Personality traits and the risk of becoming lonely in old age: A 5-year follow-up study

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Abstract

Background: Although many people experience loneliness in old age, there is little knowledge of predisposing personality factors. The aim of the present study was to explore to what extent personality traits are associated with the risk of becoming lonely, in women and men aged 60–79 years at baseline.

Methods: The panel data are from The Norwegian study on Life course, Ageing and Generations (NorLAG). Our sample consisted of 516 men and 419 women aged 60–79 years, who were surveyed in both 2002–2003 (baseline) and 2007–2008 (follow-up), and who reported not being lonely at baseline. Personality traits were measured by the Big Five scale. Multivariable logistic regression analyses were used to investigate the association between a personality trait and the risk of becoming lonely, with adjustment for age, mental health and living with a partner.

Results: At follow-up 59 women and 54 men reported loneliness (14.1% vs. 10.5%, \( p = 0.092 \)). Among women, high agreeableness at baseline was significantly associated with a higher risk of becoming lonely. Among men, low agreeableness, low conscientiousness and high neuroticism at baseline were significantly associated with a higher risk of becoming lonely.

Conclusions: Personality traits related differently to loneliness depending on gender. These findings may be useful when developing strategies for preventing loneliness in old age.

Keywords: Gender perspective, Loneliness, Longitudinal study, Personality traits
in old age. In this context, increased knowledge about causes of loneliness may be helpful.

Several studies have aimed to explore factors associated with loneliness in old age. In a recent review by Cohen-Mansfield et al. [15], in which 38 mainly cross-sectional studies were reviewed, the variables significantly associated with loneliness in older adults were: female gender, non-married status, older age, low income, lower educational level, living alone, low quality of social relationships, poor self-reported health, and poor functional status. Further, psychological attributes associated with loneliness included poor mental health, low self-efficacy beliefs, negative life events, and cognitive deficits.

A few studies have addressed the role of personality traits when experiencing loneliness in old age. Hensley et al. studied participants from the Georgia Centenarian Study, and found that both extraversion and neuroticism significantly predicted loneliness [16]. Bishop and Martin [17] also found that neuroticism directly affected loneliness, and further, that educational attainment indirectly affected loneliness via neuroticism. Long and Martin (2000) reported that neuroticism was positively associated with loneliness in the oldest old [18]. As far as we can see, none of the above-mentioned studies investigated women and men separately, and none of them had a longitudinal design. Thus, more research is needed on the association between personality traits and loneliness in old age, applying a gender perspective. Moreover, studies with a longitudinal design are requested [1], since they will enable an improved understanding of causal order.

Over the past 40 years, a number of surveys have shown that personality traits tend to spread over five dimensions, the so-called ‘Big Five’ [19], including the following five traits: extraversion (dominance, extraversion, outgoing), agreeableness (human friendliness, warmth), conscientiousness, neuroticism (anxious, negative emotions), and openness to experience (openness, openness to impressions).

Based on growing evidence concerning the detrimental aspects of loneliness, we aim to explore to what extent the five personality traits in the Big Five are associated with the risk of becoming lonely in old age, focusing on a gender perspective.

The aim of the present study was to explore to what extent personality traits are associated with becoming lonely, based on self-reported loneliness among women and men aged 60–79 years at baseline.

**Methods**

The present study is based on data from the Norwegian study of life course, ageing and generations, NorLag [20]. This is a longitudinal panel study of Norwegian individuals in mid-life and old age. The panel design of the study offers the possibility to explore the premises for vital aging and wellbeing in old age, and to contribute knowledge to a sustainable welfare policy in an aging society. The database from the study includes data from variables measuring loneliness, personality traits measured by the Big Five scale, and variables associated with loneliness.

Our sample consists of 516 men and 419 women who were surveyed in both 2002–2003 (T1) and 2007–2008 (T2), aged 60–79 years at T1, and did not report loneliness at T1. Personality traits were measured by the Big Five scale.

**The big five**

Several studies the last 40 years have shown that personality traits tend to distribute along five dimensions, called ‘The Big Five’ [21]. These dimensions are called “extraversion”, “agreeableness”, “conscientiousness”, “neurotism” and “openness to experience”.

In the NorLag study, a 20 items version of the Big Five scale was used [22]. These Big Five data were used in our study when studying the associations between personality traits and the risk of becoming lonely.

**Loneliness**

The NorLag study includes data on three questions regarding loneliness, recorded at both baseline and follow-up. The number of missing data differed markedly between these questions. We decided to base our definition of loneliness on the question ‘have you felt lonely during the last week?’, because the number of missing data was much lower for this question than for the other loneliness questions. This was thus used as dependent variable. Possible answers to this question were ‘never’, ‘seldom’, ‘sometimes’ and ‘often’. We defined that a person was lonely if he answered ‘sometimes’ or ‘often’ to this question. Thus, the dependent variable in our study is whether the person felt lonely at follow-up.

The following baseline variables were chosen to be independent variables in the present study: Big Five [22], age, gender, living with a partner (yes/no), SF-12 mental health (Short form 12 health survey) [23, 24], CES-D (Center for Epidemiologic Studies Depression scale) [25] and HSCL anxiety [26, 27].

**Statistical analysis**

A chi-squares test was used when comparing frequencies in two groups. Multivariable logistic regression analyses were used to investigate the associations between personality traits and the risk of becoming lonely, with adjustment for the baseline variables age, SF-12, CES-D, HSCL anxiety and living with a partner. The results are presented as odds ratios with 95% confidence intervals.
and p-values. The assumptions underlying logistic regression analysis were checked, and found to be adequately met in each regression model. A significance level of 5% was used. The statistical analysis was performed by using IBM-SPSS version 22.

Results

Our sample included 516 men and 419 women above 60 years, who reported not being lonely at baseline. Five years later, 54 (10.5%) of the men and 59 (14.1%) of the women reported that they felt lonely (p = 0.092). The basic variables are presented, separately for women and men, in Table 1.

Associations between personality traits and the risk of becoming lonely, after adjustment for the baseline variables, age, SF-12, CES-D, HSCL anxiety and living with a partner, are investigated separately for women and men, and the results are presented in Tables 2 and 3.

High agreeableness was associated with a higher risk of becoming lonely in women. For men, however, high agreeableness was associated with a lower risk of becoming lonely. Also, conscientiousness was associated with a lower risk of becoming lonely in men, but not in women. Furthermore, neuroticism was associated with a higher risk of becoming lonely in men, but not in women.

In the first, second and third agreeableness tertile the percentage of women becoming lonely was 9.0, 8.6 and 19.7%, respectively.

In the first, second and third agreeableness tertile the percentage of men becoming lonely was 12.7, 5.6 and 5.7%, respectively. Corresponding results for neuroticism was 5.0, 7.9 and 20.5%, and corresponding results for conscientiousness was 15.4, 9.3 and 5.6%.

Discussion

In order to explore longitudinal associations between personality traits and the risk of becoming lonely, we based our study on a representative sample of elderly people in Norway. We included participants who did not report loneliness at baseline. In this sample, 14.1% of the women and 10.5% of the men felt lonely 5 years later. Personality traits related differently to loneliness depending on gender. Among women, loneliness was associated with higher levels of agreeableness. Among men, loneliness was associated with lower levels of agreeableness, lower levels of conscientiousness, and higher levels of neuroticism.

Our findings that neurotic men became lonely more often than other men, is in accordance with gender-unspecific findings from populations of the oldest old [16, 18]. As far as we can see, no findings have been reported about the association between loneliness and agreeableness or, conscientiousness, the other two personality traits showing associations in our study. There may be several possible explanations for the associations between personality traits and loneliness. Firstly, personality traits may influence people’s ability to create or maintain friendships, family relationships or well-functioning social networks. Thus, men that are less well-off with a partner, are investigated separately for women and men, and the results are presented in Tables 2 and 3.

| Variable | Women N | Men N | Women N | p-value |
|----------|---------|-------|---------|---------|
| Age, mean | 67.7 ± 5.4 | 419 | 67.6 ± 5.4 | 516 | 0.826 |
| Agreeableness, mean | 23.7 ± 3.4 | 353 | 21.9 ± 3.6 | 429 | 0.003 |
| Extraversion | 18.6 ± 4.0 | 350 | 18.0 ± 3.7 | 427 | 0.060 |
| Conscientiousness | 20.4 ± 4.1 | 329 | 20.5 ± 3.5 | 424 | 0.940 |
| Neuroticism | 12.9 ± 5.0 | 348 | 11.4 ± 4.4 | 426 | 0.001 |
| Openness to experience | 19.5 ± 3.6 | 347 | 19.6 ± 3.1 | 427 | 0.001 |
| SF-12 mental health | 56.7 ± 6.6 | 419 | 57.8 ± 5.5 | 514 | 0.013 |
| CESD depression scale | 9.2 ± 6.3 | 330 | 8.7 ± 6.1 | 403 | 0.305 |
| HSCL anxiety | 11.8 ± 0.26 | 353 | 11.3 ± 0.23 | 429 | 0.003 |
| Living with a partner | 263 (62.8%) | 419 | 434 (84.1%) | 516 | <.001 |

Table 1 Description of the variables

Table 2 Big Five personality traits as predictors of becoming lonely, for women*

| Personality trait | Tertile 2 vs. tertile 1 | OR | 95% CI | p-value |
|-------------------|-------------------------|----|--------|---------|
| Agreeableness     | Tertile 2 vs. tertile 1 | 1.03 | 0.40–2.62 | 0.957 |
|                   | Tertile 3 vs. tertile 1 | 2.74 | 1.21–6.18 | 0.015 |
| Extraversion      | Tertile 2 vs. tertile 1 | 1.37 | 0.67–2.81 | 0.390 |
|                   | Tertile 3 vs. tertile 1 | 0.87 | 0.36–2.07 | 0.749 |
| Conscientiousness | Tertile 2 vs. tertile 1 | 0.62 | 0.25–1.55 | 0.307 |
|                   | Tertile 3 vs. tertile 1 | 0.83 | 0.38–1.80 | 0.632 |
| Neuroticism       | Tertile 2 vs. tertile 1 | 1.23 | 0.56–2.69 | 0.615 |
|                   | Tertile 3 vs. tertile 1 | 1.10 | 0.48–2.56 | 0.820 |
| Openness to experience | Tertile 2 vs. tertile 1 | 0.89 | 0.40–1.95 | 0.763 |
|                   | Tertile 3 vs. tertile 1 | 1.34 | 0.65–2.93 | 0.407 |

*Adjusted for age, mental health (SF-12), and living with partner at T1

Table 3 Big Five personality traits as predictors of becoming lonely, for men*

| Personality trait | Tertile 2 vs. tertile 1 | OR | 95% CI | p-value |
|-------------------|-------------------------|----|--------|---------|
| Agreeableness     | Tertile 2 vs. tertile 1 | 0.54 | 0.25–1.17 | 0.118 |
|                   | Tertile 3 vs. tertile 1 | 0.34 | 0.14–0.80 | 0.014 |
| Extraversion      | Tertile 2 vs. tertile 1 | 0.85 | 0.41–1.77 | 0.665 |
|                   | Tertile 3 vs. tertile 1 | 0.73 | 0.30–1.74 | 0.472 |
| Conscientiousness | Tertile 2 vs. tertile 1 | 0.53 | 0.25–1.14 | 0.102 |
|                   | Tertile 3 vs. tertile 1 | 0.31 | 0.12–0.76 | 0.010 |
| Neuroticism       | Tertile 2 vs. tertile 1 | 1.61 | 0.61–4.21 | 0.334 |
|                   | Tertile 3 vs. tertile 1 | 3.55 | 1.45–8.67 | 0.005 |
| Openness to experience | Tertile 2 vs. tertile 1 | 0.57 | 0.25–1.27 | 0.170 |
|                   | Tertile 3 vs. tertile 1 | 0.77 | 0.34–1.74 | 0.536 |

*Adjusted for age, mental health (SF-12), and living with partner at T1
agreeable, less conscientious, or more neurotic, may have less social contact simply because they have a lesser ability to establish and maintain social relationships. In this regard, it has, interestingly, been reported that for men, but not for women, a low level of social contacts and reduction of social contacts predicted loneliness [28].

Secondly, personality may affect people’s emotional state, including a sense of loneliness that is independent of actual social interaction. For example, women with elevated levels of agreeableness may miss people to care for, and thus feel lonely, although they are not socially isolated. This interpretation is supported by a qualitative study reporting elderly describing agonizing loneliness together with feeling less valuable [29]. In particular women expressed feeling bitter about no longer being important enough in the family, or feeling redundant and not interesting. Moreover, it has been reported that women living with a partner are more likely than men to experience children, family, and friends as sources of support [30]. Older women in Western countries seem to represent a generation in which traditional female roles were strongly tied to the home and family [31]. A loss of these roles may induce a feeling of loneliness, and probably more agreeable women are particularly exposed.

Concerning methodological considerations, it is important to realize that loneliness is related to but not equivalent to social isolation. People can be alone without feeling lonely, or experience loneliness in social settings. Data on the availability and use of different social networks would have made it easier to interpret relationships with personality traits. Further, we do not know the level of loneliness among non-responders. Thus, response bias may have affected the estimated prevalence of loneliness in the population. However, we believe that a potential response bias may primarily affect the frequency estimates of loneliness or personality traits and to a lesser extent their relationship [32, 33]. The main strength of the present study is the longitudinal design with the gender perspective.

Conclusions
Our study suggests that some personality traits are associated with the risk of becoming lonely in old age. Further, these associations differed markedly between men and women.

Loneliness is an unpleasant emotional state that is associated with lack of social integration. Its connection to increased risk of disease [15, 34, 35] or early death [36] emphasizes the importance of measures to counter loneliness in the elderly. For the aging population leaving work, it is important to have other gathering places that can strengthen connectedness and social interaction. Personality consists of relatively stable personality traits that is difficult to change. However, knowing that certain personality traits are related to loneliness later in life may increase the awareness of maintaining social relationships into old age.

Abbreviations
NorLAG: The Norwegian study on Life course, Ageing and Generations

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Authors’ contributions
HO contributed to study conception, study design, interpretation, writing of the article, and format editing. GE contributed to interpretation, writing of the article, and final approval of the article. TH contributed to interpretation, writing of the article, and final approval of the article. LS contributed to study design, data analysis, interpretation, writing of the article, and final approval of the article.

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Availability of data and materials
The NorLAG data are distributed by the Norwegian Social Science Data Services. Interested researchers can contact project leader Heidi Ormstad (Heidi.ormstad@usn.no) with a request for the particular data set used in the present study.

Ethics approval and consent to participate
All information about the participants in this study was obtained by Norwegian Social Science Data Services, in accordance with constitutional rules. Informed consent had been given by each respondent. All information was pseudonymised and later anonymized by Norwegian Social Science Data Services. The anonymized data material is available to researchers who provide a methodologically sound proposal in accordance with the informed consent of the respondents.

Consent for publication
Not applicable.

Competing interests
The authors declare that they have no competing interests.

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