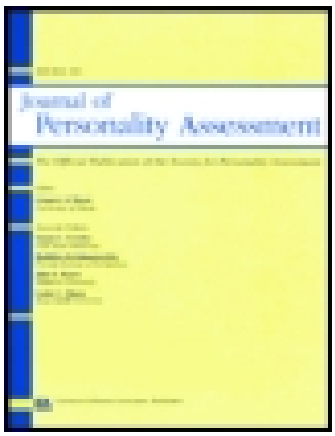

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A Short-Form Measure of Loneliness

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The revised UCLA Loneliness Scale (ULS-20) and a four-item short form (ULS-4) are widely used in personality research (Russell, Peplau, & Cutrona, 1980). In an exploratory factor analysis of the ULS-20, we identified eight items that loaded substantially on the first factor. These items were combined to form an alternative short-form measure, the ULS-8. The results of this study indicate that the ULS-8 is reliable, valid, and a better substitute for the ULS-20 than is the ULS-4. Consistent with the previous research, the loneliness measures (ULS-20, ULS-8, ULS-4) were strongly related to socially undesirable personality characteristics, but loneliness was uncorrelated with the six different health-related behaviors (exercise, meal regularity, alcohol use, hard drug use, smoking, and hours of sleep) assessed in this study.

Loneliness is a feeling of being cut off or separated from others. In comparison to the closely related concept of social support[1] (DiMatteo & Hays, 1981), defined as the quantity and quality of social contacts and resources available to the individual, loneliness refers to a deficiency of social contact compared to what is desired (Jones, 1985; Peplau & Perlman, 1979). Thus, by definition, loneliness is undesirable and must be assessed from the phenomenological perspective of the individual (Peplau, 1985; Rook, 1984, 1985).

A widely used loneliness measure is the revised UCLA Loneliness Scale (ULS-20, long form; ULS-4, short form) developed by Russell and colleagues (Russell et al., 1980; Russell, Peplau, & Ferguson, 1978). To minimize respondent burden, the ULS-4 has been used in several studies (e.g., Andersson, 1985;

[1]Loneliness and social support appear to be distinct empirically at a lower order of analysis. For example, feelings of loneliness (less emotional ties) were modestly correlated ($r = .20$) with lack of social support in the Rand Health Insurance Experiment (Donald & Ware, 1984). However, Newcomb and Bentler (in press) found that measures of loneliness and social support formed a single higher order factor of general social attachment.

Franzoi & Davis, 1985; Russell, 1982; Silverman & Kennedy, 1985). Correlations between the ULS-4 and the ULS-20 of .61 for males and .70 for females were discovered in one college sample (Franzoi & Davis, 1985). Based on these findings, Franzoi and Davis (1985) concluded that "the short version is an adequate substitute for the longer UCLA Loneliness Scale" (p. 772). But not enough is known about the tradeoffs associated with using the ULS-4 in place of the ULS-20. We hypothesized that although the ULS-4 was a very good "quick and dirty" measure of loneliness, a significant loss of information might result if it was used as a proxy for the ULS-20.

The present study has two primary objectives: (a) identification of a minimum number of items in the ULS-20 that are representative of the full scale and (b) further validation of the ULS-20. Previous research has linked loneliness (measured by the ULS-20 or ULS-4) with a variety of socially undesirable personality characteristics such as social anxiety, low self-esteem, and depression (Russell, 1982; Russell et al., 1980), with life dissatisfaction (Silverman & Kennedy, 1985), and with self-labeled loneliness (Jones, Carpenter, & Quintana, 1985; Russell et al., 1980; Silverman & Kennedy, 1985). But very little is presently known about the correspondence between loneliness and health-related behavior, and the available evidence is mixed, suggesting a problematic relationship between the two. Peplau and Perlman (1979) noted that individuals may attempt to cope with feelings of loneliness by engaging in health-compromising behaviors such as drug use. Consistent with this proposition, Carpenter, Hansson, Rountree, and Jones (1983) reported a significant negative correlation ($r = -.39$, $p < .05$) between the ULS-20 and a nine-item indicator of adherence to good health habits in the management of health and diabetes. In addition, a significant positive correlation ($r = .25$, $p < .01$) has been reported between body weight and the ULS-20 (Schumaker, Krejei, Small, & Sargent, 1985). Sadava and Thompson (1986) found that loneliness (measured by the ULS-20) correlated with the frequency of being intoxicated ($r = .20$, $p < .05$), use of alcohol to cope with emotional distress ($r = .41$, $p < .01$), problem drinking ($r = .27$, $p < .05$) and negative consequences of alcohol use ($r = .41$, $p < .01$). However, loneliness was not significantly related to the quantity and frequency of alcohol use ($r = .14$, $p > .05$).[2] There is clearly a need for further research on the connection between loneliness and health-related behavior. As Rook (1984) noted:

> Less attention has been paid to the possibility of deviance and behavioral problems as consequences of loneliness, although tendencies toward delinquency and antiso-

[2]In related research, Hays (1980) noted significant cross-sectional correlations between alienation and solitary drinking, the number of times "high" on alcohol, the number of times drunk, and problem drinking in a young adult sample ($n = 402$). In addition, frequency of marijuana use and involvement with marijuana were significantly associated with alienation for males in the sample. However, alienation was not correlated with alcohol or other drug use in an older adult sample ($n = 192$) examined in the same study (Hays, 1980).

> cial behavior have been found among lonely adolescents. . . . there are clues in the research literature that loneliness may lead to alcoholism, drug abuse, and other behavioral disorders . . . although causal pathways linking loneliness to deviance have not been specified. For example, substance abuse might represent an attempt to reduce the pain associated with loneliness or, alternatively, a means of gaining access to others or managing social anxiety. It is hoped that theoretical analyses linking loneliness to deviance and behavioral disorders will be undertaken. Such analyses would call attention to the costs of loneliness not only to the lonely individual but also to society. (p. 251)

If loneliness is a cause of health-compromising behaviors, then clinical interventions to prevent or minimize loneliness are warranted and need to be encouraged. For example, Andersson (1985) conducted an intervention designed to decrease loneliness in a sample of elderly women. Loneliness and blood pressure were reduced in the intervention group, but changes in loneliness were not associated with changes in blood pressure.

To identify a new short-form loneliness measure and to explore the relationship between loneliness and health-related behavior, we administered the ULS-20 and measures of meal regularity, exercise, hours of sleep, drug use, smoking and alcohol use to a sample of college students. A battery of personality measures and sociodemographic variables was included in the study as well.

METHOD

Subjects

Respondents were 199 college students (38.2% males, 61.8% females) at a university in southern California. The mean age of the sample was 21.0 (range 17–48, SD = 4.5). Slightly more than half of the sample was white (54.6%), followed by black (15.7%), Chicano (14.7%), Chinese (3.5%), Japanese (3.0%), other Asian (3.5%), and other ethnic statuses (5.0%). Respondents were recruited from campus and filled out the survey during either the spring or summer term of 1981.

Measures

Personality. In addition to the ULS-20, we included personality measures of social anxiety (Fenigstein, Scheier, & Buss, 1975), alienation (Hays, 1980), health locus of control (Wallston, Wallston, Kaplan, & Maides, 1976), drinking-related locus of control (Donovan & O'Leary, 1978), and life satisfaction (Jessor & Jessor, 1977). Each of these scales was administered with Likert-type response options.

Sociodemographics. Sociodemographic variables included grade in college, gender, and age.

Health-related behavior. Six health-related behaviors were assessed: meal regularity, exercise, hours of sleep, drug use, smoking, and alcohol use. The first five of these measures have been described in detail elsewhere (Hays, Stacy, & DiMatteo, 1984).

The frequency, quantity, and negative consequences of alcohol use were assessed. A quantity-frequency index (QFI; adapted from Jessor, Graves, Hanson, & Jessor, 1968) was computed by dividing the number of days respondents drank beer, wine, and hard liquor in the last month by 30 and multiplying these three values by the corresponding amount of beer, wine, and hard liquor they usually consumed at one sitting. The resulting products were multiplied by a constant representing the number of ounces of absolute alcohol per drink for each of the three types of alcohol (beer = .480; wine = .600; hard liquor = .675) and summed to form an index of absolute ounces of alcohol consumed per day on the average. The QFI, which summarizes information on frequency and quantity of alcohol intake, has been found to display convergent and discriminant validity among college students (Stacy, Widaman, Hays, & DiMatteo, 1985).

In the survey, respondents were asked how many times (*never, one, two or three, four or more*) in the past 6 months they had experienced each of nine negative consequences of alcohol use: (a) accidents at work, home, or school; (b) concern or criticism from family members; (c) financial difficulties; (d) concern or criticism from friends; (e) driven when had a good deal to drink; (f) missed school or work because of drinking; (g) been in trouble with the police or been arrested because of drinking; (h) people at school or work mention that drinking is leading to problems in school or on the job; and (i) decrease in performance at school or work due to drinking. Responses to these nine items were summed to form the measure of negative consequences.

RESULTS

Results presented include factor analysis of the loneliness items to identify the new short form; descriptive statistics, reliability estimates, and item discriminate validity for the loneliness measures; and analyses of the relationships between loneliness and personality, sociodemographics, and health-related behaviors.

Exploratory Factor Analysis of the UCLA Loneliness Scale

Although results from previous research (see Russell, 1982) were supportive of the internal consistency of the ULS-20, some researchers have found the scale to be multidimensional (Austin, 1983; Hojat, 1982b; Zakahi & Duran, 1982). We

TABLE 1
Descriptive Statistics for ULS-8 Items

ULS #	*Item*	*M*	*SD*
2.	I lack companionship.	2.34	0.87
3.	There is no one I can turn to.	1.79	0.85
9.	I am an outgoing person.	1.86	0.81
11.	I feel left out.	2.16	0.76
14.	I feel isolated from others.	2.22	0.92
15.	I can find companionship when I want it.	1.58	0.80
17.	I am unhappy being so withdrawn.	2.00	1.02
18.	People are around me but not with me.	2.35	0.90

Note. Items 9 and 15 were recoded in the direction of loneliness prior to calculating the descriptive statistics given above.

used exploratory factor analysis to identify the dimensionality of the ULS-20. The items in the scale were intercorrelated using listwise deletion of cases (n = 180). Cattell's (1966) scree test and Montanelli and Humphreys's (1976) parallel analysis (see Hays, 1985) were used to determine the number of factors to rotate. Both criteria indicated that five factors were needed for these data.

Common factor analysis with highest rs as prior communality estimates was used to obtain the unrotated matrix (first unrotated factor explained 67.44% of common variance), and an oblique Promax rotation was then performed. Factor intercorrelations for the oblique solution ranged from .30 to .50. Eight of the ULS-20 items loaded substantially (median loading = .48, range = .31–.73, loadings computed after items were scored in the same theoretical direction) on the first factor: Items 2, 3, 9, 11, 14, 15, 17, and 18. Descriptive statistics for these items are given in Table 1. The items are indicators of perceived social isolation, and they are representative of the essence of loneliness as defined by the difference between desired and actual social contact.[3] We summed these items to form a new short-form measure of loneliness, the ULS-8.

Scale Descriptive Statistics and Reliability Estimates

Table 2 provides descriptive statistics and reliability estimates for the ULS-20, ULS-8, and ULS-4. All scores reported in Table 2 represent transformation of raw scores to a 0–100 scale. This transformation enables direct comparisons across the three loneliness measures. As can be seen in Table 2, loneliness scores were well distributed. Scores on the three loneliness scales were somewhat positively skewed, reflecting a bunching of scores below the midpoint of the scale.

[3]Four other factors were identified: Unavailability of Empathic Confidants, Unavailability of Support Persons, Lack of Social Integration, and Lack of Meaningful Social Relationships. Factor intercorrelations ranged from r = .30 to .50.

TABLE 2
Descriptive Statistics and Reliability Estimates for Loneliness Scales

Scale	*M*	*Median*	*SD*	*Range*	*Skewness*	*Kurtosis*	*RTT*	*RII*
ULS-20	32.6	30.6	14.3	5–85	0.61	0.43	.90	.30
ULS-8	35.4	34.5	19.2	0–100	0.55	0.21	.84	.40
ULS-4	34.8	33.6	18.8	0–92	0.30	−0.13	.63	.29

Note. ULS-20 statistics are based on the 180 respondents who answered every loneliness item; ULS-8 and ULS-4 statistics are based on the 192 respondents who answered all the items in these scales. Scale scores were transformed to a 0–100 scale. ULS-8 consists of Items 2, 3, 9, 11, 14, 15, 17, and 18 of the ULS-20. ULS-4 consists of Items 1, 13, 15, and 18 of the ULS-20. RTT is Cronbach's (1951) alpha reliability coefficient; RII is the estimated reliability of a single item or homogeneity of the scale.

Means and standard deviations were very similar for the three measures. The average score was 33% of the maximum possible loneliness value on the ULS-20 and 35% of the maximum possible score on the ULS-8 and ULS-4.

The reliabilities of the scales were estimated using Cronbach's (1951) alpha and the intraclass correlation for items (Fiske, 1966). Internal consistency reliability was high for each of the measures. Cronbach's alpha for the ULS-4 was somewhat lower than alpha for the ULS-8 and ULS-20. Homogeneity (intraclass correlation) was higher for the ULS-8 than it was for the ULS-20 and ULS-4. The correlation between ULS-20 and ULS-8 was .91, between ULS-20 and ULS-4 was .88, and between ULS-8 and ULS-4 was .82.

Alpha reliability coefficients for the other multiple item scales in the study were .81 for alienation (k = 10), .71 for social anxiety (k = 6), .93 for drinking-related locus of control (k = 25), .69 for health locus of control (k = 11), .75 for exercise (k = 6), .66 for meal regularity (k = 2), .44 for QFI (k = 3), .72 for negative consequences of alcohol use (k = 9), .84 for hard drug use (k = 10), and .95 for smoking (k = 2).

Item discriminant validity was evaluated using the Multitrait Analysis Program (MAP) developed for the National Study of Medical Care Outcomes (Hays & Ware, 1986). MAP performs multitrait scaling analysis by comparing item-scale correlations for items in different scales. Convergent validity is supported if an item correlates about .30 or above with the scale it is hypothesized to represent. This is the traditional internal consistency criterion. Item discriminate validity is evaluated by comparing the correlation of each item and its hypothesized scale (corrected for overlap) with the item's correlations with other scales. Item discriminate validity is satisfied and a scaling "success" is counted whenever the correlation between an item and its hypothesized scale is more than two standard errors higher than its correlation with another scale.

We evaluated item discrimination for the ULS-20, ULS-8, and ULS-4 by comparing the correlations of loneliness items with their hypothesized scales versus their correlations with the measures of life satisfaction, alienation, and so-

cial anxiety. The conceptual similarity between loneliness and these other scales provides for a very stringent test of item discriminant validity across scales. For the ULS-20, there was a total of 46 out of 60 (76.7%) scaling successes; for the ULS-8, there were 18 scaling successes out of 24 (75.0%); for the ULS-4, there were 4 scaling successes out of 12 (33.3%). Thus, the ULS-8 items performed as well as the ULS-20 items, but the ULS-4 items did not discriminate very well from conceptually related constructs.

Loneliness Scales and Personality, Sociodemographics, and Health-Related Behavior

Bivariate results. Table 3 provides Pearson product–moment correlations between the three loneliness scales and the measures of personality, sociodemo-

TABLE 3
Correlations Between Loneliness Scales and Personality, Sociodemographics, and Health-Related Behaviors

	ULS-20	*ULS-8*	*ULS-4*
Personality			
Alienation	.65**	.64**	.56**
Social anxiety	.49**	.51**	.40**
Satisfaction with friends	−.46**	−.41**	−.39**
Satisfaction with sex life	−.37**	−.36**	−.30**
Satisfaction with family or home life	−.32**	−.29**	−.31**
Satisfaction with self	−.31**	−.34**	−.23**
Drinking locus of control	−.20**	−.14*	−.17*
Satisfaction with physical condition	−.11	−.14*	−.05
Satisfaction with teachers in school	.11	.18*	.11
Health locus of control	−.09	−.05	−.13
Satisfaction with school performance	−.02	.01	.00
Sociodemographics			
Gender (0 = female, 1 = male)	.23**	.18**	.28**
Age	.00	−.04	−.07
Grade in college	.01	.04	.00
Health-Related Behaviors			
Exercise	−.13	−.12	−.11
Meal regularity	−.07	−.07	−.03
Quantity-frequency of alcohol use	−.07	−.11	−.07
Negative consequences of alcohol use	.01	−.04	.00
Hard drug use	−.05	−.05	−.02
Smoking	−.03	−.03	−.02
Hours of sleep	.00	.04	.05

Note. All measures were scored to be consistent with the labels given in the table. Thus, larger scores reflect more alienation, social anxiety, satisfaction, locus of control, older age, higher grade in college, more exercise, meal regularity, alcohol use, hard drug use, smoking, and hours of sleep.
*$p <= .05$. **$p <= .01$.

graphics, and health-related behavior. Consonant with theoretical expectations, loneliness was significantly correlated with alienation, social anxiety, satisfaction with friends, satisfaction with sex life, satisfaction with family or home life, satisfaction with self, and drinking-related locus of control. Loneliness was not significantly correlated with satisfaction with physical condition, satisfaction with teachers in school (except ULS-8), health locus of control, satisfaction with school performance, age, grade in college, and health-related behavior. Similar to the results reported by Russell et al. (1980) for their first study, males were significantly lonelier than females in this study.[4]

The correlations reported in Table 3 are remarkably consistent across the three loneliness scales. The correlations involving ULS-20 and ULS-8 are almost identical, and the correlations involving ULS-4 are similar as well. These results were anticipated by the large intercorrelations among the loneliness measures. This commonality in the pattern of correlations suggests that the ULS-8 may be used in lieu of the ULS-20 without substantial loss of information.

Multivariate analyses. To determine the combined contribution of the predictors for explaining the variability in loneliness, multiple regression was conducted. Setwise regressions were run with three predictor sets: personality, sociodemographics, and health-related behavior. Each set was entered without controlling for the other sets. Then, a combined predictor set, consisting of all the variables, was evaluated. As shown in Table 4, the combined predictor set accounted for 59% of the variance in ULS-20, 60% of the variance in ULS-8, and 46% of the variance in ULS-4.

The personality variables were responsible for nearly all of this explanatory power, accounting for 57%, 57%, and 41% of the ULS-20, ULS-8, and ULS-4 variance, respectively. The amount of variance explained by the personality variables in this study is comparable to that in previous studies (e.g., Hojat, 1982a). The sociodemographic predictors were significantly related to the ULS-20 and ULS-4, but they were not quite significantly associated with the ULS-8. The significant gender effect noted in Table 3 was responsible for the explanatory power of the sociodemographic predictors. As foreshadowed by the bivariate results, the health-related behaviors were not associated with loneliness.

The results of the multiple regression analysis provide further clarification of the similarity and differences among the three loneliness measures. Relationships of the predictors to the ULS-20 and ULS-8 mirrored one another. Results for the ULS-4 were similar to those found for the ULS-20 and ULS-8, but the multivariate correlations make clear that the personality predictors share consid-

[4]But, according to research reviewed by Peplau and Perlman (1979), "more women than men report feeling lonely" (p. 104). It seems that males are less likely than females to admit being lonely when asked directly about it because of more severe negative consequences associated with male loneliness than female loneliness in our society (Borys & Perlman, 1985).

TABLE 4
Multiple Regression Analysis of the Relationship Between Loneliness Scales and Personality, Sociodemographics, and Health-Related Behaviors

Predictor Set	*R*	R^2	R^{-2}
Personality			
ULS-20	.75**	.57	.54
ULS-8	.75**	.57	.54
ULS-4	.64**	.41	.38
Sociodemographics			
ULS-20	.23*	.05	.04
ULS-8	.20	.04	.02
ULS-4	.31**	.09	.08
Health-Related Behavior			
ULS-20	.17	.03	.00
ULS-8	.18	.03	.00
ULS-4	.14	.02	.00
Combined predictors			
ULS-20	.77**	.59	.54
ULS-8	.77**	.60	.55
ULS-4	.67**	.46	.38

Note. Multiple R, R-squared, and adjusted R-squared are shown in table.
*$p < .05$. **$p < .01$.

erably more variance with the ULS-20 and ULS-8 than they do with the ULS-4 (a difference of 16% in terms of common variance). In contrast, the sociodemographic variables explained about twice the amount of variance in the ULS-4 than they did in the ULS-20 and ULS-8, which suggests that the ULS-4 may be more subjective to extraneous factors than the longer measures of loneliness.

DISCUSSION

This study was designed with two primary objectives in mind: (a) to evaluate the representativeness of the ULS-4 and to determine whether a better short form could be identified and (b) to examine further the association between loneliness and other variables.

An eight-item short-form of loneliness, ULS-8, was selected on the basis of results from exploratory factor analysis, and it was found to be highly correlated with the ULS-20 ($r = .91$). Scores on the ULS-8 were well distributed, ranging from 0% to 100% of the maximum possible. This variability in ULS-8 scores permits precise discrimination along the loneliness dimension. With respondents' time at a premium in most research, the ULS-8 is a practical alternative to the ULS-20. Self-administration of the ULS-8 takes about 1–2 min (about five items

per min), a decrease in respondent burden (60% reduction in the ULS-20) that may increase the quality of the data gathered. Although the estimated reliability of the ULS-8 was slightly lower than that of the ULS-20, its homogeneity was higher.

Consistent with previous research (see Jones, 1985), we found that loneliness was strongly related to socially undesirable personality characteristics such as alienation and social anxiety. Contrary to commonly expressed hypotheses (Peplau & Perlman, 1979; Rook, 1984, 1985) and some previous empirical results (e.g., Carpenter et al., 1983; Sadava & Thompson, 1986), we failed to find any relationship between loneliness and health-related behavior. Although loneliness may be aversive in and of itself, differences in loneliness appear to be unrelated to differences in health-related behaviors such as exercise, meal regularity, hours of sleep, alcohol use, smoking, and hard drug use.

The absence of an association between loneliness and health-related behavior provides some evidence that the lonely are no more prone or at risk for engaging in health-compromising behavior than are the nonlonely. But even though our measures of loneliness were uncorrelated with the health-related behaviors, the circumstances associated with these behaviors and the reasons for their occurrence (which we did not assess) may interact with loneliness. For example, lonely individuals may drink alone, whereas nonlonely people may engage in more social drinking (D. Perlman, personal communication, May 2, 1985). Furthermore, the effects of loneliness may interact with various other personality variables. Feelings of loneliness may lead some individuals to engage in coping efforts that are health compromising, but these same feelings may stimulate others to constructive coping responses. One person may drink alcohol or use other drugs to anesthetize the negative feelings associated with loneliness, whereas another may substitute the benefits of achievement in athletics (e.g., through vigorous exercise) or self-care activities (e.g., by good eating habits and moderation of alcohol intake) to counter the effects of loneliness.

Additional research is needed to evaluate the ULS-8 as a short-form alternative to the ULS-20. The results of this study encourage us to conclude that the ULS-8 is a notably better substitute for the ULS-20 than is the ULS-4, but further refinement in this short-form measure may be needed. Such iterations are normal in the course of instrument development. A similar process can be observed in the development of measures of socially desirable response set (Crowne & Marlowe, 1960; Hays & Hayashi, 1986; Reynolds, 1982; Strahan & Gerbasi, 1972; Zook & Sipps, 1985).

Loneliness is by definition an undesirable condition, and it is quite prevalent (about 22% of men and 30% of women report loneliness; medians calculated from studies reviewed by Borys & Perlman, 1985, p. 68). The aversiveness of loneliness warrants efforts to minimize it in our society even if, as suggested by the results of this study, it is unrelated to health-related behavior. The development of the UCLA Loneliness Scale has stimulated much of the research in this

area and has allowed for the accumulation of basic scientific information in the field. We now have good measuring instruments and some idea of what loneliness is and is not related to. In addition to continuing research on the reliability and validity of loneliness measures, further work such as Andersson's (1985) is needed to determine the feasibility of prevention and treatment efforts directed at loneliness. Application of the results of loneliness research is an important next step for those working in this area.

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