). In the 2022 article similar results were reported with the G4H program promoting significantly higher levels of resilience against loneliness when compared to the cognitive behaviour therapy group (Cruwys et al., 2022). Besse et al. (2022) compared two different psychology strategies (social cognition and mindfulness) and one skills development intervention (coping skills to manage loneliness). Study participants were grouped according to each intervention strategy and were provided with strategy-specific messaging. Out

of the three intervention strategies, mindfulness was the most successful in combatting loneliness (Besse et al., 2022).

4.7.2. Social support

The four social support intervention studies (24%) reported varying results, ranging from no effect (Larsen et al., 2021; Morin, 2022) to significant effects on loneliness (Mattanah et al., 2012; Yildiz & Duyan, 2022). Half (n=2) of the social support intervention studies included were designed to target the school environment with the goal to promote social inclusion among students (Larsen et al., 2021; Morin, 2022), and the other half (n=2) focused on using support group work to target loneliness among post-secondary students (Mattanah et al., 2012; Yildiz & Duyan, 2022). Larsen et al. (2021) designed a single- and multi-tiered school-based program to target the school environment with the goal to promote social connection, belonging and mental health among students (Larsen et al., 2021). The single tier was called the *Dream School Program (DSP),* which utilized peer mentorships to create programming, facilitate socialization, and aid lonelier students in coordination with trained teachers. The multi-tiered school-based program tested the combination of *DSP* and the *Mental Health Support Team (MHST). MHST* included trained counselors, school nurses, and follow up service staff to streamline student services to detect vulnerable students and increase service availability. Both versions of the school-based programs had no significant effect on loneliness scores (Larsen et al., 2021). Morin (2022) tested a school-wide *VIP partnership program* that incorporated both social promotion and preventative strategies, such as classroom social inclusion. The VIP program relied on trained teachers and partnered students to implement the program. Morin (2022) found the *VIP partnership program* to have no significant effect on loneliness scores. Contrary to the non-significant findings of the school-wide interventions, intervention studies that utilized support groups work strategies yielded positive results. For example, both Mattanah et al. (2012) and Yildiz and Duyan (2022) found supportive group work to significantly lower loneliness scores. The intervention study by Mattanah et al. (2012) consisted of group discussions on how to navigate certain aspects of life, for example social relationships, balancing work, residential issues, and college life. Yildiz and Duyan (2022) held group work sessions utilizing cognitive behaviour strategies, interpersonal relationships, and reflection on feelings towards loneliness, among others (Yildiz & Duyan, 2022). Whether this positive finding could be explained by the content delivered in the session or the social support received through camaraderie is unclear (Yildiz & Duyan, 2022).

4.7.3. Skills development

Two skills development intervention studies (12%) tested the same intervention program, the *Program for the Education and Enrichment of Relational Skills (PEERS)* (Gantman et al., 2012; McVey et al., 2016). *PEERS* is a program focused on teaching social skills and etiquette training to autistic youth — the primary goal being to enrich autistic youth's relational skills to promote social connection and retention of friendships (Gantman et al., 2012; McVey et al., 2016). Contradictory results are evident when comparing the results from these two studies (Gantman et al., 2012; McVey et al., 2016). Gantman et al. (2012) found significantly lower loneliness scores reported post-intervention among a small population (n=17), however (McVey et al., 2016) did

not find a significant difference in loneliness scores when utilizing a larger sample population (n=56). Cohort characteristics between study samples were not comparable and may partially explain the difference in study results (McVey et al., 2016).

4.7.4. Stress management

Our project identified two (12%) stress management intervention studies (Hahn, 2021; Iyer et al., 2022). Hahn (2021) study attempted to manage stress through five-minute physical exercise videos at varying individualized intensities each morning and mental relaxation exercises performed before bed (Hahn, 2021). This intervention did not significantly decrease loneliness scores; however, Hahn (2021) acknowledges that the intervention length may have been too short (7 days) to have a statistically significant impact on loneliness scores. A study by (Iyer et al., 2022) developed an intervention using stress management strategies, called the *Heartfulness Self-Care program.* The *Heartfulness Self-Care program* was a self-guided digital intervention, which incorporated webinars and daily activities pertaining to managing loneliness-related stress and reducing loneliness through socio-emotional means (Iyer et al., 2022). The *Heartfulness Self-Care program* yielded promising results with significantly lower loneliness scores reported post-intervention compared to pre-intervention (Iyer et al., 2022).

5.0 A review of key projections from the literature on loneliness

5.1 Strengths of existing research

Most studies (70%) were published in the past three years, signifying an increased interest in research on the economic impacts of loneliness. The COVID-19 pandemic may have increased interest in this research area, with an annual increase in youth loneliness studies published since 2019. Loneliness research has recently been more inclusive of diverse gender identities, with diverse gender identities first reported by LeBlanc (2019) in 2019 and 17% of studies included in this review reporting gender variant identities. Yet, more work is needed to ensure research is accurately representing diverse populations and identities. Most studies utilized a standardized definition of loneliness, and distinguished it from social isolation, which has previously been noted as a common concern for researchers in this area (Valtorta, Kanaan, Gilbody, Ronzi, et al., 2016; Wigfield et al., 2022). Over half (65%) of the studies included used a variant of the UCLA loneliness scale, which is a validated and common tool to measure loneliness (Alsubheen et al., 2021). The current data on the economic impact of loneliness suggests indicators across domains are being analyzed. Intervention studies targeting loneliness used a variety of theoretical, methodological approaches, and institutional settings, such as secondary schools, universities, and community mental health services. Existing evidence demonstrates the importance of analyzing contextual factors that influence loneliness like institutional setting to create feasible interventions. Overall, the included studies provide a preliminary understanding of the mechanisms that play a role in loneliness among young adults.

5.2 Gaps within existing research

This project revealed a significant lack of Canadian literature on the economic impact of loneliness or interventions to alleviate loneliness for young Canadians (<35 years). This project was unable to identify a single study within the Canadian context, thus it could be implied that

the economic impacts of loneliness for young Canadians has not yet been researched. Further, the interaction between potential compounding factors such as area of residence, gender status, ethnicity and socioeconomic backgrounds remain largely unexplored demographics for future research. Understanding the experiences of loneliness and its economic impacts for vulnerable populations in Canada, such as Indigenous Peoples, is one step closer to finding our way to achieving an equitable society. Additionally, the population characteristics of both intervention and economic impact studies were relatively homogenous, with limited attention to participants rural regions, LGBTQ+ communities, and minority populations. Therefore, there is a significant gap in stratified or group-specific economic impact research and a lack of interventions proven to meet the diverse needs of lonely individuals.

Our project only identified two longitudinal studies (Qualter et al., 2013; von Soest et al., 2020), hence there is a lack of studies identifying the economic impacts of loneliness and underlying mechanisms at play over a life course. A variety of measures have been employed to measure loneliness, variations in measurement tools make it difficult to extrapolate data and make accurate comparisons across research studies. Studying loneliness across populations requires robust scales to capture individual and cultural differences. For example, researchers have utilized adapted scales such as the R-UCLA scale Turkish version and the LSDQ-Norwegian version to suit the specific linguistic and cultural context in which the study takes place (Fandrem et al., 2021; Morin, 2022; Yildiz & Duyan, 2022). The UCLA has been translated into many languages and applied across several populations and countries (Alsubheen et al., 2021). Alsubheen et al. (2021) recommend that future research investigates the responsiveness, cross-cultural and criterion validity of the UCLA.

The current economic indicators measuring the impact of loneliness lack both depth and breadth. Most studies utilized single indicators. Studies that utilized multiple indicators revealed more complex interactions between loneliness and economic outcomes. There is a need for comprehensive or integrated indicators, that can measure broad societal costs (e.g., losses of productivity, and quality of life) attributed to loneliness so that we can accurately calculate the true social and economic cost of loneliness. This project did not find any studies that applied a cost-benefit or cost-effectiveness approach, nor were study results socioeconomically stratified. While there are interventions that reported promising results, study findings were likely compromised by factors such as small sample size and short study duration.

6.0 Implications and discussion

6.1 Policy implications

- Effective interventions to address loneliness among young people require an integrated approach and multilevel partnerships. All levels of governments (federal, provincial, and local) need to collaborate with different organizations and communities to lessen the impact of loneliness among young Canadians.
- It is pertinent to appoint a high commissioner of loneliness to coordinate actions. The United Kingdom has appointed a minister of loneliness, who is responsible for coordinating actions, developing policies, and working across agencies and ministries to

holistically reduce loneliness (United Kingdom Government Department for Digital, 2021).

6.2 Practice implications

- Current research supports the effectiveness of several intervention programs to decrease loneliness at varying degrees. Broadly synthesized, psychology-based interventions consistently showed positive results. Social support interventions delivered in smaller group settings showed more promising results compared to social support interventions delivered in larger school settings. Stress and skills management interventions showed differing results.
- Both in-person and digital delivery intervention methods showed positive results, however, it is important to recognize existing accessibility barriers to both methods and find unique ways to address those barriers to increase program uptake. Given our lack of knowledge, more research is needed on decreasing accessibility barriers for those seeking to alleviate loneliness.
- It is important to recognize that digital interventions can be useful in reframing perspectives and thought processes related to loneliness but may not be sufficient in targeting chronic loneliness.
- Most intervention studies were limited to the educational sector, which suggests the need for interventions that incorporate a variety of sectors, as well as promote a cultural shift to inspire social connection.

6.3 Research implications

- There is an urgent call for research to investigate the mechanisms through which loneliness affects the direct and the indirect economic outcomes within Canada.
- The design and implementation of a Canadian longitudinal study can address our gap in knowledge on the effects of loneliness across the life course and economic consequences linked to loneliness among young Canadians. Government bodies at various levels (e.g., SSHRC) can play a role in this by funding research/intervention programs. Further supporting loneliness research will help inform best-practices and policies to manage the increase of loneliness exacerbated by the COVID-19 pandemic.
- There is a need to mobilize existing data to see the big picture and develop surveys using standardized tools to measure loneliness (more than a direct question about how often the respondent feels lonely) and economic outcome indicators. The use of standardized tools will enable professionals to monitor the current state of loneliness, as well as trends, and patterns across regions in Canada, jurisdictions, or study findings.

7.0 Conclusion and future directions for research

Overall, this scoping review shed light on a paucity of knowledge on economic impact of loneliness among youth, as well as the empirically validated interventions to alleviate loneliness. While the literature provides some evidence affirming the economic impact of loneliness, there are significant gaps, and thus areas for future research. Similarly, a variety of theoretical and practical approaches have been utilized to alleviate loneliness, with varying levels of

effectiveness. Future research on alleviating loneliness in youth should be grounded in a knowledge of the current theoretical understanding of loneliness. Notably, the conceptual difference between social isolation and loneliness and the different manifestations of loneliness across the life course. Root causes of loneliness are different for everyone, for example some individuals may lack social skills, whereas some individuals may lack opportunities to socialize, therefore multiple interventions targeting specific causes and underpinnings are needed.

Additionally, this review revealed the need for consistent use of measures to assess the economic impacts of loneliness. A lack of uniformity makes it difficult to accurately compare study results and findings. Various measurement tools, indicators, and data sources were utilized to create a patchwork depiction of youth loneliness. Given the current state of the literature, a comprehensive understanding of loneliness and its economic dimensions among young adults cannot be derived. The current domains referenced in the limited number of loneliness-economic impact studies are education, labour market outcomes, and health service utilization. Of the existing intervention studies, none provided a cost-benefit analysis of alleviating loneliness, nor did any intervention seek to alleviate the economic impact of loneliness. However, it is evident that a variety of approaches are currently being considered to alleviate both the causes and results of loneliness. Future loneliness-intervention research should analyze and categorize intervention impacts and feasibility according to return on social and economic return on investment. Finally, to understand loneliness among young Canadians, it is necessary to analyze the changing patterns and implications of loneliness and coordinate national initiatives.

8.0 Knowledge mobilization activities

This knowledge synthesis has several target audiences, including researchers, policy makers, and educational stakeholders. This project has promoted an increased engagement in knowledge production, not only related to stated primary outcomes (SSHRC report and evidence brief), but also to more conventional academic modes of presentation and publication. For example, preliminary findings have been presented at KSG — Emerging Asocial Society — Forum (Virtual Panel Sessions) in November 2022. The sessions have been organized by SSHRC and Employment and Social Development Canada to facilitate networking and connection-building between researchers and multi-sectoral stakeholders, and it is hoped that these sessions may lead to the development of new research agendas and collaborations. Another significant benefit is that this project served as a support for two undergraduate students and an emerging scholar in her early teaching and research career to identify the gaps and develop research about the economic implications of loneliness. Outputs generated from this project will be used in educating both our university's undergraduate and graduate students who will benefit from the comprehensive synthesis of the current academic and policy work in this area.

Further, our goal is to have review findings presented to multidisciplinary audiences of academics and scholars (e.g., Canadian, and international) to encourage wide dissemination of project findings. Our team has derived a poster that has been accepted for presentation to the 2023 Canadian Population Society Conference. A proposal has been submitted to the Canadian Rural Revitalization Foundation Conference and a presentation in the Prentice Institute speaker

series. In addition, a protocol will be submitted to an academic journal, and a manuscript will be written from the findings and submitted to a relevant peer-reviewed, open access journal to promote accessibility of the project findings. The goal of presenting the project findings in various formats and settings is to encourage wide dissemination and uptake of findings.

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10.0 Appendices

10.1. Appendix Table 1 – Search Strategy: Search string used for PubMed and adapted for other electronic databases

	PubMed
Search	Query
#1	((loneliness[MeSH Terms] OR lonel*[All Fields] OR lonely[All Fields] OR disconnectedness[All Fields] OR "emotional loneliness"[All Fields] OR "perceived social isolation"[All Fields] OR sobering[All Fields] OR “social isolation”[MeSH Terms] OR “social isolation”[All Fields] OR “social loneliness”[All Fields] OR solitude[All Fields] OR “subjective social isolation”[All Fields]) AND (“young adult”[MeSH Terms] OR “young adult*”[All Fields] OR young[All Fields] OR youth[MeSH Terms] OR adolescent[MeSH Terms] OR adolescent*[All Fields] OR “young adulthood”[All Fields] OR “emerging adulthood”[All Fields] OR teenager[MeSH Terms] OR teenage[MeSH Terms] OR teen[MeSH Terms]) AND (absenteeism[MeSH Terms] OR “cost consequence*”[All Fields] OR “cost of living”[MeSH Terms] OR “cost of living”[All Fields] OR cost[MeSH Terms] OR cost[All Fields]OR debt[All Fields] OR “doctors visit”[All Fields] OR “drug costs”[MeSH Terms] OR “drug costs”[All Fields] OR earnings[All Fields] OR economic[MeSH Terms] OR economic*[All Fields] OR “economic conditions”[MeSH Terms] OR “economic conditions”[All Fields] “economic status”[MeSH Terms] OR “economic status”[All Fields] OR “economic burden”[MeSH Terms] OR “economic burden”[All Fields] OR “economic costs”[All Fields] OR “economic evaluation*”[MeSH Terms] OR “economic evaluation*”[All Fields] OR “economic hardship”[MeSH Terms] OR “economic hardship”[All Fields] OR “economic model*”[MeSH Terms] OR “economic model*”[All Fields] OR “economic wellbeing”[All Fields] OR employment[MeSH Terms] OR employ*[All Fields] OR “employment income”[All Fields] OR “employment status”[MeSH Terms] OR “employment status”[All Fields] OR expenditures[MeSH Terms] OR expenditure*[All Fields] OR “family income”[All Fields] OR “financial cost”[All Fields] OR “financial insecurity”[All Fields] OR “financial strain”[All Fields] OR “financial stress”[MeSH Terms] OR “financial stress”[All Fields] OR “food insecurity”[MeSH Terms] OR “food insecurity”[All Fields] OR “home ownership”[All Fields] OR hospitalization[All Fields] OR “household income”[All Fields] OR “housing access”[All Fields] OR income[MeSH Terms] OR income[All Fields] OR job[All Fields] OR “job motivation”[All Fields] OR “job performance”[MeSH Terms] OR “job performance”[All Fields] OR “job satisfaction”[MeSH Terms] OR “job satisfaction”[All Fields] OR “job strain”[All Fields] OR “job stress”[MeSH Terms] OR “job stress”[All Fields] OR “job turnover”[All Fields] OR “job loss”[All Fields] OR “labor participation”[All Fields] OR “labour participation”[All Fields] OR labor[All Fields] OR labour[All Fields] OR livelihood[All Fields] OR “material deprivation”[All Fields] OR “medication costs”[All Fields] OR “money expenses”[All Fields] OR occupations[MeSH Terms] OR occupation*[All Fields] OR performativity[All Fields] poverty [MeSH Terms] OR poverty[All Fields] OR productivity[MeSH Terms] OR productivity[All Fields] OR “socioeconomic factor*”[MeSH Terms] OR “socioeconomic factor*”[All Fields] “socioeconomic status”[MeSH Terms] OR “socioeconomic status”[All Fields] OR socioeconomics[All Fields] OR transportation[MeSH Terms] OR transportation[All Fields] OR unemployment[MeSH Terms] OR unemploy*[All Fields] OR utilisation[All Fields] OR utilization[All Fields] OR wealth[All Fields] OR welfare[All Fields] OR work[MeSH Terms] OR work*[All Fields] OR “work-family conflict”[All Fields] OR “working class”[All Fields] OR “working day”[All Fields]) AND (australia[All Fields] OR austria[All Fields] OR belgium[All Fields] OR canada[All Fields] OR canad*[All Fields] OR chile[All Fields] OR colombia[All Fields] OR “costa rica”[All Fields] OR “czech republic”[All Fields] OR denmark[All Fields] OR estonia[All Fields] OR finland[All Fields] OR france[All Fields] OR germany[All Fields] OR greece[All Fields] OR hungary[All Fields] OR iceland[All Fields] OR ireland[All Fields] OR israel[All Fields] OR italy[All Fields] OR japan[All Fields] OR latvia[All Fields] OR lithuania[All Fields] OR luxembourg[All Fields]

	OR mexico[All Fields] OR netherlands[All Fields] OR “new zealand”[All Fields] OR norway[All Fields] OR poland[All Fields] OR portugal[All Fields] OR “republic of korea”[All Fields] OR “south korea”[All Fields] OR slovakia[All Fields] OR slovenia[All Fields] OR spain[All Fields] OR sweden[All Fields] OR switzerland[All Fields] OR turkey[All Fields] "united kingdom"[All Fields] OR uk[All Fields] OR "great britain"[All Fields] OR england[All Fields] OR “northern ireland”[All Fields] OR scotland[All Fields] OR wales[All Fields] OR “united states”[All Fields] OR "united states of america"[All Fields] OR usa[All Fields]) AND (2012/1/1:2022/6/30[pdat]) AND (english[Filter] OR french[Filter]))
#2	((loneliness[MeSH Terms] OR lonel*[All Fields] OR lonely[All Fields] OR disconnectedness[All Fields] OR "emotional loneliness"[All Fields] OR "perceived social isolation"[All Fields] OR sobering[All Fields] OR “social isolation”[MeSH Terms] OR “social isolation”[All Fields] OR “social loneliness”[All Fields] OR solitude[All Fields] OR “subjective social isolation”[All Fields]) AND (“young adult”[MeSH Terms] OR “young adult*”[All Fields] OR young[All Fields] OR youth[MeSH Terms] OR adolescent[MeSH Terms] OR adolescent*[All Fields] OR “young adulthood”[All Fields] OR “emerging adulthood”[All Fields] OR teenager[MeSH Terms] OR teenage[MeSH Terms] OR teen[MeSH Terms]) AND (australia[All Fields] OR austria[All Fields] OR belgium[All Fields] OR canada[All Fields] OR canad*[All Fields] OR chile[All Fields] OR colombia[All Fields] OR “costa rica”[All Fields] OR “czech republic”[All Fields] OR denmark[All Fields] OR estonia[All Fields] OR finland[All Fields] OR france[All Fields] OR germany[All Fields] OR greece[All Fields] OR hungary[All Fields] OR iceland[All Fields] OR ireland[All Fields] OR israel[All Fields] OR italy[All Fields] OR japan[All Fields] OR latvia[All Fields] OR lithuania[All Fields] OR luxembourg[All Fields] OR mexico[All Fields] OR netherlands[All Fields] OR “new zealand”[All Fields] OR norway[All Fields] OR poland[All Fields] OR portugal[All Fields] OR “republic of korea”[All Fields] OR “south korea”[All Fields] OR slovakia[All Fields] OR slovenia[All Fields] OR spain[All Fields] OR sweden[All Fields] OR switzerland[All Fields] OR turkey[All Fields] "united kingdom"[All Fields] OR uk[All Fields] OR "great britain"[All Fields] OR england[All Fields] OR “northern ireland”[All Fields] OR scotland[All Fields] OR wales[All Fields] OR “united states”[All Fields] OR "united states of america"[All Fields] OR usa[All Fields]) AND (intervention[All Fields] OR coping*[All Fields] OR empower[All Fields] OR evaluation[All Fields] OR implement*[All Fields] OR interven*[All Fields] OR policy[MeSH Terms] OR policy[All Fields] OR prevent*[All Fields] OR program*[All Fields] OR psycholog*[MeSH Terms] OR psycholog*[All Fields] OR psychotherap*[MeSH Terms] OR psychotherap*[All Fields] OR recommendation[All Fields] OR resilience*[All Fields] OR therapy[MeSH Terms] OR therap*[All Fields] OR trial[All Fields]) AND (2012/1/1:2022/6/30[pdat]) AND (english[Filter] OR french[Filter]))

10.2. Appendix Table 2 – Summary of identified studies (N=23), by primary objective

Authors	Year of public-cation	Country	Reference type	Lang-uage	Study design	Sample size	Age ranges	Mean age	Study object-ive	Loneliness measure-ment tool
Smith	2021	United States	Thesis	English	Quanti-tative	292	18-29	19.6	Loneliness-economic impact study	UCLA Version 3
Cruwys et al. (a)	2021	Australia	Journal Article	English	Quanti-tative	174	15-25	19	Loneliness intervention study	UCLA Version 3
Gantman et al.	2012	United States	Journal Article	English	Quanti-tative	17	18–23	20.4	Loneliness intervention study	SELSA
Bruehlman-Senecal et al.	2020	United States	Journal Article	English	Quanti-tative	221	18-20	18.7	Loneliness intervention study	R-UCLA short form
Matthews et al.	2019	United Kingdom	Journal Article	English	Quanti-tative	2232	18	18.4	Loneliness-economic impact study	UCLA Version 3
Qualter et al.	2013	United Kingdom	Journal Article	English	Quanti-tative	361	17	NP	Loneliness-economic impact study	LACA
Hahn	2021	Nether-lands	Thesis	English	Quanti-tative	51	18-24	21	Loneliness intervention study	R-UCLA short form
Fandrem et al.	2021	Norway	Journal Article	English	Quanti-tative	1299	NP	16.5	Loneliness-economic impact study	LSDQ-Norwegian
Lim et al.	2020	Australia	Journal Article	English	Quanti-tative	20	18-31	22.95	Loneliness intervention study	UCLA Version 3
Yildiz & Duyan	2022	Turkey	Journal Article	English	Mixed method	42	20-23	NP	Loneliness intervention study	R-UCLA-Turkish
Larsen et al.	2021	Norway	Journal Article	English	Quanti-tative	2254	15-19	16.82	Loneliness intervention study	Loneliness scale Norwegian
Loucks et al.	2021	United States	Journal Article	English	Quanti-tative	96	18-26	20	Loneliness intervention study	R-UCLA
LeBlanc	2019	United States	Thesis	English	Quanti-tative	180	18-30	23.37	Loneliness intervention study	UCLA Version 3
Mattanah et al.	2012	United States	Journal Article	English	Quanti-tative	170	NP	17.67	Loneliness intervention study	R-UCLA
Cruwys et al.	2022	Australia	Journal Article	English	Quanti-tative	174	15-25	18.94	Loneliness intervention study	R-UCLA short form
Boddy	2020	United Kingdom	Journal Article	English	Quali-tative	33	19-21	NP	Loneliness-economic impact study	Projective Technique
von Soest et al.	2020	Norway	Journal Article	English	Quanti-tative	3116	32-35	NP	Loneliness-economic impact study	R-UCLA short form
Lim et al.	2019	Australia	Journal Article	English	Mixed method	20	18-23	20.68	Loneliness intervention study	UCLA Version 3
Lim et al.	2020	Australia	Journal Article	English	Mixed method	12	17-25	20.5	Loneliness intervention study	UCLA Version 3

Iyer et al.	2022	United States	Journal Article	English	Quanti-tative	108	14-19	NP	Loneliness intervention study	UCLA Version 3
Besse et al.	2022	United States	Journal Article	English	Quanti-tative	278	NP	19.43	Loneliness intervention study	Self-created
Morin	2022	Norway	Journal Article	English	Quanti-tative	1835	Upper secondary students	NP	Loneliness intervention study	LSDQ-Norwegian
McVey et al.	2016	United States	Journal Article	English	Quanti-tative	56	18 - 28	20.22	Loneliness intervention study	SELSA

[1]NP stands for not provided.
[2] NA stands for not applicable.

10.2. Appendix Table 2 – Summary of identified studies (N=23), by primary objective (Continued)

Authors	Economic dimension	Economic indicator	Category of intervention	Level of delivery	Mode of delivery	Gender reported
Smith	Health service utilization	Health service utilization (community and university mental health service utilization)	NA	NA	NA	Yes
Cruwys et al.	NA	NA	Psychology based & social support	Group-based	In-person	Yes
Gantman et al.	NA	NA	Skills development	Group-based	In-person	Yes
Bruehlman-Senecal et al.	NA	NA	Psychology based	Individual	Digital	Yes
Matthews et al.	Education, Labour market outcomes, and Health service utilization	Education (education qualifications, not in education, training), Labor Market (job preparedness, career optimism, job search activities, not employed), Health service utilization (health care visits)	NA	NA	NA	Yes
n	Health service utilization	Health service utilization (General practitioner utilization and frequency)	NA	NA	NA	Yes
Hahn	NA	NA	Stress management	Individual	Digital	Yes
Fandrem et al.	Education	Education (Intention to quit upper secondary education)	NA	NA	NA	Yes
Lim et al.	NA	NA	Psychology based	Group-based	In-person	Yes
Yildiz & Duyan	NA	NA	Social support	Group-based	In-person	Yes
Larsen et al.	NA	NA	Social support	Group-based	In-person	Yes
Loucks et al.	NA	NA	Psychology based	Group-based	In-person	Yes
LeBlanc	NA	NA	Psychology based	Individual	Mixed	Yes
Mattanah et al.	NA	NA	Social support	Group-based	In-person	Yes
Cruwys et al.	NA	NA	Psychology based & social support	Group-based	In-person	Yes
Boddy	Education	Education (Intentions to quit post-secondary education)	NA	NA	NA	No
von Soest et al.	Education, Labour market outcomes, and Health service utilization	Education (level of education), Labor Market (income, employment status), Health service utilization (Prescription of antidepressants)	NA	NA	NA	No
Lim et al.	NA	NA	Psychology based	Individual	Digital	Yes
Lim et al.	NA	NA	Psychology based	Individual	Digital	Yes
Iyer et al.	NA	NA	Stress management	Group-based	Digital	Yes
Besse et al.	NA	NA	Psychology based & skills development	Individual	In-person	Yes
Morin	NA	NA	Social support	Group-based	In-person	Yes
McVey et al.	NA	NA	Skills development	Group-based	In-person	Yes

[1]NP stands for not provided.
[2] NA stands for not applicable.

10.2. Appendix Table 2 – Summary of identified studies (n=23), by primary objective (Continued)

Authors	% of non-binary participants	% of female participants	Ethnicity reported	% of Caucasian participants in the studies	Area of residence reported	Area description	Data collected prior to COVID-19 pandemic
Smith	.038	.821	Yes	.839	No	NP	Unknown
Cruwys et al.	NP	.753	Yes	.454	No	NP	No
Gantman et al.	NP	.294	Yes	.588	No	NP	Yes
Bruehlman-Senecal et al.	.041	.59	Yes	.529	No	NP	No
Matthews et al.	NP	.51	Yes	.9045	No	Nationally representative	Yes
Qualter et al.	NP	.5016	Yes	NP	Yes	Urban	Yes
Hahn	NP	.824	No	NP	No	NP	No
Fandrem et al.	NP	.465	No	NP	Yes	Urban and district location	Yes
Lim et al.	NP	.5	Yes	.333	Yes	Urban	Yes
Yildiz & Duyan	NP	.84	No	NP	Yes	Urban	Unknown
Larsen et al.	NP	.465	No	NP	No	NP	Yes
Loucks et al.	.02	.68	Yes	.625	No	NP	Yes
LeBlanc	.011	.528	Yes	.355	No	NP	Yes
Mattanah et al.		.701	Yes	.614	Yes	Urban	Yes
Cruwys et al.	NP	.753	Yes	.454	Yes	Urban	Yes
Boddy	NP	NP	No	NP	No	NP	Yes
von Soest et al.	NP	NP	No	NP	No	Nationally representative	Yes
Lim et al.	NP	.45	Yes	.6	No	NP	Yes
Lim et al.	NP	.25	Yes	.667	Yes	Urban	Yes
Iyer et al.	NP	0.815	No	NP	No	NP	No
Besse et al.	NP	.54	Yes	.795	No	NP	No
Morin	NP	.605	No	NP	No	NP	Yes
McVey et al.	NP	.25	Yes	.833	Yes	Urban	Yes

[1]NP stands for not provided.
[2] NA stands for not applicable.

Note: The full list of screened records can be consulted online, here.