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Published in:
Journal of Public Health

DOI:
[10.1093/pubmed/fdy133](https://doi.org/10.1093/pubmed/fdy133)

Publication date:
2019

Document version:
Accepted manuscript

Citation for published version (APA):
Madsen, K. R., Holstein, B. E., Damsgaard, M. T., Rayce, S. B., Jespersen, L. N., & Due, P. (2019). Trends in social inequality in loneliness among adolescents 1991-2014. *Journal of Public Health, 41*(2), e133-e140. <https://doi.org/10.1093/pubmed/fdy133>

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Trends in social inequality in loneliness among adolescents 1991-2014

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Abstract

Background: Loneliness and social inequality in health are important public health concerns. We examined 1) trends in loneliness among adolescents from 1991 to 2014 in Denmark and 2) trends in social inequality in loneliness.

Methods: Study population: 11-15-year-olds in random samples of schools in 1991, 1994, 1998, 2006 and 2014, n=19,096. Loneliness was measured by a single item and social background by parents' occupational social class (OSC). We calculated absolute (%) differences in loneliness between high and low OSC and relative differences by odds ratio for loneliness.

Results: Across all surveys, 6.3% reported feeling lonely. The prevalence increased from 4.4% in 1991 to 7.2% in 2014. The prevalence of loneliness in high, middle and low OSC was 5.8%, 5.9% and 8.0%. The increase in loneliness was more pronounced in higher than lower OSC, resulting in a decreasing absolute social inequality in loneliness. The statistical interaction between OSC and survey year was significant, $p=0.0176$, i.e. the relative social inequality in loneliness also decreased from 1991 to 2014.

Conclusion: The prevalence of loneliness increased from 1991 to 2014. The social inequality in loneliness decreased in both absolute and relative terms because of a rising prevalence of loneliness among children from high OSC.

Key words: Adolescents, loneliness, trends, social inequality

Introduction

Loneliness is increasingly seen as a public health issue, due to its strong links to health problems¹⁻⁴ and behavioural and emotional problems²⁻⁵ in adolescence and early mortality in adulthood⁶. Loneliness is typically defined as the cognitive discrepancy between the social relations an individual wishes to have and those one perceives to have and the affective reactions of sadness and emptiness resulting from this discrepancy^{1,7-9}. The feeling of loneliness is common in adolescence.^{8,9} For some adolescents loneliness can become a chronic state. Longitudinal studies show that intense and prolonged feelings of loneliness during childhood and adolescence have severe consequences.¹⁻⁶ It is therefore important to monitor the prevalence of loneliness and to stimulate political attention and prevention of loneliness among adolescents. There are few studies on time trends in loneliness among children and adolescents. A Finnish study among 8-9-year-olds found no substantial change in the prevalence of loneliness 1989-2013.¹⁰ A study from US found a decline in loneliness over time in college (1978-2009) and high school students (1991-2012)¹¹ and a study from the Philippines found increasing prevalence of loneliness among adolescents 2003-2011.¹²

The aetiology of loneliness among children and adolescents is complex. Most research addresses circumstances related to the individual and his/her social relations as the most important contributors to loneliness. These are factors such as genes,¹³ low self-esteem, low social competence,^{14,15} depression, anxiety,¹⁶ poor relations with parents¹⁷ and negative peer experiences such as lack of social acceptance and victimization.¹⁵

It is less clear what role social background factors such as the family's socioeconomic status play in the aetiology of loneliness, even though social inequality in several other mental health problems are well established.^{18,19} A study from Finland showed increasing odds for loneliness by decreasing parental education among 8-9-year-old children.¹⁰ A study of Hungarian adolescents found that loneliness was associated with low subjective socioeconomic status, parental unemployment and low educational attainment.²⁰ A study from USA²¹ found that high family income participants were more likely to experience a trajectory of stable, low loneliness compared to trajectories of increasing and chronic high loneliness. Insight into the social patterning of loneliness is important because it may help us focus on the groups in most need of intervention and prevention.

This paper examines trends in social inequality in loneliness among nationally representative study populations of 11-15-year-olds in Denmark over a 23-year period, 1991-2014. The measurement of social background is an important consideration in such a study. The most common indicators of social

background within public health research are education, income and occupation²² and this study applies parental occupation. Occupation (parental or own adult) is strongly related to income, social standing, social networks, control and autonomy,²³ variables which may be related to loneliness. Occupation is therefore a relevant social background factor for studies of the social patterning of loneliness. Another important issue in this trend study is whether the applied social background measure is sufficiently stable over time. Jobs do not remain fixed and new jobs occur. The applied measure of occupational social class (OSC) categorizes occupations by two general features which are much more stable than occupation itself, namely required educational qualifications and the control (over capital or people).

Methods

Design and study population: The paper applies pooled data from five Danish contributions to the international cross-national Health Behaviour in School-aged Children study (HBSC).¹⁹ The overall aim of HBSC is to enhance the understanding of young people's health and health behaviours in their social settings. The study design is repeated, cross-sectional surveys of representative samples of 11-, 13-, and 15-year-old schoolchildren with a four-year interval. The surveys in 1991, 1994, 1998, 2006 and 2014 included a measure of loneliness.

The HBSC study is based on sampling of schools (cluster sampling). In each survey year we drew a new random sample of schools from complete lists of public and private schools in Denmark. In each of the participating schools we included all students in the fifth, seventh, and ninth grade, corresponding to the age groups 11-, 13- and 15-year-olds. The overall response rate was 88.7%, N=21,914. The study population in this paper comprised 19,096 participants with complete data about the included variables (Table 1).

Data collection and measurements: The participants answered the internationally standardised HBSC questionnaire²⁴ in the classroom. Loneliness was measured by one question which was strictly identical in all studies: "Do you feel lonely?" (Response key "very often", "often", "sometimes", and "never"). Asher & Paquette²⁵ find that children and adolescents have a fundamental understanding of what loneliness is, and that loneliness can be reliably measured in these age-groups. The applied single item measure of loneliness has similar reliability and validity to equivalent multi-items measures^{26,27} and it correlates well with widely used and validated multi-item scales such as the UCLA Loneliness Scale²⁸ and the De Jong Gierveld Loneliness Scale.²⁹

We applied a dichotomous version of this measure into lonely ("very often" + "often") and not lonely ("sometimes" + "never") in the analyses because it is the prolonged feeling of loneliness which is associated

with severe health, behavioural and academic problems.^{30,31} The lonely category captured the most severe, chronic, and potentially debilitating cases of loneliness and the non-lonely category captured less severe and more transient loneliness or a complete absence of loneliness. This same dichotomization approach has been applied in earlier research among adolescents.^{4,12,32} We repeated the analyses with two other cut-points: 1) Lonely “very often” vs. other responses and 3) lonely “very often” + “often” + “sometimes” vs. “never” to study the robustness of the association between OSC and loneliness.

The HBSC study in 2014 also included a four-item version of the UCLA Loneliness Scale³³ which we used for validation purposes. The four items are: “How often do you feel isolated from others?” “How often do you miss someone to be with?” “How often do you feel outside?” and “How often do you miss someone to feel closely linked to?” (Response key “never”, “rarely”, “sometimes” and “mostly”). The Pearson rank order correlation between the single item measure of loneliness and these four-item from the UCLA Loneliness Scale ranged from 0.47 to 0.51.

Parents’ OSC was measured by the items: “Does your father (mother) have a job?” “If yes, please write exactly what job he (she) does”. “Please say in what place he (she) works”. The research group coded the responses from I (high) to V (low). We added a category VI that includes parents outside the labour market who receive unemployment benefits, disability pension or other kinds of transfer income. The coding procedure was similar in all five surveys and assessed all occupations by two criteria: required educational qualifications and the control (over capital or people) connected with the occupation.³⁴ Schoolchildren in these age categories are able to report their parents’ occupation with a fair validity.³⁵⁻³⁷ Each participant was categorized by the highest ranking parent into high (I-II), middle (III-IV) and low (V-VI) OSC.

Statistical analyses: First, we applied a Cochran-Armitage test for trends in loneliness over time. This test is based on the regression coefficient for a weighted linear regression of a binomial proportion of a variable (here: prevalence of loneliness) on an explanatory variable (here: survey year).³⁸

Second, we used two measures of social inequality: 1) Absolute social inequality calculated as prevalence difference in loneliness between high and low OSC. 2) Relative social inequality, i.e. odds ratio (OR) for loneliness from multilevel logistic regression analysis with high OSC as reference group, adjusted for sex, age group and survey year and a final model with inclusion of an interaction product (survey year * OSC). The multilevel modelling (PROC GLIMMIX in SAS) took into account the cluster sampling. Fourth, we conducted multilevel logistic regression analyses with alternative cut-off points for loneliness.

Ethical issues: There is no formal agency for ethical approval of questionnaire-based surveys in Denmark. Therefore, we asked the school board (parent representatives), the headmaster, and the student council in each of the participating schools to approve the study. The participants received oral and written information that participation was voluntary and anonymous. The data file does not comprise data about the identity of the individual participants. The study complies with national standards for data protection. The Danish Data Protection Authority has granted acceptance (Case No. 2013-54-0576).

Results

Table 1 shows that 6.3% of the schoolchildren in the entire study population reported feeling lonely very often or often. The prevalence of loneliness varied by survey year with an overall increasing trend from 4.4% in 1991 to 7.2% in 2014 (test for trend, $p < 0.0001$). The prevalence of loneliness in high, middle and low OSC was 5.8%, 5.9% and 8.0% (chi²-test, $p < 0.0001$) (Table 1). Students with missing information about OSC ($n=2,659$) were not included in the analyses. The prevalence of loneliness in this group was 8.7%.

Figure 1 shows trends in prevalence of loneliness by OSC. There was an increasing trend in high and middle OSC ($p_{\text{high}} < 0.0001$, $p_{\text{middle}} < 0.0001$) but not in low OSC ($p_{\text{low}} = 0.5489$). The prevalence difference between high and low OSC increased from 2.6% in 1991 to 4.6% in 1994. Thereafter it decreased to 2.4% in 1998, 1.5% in 2006 and 1.1% in 2014. These data suggest that the absolute social inequality in loneliness decreased over time.

Table 2 shows mutually adjusted OR (95% CI) for loneliness by sex, age group, survey year and OSC. There was a significantly higher OR for loneliness among girls than boys, OR=1.71 (95% CI 1.51-1.93). The OR for loneliness was not significantly different between the three age groups. There was a gradually increasing OR for loneliness from 1991 to 2014 and a higher OR for loneliness among adolescents from low compared to high OSC (OR: 1.42, 95% CI 1.21-1.66). The statistical interaction between survey year and OSC was significant ($p=0.0176$) which suggests that the relative social inequality in loneliness decreased over time. The sensitivity analysis with the cut-point "very often" vs. other responses also showed a significantly higher OR for loneliness in the lowest OSC category, OR=1.93 (1.46-2.50) but there was no difference between the OSC categories in analyses where loneliness was defined as all levels of loneliness (Table 2).

Discussion

Main findings: There was an overall increase in the prevalence of loneliness from 4.4% in 1991 to 7.2% in 2014. In the entire pooled study population, there was a higher prevalence of loneliness among

adolescents from low than high OSC. This social inequality appeared when we defined loneliness by the response categories “very often” and “often” and with “very often” alone but not when we included lonely “sometimes” in the definition of loneliness. The social inequality in loneliness decreased from 1991 to 2014 because of an increasing prevalence of loneliness in high but not low OSC and there was no social inequality in the last survey. The social inequality in loneliness decreased both in terms of absolute and relative social inequality.

What is already known on this topic? The finding of an increasing trend in loneliness in adolescents does not correspond to findings from Clark et al. (2015)¹¹ who found loneliness to decline over time in older adolescents from American colleges (1978-2009) and high schools (1991-2012). A study among Finnish children showed no substantial change in the prevalence of loneliness 1989-2013 and a study in the Philippines showed increasing prevalence in loneliness 2003-2011. These observations suggest that time trends in loneliness are related to a national context and/or the measurement of loneliness. The increase in loneliness from 1991 to 2014 among Danish adolescents corresponds with findings of increasing trends in poor mental health in these age groups.³⁹ The findings of an overall social inequality in loneliness corresponds to the studies of Lempinen et al. (2018),¹⁰ Schinka et al. (2013)²¹ and Varga et al. (2014).²⁰

What this study adds: This is one of the first papers to report trends in loneliness and in social inequality in loneliness among adolescents. It is a new finding that the social inequality in loneliness decreased from 1991 to 2024 because the prevalence of loneliness in high OSC increased and reached the level in low OSC. There was no social inequality in loneliness in the last survey from 2014.

While the HBSC study includes much data to analyse potential causes of loneliness it does not include data to explain the changing social inequality in loneliness. In the observation period 1991-2014 there was a substantially increasing use of computers and social media among adolescents. Whether these factors account for the increasing prevalence of loneliness is unclear. A study of undergraduate students in USA shows that Instagram interaction and Instagram browsing was related to lower loneliness.⁴⁰

Limitations: The strength of the study is the comparability of the five nationally representative cross-sectional studies which applied a standard protocol for sampling and measurement, and the long observation period from 1991 to 2014. The participation rate was high but non-participating students may still cause selection bias. Unfortunately, we are unable to conduct analyses of participating and non-participating students because the study is completely anonymous. One kind of selection bias relate to schools that declined participation. If these schools include more students from lower OSC families the study may underestimate the prevalence of loneliness. Another kind of selection bias may stem from non-

participating students. Michaud et al.⁴¹ examined students who were absent on the day of data collection in a school survey and found that they reported higher rates of substance use, truancy or exclusion from the school. Therefore, it is likely that school surveys underestimate the prevalence of loneliness. A third kind of selection bias relate to students who did not answer the questions about loneliness and parents' occupation. Students with missing data on OSC have a high prevalence of loneliness. In summary, it is likely that the study underestimates the prevalence of loneliness but we have no reason to suspect that this underestimation invalidates the findings about social inequality in loneliness.

Studies on the validity of student-reported parental occupation suggest that this measurement has acceptable validity.³⁵⁻³⁷ The social class distribution in the population changes over time, mostly because the traditional working classes shrink, and the upper middle classes increase in size. Table 1 shows that this is a minor problem in this study. The applied measure of OSC is based on a coding of two features that are more stable than occupation itself: required educational qualifications and control (over capital or people) connected with the occupation.³⁴

We considered use of a different socioeconomic indicator, the Family Affluence Scale (FAS) which is a measure of material assets in the family based on four items about car ownership, own bedroom, number of computers in the family, and number of family vacations.⁴² FAS was however less suitable for our study for the following three reasons. 1) The four item FAS measure was only available for the three last surveys (1998, 2006, 2014) but not for the two first surveys (1991, 1994). 2) There was a substantial change in the FAS distribution from 2006 to 2014 because of an increase in car ownership and computer ownership. This increase does not reflect changes in socioeconomic status but rather a general increase in wealth and accessibility to specific consumer goods. 3) Finally, FAS is not a generic measure of social background but rather a dependent variable (dependent on education, occupation and income). The time relation between loneliness and FAS is unclear since the level of material assets in the family may appear after the occurrence of loneliness.

The measurement of loneliness may result in information bias. Because loneliness carries a social stigma, questions asking directly about loneliness may underreport the prevalence of loneliness.⁴³ Further, loneliness is a multifactorial experience which may be difficult to capture with one item. It is therefore likely that the reported prevalence of loneliness would appear different if we had used a multi-item scale. The item we use to measure loneliness is significantly associated with the validated and often used UCLA Loneliness Scale²⁸ and with the De Jong Gierveld Loneliness Scale.²⁹ We also found a high correlation between the single item measure of loneliness and the four-item version of the UCLA Loneliness Scale which was included in the 2014 study.

Another validity issue is the applied dichotomization of loneliness into “very often” + “often” vs. “sometimes” + “no”. We chose this dichotomization because it is particularly the prolonged feeling of loneliness that is associated with severe health, behavioural and academic problems.^{30,31} This same dichotomization approach has been applied in earlier research among adolescents.^{4,12} It was reassuring that we found a similar association between OSC and loneliness with the cut-point “very often” vs. the other response categories. There was no association between OSC and loneliness when we applied the third cut-point, “very often” + “often” + “sometimes” vs. “no”.

Implications: From a research point of view, it is important to get more insight into the processes which cause changing levels of loneliness in the population. Such changes – including changes in social inequality in loneliness - may differ by country. Therefore, it is worthwhile to conduct further studies in the entire HBSC database with data from many European and North American countries.¹⁹ We also recommend studies which apply parental education as the social background measure because education may tap the cultural capital in the family better than occupation.⁴⁴

From a practice point of view, it is important to develop interventions and health education efforts to fight loneliness in adolescence. There is no need to select specific socioeconomic strata for intervention since there was no social inequality in loneliness in the most recent study. The school may be an ideal setting for intervention and health education because it is possible to target the entire population of adolescents and because there are positive experiences with more general efforts to address mental health problems in the school setting.⁴⁵

Declaration of interests: There are no conflicts of interest for any of the authors.

Funding

This work was supported by the Nordea foundation (Grant number 02-2011-0122). The sponsor had no role in the study design, data collection, analysis and interpretation of data.

Acknowledgements

Bjørn Holstein was the Principal Investigator of the Danish HBSC study in 1991, Pernille Due was the Principal Investigator in the period 1994-2010 and Mette Rasmussen was the Principal Investigator of the 2014 study.

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Table 1 The study population by sex, age group, occupational social class (OSC), survey year and prevalence of loneliness defined as feeling lonely “very often” + “often”

	Survey year					
	1991	1994	1998	2006	2014	Total
Number of invited schools	23	50	64	100	169 ^c	406
Number of participating schools	19	45	55	80	48	247
Student response rate ^a	90.2%	89.9%	89.9%	88.8%	85.7%	88.7%
N = participating students	1860	4046	5205	6269	4534	21,914
N included in this study ^b	1679	3675	4794	5007	3941	19,096
Distribution by gender						
Percent boys	50.1	49.3	49.6	48.6	47.9	49.0
Percent Girls	49.9	50.7	50.4	51.5	52.1	51.0
Distribution by age group						
Percent 11-year-olds	29.9	30.6	33.6	36.4	30.5	32.8
Percent 13-year-olds	34.6	34.6	35.5	36.0	35.4	35.3
Percent 15-year-olds	35.5	34.8	30.9	27.6	34.2	31.9
Distribution by OSC						
Percent high OSC	28.4	33.0	27.9	27.7	42.2	31.8
Percent middle OSC	51.9	48.6	49.6	49.6	41.5	47.9
Percent low OSC	19.8	18.4	22.5	22.8	16.3	20.3
Percent lonely						
... in the entire study population	4.4	5.0	6.1	7.2	7.2	6.3
... in high OSC	4.0	3.7	5.6	6.7	7.1	5.8
... in middle OSC	3.8	4.7	5.6	7.0	7.0	5.9
... in low OSC	6.6	8.3	8.0	8.2	8.2	8.0

^a Number of participants in the surveys as percentage of schoolchildren enrolled in the participating classes

^b Students with data about loneliness and parents’ occupational social class

^c Most of the invited schools in the 2014 survey declined because they had recently participated in a similar health survey

Figure 1 Prevalence of loneliness by occupational social class and survey year

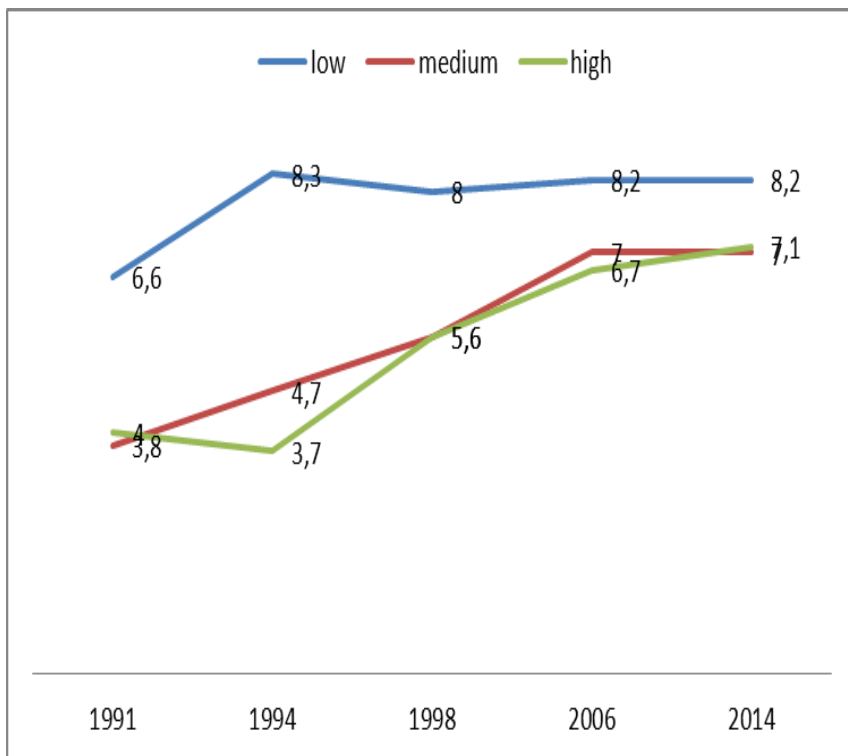


Table 2 Mutually adjusted OR (95% CI) for loneliness by sex, survey year and occupational social class (N=19,096), adjusted for the cluster sampling

	Main analysis	Sensitivity analyses	
	OR (95% CI) for feeling lonely “very often” + “often” vs. “sometimes” + “never”	OR (95% CI) for feeling lonely “very often” vs. “often” + “sometimes” + “never”	OR (95% CI) for feeling lonely “very often” + “often” + “sometimes” vs. “never”
Girls vs. boys	1.71 (1.51-1.93)	1.77 (1.44-2.18)	1.87 (1.77-1.99)
13- vs. 11-year-olds	1.03 (0.89-1.19)	0.91 (0.72-1.14)	1.14 (1.06-1.23)
15- vs. 11-year-olds	1.10 (0.95-1.27)	0.81 (0.63-1.04)	1.16 (1.08-1.25)
1994 vs. 1991	1.16 (0.85-1.55)	1.67 (1.01-2.75)	1.16 (0.98-1.38)
1998 vs. 1991	1.41 (1.07-1.86)	1.48 (0.90-2.41)	1.31 (1.11-1.55)
2006 vs. 1991	1.66 (1.26-2.18)	2.16 (1.34-3.47)	1.16 (0.98-1.35)
2014 vs. 1991	1.70 (1.29-2.26)	2.06 (1.27-3.56)	1.18 (0.99-1.40)
Occupational social class			
2 (middle) vs. 1 (high)	1.01 (0.88-1.17)	1.23 (0.96-1.58)	1.00 (0.93-1.07)
3 (low) vs. 1 (high)	1.42 (1.21-1.66)	1.91 (1.46-2.50)	1.05 (0.96-1.15)

Estimates in bold are statistically significant