Title: Social attitudes and activities associated with loneliness: Findings from a New Zealand national survey of the adult population

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Data statement:

The data that support the findings of this study are openly available in Figshare at https://figshare.com/articles/ISSP2017_Social_Networks_III/5405554.

Data citation:

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Abstract:

There has been growing recognition of the harmful consequences of loneliness for health and well-being, and the need for community intervention, particularly in times of global crisis such as the Covid-19 pandemic with its imperatives of distancing, isolation, and quarantine. Social capital and a sense of social cohesion are known to have roles in buffering against the effects of adverse life circumstances. Our study sought to investigate the association of a range of social attitudes and activities – as proxies for social capital - with loneliness while taking into account socio-demographic factors. We undertook a national survey on a stratified random sample of the New Zealand adult population aged 18+ in 2017 (n=1,358), data from which included the requisite variables. The prevalence of loneliness was highest in young adults (18-30), falling with age until a slight rise in older people (76+). Loneliness was associated with socio-demographic factors whereby loneliness was more prevalent in the more disadvantaged groups: the deprived, Māori (the indigenous people of New Zealand), the non-partnered, and the less educated. While controlling for these socio-demographic factors, pro-social attitudes – i.e. towards political efficacy, trust in others, not feeling exploited, or being committed to family - and participation in social activities – i.e. being employed, or being involved in recreation groups - were protective against loneliness. Our study supports asset-based approaches to tackling loneliness – with implications for health and social care - that emphasise mobilising existing social resources, building social capital, and raising social cohesion in our communities. Such intervention on loneliness would help to prevent and ameliorate its detrimental consequences for public health.

Keywords: Loneliness, social participation, social capital, social attitude, social activity, New Zealand

What is known about the topic

- Loneliness has been shown to have harmful consequences for health and well-being
- Adult loneliness is distributed by age and other socio-demographic factors, with differences among countries
- There has been little investigation of the association between social capital and loneliness

What this study adds

- In the New Zealand adult population, loneliness is most prevalent in: young people (18-30) (followed by older adults (76+)), the deprived, Māori (the indigenous people), the non-partnered, and the less educated
- Pro-social attitudes, e.g. trust, and social participation (proxies for social capital) protect against loneliness
- Building social capital and raising social cohesion may help to prevent and ameliorate loneliness, with implications for health and social care and the improvement of public health

Introduction

Humans are social beings who rely upon and support one another within their communities in order to survive and thrive (Berkman et al., 2000). This truth has never been more important than in these times of global health crisis exemplified by the Covid-19 pandemic and its imperatives of distancing, isolation, and quarantine (Smith & Lim, 2020). Adequate social networks and access to social resources are necessary for good health and well-being. A telling measure of social disconnection is the degree to which an individual feels lonely (Hawkley & Cacioppo, 2010). Particularly in developed countries, there has been growing recognition of the adverse effects of loneliness (Courtin & Knapp, 2017) and its threat to public health (Holt-Lunstad et al., 2017; Leigh-Hunt et al., 2017). Loneliness has been consistently associated with increased morbidity and mortality: for example, a range of recent reviews has concluded that loneliness is a risk factor for depression (Erzen & Cikrikci, 2018), cognitive decline (Lara et al., 2019), coronary heart disease and stroke (Valtorta et al., 2016), and premature mortality (Holt-Lunstad et al., 2015). The magnitude of the mortality risk due to loneliness has been compared to that of well-established factors such as physical activity, obesity, and substance abuse (Holt-Lunstad, 2015). The mechanisms by which loneliness may harm health are unclear though its effects, for example, on physiological functioning and on health behaviour have been implicated (Hawkley & Cacioppo, 2010; Hodgson et al., 2020). Alongside this growing understanding, the development of effective intervention strategies is also high on the agenda, with implications for health and social care (Cacioppo et al., 2015; Gardiner et al., 2018).

Loneliness is not the same as social isolation in that it is not only the contact, but also its quality and meaning that are important. Being lonely is a negative experience felt by an individual living with a particular set of social circumstances and needs. Loneliness can be defined as arising from a perceived gap between the desired and actual state of one's social relationships (Perlman & Peplau, 1981). Loneliness can affect individuals at any age (Hawkley & Cacioppo, 2007) though the specific experience may vary with each life stage (Rokach, 2000). Investigations of loneliness across the full range of adult age groups are uncommon – most studies have been on older people - but important

to understand any differences in prevalence and covariates. Such studies – using different measures and populations - have established varied estimates of the age-specific prevalence of loneliness. In New Zealand (NZ), the General Social Survey (NZGSS) conducted in 2016/17, found that 6.3% of adults aged 15+ had felt lonely most or all of the time in the last four weeks, ranging from 8.3% in young people aged 15-24, to 7.1% in older people aged 65+) (Statistics NZ, 2017). Among developed countries, the adult age distribution has been found to differ across studies with loneliness linearly increasing (Yang & Victor, 2011) or decreasing (Nyqvist et al., 2016), or following a U-shaped curve (Nicolaisen & Thorsen, 2016). The age-related prevalence of loneliness can be understood in terms of structured stages in the life course that are pivotal turning points (Hagestad & Dykstra, 2016; Nguyen et al., 2020).

Aside from age, loneliness in adults is distributed differentially by other socio-demographic factors (Theeke, 2010). The relationship between loneliness and gender is inconclusive (Rokach, 2018). Loneliness is more prevalent among ethnic minority and immigrant groups (Victor et al., 2012). Adult living arrangements impact loneliness with those who are partnered being strongly protected from feeling lonely (Victor & Yang, 2012). Lower education level increases the risk of loneliness (Hawkley et al., 2008). Finally, living in deprived communities - with poor access to material and social resources - has been universally associated with higher levels of loneliness (MacDonald et al., 2018).

As articulated by Putnam (1995), social capital refers to connections between individuals within social networks that engender norms of trust and reciprocity, and thus can facilitate mutual support and co-operation. There is a well-established positive relationship between social capital and health (Kawachi et al., 2013), with evidence that social capital may mediate the effects of the social determinants of health (Hunter et al., 2011). Social capital has also been found to have a buffering role against the adverse effects of loneliness (Campbell & Gillies, 2001; Nyqvist et al., 2016). Social attitudes (such as trust in others) and social activities (such as participation in clubs) are useful proxy measures of social capital as they represent, in concrete forms, important antecedent building

blocks. Attitudes towards social solidarity (i.e. reciprocity among group members) and social control (i.e. enforcement of group norms) are influential in the creation of social capital (Likki & Staerklé, 2014). Adult social activities (Lucas et al., 2010; Queen et al., 2014) have been found to be important protective or risk factors for loneliness. A greater quantity of social activities seems to be associated with less loneliness across all age groups (Luhmann & Hawkley, 2016; Schnittker, 2007) while the impact of their type and quality on loneliness varies by age group (Child & Lawton, 2017; Segrin, 2003). For adults in mid and later life, the quality rather than the quantity of social engagement may be more protective against loneliness (Carmichael et al., 2015). Furthermore, trust in others may orientate adults towards greater social participation and in turn less loneliness (Kearns et al., 2015; Lelkes, 2013), with this found to apply across all adult age groups (Nyqvist et al., 2016; Rotenburg et al, 2010). It is evident that levels of social capital, in the measurable form of attitudes and activities, are associated with levels of loneliness, and that increasing levels of social capital may therefore be an important intervention strategy to reduce loneliness. However, these relationships have not been established in a national population while taking account of the socio-demographic profile of that population.

Using a representative sample of NZ's adult population in 2017, this paper aims firstly to determine age-specific prevalence levels of loneliness – as the age relationship and whether the burden falls more upon young, middle-aged or older adults remain unclear (Franssen et al., 2020) – and to assess the effect of other socio-demographic factors that have been shown to be important in the literature. Secondly, while adjusting for the aforementioned age and other socio-demographic factors, we aim to identify the pure effects of social attitudinal and activity covariates of loneliness in this national population. We formulate our research questions as follows:

1. How does the prevalence of loneliness vary across socio-demographic factors, in adulthood? We hypothesise that levels of loneliness will be higher in those sub-groups that are

experiencing critical life stages (the young and older people) and/or are more disadvantaged.

2. Are social attitudes and activities associated with adult loneliness, even after adjusting for socio-demographic factors? We hypothesise that particular social attitudes and activities are associated with higher levels of loneliness in adults, given their socio-demographic background.

Methods

Data source

The International Social Survey Programme (ISSP) is an ongoing collaboration of over 50 countries which runs annual surveys assessing a different topic each year (http://www.issp.org). The topic in 2017 was 'social networks and social resources'. This study reports results from the 2017 survey for the NZ arm of the ISSP, i.e. the NZ Social Attitudes Survey (NZSAS) (Li et al., 2018; Milne et al., 2018). From the NZ Electoral Roll (NZER), a stratified random sample of 3,876 adults aged 18+ was selected. Stratification was by age, ethnicity, deprivation, occupation, and region. A total of 1,358 participants returned completed questionnaires between April 17, 2017 and August 22, 2017, giving a raw response rate of 35.0%, and an effective response rate of 41.2% (i.e., the response rate that would have been achieved with a random sample). The study was approved by the University of Auckland Human Participants Ethics Committee (reference number 018740).

Description of variables

Outcome: Loneliness

Loneliness was a composite measure derived from 3 survey items in the short version of the UCLA Loneliness Scale (Hughes et al., 2004):

How often in the past 4 weeks have you felt that …

a. you lack companionship?

b. you are isolated from others?

c. you are left out?

The valid response categories, each assigned a numerical value (in brackets), were: never (1), rarely (2), sometimes (3), often (4), or very often (5). Response values of 'often' or 'very often' ('4' or '5'), to any of the three questions, were designated as belonging to the 'lonely' category to produce a binary variable that was employed in analyses. The loneliness categories of '4' or '5' denote 'often' or 'very often' lonely, indicating chronic loneliness, the most deleterious form (cf. transitory loneliness) which is linked to poorer health and well-being outcomes. We considered that a binary measure indicating the presence or absence of chronic loneliness would be clear-cut and aid interpretation of findings as well as translation to policy and practice. Thus, in a nutshell, we tried to answer the question: what social attitudes and activities are associated with chronic loneliness.

Socio-demographic factors

a. *Age group* – from NZER - was categorised as 18-30, 31-45, 46-60, 61-75, or 76+ years.

b. *Area-level deprivation* – from address information in NZER – was measured by the NZ Index of Deprivation 2013 (NZDep2013) which uses deprivation characteristics, derived from 2013 census data, to classify 'meshblocks' (Atkinson et al., 2014). A meshblock is a small geographical area with a typical population of 60 to 110 people (median 81). Each meshblock was assigned a decile value from 1 (least deprived) to 10 (most deprived). Quintiles of deprivation (1 to 5) were created by combining adjacent deciles.

c. *Gender* – from NZSAS – was reported as female or male.

d. *Ethnic identification* – from NZSAS – was categorised under the following groups (shown by size): European, Māori (the indigenous people), Pacific, Asian, or Other. Multiple responses were permissible, following common practice in NZ (Statistics NZ, 2005). Each ethnic group was represented by a binary variable (yes/no), with a participant having a value on each such variable (except for Other, owing to small numbers).

e. *Partnership status* – from NZSAS – was assigned as: partnered (married, de facto or civil union), formerly partnered (widowed, divorced or separated), or single (not partnered or never married).

f. *Educational level* – from NZSAS – was measured by the qualification attained: no formal education, school certification, trade or diploma certification, or higher education (university undergraduate degree or higher).

Covariates: Social attitudes

a. *Political inefficacy:* 'People like me don't have any say about what the government does.' Responses were categorised on a five-point rating scale: strongly agree, agree, neither agree nor disagree, disagree, or strongly disagree.

b. *People take advantage:* 'How often do you think that people would try to take advantage of you if they got the chance, and how often would they try to be fair?' Responses were dichotomised: 'no' (i.e. try to be fair almost all or most of the time), or 'yes' (i.e. try to take advantage almost all or most of the time).

c. *Trust*: 'Generally speaking, would you say that people can be trusted or that you can't be too careful in dealing with people?' Responses were dichotomised: 'no' (i.e. you almost always or usually can't be too careful in dealing with people), or 'yes' (i.e. people can almost always or usually be trusted).

d. *Family first*: 'You should take care of your family first, before helping other people.' Responses were categorised on a five-point rating scale: strongly agree, agree, neither agree nor disagree, disagree, or strongly disagree; the last two categories were combined, owing to small numbers.

e. *Help friends*: 'People who are better off should help friends who are less well off.' Responses were categorised on a five-point rating scale: strongly agree, agree, neither agree nor

disagree, disagree, or strongly disagree; the last two categories were combined, owing to small numbers.

f. *Political leaning* : 'In politics sometimes people talk of left and right. Where would you place yourself on the following scale where 0 means left and 10 means right?' Responses were categorised into four groups: 'left' (0-3), 'centre' (4-6), 'right' (7-10), or 'can't/won't say' (i.e. undecided).

Covariates: Social activities

a. *Employment status* was classified as 'full-time', 'part-time', 'unemployed', or 'not in work-force' (i.e. sick/disabled, student, home-maker, or retired).
b. *Recreation groups*: 'In the past 12 months, how often, if at all, have you taken part in activities of groups or associations for leisure, sports, or culture?' Responses were dichotomised: 'Involved' or 'not involved'.
c. *Political groups*: 'In the past 12 months, how often, if at all, have you taken part in activities of political parties, political groups, or political associations?' Responses were dichotomised: 'Involved' or 'not involved'.
d. *Charitable or religious groups*: 'In the past 12 months, how often, if at all, have you taken part in activities of charitable or religious organisations that do voluntary work?' Responses were dichotomised: 'Involved' or 'not involved'.
e. *Time spent on social media*: 'How many hours do you spend on social media for personal use (including Facebook)?'

   Responses were categorised into time intervals: <=1 hour, 1-5 hours, 6-10 hours, or >10 hours.

Data analysis

We first described the sample and determined the prevalence of loneliness by age group and other socio-demographic characteristics. We then cross-tabulated loneliness with our measures of social

attitudes and activities in turn. We tested whether single socio-demographic or covariate items respectively were associated with loneliness ($p<0.05$) using a corrected weighted Pearson chi square test. Finally, we ran a series of logistic regression models where each model, with loneliness as the binary outcome, included a single covariate of interest identified as being statistically significant in prior bivariate tests, while controlling for socio-demographic variables (i.e. age group, deprivation level, gender, ethnic groups, partnership status, and education level). Interactions between a covariate of interest and each socio-demographic factor were not significant and excluded from final models. Results are reported as estimated marginal means and odds ratios, both with 95% confidence intervals. All results were weighted to represent population distributions in the NZER (Li et al., 2018).

Results

The weighted prevalence of loneliness, on our binary measure, was 14.3% (Table 1).

Bivariate analysis: Socio-demographic factors

Loneliness varied by socio-demographic characteristics (Table 1). Age group was significantly related to loneliness, with the youngest group aged 18-30 having the highest proportion who were lonely (22.6%), dropping in the 31-45 group (14.7%), with a nadir in the 61-75 group (8.4%), before rising slightly in the 76+ group (10.2%). Loneliness increased in a dose-response fashion with worsening area deprivation quintile from 8.8% in the least deprived to 23.6% in the most deprived. Gender was not significantly associated with loneliness. Māori participants were significantly more likely to have a higher proportion lonely (16.3%) than non-Māori participants; there was no significant difference in loneliness on any of the other binary ethnic variables. The proportion lonely was lowest in the two-thirds of participants who were partnered (8.5%), intermediate in those formerly partnered (18.9%), and highest in those single and never married (29.9%). Loneliness decreased significantly as education level increased from 18.4% in those who had no formal education to 9.9% in those with higher education.

Bivariate analysis: Social attitudes

A range of social attitudes were significantly associated with loneliness (Table 2). Higher proportions of loneliness were evident in (a) participants who reported low political efficacy (23.8%) versus those who strongly disagreed (12.9%); and (b) participants whose political leaning was to the left (18.9%) versus those who leaned right (8.9%). Most participants showed high levels on measures of trust: 65.4% would trust other people, while 81.6% did not think others took advantage of them. Higher levels of loneliness applied to participants who responded that they did not trust other people rather than did (20.9% versus 10.7%), or that they thought other people would take advantage of them rather than not (32.4% versus 9.7%). More participants broadly agreed (76.9%) than disagreed (6.2%) that family should be put first, while more broadly agreed (40.3%) than disagreed (18.9%) that they should help friends in need. The lowest degrees of self-interest were related to the highest levels of loneliness: in those disagreeing or strongly disagreeing that family should be taken care of first ahead of friends (32.4% lonely), and in those strongly agreeing that friends in need should be helped (21.2% lonely).

Bivariate analysis: Social activities

Engagement across a range of social activities (except involvement in charitable or religious groups) was significantly associated with loneliness (Table 2). Higher proportions of lonely people were found in the unemployed (36.8%) versus the fully employed (12.3%), and those not in the work-force (16.6%); in those involved in political groups (23.9%) versus those not involved (13.6%): and in those who spent >10 hours per week on social media (21.7%) versus those who spent <1 hour (12.5%). A lower proportion of lonely people was found in those involved in recreation groups (11.0%) versus those not involved (16.7%).

Adjustment for socio-demographic factors: Social attitudes and activities

Proportions of lonely across measures of social attitude and activity, once adjusted for socio-demographic factors, showed that relativities among categories of each measure were retained, with the highest raw proportions being attenuated (Table 3).

Logistic regression analysis: Social attitudes (adjusted for socio-demographic factors)

Participants with a neutral attitude to the lack of political efficacy were moderately less likely to be lonely compared to those who strongly agreed there was a lack (OR: 0.52, 95% CI: 0.28-0.96, p=0.038) (Table 3). Having a trusting attitude towards other people compared to not was moderately protective against loneliness (OR: 0.54, 95% CI: 0.37-0.78, p=0.001), while believing that other people take advantage compared to not strongly increased the risk of loneliness (OR: 3.74, 95% CI: 2.41-5.79, p=0.000). The risk of loneliness was strongly increased in those who disagreed that family should be put first versus those who strongly agreed (OR: 3.13, 95% CI: 1.61-6.07, p=0.001). Other bivariate relationships between loneliness and (a) helping friends, and (b) political leaning, became insignificant once controlling for socio-demographic factors.

Logistic regression analysis: Social activities (adjusted for socio-demographic factors)

Not being in the work-force moderately increased the risk of being lonely compared to being employed full-time (OR: 1.68, 85% CI: 1.07-2.63), p=0.024) (Table 3). Being involved in recreation groups protected against loneliness compared to not being involved (OR: 0.65, 95% CI: 0.44-0.94, p=0.024). Other bivariate relationships between loneliness and (a) involvement in political groups, and (b) time spent on social media, became insignificant once controlling for socio-demographic factors.

Discussion

This investigation of loneliness used a nationally representative, cross-sectional survey of the adult population, aged 18+, living in NZ in 2017. We identified predictors of loneliness in the domains of social attitudes and activities – as proxy measures of social capital. These associations have not been

established in a national population while controlling for its socio-demographic profile. Knowledge of these risk factors and their effect sizes will help to inform the design of interventions – and the shape of health and social care - to prevent or ameliorate loneliness and thus its adverse effects on health and well-being.

Principal findings and implications

Research question 1. How does the prevalence of loneliness vary across socio-demographic factors, in adulthood?

The overall prevalence of loneliness was found to be 14.3%, with a significant relationship to age. We found that loneliness was not associated with gender, was positively associated with deprivation and Māori ethnic identity, and negatively associated with partnership and education level. These findings largely corroborate other studies in the literature - for example the NZGSS 2016/17 showed similar associations (Statistics NZ, 2017) - though there are some international differences (de Jong Gierveld et al., 2016).

Loneliness was associated with age. The distribution across age groups suggests a linear relationship: the proportion lonely was highest In the 18-30 group (22.6%), dropping to a low of 8.4% in the 61-75 group, before perhaps a slight up-turn in the 76+ group (10.2%). This compares to the NZGSS 2016/17, which found a shallow U-shaped age distribution (Statistics NZ, 2017). In a study of 25 European countries, Yang & Victor (2011) identified three groups: linear, U-shaped, and flat with step changes, finding no consistent association between age and the prevalence of loneliness across countries. In a study focused on the United Kingdom (Victor & Yang, 2012), loneliness followed a U-shaped distribution, with those aged <25 and those aged 65+ reporting the highest levels of loneliness. These peaks of loneliness in the young and the old can be understood in terms of cohort-related stages in the life course when major events are occurring: e.g. the young are transitioning to adulthood, and the old are experiencing changes in health and social circumstances (Elder & George, 2016). Risk factors for loneliness may be age-specific or universal (Luhmann &

Hawkley, 2016), while age may no longer be associated with loneliness once age-related factors – such as increasing disability and decreasing social integration - are considered (Jylhä, 2004). There is recent evidence that risk factors may be the same - with similar strength of effect - irrespective of age even though there may differences in the prevalence of loneliness from young adulthood to old age (Hawkley et al., 2020).

Loneliness was not associated with gender, a finding that is consistent with some studies (Statistics NZ, 2017), though others have found that women (Lasgaard et al., 2016; Victor & Yang, 2012) or men (Aartsen & Jylhä, 2011) were more likely to experience or at least to report being lonely. Differences between men and women have been attributed to differences in socialisation paths, propensities to report loneliness, precipitating circumstances even at the same life stage, and the quantity and quality of their relationships (Rokach, 2018). Men and women may respond differently to life events which in turn affects their respective vulnerabilities to loneliness (Nicolaisen & Thorsen, 2014). In older age, widowhood and living alone may expose women to greater risk of loneliness (Brittain et al., 2017).

Loneliness was positively associated with area deprivation, and negatively associated with education level, which is consistent with the NZGSS 2016/17 (Statistics NZ, 2017). In the international literature, loneliness has been linked to social structural factors that shape individual lives (Hawkley et al., 2008), and to social exclusion based on the lack of material and/or social resources (Scharf et al., 2005). Loneliness may be more prevalent in deprived areas characterised by deficient infrastructure and a lack of resources for residents (Algren et al., 2020; Gibney et al., 2019). It may also be that negative perceptions of the neighbourhood, e.g. lack of trust in neighbours, play a role in maintaining feelings of loneliness (Matthews et al., 2019). Lower education level is associated with the higher prevalence of loneliness (Cohen-Mansfield et al., 2016; Lasgaard et al., 2016). The less educated are blocked from a potential route to better life chances and higher social position that may have buffered against loneliness (Hawkley et al., 2008). Disadvantage may occur in

multiple forms – e.g. being ill and poor - that intersect or accumulate to not only produce but to hamper coping with loneliness (Bosma et al., 2015).

Loneliness was positively associated with Māori ethnic identity, corroborating the NZGSS 2016/17 (Statistics NZ, 2017)**.** Other NZ studies, in these cases of older adults, found that Asian people reported being the most lonely (Beere et al., 2019), with Asian migrants facing particular difficulties from living in a foreign society (Park et al., 2019). International literature has also found higher prevalence of loneliness among ethnic minority and immigrant groups owing to differences in their risk profiles (Salma & Salami, 2020; Visser & El Fakiri, 2016). Socio-economic inequalities, for example, in levels of education and income (Hawkley et al. (2008), as well as diverse cultural meanings (Lykes & Kemmelmeier, 2013; Rokach, 2018; van Staden & Coetzee, 2010) may explain ethnic differences in loneliness. In NZ, the elevated prevalence of loneliness among Māori – the indigenous people (who form a minority of the national population) - may be explained by two further socio-cultural factors: (a) greater social disadvantage arising from colonisation (Dyall et al., 2014; Reid et al., 2019), and (b) cultural conflict between traditional, collective and modern, individualistic values, such that expectations are unmet (Brougham & Haar, 2013; Podsiadlowski & Fox, 2011).

Loneliness was negatively associated with partnership, a result in line with the NZGSS 2016/17 (Statistics NZ, 2017). The shape of adult living arrangements is known to have an impact on loneliness so that particularly those who are partnered are strongly protected from feeling lonely (Cohen-Mansfield et al., 2016; Luhmann & Hawkley, 2016; Theeke, 2010). Living with a partner provides the intimate supportive relationship that may guard against feelings of emotional loneliness.

Research question 2. Are social attitudes and activities associated with adult loneliness even after adjusting for socio-demographic factors?

Pro-social **attitudes** and community-oriented **activities** were associated with lower levels of adult loneliness after accounting for socio-demographic factors. The same attitudinal and activity-related risk factors for loneliness were important across different age groups. Luhmann & Hawkley (2016) identified social engagement as a universal predictor that did not differ in its effect on different age groups. Even more to the point, Nguyen et al. (2020) found that lower levels of pro-social behaviour were associated with loneliness across all decades – from the 20s to the 60s - of the adult life course. Some attitudes or activities were not related to loneliness, once adjustment was made for socio-demographic factors, indicating that these attitudes or activities were unevenly distributed among socio-demographic groups (e.g. by age, social position, ethnicity, partnership, or an intersection of factors) so that the apparent relationship with loneliness was confounded.

Social attitudes: There was a lower risk of loneliness if participants had the attitude that: (1) they had some influence on government actions, (2) they trusted other people, (3) other people did not take advantage of them, or (4) they should put family first. Attitudes to providing help to friends, and to political affiliation were not associated with loneliness once adjusted for socio-demographic factors. Pro-social attitudes - particularly a high level of trust in others - may pre-dispose adults towards greater engagement in social activities and in turn protect against the occurrence of loneliness (Newall et al., 2009; Nyqvist et al., 2016; Rotenburg et al, 2010). Such attitudes are likely to have been shaped by the community – the socio-cultural context in which a person lives - so that, for example, strong social cohesion within a neighbourhood may foster greater trust that then encourages interaction with neighbours (Matthews et al., 2019). Belonging to a network high in social capital may ward off loneliness (Litvin & Shiovitz-Ezra, 2010). Perceived neighbourhood quality has been shown to have an effect on health via loneliness and other psychosocial factors (Wen et al., 2006). Our findings support the importance of community-level strategies in building social capital, promoting social connection, and reducing loneliness (Coll-Planas et al., 2017; Holding et al., 2020; Wildman et al., 2019).

Social activities: There was a lower risk of loneliness for participants who engaged in the following activities, even after adjustment for socio-demographic factors: (1) being employed, or (2) being involved in recreation groups. Social activities in general – in type, quantity, and quality - have been found to be associated with loneliness (Carmichael et al., 2015; Child & Lawton, 2017; Lucas et al., 2010). Queen et al. (2014) found that loneliness was associated with engaging in more activities alone than with others. Loneliness has been related to employment status (Creed & Reynolds, 2001) - being employed may be considered a kind of productive social activity though social interaction itself may not be the primary motive - with the unemployed tending to be less trusting, less socially and politically engaged, and more lonely (Lelkes, 2013). In older people, loneliness was also less prevalent in those who engaged in leisure activities (Croezen et al., 2009), while participation in social activities buffered the deleterious effect of social disadvantage (Niedzwiedz et al., 2016). Though previously linked to loneliness, involvement in political groups (Lelkes, 2013), and time spent on social media (Nowland et al., 2018) were no longer associated with loneliness, in our study, once socio-demographic factors were considered. Our findings – particularly regarding employment status and involvement in recreation groups - corroborate the important role of social activities in preventing loneliness.

Strengths and weaknesses

The main strength of this study lies in the national representativeness of the sample and coverage across a range of adults aged 18+. However, our broadly defined age groups – useful for detecting a general pattern - may lack the discrimination to reveal finer differences. The response rate was low, though weighting was used to correct for bias. As a cross-sectional study, we can interpret findings only in terms of association. In our regression analyses, we assumed a uni-directional predictive relationship, and have not taken into account any other contextual confounders (aside from socio-demographics) nor any reciprocal effects.

The multi-item indirect measure of loneliness used does not assume a common understanding of what it is to be lonely nor is it susceptible to under-reporting due to stigma (Victor et al., 2005). However, self-report may have led to recall bias though the time-period in question was only four weeks. Finally, the dichotomised measure used for analysis aids interpretation of findings but also entails a loss of information.

Future research

The relationships between social attitudes and activities, and their joint effect in the genesis of loneliness, need to be further explored. Longitudinal studies are required to address causality and the mechanisms that give rise to loneliness, as well as to disentangle age, cohort, and period effects. The wider context of loneliness and its risk factors needs to be considered in order to inform interventions that are effective in promoting, and in removing barriers to, positive social change. Larger studies that facilitate sub-group analysis might better identify sections of society that are particularly vulnerable to loneliness and its harmful consequences for health.

Conclusions

We found that loneliness was distributed by age group peaking in young adults and then decreasing until perhaps a slight uplift in the oldest old – corresponding to two pivotal life stages. Although loneliness was ubiquitous across the life course, it also had a structural dimension, being associated with ethnic affiliation and partnership status as well as social disadvantage, i.e. low education level or living in a deprived area. After controlling for socio-demographic factors, various forms of pro-social attitudes and engagement in social activities – our proxies for social capital - remained protective against loneliness. Our study supports an asset-based approach to tackling loneliness where the emphasis is on mobilising existing social resources and building social capital (Gardiner et al., 2018; Leigh-Hunt et al., 2017). Such an approach will inform the role of the health and social care system – contributing to a broad front - in preventing loneliness and supporting lonely people. The more effective interventions may be those that are motivated by collective responsibility and that

promote a sense of social inclusion and solidarity in our communities. Being able to intervene on loneliness would help to prevent and ameliorate its detrimental consequences for public health.

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Table 1. Loneliness by socio-demographic factors

	Distribution: n (%) †‡	Lonely (%) ‡	Test of association
Overall	[n=1334]	14.3	-
Age group			p=0.0002*
18-30	257 (19.3%)	22.6	
31-45	329 (24.7%)	14.7	
46-60	372 (27.9%)	13.8	
61-75	270 (20.2%)	8.4	
76+	106 (7.9%)	10.2	
Area deprivation	[n=1327]		p=0.0001*
quintile 1	329 (24.8%)	8.8	
2	278 (20.9%)	14.1	
3	263 (19.8%)	11.4	
4	244 (18.4%)	15.4	
(high) 5	213 (16.1%)	23.6	
Gender	[n=1334]		p=0.9944
female	779 (58.4%)	14.3	
male	555 (41.6%)	14.3	
Ethnicity (binary variables)	[n=1325]		
European	1105 (83.4%)	13.8	p=0.2437
Māori	166 (12.5%)	16.3	p=0.0019*
Pacific	41 (3.1%)	15.4	p=0.2968
Asian	112 (8.5%)	10.8	p=0.2950
Partnership status	[n=1318]		p=0.0000*
partnered	894 (67.8%)	8.5	
formerly partnered	171 (13.0%)	18.9	
single	253 (19.2%)	29.9	
Education level	[n=1317]		p=0.0312*
no formal education	181 (13.7%)	18.4	
school certification	331 (25.1%)	15.6	
trade/diploma certification	372 (28.2%)	15.0	
higher education	433 (32.9%)	9.9	

† raw numbers are participants who answered the 'loneliness' questions; ‡ weighted percentages; * $p<0.05$

Table 2. Loneliness by covariates: Social attitudes and activities

	Distribution n (%) †‡	Lonely (%) ‡	Test of association
Social attitudes			
Political inefficacy	[n=1300]		p=0.0049*
strongly agree	178 (13.7%)	23.8	
agree	320 (24.6%)	14.8	
neither agree nor disagree	289 (22.2%)	11.9	
disagree	416 (32.0%)	11.9	
strongly disagree	97 (7.5%)	12.9	
People take advantage	[n=1192]		p=0.0000*
no	973 (81.6%)	9.7	
yes	219 (18.4%)	32.4	
Trust people	[n=1306]		p=0.0000*
no	452 (34.6%)	20.9	
yes	854 (65.4%)	10.7	
Family first	[n=1317]		p=0.0000*
strongly agree	366 (27.8%)	13.7	
agree	647 (49.1%)	11.8	
neither agree nor disagree	222 (16.9%)	13.8	
disagree/strongly disagree	82 (6.2%)	32.4	
Help friends	[n=1318]		p=0.0330*
strongly agree	123 (9.3%)	21.1	
agree	409 (31.0%)	11.9	
neither agree nor disagree	537 (40.7%)	13.2	
disagree/strongly disagree	249 (18.9%)	17.6	
Political leaning	[n=1274]		p=0.0193*
left	210 (16.5%)	18.9	
centre	523 (41.1%)	13.7	
right	268 (21.0%)	8.9	
can't/won't say	273 (21.4%)	15.8	
Social activities			
Employment status	[n=1316]		p=0.0020*
full-time	705 (53.6%)	12.3	
part-time	172 (13.1%)	13.5	
unemployed	28 (2.1%)	36.8	
not in work-force	411 (31.2%)	16.6	
Recreation groups (past 12 months)	[n=1288]		p=0.0053*
not involved	694 (53.9%)	16.7	
involved	594 (46.1%)	11.0	
Political groups (past 12 months)	[n=1256]		p=0.0296*
not involved	1189 (94.7%)	13.6	
involved	67 (5.3%)	23.9	
Charitable or religious groups (past 12 months)	[n=1276]		p=0.5339
not involved	809 (63.4%)	14.5	
involved	467 (36.6%)	13.2	
Time spent on social media (per week)	[n=1184]		p=0.0029*
<=1 hour	300 (25.3%)	12.5	
1-5 hours	346 (29.2%)	11.4	
6-10 hours	297 (25.1%)	11.8	
>10 hours	241 (20.4%)	21.7	

† raw numbers are participants who answered the 'loneliness' questions; ‡ weighted percentages; * p<0.05

Table 3. Loneliness predicted by covariates: Social attitudes and activities, adjusted for socio-demographic factors

		Lonely % (95% CI) †§	OR (95% CI), p ‡§
Social attitudes			
Political inefficacy	[n=1261]		
	strongly agree	19.0 (13.0-25.2)	1.00 (reference)
	agree	14.6 (10.6-18.6)	0.70 (0.39-1.23), p=0.209
	neither agree nor disagree	11.6 (7.6-15.5)	0.52 (0.28-0.96), p=0.038*
	disagree	12.9 (9.4-16.5)	0.60 (0.33-1.07), p=0.083
	strongly disagree	13.0 (6.5-19.6)	0.60 (0.27-1.32), p=0.207
People take advantage	[n=1158]		
	no	10.2 (8.1-12.2)	1.00 (reference)
	yes	27.1 (20.9-33.4)	3.74 (2.41-5.79), p=0.000*
Trust people	[n=1267]		
	no	18.3 (14.7-22.0)	1.00 (reference)
	yes	11.3 (9.0-13.6)	0.54 (0.37-0.78), p=0.001*
Family first	[n=1276]		
	strongly agree	13.3 (9.8-16.8)	1.00 (reference)
	agree	12.0 (9.4-14.5)	0.87 (0.57-1.36), p=0.545
	neither agree nor disagree	13.0 8.4-17.5)	0.97 (0.55-1.72), p=0.907
	disagree/strongly disagree	29.3 (19.4-39.3)	3.13 (1.61-6.07), p=0.001*
Help friends	[n=1279]		
	strongly agree	15.1 (9.4-20.7)	1.00 (reference)
	agree	11.8 (8.5-15.2)	0.73 (0.40-1.33), p=0.308
	neither agree nor disagree	13.6 (10.6-16.6)	0.88 (0.49-1.56), p=0.653
	disagree/strongly disagree	18.9 (13.7-24.1)	1.36 (0.72-2.58), p=0.344
Political leaning	[n=1241]		
	left	18.2 (12.5-23.9)	1.00 (reference)
	centre	13.9 (10.7-17.0)	0.70 (0.41-1.18), p=0.177
	right	11.8 (7.3-16.3)	0.57 (0.30-1.08), p=0.085
	can't/won't say	12.3 (8.6-16.0)	0.60 (0.33-1.08), p=0.090
Social activities			
Employment status	[n=1278]		
	full-time	12.1 (9.6-14.6)	1.00 (reference)
	part-time	12.8 (7.5-18.2)	1.08 (0.60-1.93), p=0.793
	unemployed	22.2 (8.7-35.7)	2.26 (0.90-5.71), p=0.084
	not in work-force	18.0 (13.5-22.4)	1.68 (1.07-2.63), p=0.024*
Recreation groups (past 12 months)	[n=1251]		
	not involved	15.8 (13.1-18.5)	1.00 (reference)
	involved	11.3 (8.6-14.0)	0.65 (0.44-0.94), p=0.024*
Political groups (past 12 months)	[n=1221]		
	not involved	13.5 (11.5-15.4)	1.00 (reference)
	involved	22.2 (12.0-32.3)	1.99 (0.98-4.04), p=0.058
Time spent on social media (per week)	[n=1153]		
	<=1 hour	13.4 (9.3-17.6)	1.00 (reference)
	1-5 hours	12.5 (8.6-16.4)	0.91 (0.52-1.60), p=0.747
	6-10 hours	12.5 (8.6-16.4)	0.91 (0.52-1.61), p=0.750
	>10 hours	16.3 (11.8-20.8)	1.29 (0.73-2.26), p=0.383

† estimated marginal mean; ‡ adjusted odds ratios reported for each single covariate; § weighted results; * p<0.05