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# Use of Direct Versus Indirect Approaches to Measure Loneliness in Later Life

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## Abstract

The aim of the current investigation was to compare a direct versus an indirect approach for measuring loneliness by comparing the one-item Center for Epidemiologic Studies Depression Scale, representing the direct approach, with the shortened version of the Revised UCLA Loneliness Scale, representing the indirect approach, using approximately 2,000 observations from the 2002 Health and Retirement Study. The authors artificially identified a cut point of  $\geq 6$  on the three-item Revised UCLA Loneliness Scale to potentially yield the most similar results to the single-item scale and demonstrate the best sensitivity and specificity. Nonetheless, a high rate of respondents (57%) who reported being lonely on the direct item were classified as not lonely on the indirect scale. Inconsistency between the two approaches was also evident with regard to the associations between loneliness and age, as well as with education. These findings indicate that the different measures of loneliness provide a somewhat different picture of both the prevalence of loneliness and the characteristic of the people who suffer from it.

## Keywords

loneliness, direct measurement, indirect measurement, HRS

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Loneliness is a socially prevalent phenomenon among older adults, mainly at advanced ages (Dykstra, 2009; Dykstra, Van Tilburg, & de Jong Gierveld, 2005). In a representative sample of British community-dwelling older people, almost 40% experienced loneliness to some degree. Of these, 7% reported feeling lonely often or always (Victor, Scambler, Bowling, & Bond, 2005). Similar prevalence rates were recently found in France, Germany, Israel, and Italy among Survey of Health, Ageing, and Retirement in Europe participants aged 65 years and older, with an even higher prevalence rate found in Greece (Sundström, Fransson, Malmberg, & Davey, 2009). Contemporary estimates in the United States suggest that 17% of the people aged 50 years and older experience loneliness (Theeke, 2010). Despite these high prevalence rates, it may well be that these studies underrepresent levels of loneliness among older people because of a reluctance of lonely people to take part in studies (Pinquart & Sörensen, 2001) and to admit their loneliness (Victor, Scambler, et al., 2005).

Along with these high prevalence rates, which cannot be ignored, the growing research interest in feelings of loneliness is concerned with the damaging effects that loneliness has on the mental and physical health of older adults. Advanced analyses using longitudinal data provide strong support for the effect of loneliness on depressive symptomatology (Cacioppo, Hawkey, & Thisted, 2010; VanderWeele, Hawkey, Thisted, & Cacioppo, 2011). Loneliness was also found to be negatively associated with emotional well-being (Lee & Ishii-Kuntz, 1987), positively associated with daytime dysfunction in terms of low energy and fatigue (Hawkey, Preacher, & Cacioppo, 2010), lower quality of life (Ekwall, Sivberg, & Hallberg, 2005) and serious thoughts of suicide and parasuicide (Stravynski & Boyer, 2001).

Alongside the influences on the mental sphere, loneliness is associated with impaired physical health. Loneliness was found to be associated with elevated systolic blood pressure and was identified as a unique predictor of age-related increases in systolic blood pressure (Hawkey, Masi, Berry, & Cacioppo, 2006). Loneliness was also found to be negatively associated with cardiovascular health by predicting higher basal total peripheral resistance and lower cardiac output (Hawkey, Burleson, Berntson, & Cacioppo, 2003). In a longitudinal study, chronically lonely individuals had shown poorer physical health, in terms of chronic illnesses and greater number of nights in nursing homes (Theeke, 2010).

Moreover, loneliness has shown to be a risk for mortality. Recently, analysis of four waves of the Health and Retirement Study (HRS), a longitudinal study carried out in the United States, revealed that both those identified as “situationally lonely” as well as those identified as “chronically lonely” had

a greater risk for all-cause mortality net of the effect of possible demographic and health confounders (Shiovitz-Ezra & Ayalon, 2010). The association between loneliness and mortality was also substantiated in several studies in Europe (Maier & Smith, 1999; Penninx et al., 1997) and in a more oriental society such as Japan (Sugisawa, Liang, & Liu, 1994).

Given the serious implications loneliness has on older adults' lives, it is important to gather intensive insights into its roots. Theorists and researchers place loneliness in the subjective sphere. It is accepted that loneliness as opposed to social isolation is a discrete, subjective construct associated with objective social situation but not synonymous with actual circumstances. Thus, people can feel lonely in a crowd or be alone without feeling lonely (Andersson, 1998; Peplau & Perlman, 1982). According to the cognitive theory, a sense of loneliness results from the perceived discrepancy between one's optimal levels of social ties (desired levels) and actual social relationships (achieved levels) (Peplau & Perlman, 1982).

The conceptual differentiation between the objective social situation characterized by a lack of relationships with others, defined as aloneness or social isolation (Dykstra, 2009), and the more subjective phenomenon defined as loneliness leads to distinct ways of measuring the two facets. Whereas social isolation is commonly measured by quantitative objective measures of one's social network, such as number of friends and family members, frequency of contact with network members, being unmarried, and living alone (Cornwell & Waite, 2009), the measurement of loneliness most often involves subjective evaluation of the objective social circumstances (Hughes, Waite, Hawkey, & Cacioppo, 2004).

There are two common approaches that capture the subjective nature of loneliness. First is the single self-labeling item that asks directly whether a person has felt lonely or loneliness in general or within a specific time frame, such as during the previous month or week (Marangoni & Ickes, 1989). This is known as the direct way of measuring loneliness because of the inclusion of the specific word *lonely* or *loneliness* in the question. The single direct question has been used extensively in past and contemporary research (Routasalo, Savikko, Tilvis, Strandberg, & Pitkälä, 2006; Savikko, Routasalo, Tilvis, Strandberg, & Pitkälä, 2005; Shiovitz-Ezra & Ayalon, 2010; Sundström et al., 2009; Thurston & Kubzansky, 2009) and is considered a common way to measure loneliness in epidemiological studies.

Nevertheless, the methodological literature has substantiated several profound shortcomings of the single self-rating measure of loneliness. The first is concerned with the willingness of respondents to admit to being lonely. Previous experimental studies have demonstrated that lonely people are

socially stigmatized and are perceived much more negatively compared with their counterparts who are not lonely: They are perceived as weaker, passive, and less attractive and achieve less social acceptance (Lau & Gruen, 1992; Rotenberg, 1998; Rotenberg & Kmill, 1992). The “social stigma” view of loneliness (Crocker & Major, 1989) motivates respondents to avoid characterizing themselves as lonely (Victor, Scambler, Bond, & Bowling, 2000; Victor, Scambler, et al., 2005). Therefore, it has been argued that the direct method has the potential to result in underestimation of loneliness, because lonely people do not tend to report loneliness, even though their lives are surrounded by these burdensome feelings. Another related issue is possible unawareness of loneliness. It has been argued that “the experience of loneliness may not always be consciously recognized or verbalized as such” (Marangoni & Ickes, 1989, p. 94). This might also lead to a biased estimation of loneliness using the self-labeling method. Added to that is the reliability problem of single-item measures (Marangoni & Ickes, 1989) and the multiple versions of the single loneliness item used in different inquires that complicate cross-study comparisons (Russell, 1982).

The alternative approach of measuring loneliness is through the use of multiple-item scales that do not explicitly use the word *loneliness* and are therefore referred to as the indirect way of evaluating loneliness. Included in this category are two of the most widely used measures of loneliness, the Revised UCLA Loneliness Scale (R-UCLA; Russell, 1996; Russell, Peplau, & Cutrona, 1980) and the De Jong Gierveld Loneliness Scale (de Jong Gierveld & Kamphuis, 1985).

The R-UCLA is one of the most widespread scales of loneliness that has been used extensively in studies conducted in the United States (Cacioppo et al., 2010; Hawkey et al. 2006; Hawkey, Thisted, & Cacioppo, 2009; Steptoe, Owen, Kunz-Ebrecht, & Brydon, 2004; VanderWeele et al., 2011). It is a unidimensional, 20-item, self-report scale that asks respondents to rate how often they feel certain feelings that implicitly capture loneliness or social isolation (e.g., “How often do you feel left out?”) on a 4-point, Likert-type scale ranging from 1 (*never*) to 4 (*often*). The R-UCLA was proven to have good psychometric properties and has several shortened versions used in social surveys, with the shortest one comprising only three items of adequate psychometric properties (Hughes et al., 2004).

The De Jong Gierveld Loneliness Scale (de Jong Gierveld & Kamphuis, 1985), on the other hand, is an 11-item, two-dimensional scale mostly used in research projects carried out in Europe (Dykstra & de Jong Gierveld 2004; Tjihuis, de Jong Gierveld, Feskens, & Kromhout, 1999; Van Baarsen, Snijders, Smit, & Van Duijn, 2001). The formulation of this scale is based

on Weiss's (1973) theoretical classification of emotional loneliness and social loneliness. The former emphasizes the absence of an intimate figure that may take place following a divorce or the death of a partner. Social loneliness, on the other hand, relates to the absence of valued social networks. Therefore, 6 of the 11 items, such as "I often feel rejected," are used as indicators of emotional loneliness, and the other 5 reflect social loneliness (e.g., "I can call on my friends whenever I need them"). Response categories for each item range from 1 to 5. Recently, a shortened version of 6 items was found reliable and valid (de Jong Gierveld & Van Tilburg, 2006). The main disagreement between the two indirect scales lies in the conceptualization of loneliness as either a unidimensional or a multidimensional construct (Marangoni & Ickes, 1989).

As mentioned earlier, both classification methods of loneliness, direct and indirect measurement, are used extensively in loneliness research, albeit not without problems. Little is known about the level of agreement between the two methods. The one study to address this question compared the differing loneliness measures in a restricted Australian sample and focused solely on prevalence estimates yielded by using different methods of measurement (Victor, Grenade, & Boldy, 2005). Another empirical attempt, albeit an indirect one, can be found in Borys and Perlman's (1985) study, which was mainly concerned with gender differences in loneliness. Their analysis of 39 data sets revealed that women were more likely to label themselves as lonely on the loneliness direct self-reporting question, whereas the indirect measure (the UCLA Loneliness Scale) yielded no gender differences or even a reverse finding, with men reporting greater loneliness compared with women (Borys & Perlman 1985).

Nevertheless, the latter examined the different approaches with regard to gender only, and the results were based on different data sets, each using different methods. Given the shortcomings of past research, aim of the present study was to achieve better understanding of the two measurement approaches. Specifically, we are interested in the degree of concordance between the two measurement approaches as well as the specific characteristics of individuals who are being classified as lonely by each approach. In other words, do both measurement styles show the same prevalence rates of loneliness in a large representative sample? Do both measurement styles capture the same people? Who is more likely to acknowledge loneliness using the direct versus the indirect measures of loneliness? To test both methods, we analyzed data from the 2002 wave of the HRS, which used both the direct self-report measure as well as an indirect scale.

## Methods

The HRS is a nationally representative sample of individuals aged 50 years and older living in the United States (<http://hrsonline.isr.umich.edu>). The HRS is sponsored by the National Institute on Aging and is conducted by the University of Michigan. The study is reviewed and approved by the University of Michigan's Health Sciences Institutional Review Board. Participants take part in a biennial interview that covers a range of topics, including income, wealth, work, retirement, health, health care utilization, and so on.

The HRS began in 1992 as a longitudinal study of a preretirement cohort of individuals born between 1931 and 1941 and their spouses of any age. It was combined with additional cohorts in 1993 (the Asset and Health Dynamics of the Oldest-Old cohort, born in 1923 and earlier) and 1998 to represent the entire population aged 51 years and older as of 1998 (born in 1947 and earlier). It currently represents a national area probability sample of U.S. households, with oversamples of Blacks, Hispanics, and residents of the state of Florida. The HRS includes data on over 30,000 individuals. Response rates over the years have varied from a low of 84% to a high of 93%. The primary mode used for baseline interviews and for those over the age of 80 years is face to face. Follow-up interviews are usually conducted over the phone.

Data for the present study were collected in 2002. Overall, 18,167 individuals responded to the 2002 HRS questionnaire. In addition to the core interview, each wave of the HRS includes additional modules on selected topics that are administered to randomly selected participants. Randomization is computerized and is conducted by the University of Michigan. The potential analytic sample for this study was the 3,008 participants who were randomly selected to participate in a module designed to evaluate feelings of loneliness.

## Measures

*Loneliness.* Loneliness was evaluated in two ways, directly and indirectly. Direct measurement involved one item taken from the Center for Epidemiologic Studies Depression Scale (CES-D) concerning loneliness. The CES-D is a commonly used measure for the assessment of depression in population studies (Radloff, 1977). The HRS uses the eight-item version of the CES-D. The items on the scale represent symptoms associated with depression. The single loneliness item asks respondents directly whether they felt lonely

much of the time over the past week. Response options are “yes” and “no.” For indirect measurement, the three-item R-UCLA, an abbreviation of the commonly used R-UCLA (Russell et al., 1980) for the assessment of loneliness, was used. Respondents were asked to rate, on a 3-point scale, how often they felt a lack of companionship, left out, or isolated from others. Responses to each question are summed, with higher scores indicating greater loneliness. The psychometric properties of the abbreviated three-item scale have shown to be adequate in past research (Hughes et al., 2004). In the present study, Cronbach’s  $\alpha$  coefficient was .71. As mentioned earlier, the R-UCLA is a unidimensional scale and therefore does not make a distinction between social and emotional loneliness.

*Health variables.* Medical status was measured using a sum of indicators for whether a doctor has ever told the respondent that he or she has ever had a particular disease. The eight included diseases are high blood pressure, diabetes, cancer, lung disease, heart disease, stroke, psychiatric problems, and arthritis. The presence of more than one condition was rated as 1, whereas one or less were considered 0. Activities of Daily Living (ADL) includes the five tasks bathing, eating, dressing, walking across a room, and getting in or out of bed. Assistance in more than one task was coded as one.

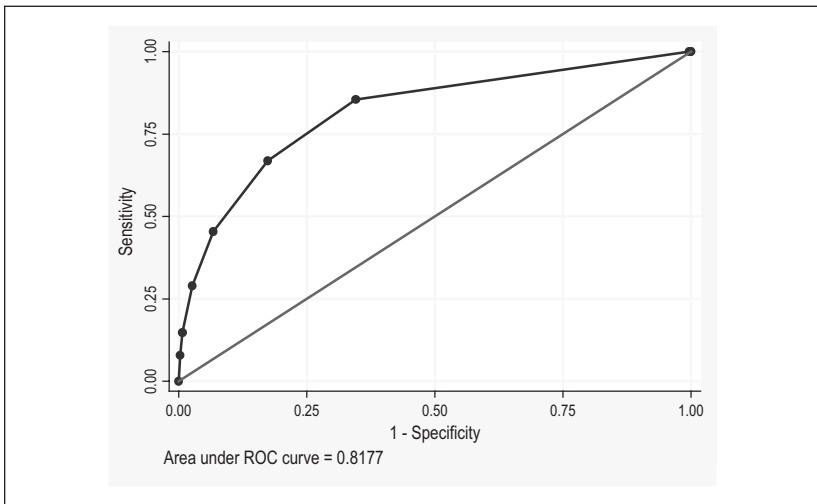
*Demographic variables.* Age (<65, 65 to 74, or >75 years), gender, and education (0 to 12 or >12 years), were evaluated on the basis of self-report.

### Statistical Analysis

We first evaluated the specificity and sensitivity of the three-item R-UCLA against the single loneliness item taken from the CES-D, using receiver-operating characteristic (ROC) curves. Such analysis allows for direct comparison of the two methods. ROC curves are used to assess the ability of a tool to discriminate between cases and noncases (Griner, Mayewski, Mushlin, & Greenland, 1981). ROC curves can also be used to compare the diagnostic performance of various tools (DeLong, DeLong, & Clarke-Pearson, 1988). In ROC curve analysis, the true-positive rate (sensitivity) is plotted against the false-positive rate ( $1 - \text{specificity}$ ). An area under the curve of 1 represents perfect predictive ability, whereas an area of 0.5 represents worthless predictive ability. Thus, the closer the area under the curve is to 1, the better the discriminative ability of the tool.

Because there is no established cutoff for the three-item R-UCLA, we identified an artificial cut point on the three-item scale that would yield the most similar results to the one-item CES-D by identifying a similar portion of respondents as lonely and by demonstrating the best sensitivity and





**Figure 1.** The continuous three-item Revised UCLA Loneliness Scale relative to the one-item Center for Epidemiologic Studies Depression Scale.

Note: ROC = receiver-operating characteristic.

specificity possible. Next, we evaluated the degree of concordance between the one-item CES-D and the dichotomized three-item R-UCLA, using  $\chi^2$  analysis and  $\kappa$  statistics. The  $\kappa$  statistic examines the degree of agreement beyond what would occur by chance. A  $\kappa$  value of 0 indicates that the level of agreement is no more than would be expected by chance alone, while a  $\kappa$  value of 1 indicates perfect agreement. Finally, we evaluated the unique association of the three methods of classification of loneliness (one-item CES-D, dichotomized three-item R-UCLA, and continuous three-item R-UCLA) with a variety of demographic and clinical variables, using  $\chi^2$  analyses for the two categorical scales and analysis of variance or  $t$  tests for the continuous scales. Descriptive statistics were weighted to account for the complex sampling design.

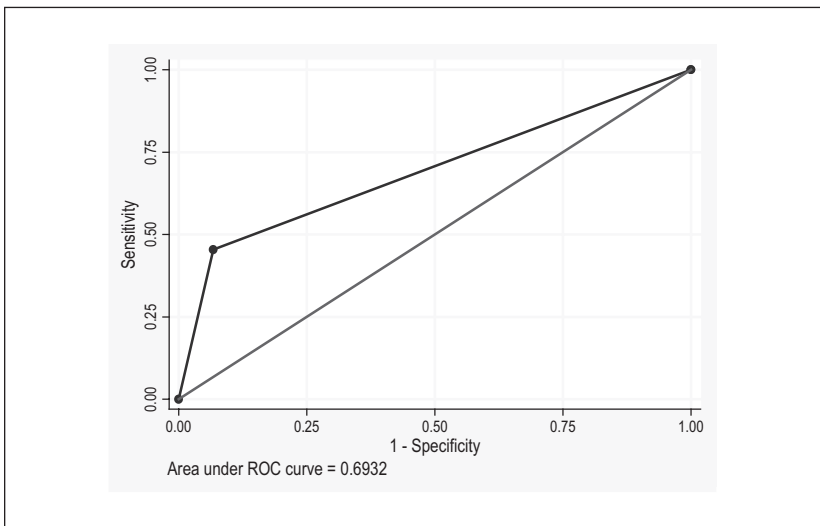
## Results

Evaluating the continuous three-item R-UCLA against the one-item CES-D (as an artificial standard for determining lonely vs. not lonely) yielded an area under the curve of .81, indicating that the two measures largely classify similar individuals as lonely (Figure 1).

**Table 1.** Sensitivity and Specificity of the Continuous Three-Item R-UCLA Versus the One-Item CES-D

| Cut Point | Sensitivity | Specificity | Correctly Classified |
|-----------|-------------|-------------|----------------------|
| $\geq 1$  | 100%        | 0%          | 14%                  |
| $\geq 2$  | 100%        | 0.1%        | 15%                  |
| $\geq 3$  | 100%        | 0.3%        | 15%                  |
| $\geq 4$  | 85%         | 65%         | 68%                  |
| $\geq 5$  | 67%         | 83%         | 80%                  |
| $\geq 6$  | <b>45%</b>  | <b>93%</b>  | <b>86%</b>           |
| $\geq 7$  | 29%         | 97%         | 87%                  |
| $\geq 8$  | 15%         | 99%         | 87%                  |
| $\geq 9$  | 8%          | 100%        | 86%                  |
| $> 9$     | 0%          | 100%        | 85%                  |

Note: CES-D = Center for Epidemiologic Studies Depression Scale; R-UCLA = Revised UCLA Loneliness Scale.

**Figure 2.** The dichotomized three-item Revised UCLA Loneliness Scale relative to the one-item Center for Epidemiologic Studies Depression Scale.

Note: ROC = receiver-operating characteristic. Sensitivity = 45%, specificity = 93%.

We then dichotomized the three-item R-UCLA using a cut point of  $\geq 6$ . This cutoff was selected to provide the greatest resemblance to the classification used by the single-item scale in terms of the percentage of individuals

**Table 2.** Comparison of the Two Methods of Classification

|                |            | Three-Item R-UCLA<br>(Dichotomized) |           |       |
|----------------|------------|-------------------------------------|-----------|-------|
|                |            | Not Lonely                          | Lonely    |       |
| One-Item CES-D | Not lonely | 1,745 (94%)                         | 127 (6%)  | 1,872 |
|                | Lonely     | 173 (55%)                           | 144 (45%) | 314   |
|                |            | 1,918                               | 271       | 1,998 |

Note: CES-D = Center for Epidemiologic Studies Depression Scale; R-UCLA = Revised UCLA Loneliness Scale.  $\chi^2(1) = 387.42$ ,  $p < .001$ ;  $\kappa = .27$ .

identified as lonely versus not lonely as well as the best sensitivity and specificity relative to the single-item measure. The dichotomized three-item R-UCLA resulted in sensitivity of 45% and specificity of 93%. The area under the curve was .69 (Table 1, Figure 2). This suggests that even under the best circumstances, when we artificially dichotomized the continuous indirect three-item R-UCLA to provide the best proximity to the direct single-item CES-D measure, only 45% of those who reported being lonely on the direct measure were also classified as such on the indirect measure. Nonetheless, almost none of those who denied being lonely on the direct measure were classified as lonely by the indirect measure, as indicated by a specificity of 93%. It is important to note, however, that using a higher cutoff, would have resulted in even worse sensitivity and better specificity, whereas a lower cutoff would have resulted in better sensitivity but worse specificity. Nevertheless, no matter what cutoff used, the two measurement formats would have captured somewhat different individuals as lonely versus not lonely.

Consistently,  $\chi^2$  analysis revealed that the two classifications (one-item CES-D vs. dichotomized three-item R-UCLA) are significantly different (see Table 2). Although most individuals who reported being not lonely on the single direct item were classified as not lonely on the indirect scale as well, as many as 57% of those who reported being lonely on the direct item were classified as not lonely on the indirect scale. This was further corroborated with a  $\kappa$  statistic of .27, suggesting only minimal agreement between the two classification methods.

Table 3 summarizes the demographic and clinical characteristics of the sample by loneliness. As can be seen, the three measurements of loneliness (one-item CES-D, dichotomized three-item R-UCLA, and continuous three-item R-UCLA) yielded somewhat different results. Age was a significant

**Table 3.** Clinical and Demographic Characteristics of the Sample by Loneliness

| Variable          | Loneliness Based on the Single-Item Question From the CES-D (n = 2,446) |                  |                        | Loneliness Based on the Dichotomized Three-Item R-UCLA (n = 2,190) |                  |                        | Loneliness Based on the Continuous Three-Item R-UCLA (n = 2,190) |             |       |
|-------------------|---|------------------|------------------------|--|------------------|------------------------|--|-------------|-------|
|                   | Total (n = 3,008)   | Lonely (n = 387) | Not Lonely (n = 2,059) | p  | Lonely (n = 272) | Not Lonely (n = 1,918) | p  | M (SD)      | p     |
| Age (years)       |   |                  |                        | .001   |                  |                        | .39  |             | .17   |
| <65               | 1,296 (44.8%)   | 149 (11.3%)      | 968 (88.8%)            |  | 119 (10.4%)      | 856 (89.5%)            |  | 3.77 (0.05) |       |
| 65 to 75          | 957 (30.4%)   | 127 (15.4%)      | 681 (84.5%)            |  | 91 (11.4%)       | 639 (88.5%)            |  | 3.84 (0.06) |       |
| >75               | 755 (24.7%)   | 111 (19.5%)      | 410 (80.4%)            | .19  | 62 (13.3%)       | 423 (86.7%)            | .006   | 3.92 (0.06) | <.001 |
| Education (years) |   |                  |                        |  |                  |                        |  |             |       |
| 0 to 12           | 1,878 (61.1%)   | 280 (17.6%)      | 1,206 (82.4%)          |  | 188 (13.4%)      | 1,125 (86.5%)          |  | 3.93 (0.05) |       |
| >12               | 1,128 (38.8%)   | 107 (9.8%)       | 852 (90.1%)            | .006   | 84 (8.5%)        | 793 (91.4%)            | .001   | 3.68 (0.04) | <.001 |
| Gender            |   |                  |                        |  |                  |                        |  |             |       |
| Male              | 1,179 (43.9%)   | 108 (11.5%)      | 775 (88.4%)            |  | 73 (8.5%)        | 716 (91.4%)            |  | 3.62 (0.04) |       |
| Female            | 1,829 (56.0%)   | 279 (16.4%)      | 1,284 (83.5%)          | <.001  | 199 (13.4%)      | 1,202 (86.5%)          | <.001  | 3.97 (0.04) | <.001 |
| ADL impairments   |   |                  |                        |  |                  |                        |  |             |       |
| 0 or 1            | 2,789 (94.5%)   | 346 (13.8%)      | 1,988 (86.2%)          |  | 237 (10.3%)      | 1,852 (89.6%)          |  | 3.77 (0.03) |       |
| >1                | 219 (5.4%)  | 41 (31.0%)       | 71 (68.9%)             | <.001  | 35 (36.3%)       | 66 (63.7%)             | <.001  | 5.08 (0.22) | <.001 |
| Medical status    |   |                  |                        |  |                  |                        |  |             |       |
| 0 to 1            | 1,320 (45.0%)   | 112 (8.0%)       | 1,009 (91.9%)          |  | 91 (8.1%)        | 898 (91.9%)            |  | 3.66 (0.03) |       |
| >1                | 1,688 (55.0%)   | 275 (20.0%)      | 1,050 (79.9%)          | <.001  | 181 (14.2%)      | 1,020 (85.7%)          | <.001  | 3.97 (0.05) | <.001 |

Note: ADL = activity of daily living; CES-D = Center for Epidemiologic Studies Depression Scale; R-UCLA = Revised UCLA Loneliness Scale.

correlate of the one-item CES-D, so that older adults were more likely to report loneliness on this item. However, a similar pattern was not evident for the other two measurements of loneliness. With regard to education, there were no significant differences on the one-item CES-D. However, both the dichotomized and the continuous three-item R-UCLA showed that more educated individuals are less likely to report loneliness. Women were more likely to report loneliness on all three measures. All three measures of loneliness were correlated with marital status, so that married individuals were less likely to report loneliness. Less impairment in activities of daily living and better medical status were associated with less loneliness across all three measurements.

## Discussion

Loneliness is difficult to measure in social surveys, mostly because of its subjective and private nature, as opposed to social isolation, which is the subject of more concrete and objective measurement of one's social network. In research studies, two main approaches are used to measure loneliness. First is the direct approach, which makes explicit reference to loneliness. The direct approach has several versions that share the assumption of common understanding of the terms *loneliness* and *lonely* among respondents (Victor, Scambler, et al., 2005). Although the direct measure of loneliness is easy to apply in social surveys and has strong face validity, it may also be a subject to underestimation, because loneliness is a sensitive and stigmatizing concept (Borys & Perlman, 1985). Therefore, lonely individuals might avoid identifying themselves as lonely. The alternative approach is using a scale that consists of several indirect questions related to the subjective appraisals of one's social relationships.

Given the deleterious effects of loneliness on both physical and mental aspects, it is important to evaluate whether the way it is measured affects the results obtained and who is most likely to be classified as lonely by the different methods. To date, efforts to compare the two prevalent approaches have been minimal and insufficient. The aim of the current investigation was to compare the direct and indirect approaches for measuring loneliness by comparing the shortened version of the R-UCLA, which has been used extensively in loneliness research, with the one-item CES-D, another very common measure of loneliness, representing the direct approach.

To compare a dichotomous measure with a scale, we artificially identified a cut point on the three-item scale that potentially yields the most similar results to the one-item CES-D and demonstrates the best sensitivity and

specificity. Nonetheless, our findings show that even when the continuous indirect scale is artificially dichotomized to be as similar as possible to the single-item direct scale, a large number of respondents who acknowledged being lonely on the direct scale were missed on the indirect scale.

Comparing the two measures, we found a low degree of concordance between the single-item CES-D and the dichotomized three-item R-UCLA, with a  $\kappa$  statistic of .27. A similar trend was found in the Perth survey, in which approximately 40% of the respondents did not share the same classification on both measures (Victor, Scambler, et al., 2005). These results emphasize that the two approaches classify as lonely different individuals. Whereas most individuals who self-identified as not lonely on the direct measure were classified as such also on the indirect measure of loneliness, a large number of respondents reported being lonely on the direct measure but were not classified as lonely on the indirect measure.

The observed differences between the direct and indirect approaches could be partially explained by the different time frame of the two measures. Whereas the single self-rating measure tapped a specific time frame (the past week), the indirect scale asked in general how often the respondent had felt various emotionally and socially distressing experiences, such as being left out. This relates to a distinction based on the duration of loneliness as transient, situational, or chronic (de Jong Gierveld & Raadschelders, 1982). The former reflects the most frequent appearance of the phenomenon, consequent on common happenings (such as a lack of social visits on a particular weekend or bad weather that limits social encounters) and is limited by time. Situational loneliness occurs after experiencing stressful life events, such as widowhood, and is considered to be less detrimental and more temporal, whereas chronic loneliness is a more stable state that results from the inability to develop significant social ties over time. It is possible that the time frame specified in the direct measure directed the respondents toward transient or situational loneliness, whereas the general perspective adopted in the indirect scale implied to a more chronic experience of loneliness.

To some extent, disagreements between the approaches could also be attributable to the shortened version of R-UCLA loneliness scale adopted in the 2002 wave of the HRS. Although the three-item scale presented good internal reliability in another American nationally representative sample (the sample of the National Social Life, Health, and Aging Project), with a Cronbach's  $\alpha$  coefficient of .81 (Shiovitz-Ezra & Leitsch, 2010), in our analytical HRS sample, this short loneliness scale reached only a moderate reliability score. This might also have compromised the congruence between the direct and indirect measures. Another issue concerns the content validity

of the shortened version of the loneliness scale used. Despite the fact that the R-UCLA is considered unidimensional, a recent study reported a three-factor structure of the full scale. Examining the items that were loaded on each factor indicates that the three items that constitute the three-item loneliness scale were loaded on only one factor, termed by the authors "isolation" (Hawkey, Browne, & Cacioppo, 2005). Consequently, only one factor of loneliness was represented in the short version used in the present study. This could potentially lead to discordance between the single measure of loneliness that encompasses the term *loneliness* on the basis of the general concept of loneliness and a scale that captures only one facet of loneliness (e.g., isolation). This is not to say however, that the use of short scales is erroneous. Many comprehensive, up-to-date social surveys use short scales to save total interviewing time and costs. Shorter questionnaires also minimize the burden to respondents, which results in more reliable responses. Therefore, efforts are being made to validate shortened versions in the loneliness field (de Jong Gierveld & Van Tilburg, 2006; Hughes et al., 2004).

Differences between the two approaches were also evident when testing loneliness correlates. We found a significant positive association between age and loneliness, with older adults being more likely to report loneliness on the direct measure but not on the indirect one. This might partly explain the inconclusive results found in past research concerning the relationship between age and loneliness. For instance, whereas a positive age-loneliness association was found among a random Finnish sample of people aged 75 years and older applying the single direct measure of loneliness (Savikko et al., 2005), Shiovitz-Ezra and Leitsch (2010) did not establish significant association between age and loneliness using the 3-item R-UCLA. The latter was also found with regard to emotional and social loneliness on multivariate analyses using the 11-item De Jong Gierveld Loneliness Scale among married men and women (de Jong Gierveld, van Groenou, Hoogendoorn, & Smith, 2009). However, as the nexus between age and loneliness was found to be nonlinear, with increased loneliness among the oldest group, age 80 years and older (Pinquart & Sorensen, 2001), it is important to include a wider age range in studies of this sort and to explore age differences in loneliness separately for different age groups. Inconsistency between the direct and indirect measures was also evident with regard to education; although there were no significant differences on the 1-item CES-D, both the dichotomized and the continuous 3-item R-UCLA showed that more educated individuals are less likely to report loneliness. These findings may demonstrate the difference between the two approaches in identifying specific risk groups for loneliness.

Nevertheless, consistency across the two measurement approaches was evident with regard to the association between gender and loneliness. Women were more likely to report loneliness on all three measures, as was found in previous research (Holmen, Ericsson, Andersson, & Winblad, 1992; Pinquart & Sörensen, 2001; Prince, Harwood, Blizard, Thomas, & Mann, 1997). Furthermore, all three measures of loneliness were correlated with marital status, so that married individuals were less likely to report loneliness; this finding is also consistent with past studies (Shiovitz-Ezra & Leitsch, 2010; Wenger & Burholt, 2004). Less impairment in activities of daily living and better medical status were associated with less loneliness across all three measurements, as shown in another contemporary study (Shiovitz-Ezra & Ayalon, 2010).

On the basis of our results, we can conclude that the different measures of loneliness provide a somewhat different picture of both the prevalence of loneliness and the characteristics of the people who suffer from it. This does not come as a surprise, considering the subjective and relatively ambiguous nature of the concept of loneliness, which has no single unified set of cognitive, emotional, or behavioral indicators (Marangoni & Ickes, 1989). Future efforts should emphasize testing the direct and indirect approaches, using greater similarity in terms of the time frame used. In addition, comparing the direct measure with different indirect scales that, for example, explicitly differentiate between different types of loneliness may also be recommended.

It is important to note however that data on loneliness might still be biased because of the mode of administration. The HRS data were largely gathered through telephone interviews. Given the fact that loneliness is a private and stigmatizing concept, lonely people might avoid admitting that they experience it in front of a third party (the interviewer). The self-completion mode of data collection, on the other hand, is experienced as more confidential, so that in response to sensitive questions, more trustworthy responses are expected (de Leeuw, 1992). Different modes of administration might also interact with the two approaches of measuring loneliness. Therefore, future research should also examine different modes of administration by randomly assigning the sample into two groups: one receiving the direct self-report measure and the indirect scale as part of a paper-and-pencil questionnaire and the other group randomly assigned to an interview mode. Examining interactions between mode of administration and the two different approaches will enrich our insight on possible biases in measuring loneliness in social surveys.

It is also important to note that our selection of a cut point for the indirect scale was somewhat arbitrary. Using a lower cutoff on this scale would have



yielded better concordance between the two measurement styles concerning the classification of those, who report loneliness on both measures, but worse specificity (higher percentage of individuals who deny being lonely on the direct item would be identified as lonely on the indirect scale). Consistently, using a higher cutoff would have resulted in even worse sensitivity but better specificity. Nonetheless, no matter what cutoff is used, the two scales do not capture the same individuals. This suggests a need for a more empirical investigation into the origins of the differences between the measures, which takes into account different types of loneliness (i.e., chronic and situational loneliness), among other potential factors.

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