Loneliness, living alone, and all-cause mortality: The role of emotional and social loneliness in the elderly during 19 years of follow-up

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ABSTRACT

Objective: To examine the predictive value of social and emotional loneliness for all-cause mortality in the oldest-old who do, and do not live alone and to test whether these varied by functional status and personality.

Methods: Participants were 413 older adults from the Berlin Aging Study ($M \pm SD = 84.53 \pm 8.61$ years of age) who either lived alone ($n = 253$) or did not live alone ($n = 160$). Significance values for hazard ratios are reported having adjusted for age, sex, education, income, marital status, depressive illness, and both social and emotional loneliness.

Results: While social loneliness was not associated with mortality in those living alone, emotional loneliness was; with each 1 SD increase in emotional loneliness there was a 18.6% increased risk of all-cause mortality in the fully adjusted model ($HR = 1.186; p = 0.029$). No effects emerged for social or emotional loneliness for those not living alone. No associations emerged for social or emotional loneliness among those not living alone. Examinations of potential moderators revealed that with each 1 SD increase in functional status, the risk associated with emotional loneliness for all-cause mortality increased by 17.9% ($HR_{interaction} = 1.179; p = 0.005$) in those living alone. No interaction between personality traits with loneliness emerged.

Conclusions: Emotional loneliness is associated with an increased risk of all-cause mortality in older aged adults who live alone. Functional status was identified as one potential pathway of accounting for the adverse consequences of loneliness. Emotional loneliness that can arise out of the loss or absence of a close emotional attachment figure appears to be the toxic component of loneliness.
Keywords: loneliness; mortality; emotional loneliness; social loneliness; functional status; living alone

Abbreviations: BASE = Berlin Aging Study, CHD = coronary heart disease, CI = confidence intervals, DSM-III-R = Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised, HR = hazard ratio, LISTREL = linear structural relations
INTRODUCTION

Loneliness is associated with an individual’s risk of morbidity and mortality (1-4). Other research has found that those who are lonely have higher rates of depression, lower quality of life (5,6), an increased vulnerability for coronary heart disease (CHD; 7), and display atypical cardiovascular reactions to stress (8). While these studies have treated loneliness as a unidimensional construct, Weiss in his seminal work suggested that loneliness has social and emotional dimensions (9). In fact, recent studies have found emotional loneliness to be more common than social loneliness (10), and to be more damaging for health (11). Importantly, the research on loneliness have not disentangled the effects of emotional and social loneliness for mortality.

According to Weiss (9), emotional loneliness arises out of the loss or absence of a close emotional attachment figure, whereas social loneliness arises out of the absence of ‘an engaging social network’ that is a wider circle of friends and acquaintances that can provide a sense of belonging, of companionship and of being a member of a community (9). Moreover, emotional loneliness he argued results in feelings of aloneness, anxiety, hypervigilance, high sensitivity to minimal cues, and feelings of abandonment. In contrast, he suggested that social loneliness would be associated with boredom, depression, and aimlessness. Further, recent studies have found that both social and emotional dimensions are predicted by different psychosocial and demographic factors (10,11). Factor analytic studies also indicate that measurement models, which distinguish between these dimensions of loneliness, are superior to unidimensional models, and that social and emotional loneliness are only moderately correlated (12). Thus, given these insights and the fact that loneliness is considered a public health concern (13) further research is clearly warranted.

The overall aim of the present study was to examine the associations between social and emotional loneliness and all-cause mortality. Given living alone in older age has been
repeatedly implicated as a risk factor for premature mortality (14, 15), we examined effects across individuals who do and do not live alone. In addition, we sought to examine functional status as a possible moderator of effects, given its relevance as a crucial marker of health in old age, in addition to being implicated in loneliness (16, 17). Further, personality traits have been repeatedly associated with loneliness (18), and health processes and mortality (16, 19, 20), and as such it was of importance to determine if they may act as a further potential moderator in the association between loneliness and mortality.

METHODS

Participants

Berlin Aging Study (BASE) begun between 1990-1993 and is a multidisciplinary investigation of older adults (21, 22). Participants recruited in the BASE were sourced using an obligatory population registry for the entire city of Berlin. The present sample comprised of 413 participants ($M \pm SD = 84.53 \pm 8.61$ years of age) differentiated by living status; those who either lived alone ($n = 253; M \pm SD = 85.19 \pm 8.51$ years of age; range = 70 – 103 years) or did not live alone at baseline ($n = 160; M \pm SD = 83.49 \pm 8.68$ years of age; range = 70 – 101 years).

Measures

Mortality

Status of mortality was defined as the number of days between the initial contact at baseline (between 1990 – 1993) and date of death. The final available update pertaining to the mortality status of participants was in July 2009. This study sample across follow-up consists of 385 deaths, and 28 reported as alive in their final update. The study comprised of 235
deaths and 18 reported as alive in those living alone ($M \pm SD = 2595.53 \pm 1991.04$ days; range = 176 - 7012 days), and 150 deaths and 10 reported as alive in those not living alone ($M \pm SD = 2486.49 \pm 1937.96$ days; range = 118 - 7012 days).

**Covariates**

The following variables were included as covariates: age; sex (male, female); education (elementary school, no apprenticeship; elementary school, apprenticeship; secondary school certificate, apprenticeship), income (defined as the net household income weighted by the number of people sharing the household), marital status (married, widowed, divorced, single), depressive illness (based on diagnosis in DSM-III-R into three categories [no depressive disorder, questionable depressive disorder, or depressive disorder]). Recent losses (defined as the total number of losses of very close individuals that the participant deemed as having occurred recently) was also examined. These variables were selected for the present study given they are repeatedly implicated in both health and mortality (23-26).

**Loneliness**

In order to assess loneliness, eight items were selected from the revised UCLA-Loneliness Scale (27). The scale captures both social (comprising of 4 items; e.g. “I feel part of a group of friends”) and emotional (comprising of 4 items; “I feel isolated”) loneliness. Items are scored on a 5-point Likert scale ranging from 1 “does not apply to me at all” to 5 “applies very well to me”. Higher scores on each scale represents greater feelings of loneliness. A complete list of original scale items, translations which were made for BASE, and correlations are available in Table 1. For cross-instrument comparability and ease of interpretation, scores for loneliness as a unidimensional measure, and both social and
emotional loneliness dimensions were converted to standard deviation units \((M = 0, \ SD = 1)\). Medium to small correlation coefficients were observed between social and emotional loneliness; in the complete sample \(r = .32\), in those living alone \(r = .35\), and those not living alone \(r = .24\). These coefficients are consistent with the range seen in existing research with older individuals (28). A linear structural relations (LISTREL) analysis of BASE data supports the use of both social and emotional loneliness factors (29). Cronbach’s alphas were loneliness = .74, social loneliness = .68, and emotional loneliness = .73.

**Table 1 Here**

**Functional Status**

A modified version of the Katz Index of Activities of Daily Living was employed to measure functional status (30). Participants indicated whether they need personal assistance with dressing, bathing, toileting, transferring, and eating (e.g. toileting example: “going to the toilet”). Total scores for the Katz Index represented a range from 0 (completely dependent on help) to 5 (completely independent). A high Cronbach’s alpha (0.87) was observed.

**Personality**

Neuroticism, extraversion, and openness to experience were measured using items from the NEO Personality Inventory (31). To measure each trait six items were used which were scored on a 5-point Likert scale which ranged from “does not apply to me at all” to “applies very well to me”. The following measures of internal reliability consistency were observed (Cronbach’s alpha; neuroticism = 0.75, extraversion = 0.65, openness to experience = 0.55).
Statistical Analyses

Statistical analyses were conducted using PASW Statistics 24.0 (SPSS Inc., Chicago, IL) and R (32). In order to consider time-to-event while including those reported as alive (censored), the Cox Proportional Hazards Model was used to estimate the risk of death. Models examining the association between the unidimensional measure of loneliness are reported both unadjusted and adjusted for covariates. Following this, models examining the association between both emotional and social loneliness were similarly reported. Variables in the model are entered simultaneously with effects and significance levels estimated following full adjustment. For categorical variables, the method of contrast was set to simple which allows each category of the predictor variable to be compared to the reference category, which was set to the first category in each instance. Further, significant effects were illustrated by dividing participants into tertiles of loneliness. Schoenfeld Residual Analysis revealed the assumption of proportional hazards was not violated. HRs and 95% CIs were reported for Cox Proportional Hazards analyses.

RESULTS

Table 2 Here

Firstly, we examined descriptive statistics of the present sample which revealed several significant differences within the present sample (see Table 2). Particularly noteworthy are the observed significant differences in sex and marital status observed between those who do and do not live alone. We then examined the unidimensional measurement of loneliness (\( M \pm SD = 2.13 \pm 0.61 \)) as a significant predictor of all-cause mortality. Loneliness emerged as a significant predictor of all-cause mortality within the unadjusted model (HR = 1.176; \( p < 0.001 \); 95% CI = 1.074 – 1.289). Following adjustment for all covariates the observed effect
was no longer significant (HR = 1.07; \( p = .22 \)). Given the previously outlined importance of considering living status, we also introduced an interaction between loneliness and living status which did not emerge as significant (HR_{interaction} = 0.85; \( p = .16 \)).

We then repeated this procedure with both social and emotional dimensions of loneliness. Within the unadjusted models, social loneliness did not emerge as a significant predictor of all-cause mortality (HR = 1.10; \( p = .057 \)). Emotional loneliness did emerge as a significant predictor (HR = 1.214; \( p < 0.001 \); 95% CI = 1.105 – 1.333). Following this, we examined both social and emotional loneliness effects within the fully adjusted model. Both social (HR = 1.01; \( p = .81 \)) and emotional (HR = 1.06; \( p = .29 \)) loneliness were not observed as significant following adjustment for all covariates. We then introduced an interaction term with living status for both dimensions. The interaction between emotional loneliness and living status emerged as significant (HR_{interaction} = 0.804; \( p = 0.043 \); 95% CI = 0.650 – 0.994), while social loneliness did not (HR_{interaction} = 0.95; \( p = .64 \)).

**Emotional Loneliness and Living Status**

In order to further examine the potential effects of emotional loneliness and living status, we examined emotional loneliness effects in persons who do and do not live alone. Within the unadjusted model, emotional loneliness emerged as a significant predictor of all-cause mortality in those living alone (HR = 1.316; \( p < 0.001 \); 95% CI = 1.160 – 1.493), but not in participants who did not (HR = 1.09; \( p = .25 \)). In fully adjusted model for those living alone, emotional loneliness remained significant following adjustment (HR = 1.186; \( p = 0.029 \); 95% CI = 1.017 – 1.383). Each 1 SD increase in emotional loneliness was associated with a 18.6% increased risk in all-cause mortality (see Fig 1). The other independent predictors in the model were sex (HR = 0.662; \( p = 0.007 \); 95% CI = 0.490– 0.892), age (HR = 1.114; \( p <
0.001; 95% CI = 1.091 – 1.138), education (comparison of elementary school, no apprenticeship, and both elementary school, apprenticeship (HR = 1.17; \( p = 0.31 \)), and secondary school certificate, apprenticeship, (HR = 1.651; \( p = 0.018 \); 95% CI = 1.190 – 2.501), marital status (all \( p \)’s > .29), income (\( p = .088 \)), depressive illness (all \( p \)’s > .45), and social loneliness (HR = 0.99; \( p = 0.94 \)). The observation that many of those living alone were widowed raised the possibility that bereavement may account for observed effects with emotional loneliness (see Table 2.). As such, we included the total number of recent losses of close persons within the adjusted model. The inclusion of recent losses within the model did not alter the effects of emotional loneliness (HR = 1.194; \( p = 0.024 \); 95% CI = 1.024 – 1.394).

Figure 1 Here

Figure 1. Kaplan-Meier plot of those living alone illustrating the proportion of persons surviving by tertiles of emotional loneliness. Note: The analyses examined days to death, years are represented here for clarity. + indicates censored points.

We also conducted a moderation analyses to determine potential pathways of the effect observed for emotional loneliness in those living alone. Firstly, functional status, and its interaction with emotional loneliness was entered within the fully adjusted model. Functional status significantly predicted mortality (HR = 0.766; \( p < 0.001 \); 95% CI = 0.685 – 0.865), with lower mortality among participants with better functional status. A significant effect also emerged for the interaction between emotional loneliness and functional status (HR_{interaction} = 1.179; \( p = 0.005 \); 95% CI = 1.051 – 1.323). Thus, for each increase in independence in functional status, the effect rate of loneliness on all-cause mortality increased by 17.9%. For
personality traits, all analyses revealed no significant interaction effect between neuroticism, extraversion, and openness to experience, and emotional loneliness (all \( p \)'s > .11).

**DISCUSSION**

While other studies have suggested emotional loneliness to be more damaging for health than social loneliness, the present study provides new evidence showing that emotional loneliness is associated with mortality in very old adults who live alone. More specifically, in a sample of older adults followed over 19 years, higher emotional loneliness was found to significantly predict an increased risk of all-cause mortality. This effect remained following the adjustment for several confounds, including clinically assessed depression. No significant effects were observed for social loneliness in those living alone. Similarly, no significant loneliness effects were observed for individuals who did not live alone. The previously observed significant effects for loneliness as a unidimensional measure did not remain significant following adjustment for all covariates.

A growing literature base is indicating the relevance of loneliness on health into old age. Here, however, we extend on this to show that emotional loneliness, which is often associated with feelings of abandonment and anxiety, to be the toxic component of loneliness. Moreover, it has identified those at greatest risk, older adults who live alone and experience this sense of emotional abandonment, whereas this risk was not evident in those older adults living with someone and had the same experiences. This could well be the result of living alone being primarily the result of bereavement. While the supplementary examination of recent losses did not alter the effect, further research needs to examine this potential pathway in detail. Further, a full examination of possible biobehavioral pathways in the associations between emotional loneliness, living alone, and mortality is required. While speculative, the mechanisms implicated within existing literature on loneliness more broadly
(e.g. increased hypothalamic adrenocortical functioning, altered gene expression, increased inflammation, and poor sleep (for review see 33 and 34) may be similar.

Increases in emotional loneliness resulted in an increase of the effect rate of functional status on mortality. Functional status is a crucial marker of health in old age, and its decline represents health deterioration. Existing research has linked functional status and loneliness (35). This study provides new evidence that functional status may provide a pathway in the association between emotional loneliness and mortality in persons who live alone. Further, despite personality traits accounting for an individual’s tendency to exhibit consistent thoughts, emotions, and behaviors over long periods of time, and being repeatedly associated with loneliness, they did not emerge as significant moderators of emotional loneliness and mortality.

STRENGTHS AND LIMITATIONS

The present study examined a heterogeneous and locally representative sample followed over a long period. This study also employed several data forms known to predict all-cause mortality. The study employed theoretically appropriate and methodologically robust covariates. However, limitations must be duly noted. This study is of the oldest old, and as such, it is unclear how these effects generalise to younger cohorts. It must also be noted that the translated items for the UCLA loneliness scale employed within BASE may also be open to cultural influences in its interpretation. Future research must also consider the generalisability of these findings in the context of cultural differences across countries. Cultural differences between individualistic and collectivistic societies across Europe in the experience of loneliness have been documented (36). Further, while average levels of loneliness within the present sample are below the midpoint of the scale with the complete range of ratings used, it is difficult to compare loneliness levels across studies given a subset
of items from the UCLA loneliness scale were used during data collection. In addition, the variable included to address the possibility of bereavement may not capture the loss of a close individual beyond what an individual may consider recent. As such, it is imperative that future research clearly examines the potential for a bereavement pathway within the loneliness and mortality context. It would have been beneficial to the study if information pertaining to status of living alone was available repeatedly over the follow-up period. This would have provided a clearer separation of both groups across the entire follow-up period.

In addition, future research should consider the associations between loneliness and various illness and disease trajectories and their resulting effect on mortality, particularly in the case of samples consisting of the oldest old. While there was no information available about cause of death in the present sample, future research should examine potential associations with specific types of mortality.

CONCLUSIONS

This study provides new evidence that emotional loneliness is associated with all-cause mortality in older adults who were living alone. Those highest in emotional loneliness were at a greater risk of premature mortality. Functional status was identified as one potential pathway of effect. Present findings suggest future research would benefit from the further examination of associations between emotional loneliness and mortality in older adults who live alone. The results of this present study would suggest that the emotional component of loneliness appears to be of relevance to mortality, above social loneliness effects.
REFERENCES

1. Holt-Lunstad J, Smith TB, Baker M, Harris T, Stephenson D. Loneliness and social isolation as risk factors for mortality: a meta-analytic review. Perspect Psychol Sci 2015;10(2):227-37.

2. Holwerda TJ, Deeg DJ, Beekman AT, van Tilburg TG, Stek ML, Jonker C, Schoevers RA. Feelings of loneliness, but not social isolation, predict dementia onset: results from the Amsterdam Study of the Elderly (AMSTEL). J Neurol Neurosurg Psychiatry 2014;85(2):135-42.

3. Valtorta NK, Kanaan M, Gilbody S, Ronzi S, Hanratty B. Loneliness and social isolation as risk factors for coronary heart disease and stroke: systematic review and meta-analysis of longitudinal observational studies. Heart 2016;102(13):1009-16.

4. Steptoe A, Shankar A, Demakakos P, Wardle J. Social isolation, loneliness, and all-cause mortality in older men and women. Proc Natl Acad Sci 2013;110(15):5797-801.

5. Cacioppo JT, Hughes ME, Waite LJ, Hawkley LC, Thisted RA. Loneliness as a specific risk factor for depressive symptoms: cross-sectional and longitudinal analyses. Psychol Aging. 2006 Mar;21(1):140.

6. Mellor D, Stokes M, Firth L, Hayashi Y, Cummins R. Need for belonging, relationship satisfaction, loneliness, and life satisfaction. Pers Individ Dif 2008;45(3):213-8.
7. Valtorta NK, Kanaan M, Gilbody S, Hanratty B. Loneliness, social isolation and risk of cardiovascular disease in the English Longitudinal Study of Ageing. Eur J Prev Cardiol 2018;25(13):1387-96.

8. Brown EG, Gallagher S, Creaven AM. Loneliness and acute stress reactivity: A systematic review of psychophysiological studies. Psychophysiology 2018;55(5):e13031.

9. Weiss RS. Loneliness: The experience of emotional and social isolation. Cambridge, MA, US: The MIT Press; 1973

10. Diehl K, Jansen C, Ishchanova K, Hilger-Kolb J. Loneliness at universities: determinants of emotional and social loneliness among students. Int J Environ Res Public Health 2018;15(9):1865.

11. Peerenboom L, Collard RM, Naarding P, Comijs HC. The association between depression and emotional and social loneliness in older persons and the influence of social support, cognitive functioning and personality: A cross-sectional study. J Affect Disord 2015;182:26-31.

12. Liu BS, Rook KS. Emotional and social loneliness in later life: Associations with positive versus negative social exchanges. J Soc Pers Relat 2013 Sep;30(6):813-32.

13. Hunter D. Loneliness: a public health issue. Perspect Public Health. 2012;132(4):153.
14. Abell J, Steptoe A. Living alone and mortality: more complicated than it seems. Eur Heart J Qual Care Clin Outcomes, in press

15. Jensen MT, Marott JL, Holtermann A, Gyntelberg F. Living alone is associated with all-cause and cardiovascular mortality. Eur Heart J Qual Care Clin Outcomes, in press

16. O’Súilleabháin PS, Hughes BM. Neuroticism predicts all-cause mortality over 19-years: The moderating effects on functional status, and the angiotensin-converting enzyme. J Psychosom Res 2018;110:32-7.

17. Perissinotto CM, Cenzer IS, Covinsky KE. Loneliness in older persons: a predictor of functional decline and death. Arch Intern Med 2012;172(14):1078-84.

18. Wang B, Dong X. The association between personality and loneliness: Findings from a community-dwelling Chinese aging population. Gerontol Geriatr Med 2018;24;4:1-9.

19. O’Súilleabháin PS, Howard S, Hughes BM. Openness to experience and adapting to change: Cardiovascular stress habituation to change in acute stress exposure. Psychophysiology 2018;55(5):e13023.
20. O’Súilleabháin PS, Howard S, Hughes BM. Openness to experience and stress responsivity: An examination of cardiovascular and underlying hemodynamic trajectories within an acute stress exposure. PloS one. 2018 18;13(6):e0199221.

21. Baltes PB, Mayer KU. The Berlin aging study: Aging from 70 to 100. New York: Cambridge University Press; 2001.

22. Lindenberger U, Smith J, Mayer KU, Baltes, PB (Hrsg.). Die Berliner Altersstudie (3. erw. Aufl.). Berlin: Akademie Verlag; 2010.

23. National Institutes of Health. NIH Strategic Plan for Women’s Health Research. Available at: http://orwh.od.nih.gov/research/strategic-plan/. Accessed September 03, 2018.

24. Cutler DM, Lleras-Muney A. Education and health: evaluating theories and evidence. National Bureau of Economic Research (Working Paper) 2006.

25. Adler NE, Boyce T, Chesney MA, Cohen S, Folkman S, Kahn RL, Syme SL. Socioeconomic status and health: The challenge of the gradient. Am Psychol 1994;49:15-24.

26. Penninx BW, Beekman AT, Honig A, Deeg DJ, Schoevers RA, van Eijk JT, van Tilburg W. Depression and cardiac mortality: results from a community-based longitudinal study. Arch Gen Psychiatry 2001;58:221-7.
27. Russell D, Cutrona CE, Rose J, Yurko K. Social and emotional loneliness: an examination of Weiss's typology of loneliness. J Pers Soc Psychol 1984;46(6):1313-21.

28. Green LR, Richardson DS, Lago T, Schatten-Jones EC. Network correlates of social and emotional loneliness in young and older adults. Pers Soc Psychol Bull 2001;27(3):281-8.

29. Smith J, Baltes PB. Trends and profiles of psychological functioning in very old age. In: Baltes PB, Mayer KU, editors. The Berlin aging study: Aging from 70 to 100. New York: Cambridge University Press; 2001.

30. Katz S, Downs TD, Cash HR, Grotz RC. Progress in development of the index of ADL. Gerontologist 1970;10:20-30.

31. Costa PT Jr, McCrae RR. The NEO Personality Inventory manual. Odessa, FL: Psychological Assessment Resources; 1985.

32. RDC Team. R: A language and environment for statistical computing. Vienna: R Foundation for Statistical Computing. 2004 Available: http://www.R-project.org. Accessed 03 September 2018.

33. Ong AD, Uchino BN, Wethington E. Loneliness and health in older adults: A mini-review and synthesis. Gerontology. 2016;62(4):443-9.
34. Hawkley LC, Capitanio JP. Perceived social isolation, evolutionary fitness and health outcomes: a lifespan approach. Philos Trans R Soc Lond B Biol Sci 2015;370(1669):20140114.

35. Shankar A, McMunn A, Demakakos P, Hamer M, Steptoe A. Social isolation and loneliness: Prospective associations with functional status in older adults. Health Psychol 2017;36(2):179-187.

36. Lykes VA, Kemmelmeier M. What predicts loneliness? Cultural difference between individualistic and collectivistic societies in Europe. J Cross Cult Psychol 2014;45(3):468-90.
Table 1. Correlation matrix of loneliness items, including translations.

| Original Items | German Translation | Dimension | 1  | 2  | 3  | 4  | 5  | 6  | 7  |
|----------------|---------------------|-----------|----|----|----|----|----|----|----|
| [1] I do not feel alone | Ich fühle mich allein\(^1\) | Emotional |  |    |    |    |    |    |    |
| [2] I lack companionship | Ich habe wenig Gesellschaft | Emotional | .410** |    |    |    |    |    |    |
| [3] There are people I feel close to | Es gibt Menschen, die mir nahe stehen | Social | .129** | .140** |    |    |    |    |    |
| [4] I feel isolated | Ich fühle mich isoliert | Emotional | .483** | .406** | .186** |    |    |    |    |
| [5] There are people I can turn to | Es gibt Personen, an die ich mich vertrauensvoll wenden kann | Social | .163** | .127** | .364** | .174** |    |    |    |
| [6] I feel left out | Ich fühle mich ausgeschlossen | Emotional | .321** | .342** | .262** | .531** | .209** |    |    |
| [7] I feel part of a group of friends | Ich fühle mich einem Bekanntenkreis zugehörig | Social | .123* | .264** | .349** | .176** | .336** | .149** |    |
| [8] There are people I can talk to | Es gibt Menschen, mit denen ich offen sprechen kann | Social | .172** | .129** | .326** | .239** | .555** | .241** | .271** |

\(^1\)Double-negatives were avoided in the translation. * \(p < .05\), ** \(p < .01\)
Table 2. Descriptive statistics of the present sample.

|                        | Living Alone (n = 253) | Not Living Alone (n = 160) | t-test/Chi-Square |
|------------------------|------------------------|-----------------------------|-------------------|
|                        | M/n SD/%               | M/n SD/%                    |                   |
| Age (Years)            | 85.19 8.51             | 83.49 8.68                  | 0.051             |
| Sex                    |                        |                             | <0.001            |
| Male                   | 98 38.7%               | 125 78.1%                   |                   |
| Female                 | 155 61.3%              | 35 21.9%                    |                   |
| Education              |                        |                             | 0.111             |
| Elementary School, No Apprenticeship | 77 30.4%               | 36 22.5%                    |                   |
| Elementary School, Apprenticeship | 123 48.6%              | 79 49.4%                    |                   |
| Secondary School Certificate, apprenticeship | 53 20.9%               | 45 28.1%                    |                   |
| Income (Deutsche Mark)*| 2067.77 960.66         | 1824.12 873.69              | 0.010             |
| Depressive Illness     |                        |                             | 0.007             |
| No Depressive Disorder | 132 52.2%              | 108 67.5%                   |                   |
| Questionable Depressive Disorder | 103 40.7%              | 42 26.3%                    |                   |
| Depressive Disorder    | 18 7.1%                | 10 6.3%                     |                   |
| Marital Status | | | | |
|----------------|----------------|----------------|----------------|
| Married        | 8              | 3.2%            | 122            | 76.3%          |
| Widowed        | 191            | 75.5%           | 35             | 21.9%          |
| Divorced       | 26             | 10.3%           | 0              | 0%             |
| Single         | 28             | 11.1%           | 3              | 1.9%           |

| Recent losses | 0.91 | 1.20 | 0.75 | 1.21 | 0.182 |
| Functional Status | 4.55 | 1.15 | 4.38 | 1.32 | 0.147 |
| Neuroticism    | 2.38 | 0.79 | 2.22 | 0.71 | 0.035 |
| Extraversion   | 3.37 | 0.56 | 3.35 | 0.61 | 0.735 |
| Openness to Experience | 3.13 | 0.59 | 2.97 | 0.55 | 0.007 |
| Loneliness (unidimensional)* | 2.23 | 0.64 | 1.96 | 0.53 | <0.001 |
| Emotional Loneliness* | 2.42 | 0.87 | 1.99 | 0.70 | <0.001 |
| Social Loneliness* | 2.05 | 0.70 | 1.95 | 0.65 | 0.133 |

*Represents raw values prior to conversion to standard deviation units.