

Locked and lonely? A longitudinal assessment of loneliness before and during the COVID-19 pandemic in Norway

Abstract

Aims: There are concerns that lockdown measures taken during the current COVID-19 pandemic lead to a rise in loneliness, especially in vulnerable groups. We explore trends in loneliness before and during the pandemic and differences across population subgroups.

Methods: Data were collected via online questionnaires in June 2020 and four-to-eight months prior in two Norwegian counties ($n=10,740$; 54% women; age 19–92). Baseline data come from the Norwegian Counties Public Health Survey (participation rate 46%, of which 59% took part in a COVID-19 follow-up study). *Results:* Overall loneliness was stable or falling during the lockdown. However, some subgroups, single individuals and older women, reported slightly increased loneliness during lockdown. Interestingly, individuals with low social support and high levels of psychological distress and loneliness before the pandemic experienced decreasing loneliness during the pandemic. *Conclusions:* Although data limitations preclude strong conclusions, our findings suggest that, overall, Norwegians seem to have managed the lockdown without alarming increases in loneliness. It is important to provide support and to continue investigating the psychological impact of the pandemic over time and across regions differentially affected by the pandemic.

Keywords: COVID-19, loneliness, social isolation, Norway, longitudinal analysis

Word count (excl. abstract, references, figures, and tables): 2994

Introduction

The COVID-19 pandemic has led to implementation of unprecedented social distancing measures that significantly restrict social life. To contain the health emergency and slow the spread of the virus, on 12 March 2020 the Norwegian government and health authorities mandated closure of schools, nonessential businesses, and many public facilities [1]. In addition, people were encouraged to curtail face-to-face contact and social activities, work from home, restrict travelling, and avoid populated areas. These “lockdown” measures emphasized protection of vulnerable groups, in particular individuals aged 65+ and those with immune deficiency and/or chronic illnesses with an increased risk for severe illness from COVID-19. While many of the formal restrictions were removed during the spring and summer of 2020, the social distancing recommendations remained (e.g., maintain social distance, work from home, and avoid social gatherings and public transportation).

These measures can be hypothesized to seriously obstruct basic human needs—i.e., for social contact, affiliation, affection, and support [2]. There is thus widespread concern that unwanted and prolonged social distancing will increase feelings of loneliness, particularly in vulnerable groups. Loneliness – the unpleasant feeling of being isolated from others – is relative in nature, stemming from a negative discrepancy between desired and actual social relationships [3, 4]. Loneliness is linked with myriad negative health outcomes, including depression, suicidal behavior, and mortality [3]. Findings from the UK have also shown that loneliness during the ongoing pandemic is strongly associated with depression and suicidal ideation [5].

A competing hypothesis is that the pandemic has spurred positive changes in social well-being for some people [6]. In past mass tragedies, researchers have documented increased social cohesion and closeness [7, 8]. Being collectively under threat and experiencing a shared challenge can promote a sense of solidarity and attachment within

primary support networks and local communities [8]. A similar pattern seems to occur with COVID-19, as both Norwegian and US cross-cohort data show an increase in perceived support from right before to during the initial stage of the pandemic [9, 10]. These experiences may alleviate loneliness by fostering feelings of connection and belonging. Moreover, social comparison processes and the relative nature of loneliness predict that different groups may become less lonely in response to the lockdown. During the lockdown, younger and middle-aged adults in particular may, consciously or unconsciously, lower their social expectations and enjoy a time out from competing social opportunities and pressures (embracing the “joy of missing out”). Lower social aspirations and limited social opportunities may increase satisfaction with available relationships and time spent alone, and thus mitigate loneliness. A similar prediction can be made for those with pre-existing problems with loneliness, with the problems somewhat reduced by a perception that they are now shared and better understood by others, and de-stigmatized and more openly discussed.

Pandemic-related impacts are likely to differ across social groups. As UK author Damian Barr comments: “We are not all in the same boat. We are all in the same storm. Some are on super-yachts. Some have just the one oar” [11]. Based on what is known about risks and protective factors during times of crisis [12], pronounced negative effects may be expected among individuals with fewer socioeconomic (e.g., education and income), social (e.g., friendships and support network), and psychological (e.g., emotional stability and sense of control) resources.

An emerging literature has begun to document associations between the COVID-19 pandemic and loneliness. Studies typically resort to two indirect approaches. The first uses repeated cross-sectional data to compare loneliness in different stages of the pandemic. These studies show either a stable (high) [13, 14] or an increasing level of loneliness during the initial “lockdown” phase and a lower level in the subsequent re-opening phase [5, 15]. The

second approach compares cross-sectional data collected before (in 2018/2019) and during the pandemic. These latter studies show conflicting results. For example, while one set of studies from the UK and US show stability [16-18], other studies document markedly increased loneliness in the UK [5, 19] or a slight increase in the US [20] and among older Austrians [14]. These cross-sectional studies provide limited evidence on causality or on whether loneliness was elicited by, or existed prior to, the pandemic. Only a few studies have used panel data collected right before and during the pandemic. While a Swedish panel study of older adults [21] and a study of UK and US adults [9, 18] show no change in loneliness, studies of older adults in the US [22] and the Netherlands [23] find higher loneliness following the onset of the pandemic. Besides the dearth of longitudinal studies, much of the reviewed literature has other notable limitations, such as the use of small or convenience samples, a focus on older adults, and a lack of attention to subgroup differences and independent risk factors.

The current study aims to extend the literature by examining longitudinal change in loneliness associated with the pandemic using data from a probability-based sample of 10,740 adults aged 18+ surveyed 1–5 months before the pandemic and then re-assessed in June 2020 after formal restrictions had been in place for about three months. We also examine whether changes in loneliness vary by gender, age, education level, employment status, partnership status, physical and mental health problems, and pre-pandemic level of loneliness.

Methods

Data

The Norwegian Counties Public Health Survey (NCPHS) is a cross-sectional study of health and quality of life in the Norwegian general population. Invitations to NCPHS are distributed by email and SMS with links to an online survey. Email addresses and cell phone numbers are

provided by the registers of the Norwegian Digital Agency. Baseline data (t1) in our study are NCPHS data collected in Agder (23 Sept–18 Oct 2019, $N = 28,047$, RR=46%) and Nordland county (27 Jan–16 Feb 2020, $N = 24,222$, RR=47%). A random sample of 20,196 from these counties was invited to participate in a NCPHS Covid-19 study (t2). Data were collected 4–18 June 2020 ($N = 11,953$, RR=59%). In supplementary analysis, we estimate the probability of dropout at time 2 and re-estimate our analytic models controlling for the propensity to drop out; it shows broadly similar patterns. Agder and Nordland were chosen as the target population for the Covid-19 study because they participated in the NNCPHS closer in time (<6 months) to the 12 March 2020 shutdown than other counties. Analyses are based on 10,740 individuals with complete data from both waves.

Variables

Loneliness is assessed with a direct question, “Think about the past 7 days, to what degree did you feel lonely?”, measured on a scale from 0 (not at all) to 10 (very). To explore a more serious and problematic level of loneliness, we also use a binary variable where scores ≥ 6 indicate feeling “lonely”. This cutoff yields similar loneliness rates to a cutoff of 10 for the UCLA-3 scale [24]. It also gives similar rates to those reported in a previous Norwegian study focusing on severe loneliness among older adults [4], which indicates that our chosen cutoff is quite conservative.

In addition to *gender* and *age*, we include *education* (non-tertiary = <college/university, tertiary = college/university) and *partner status* (single, non-resident partner, and married/cohabiting). *Employment status* is recoded into employed (full/part time, self-employed, sickness leave), outside of the labor force (unemployed, disability pension, social welfare), and others (retired, home worker, student, military service). *Financial situation* (“Ability to make ends meet”) is recoded into difficult (1–3), quite easy (4), and

easy (5–6). *Self-rated health* is recoded into poor (1–2), fair (3), and good (4–5).

Psychological distress is measured using the five-item Hopkins Symptom Checklist (HSCL-5), categorized into low and high (score >2) [25]. The quality of *social support* is measured with the three-item Oslo Support Scale (OSS-3) [26]. Scores are categorized into poor (score 3–8), moderate (9–11), and strong (12–14). All independent variables are measured at t1, except partner status (t2).

Analytical strategy

We first provide descriptive statistics on the levels of perceived loneliness between subgroups including paired t-tests. We identify the unique predictive role of the subgroup risk factors in multivariate modelling. The NCPHS has a nested structure, in which individuals are nested in municipalities (n=71). The intra class correlation (ICC) shows that within-municipality/individual-level factors explain about 99% of the total variance in loneliness. We thus proceed our analysis within the OLS framework with a cluster option in Stata. There is a strong negative association between initial status and growth of loneliness in our data.

Following Kelly & Feifei [27], we thus apply a change score model; the changed value of loneliness between Y_t and Y_{t-1} now serves as our dependent variable. However, there might be unobserved municipality-level variables that confound the relationships in our change score model. To address this concern, we also re-estimate our models with a municipality fixed-effect model. The results, however, show very similar results (results are available upon request).

Results

Figures 1 (women) and 2 (men) show unconditional means/rates of loneliness across different age groups between two time points. Among women, loneliness is U-shaped across age in

cross-sectional analysis, with the lowest rates in the ages 45–74. Longitudinally, women report slightly decreasing loneliness from t1 to t2 among those aged <65, quite stable loneliness among those aged 65–74, and increasing means (from 2.0 to 2.5) and rates (from 8.6 to 14.4%) among the oldest ($p < .01$). Among men, loneliness decreases with age in cross-sectional analysis. Their t1–t2 change in loneliness increases slightly among the youngest (the rate from 23 to 28%) and oldest, and decreases slightly or remain stable in the middle age groups.

[Insert figures 1/2 about here]

Table 1 shows repeated cross-sectional analysis of mean loneliness scores at t1 and t2. Loneliness is U-shaped across age and remained quite stable over time except for a modest fall among the middle-aged and an increase among older women. Remaining patterns are quite similar for men and women. Educational level is inversely associated with loneliness at baseline, but largely unrelated to change in loneliness. Furthermore, we observe significant drops in loneliness among individuals with a resident or non-resident partner, and stable (men) or increasing (women) loneliness over time among the single. A recurring pattern is evident for the last five variables in Table 1; being in a more disadvantaged position (i.e., low social support, unemployed, poor self-rated health, and high self-reported psychological distress and loneliness at t1), though cross-sectionally related to higher loneliness, is longitudinally associated with decreased loneliness.

Table 2 explores multivariate longitudinal associations between loneliness and independent variables. Factors predicting significantly stronger decreases in loneliness are age <75 (for women only), being partnered, low social support, and high psychological distress. Factors largely unrelated to change in loneliness are educational level, financial situation, employment status, and self-reported health.

[Insert tables 1/2 about here]

Discussion

This study provides a descriptive portrait of trends in loneliness before and during the pandemic and differences across population subgroups in two Norwegian counties. Several interesting findings emerge; we highlight three. First and most importantly, we find no indications of a general pandemic-related upsurge in loneliness. Previous cross-sectional and longitudinal findings are about evenly divided between those finding stability and those reporting increasing loneliness in response to COVID-19 (see Introduction). Based on a unique and rich dataset we echo prior studies observing no substantial increase in loneliness. At least five interpretations can be offered. First, that findings reflect and attest to resilience and adaptability in response to “lockdown”. This interpretation resonates with extensive research demonstrating the human capacity to adapt to adverse life situations [28]. Second, the fact that loneliness is quite a stable phenomenon, influenced by dispositional and personality-related factors, probably contributes to stability [29]. Third, during lockdown, the level of social contact considered a deficit (the “loneliness threshold”) may be (temporarily) inflated, thus preventing feelings of loneliness. Fourth, selective participation (t1) and attrition (t2) could lead to an under-representation of people vulnerable to loneliness during COVID-19 (see below). Finally, the findings likely speak to heterogeneity among Norwegians. For some it introduced unwanted isolation and loneliness; for others it had little or even positive impact (see below) on social contact.

A second key finding is that single adults and older women experienced a slight spike in loneliness when social distancing measures were initiated. Living situation has been largely ignored in previous work, and it is unsurprising yet important to note that adapting to COVID-19 can be especially challenging for single individuals. A stronger risk among older adults is also shown in US panel data [9]. This finding is expected given that older adults in

particular have been advised to self-isolate, and many are not used to communicate digitally. Why these mechanisms are not borne out by older men is uncertain. Albeit speculative, one explanation could pertain to gender differences in social expectations [30]. Insofar as women generally are more socially active and integrated, social distancing may lead to a larger relative social deficit. Similarly, particularly in this generation women tend to assume greater responsibility as caregivers within the family [31], and lockdown may thus be more disruptive of social relationships and valued roles (e.g., as grandparents), which in turn may foster dissatisfaction and loneliness. One should note that the increased loneliness observed among the oldest is likely to be underestimated as the oldest age group in large surveys tend to be biased towards higher-functioning older adults, especially in online surveys. In addition, the study excludes institutionalized and frail elderly, whose well-being may be particularly compromised during lockdown. Further, these seemingly minor increases in loneliness may be practically important as even a small increase in loneliness may pose detrimental risks for physical and mental health problems [3].

The third significant finding is the reported drop in loneliness among groups with pre-pandemic high levels of psychological distress, social disconnection (lack of support), and loneliness. Their drops are significantly larger than those reported by their less distressed counterparts. However, because of the strong correlation between initial status and change, and the related floor effects and regression towards the mean, it is expected that the most favorable change would occur among individuals who were initially more lonely [27]. It is also important to recognize that these groups, while reporting a relative favorable change in loneliness, still report disproportionately high loneliness both before and during the pandemic. Nonetheless, the beneficial changes observed in the mentioned disadvantaged groups are noteworthy, counterintuitive, and at odds with the notion that people with pre-existing high levels of psychological distress would be particularly vulnerable and need extra support

during the pandemic [5]. Underpinning their relative improvement in loneliness may be that the observed increase in experienced social and emotional support during the pandemic [9, 10] is particularly potent for those with high loneliness and distress before the pandemic, as one qualitative study suggests [32].

Findings demonstrate no or minor independent effects on loneliness during COVID-19 of educational level, financial situation, employment status, or self-reported health. This pattern could reflect heterogeneity within groups; for example, some people with health problems (e.g., immune deficiency) may strongly self-isolate whereas others may be largely unaffected or even feel more supported and integrated during the pandemic.

This study has several strongpoints, most notably a within-person design which enables assessment of changes across the pandemic. A further strength is the large sample size and scope of variables, providing rich possibilities for subgroup analysis. The reliance on online questionnaires helps mitigate social desirability bias and improve reliability when probing a sensitive issue like loneliness [4]. At the same time, however, these methods are likely to miss populations especially vulnerable to loneliness during the pandemic, such as the oldest old, and people with chronic health problems or living in long-term care facilities.

There are some other caveats and limitations to note. First, while our t1 and t2 response rates of 45–60 can be considered satisfactory, the combined response rate is only 27. As with all longitudinal studies, there may be non-random patterns of attrition. While the timing and subject of the follow-up study can have attracted individuals who were feeling lonely during the lockdown, dropout based on loneliness is normally highest among the loneliest [33]. The latter is also found in supplementary analysis of our data, as dropouts (mean 2.39) had higher loneliness at t1 than retainers (2.02). Furthermore, supplementary analysis shows that attrition is highest among lower-educated and younger and older (only t2) individuals. These patterns (e.g., underrepresentation of the oldest-old and higher loneliness

among dropouts) are likely to slightly underestimate overall prevalence rates of loneliness, but should have less effect on subgroup rates. While the exact impact of attrition is unclear, one should be cognizant that it may have affected the generalizability of the findings. Second, findings should be interpreted in light of the relatively non-restrictive lockdown and few deaths, and the relatively flexible working life and generous welfare provisions, in Norway. Hence, problems with “lockdown loneliness” could be different, and probably greater, in other countries. Third, as we only have data from two counties, we do not know how generalizable the results are to Norway as a whole. The included counties are rather rural, and urban areas, and especially the capital of Oslo, were more heavily hit by the pandemic [34]. That said, the issued government restrictions were largely national, which could negate regional patterns of pandemic-related psychological impacts. Fourth, we provide an early picture and longer-term monitoring will be necessary. June 2020 may have been too early to register more substantial and sustained effects of social restrictions on loneliness. Fifth, our measure of loneliness is largely untested, and both the measure and our chosen cutoff need further validation. Finally, seasonal changes in loneliness may play a role; t1 took place during autumn and winter and t2 in the summer, potentially concealing negative emotional impacts of COVID-19.

To conclude, we find that loneliness overall has remained stable or slightly decreased during COVID-19. Subgroups such as older women and single individuals report slightly increased loneliness. Interestingly, people expected to be highly vulnerable to loneliness during the pandemic, people with pre-existing psychological distress and social disconnection, show significant drops in loneliness during COVID-19. One interpretation is that these groups in particular may have experienced an enhanced sense of togetherness, shared values, and social support during the pandemic, helping mitigate their loneliness. It is important to continue to monitor loneliness over time as the situation evolves and social

restrictions become prolonged or intensified. It is also critical to have preventive programs in place that offer online and real-life support and social interactions for at-risk groups such as singles and older adults.

Figure 1. Mean and rates (%) of loneliness before and during COVID-19 by age, among men

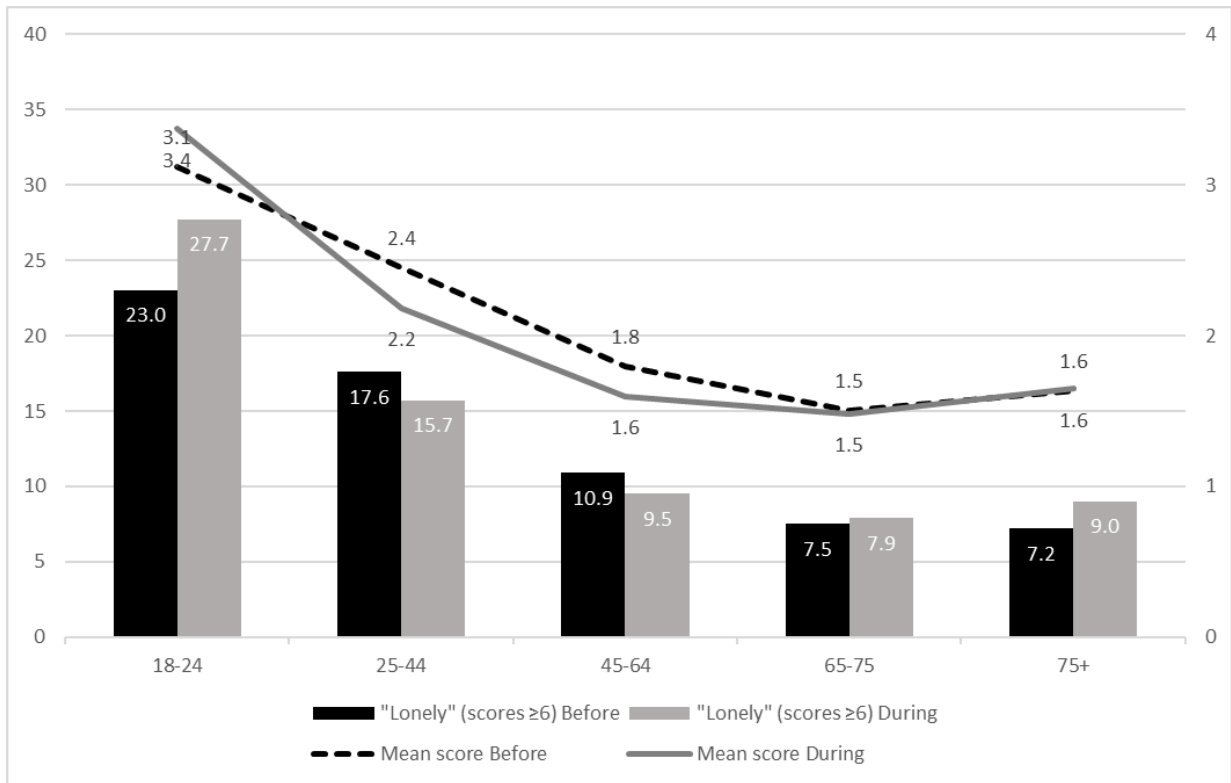


Figure 2. Means and rates (%) of loneliness before and during COVID-19 by age, among women

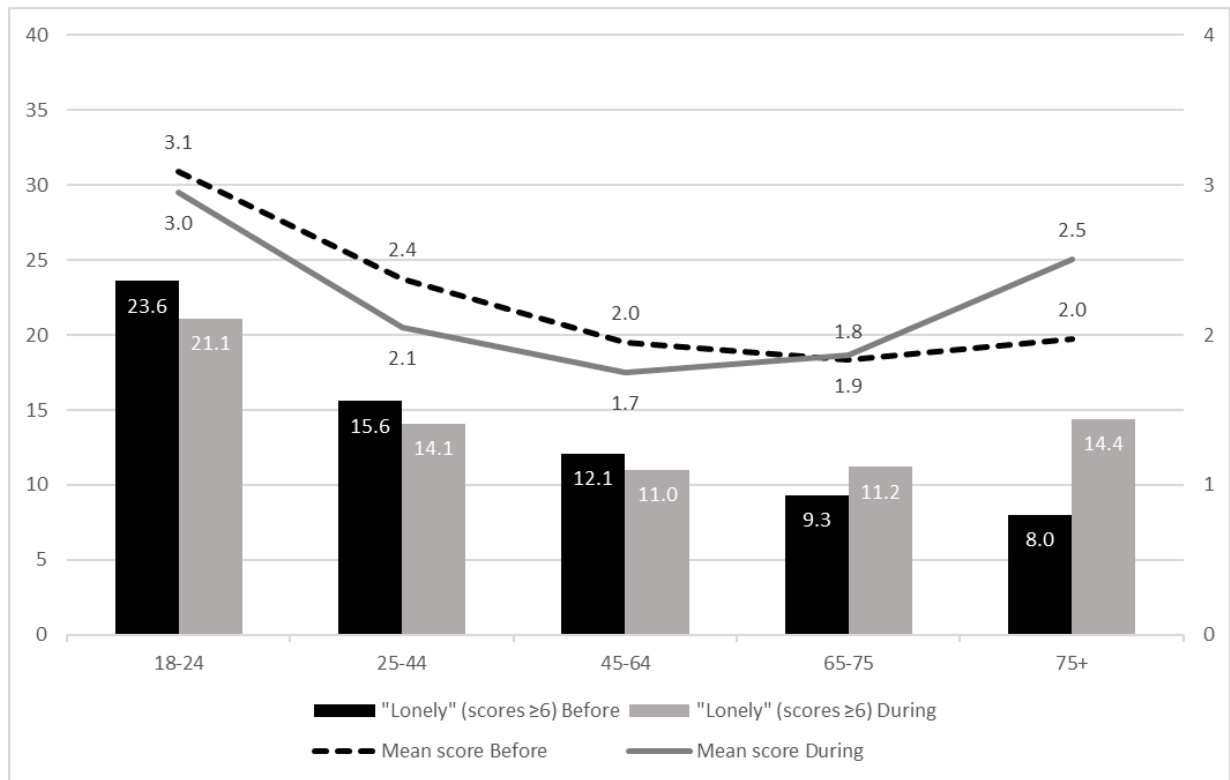


Table 1. Descriptive statistics and prevalence of loneliness across subgroups, stratified by gender

	Men				Women			
	N (%)	T1 mean (SD) loneliness	T2 mean (SD) loneliness	Diff.	N (%)	T1 mean (SD) loneliness	T2 mean (SD) loneliness	Diff.
Age group								
18-24	148 (3)	3.12 (2.68)	3.37 (3.04)	0.25 *	331 (6)	3.09 (2.90)	2.95 (2.97)	-0.14
25-44	1055 (22)	2.45 (2.81)	2.18 (2.77)	-0.27 *	1676 (29)	2.38 (2.70)	2.05 (2.73)	-0.33 *
44-64	2320 (47)	1.80 (2.39)	1.60 (2.38)	-0.20 *	2844 (49)	1.95 (2.49)	1.75 (2.50)	-0.21 *
65-74	1053 (21)	1.51 (2.18)	1.48 (2.24)	-0.03	805 (14)	1.83 (2.31)	1.87 (2.51)	0.03
75+	334 (7)	1.63 (2.24)	1.65 (2.33)	0.02	174 (3)	1.98 (2.22)	2.51 (2.55)	0.53 **
Education								
Non-tertiary	2658 (51)	2.07 (2.59)	1.88 (2.63)	-0.19 **	2609 (51)	2.32 (2.74)	2.13 (2.77)	-0.18 **

Tertiary	2517 (49)	1.73 (2.32)	1.63 (2.32)	-0.10 *	2549 (49)	1.98 (2.42)	1.80 (2.48)	-0.18**
Financial situation								
Difficult	769 (16)	3.24 (2.95)	2.79 3.04)	-0.45 **	1003 (17)	3.33 (3.04)	2.99 (3.18)	-0.34 **
Quite easy	1301 (27)	1.97 (2.40)	1.91 (2.53)	-0.06	1649 (28)	2.35 (2.59)	2.09 (2.62)	-0.26 **
Easy	3178 (58)	1.51 (2.21)	1.41 (2.20)	-0.10 *	3178 (55)	1.62 (2.23)	1.54 (2.29)	-0.08 *
Partner status								
Married/cohabiting	3760 (77)	1.46 (2.14)	1.29 (2.11)	-0.18 **	4209 (72)	1.77 (2.36)	1.50 (2.31)	-0.27 **
Non-resident partner	280 (6)	2.60 (2.72)	2.22 (2.68)	-0.38 *	358 (6)	2.42 (2.69)	2.08 (2.65)	-0.34 *
Single	870 (18)	3.60 (2.86)	3.62 (2.97)	0.02	1263 (22)	3.22 (2.86)	3.37 (3.03)	0.15 *
Oslo Support Scale								
Poor support	537 (11)	4.43 (2.99)	3.74 (3.24)	-0.69 **	583 (10)	4.81 (3.03)	4.09 (3.30)	-0.72 **
Moderate support	2346 (48)	2.11 (2.41)	1.91 (2.45)	-0.20 **	2555 (44)	2.49 (2.52)	2.24 (2.62)	-0.25 **
Strong support	2027 (41)	1.00 (1.77)	1.05 (1.94)	0.05	2692 (46)	1.19 (1.93)	1.20 (2.08)	0.00

Employment status								
Employed	3300	1.85 (2.42)	1.67 (2.44)	-0.18 **	4049	1.98 (2.48)	1.76 (2.47)	-0.22 **
Outside of workforce	413	3.00 (3.00)	2.73 (2.98)	-0.28 *	752	3.22 (3.02)	2.78 (3.13)	-0.44 **
Others	1197	1.67 (2.28)	1.66 (2.38)	-0.01	1029	1.89 (2.32)	2.04 (2.61)	0.16 *
Subjective health								
Poor	356 (7)	3.46 (3.10)	3.18 (3.14)	-0.28 *	516 (9)	3.63 (3.18)	3.30 (3.29)	-0.33 **
Fair	1030 (21)	2.55 (2.65)	2.26 (2.65)	-0.29 **	1183 (20)	2.86 (2.77)	2.43 (2.78)	-0.43 **
Good	3524 (72)	1.56 (2.23)	1.46 (2.26)	-0.10 **	4131 (71)	1.73 (2.28)	1.63 (2.38)	-0.10 **
Psychological distress								
High	472 (10)	4.72 (2.96)	4.08 (3.15)	-0.64 **	749 (13)	4.74 (2.96)	3.92 (3.24)	-0.82 **
Low	4438 (90)	1.61 (2.21)	1.51 (2.72)	-0.10 **	5081 (87)	1.74 (2.26)	1.65 (2.37)	-0.09 *
Lonely at t1								
No	4335 (88)	1.19 (1.54)	1.38 (3.07)	0.18 **	5059 (87)	1.33 (1.59)	1.54 (2.27)	0.21 **

Yes	575 (12)	7.30 (1.15)	4.56 (3.07)	-2.74 **	771 (13)	7.36 (1.23)	4.58 (3.12)	-2.78 **
Total	4910 (46)	1.90 (2.46)	1.74 (2.56)	-0.16**	5830 (54)	2.12 (2.56)	1.94 (2.60)	-0.18 *

* p< .05, ** p< .01

Table 2. Multivariate change score (t2-t1) regression of loneliness

	Men (n=4910)	Women (n=5830)
Age group (ref. 75+)		
18-24	0.21 (0.26)	-0.37* (0.20)
25-44	-0.14 (0.16)	-0.41 (0.25)
44-64	-0.10 (0.17)	-0.35 (0.22)
65-74	-0.01 (0.14)	-0.38* (0.18)
Tertiary education (ref. non-tertiary)	0.06 (0.06)	-0.05 (0.06)
Financial situation (ref. easy)		
Difficult	-0.14 (0.11)	-0.12 (0.11)
Quite easy	0.10 (0.07)	-0.14 (0.09)
Partner status (ref. single)		
Married/cohabiting	-0.31** (0.10)	-0.55** (0.09)
Non-resident partner	-0.48** (0.17)	-0.54** (0.13)
Oslo Support Scale (ref. strong support)		
Poor support	-0.66** (0.16)	-0.59** (0.14)
Moderate support	-0.23** (0.07)	-0.22** (0.06)
Employed (ref. employed)		
Outside of labor force	0.15 (0.15)	-0.04 (0.10)
Other	0.09 (0.11)	0.26* (0.12)

Subjective health (ref. poor)		
Fair	-0.09 (0.20)	-0.34* (0.15)
Good	-0.00 (0.19)	0.14 (0.14)
High psychological distress (ref. low)	-0.34** (0.13)	-0.61** (0.09)
R²	.02	.03

* p< .05, ** p< .01. Unstandardized regression coefficients (robust standard errors).

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