Loneliness and Self-rated Health Among Church-Attending African Americans

Felicia D. Fisher, MS [Doctoral Candidate],
Department of Educational Psychology, College of Education, University of Houston, Houston, TX

Lorraine R. Reitzel, PhD [Associate Professor],
Department of Educational Psychology, College of Education, University of Houston, Houston, TX

Nga Nguyen, MS [Senior Statistical Analyst],
Department of Biostatistics, The University of Texas MD Anderson Cancer Center, Houston, TX

Elaine J. Savoy, MA [Doctoral Candidate],
Department of Clinical Psychology, University of Houston, Houston, TX

Pragati S. Advani, MPH [Doctoral Candidate],
Department of Health Promotion and Behavioral Sciences, The University of Texas School of Public Health

Adolfo G. Cuevas, MS [Doctoral Candidate],
Department of Psychology, Portland State University, Portland, OR

Jennifer I. Vidrine, PhD [Associate Professor],
Department of Health Disparities Research, The University of Texas MD Anderson Cancer Center, Houston, TX

David W. Wetter, PhD [Professor and Chair], and
Department of Health Disparities Research, The University of Texas MD Anderson Cancer Center, Houston, TX

Lorna H. McNeill, PhD [Associate Professor]
Department of Health Disparities Research, The University of Texas MD Anderson Cancer Center, Houston, TX

Abstract

Objectives—To explore relations between loneliness and self-rated health among diversely-aged African American adults.

Correspondence Dr. Reitzel; Lrreitzel@uh.edu.
Lorraine R. Reitzel and Lorna H. McNeill are joint senior authors.

Human Subjects Statement

All procedures were approved by the University of Texas MD Anderson Institutional Review Board. Informed consent was obtained from participants prior to data collection.

Conflict of Interest Statement

The authors have no competing interests pertaining to this research.

Methods—Associations between loneliness and self-rated health were investigated using covariate-adjusted linear regression models. Perceived social support was examined as a moderator. The potential indirect effects of stress and/or depressive symptoms were examined using nonparametric bootstrapping procedures.

Results—Greater loneliness was associated with poorer self-rated health (p = 0.008), and social support did not moderate. Stress and depressive symptoms yielded significant indirect effects in single and multiple mediator models (p values .05).

Conclusions—Loneliness may contribute to poorer health among African Americans. Results suggest that greater stress and depressive symptoms might underlie these associations, but longitudinal studies are needed to assess causal relations.

Keywords

loneliness; self-rated health; depression; stress

Loneliness is characterized as a distressing feeling that is attributable to a disconnection between one's desired versus one's actual social relationships.[1] Loneliness appears to be highly prevalent; for example, as many as 20% to 39% of older adults report feelings of loneliness at any given time.[2,3] These numbers are concerning given that loneliness has been associated with a host of undesirable physical and psychological health consequences. For example, loneliness has been associated with a reduction in physical activity,[4] increased systolic blood pressure,[5] daytime dysfunction and impaired sleep,[6] anxiety,[7] and depressive symptoms.[8–10] Loneliness is associated with undesirable social factors as well, including poor communication decoding within interpersonal interactions.[11] Furthermore, a negative relationship between loneliness and self-rated health has been frequently reported within the literature.[12–14]

Self-rated health is obtained by asking individuals to assess their own health status or to compare their health with their same aged peers.[15] Although subjective in nature, self-rated health is of interest because it is one of the most frequently employed health indicators in empirical studies and is considered one of the best indictors of mortality.[16] Although the physical and psychological health consequences of loneliness on self-rated health are understood, most studies in this area were conducted among aging and majority White samples, which limits the generalizability of these findings to other populations. Therefore, additional research on the associations of loneliness and self-rated health among diversely aged and racial/ethnic minority groups is recommended.

African Americans are important to study when assessing the impact of loneliness on self-rated health, given the numerous health disparities experienced by this ethnic group. For example, African Americans have the earliest onset of hypertension and develop high blood pressure at a higher rate than other ethnic groups.[17] African American women have higher breast cancer mortality rates than women of all other ethnic groups; for example, they are 40% more likely to die of breast cancer than White women.[18] Similarly, African American men have higher incidence and mortality rates for several cancers as compared with Whites and Hispanics (eg, lung and prostate cancer).[19–21] These health disparities are also reflected

in self-rated health, with African Americans over the age of 50 rating themselves as having poorer health on average than their White counterparts.[22] Studies have indicated that a variety of characteristics, such as depressive symptoms, smoking, and less education, were associated with poorer self-rated health[23] and self-rated health trajectories[24] among African Americans. However, to our knowledge, no previous studies have examined the association of loneliness and self-rated health among African Americans of any age group. Such an area may be fruitful to explore, given the links between loneliness and poorer self-rated health among aging adults and majority White samples.[12–14] Moreover, a better understanding of the various determinants of poorer self-rated health endorsed by African Americans might be helpful for targeting or adapting interventions to reduce disparities in health.

Many African American families benefit from a unique social structure. For example, as a result of cultural, social and economic factors, African Americans have commonly relied on extended family and informal networks as a source of support.[25] Previous studies have found that the level of perceived social support experienced by African Americans has been associated with a variety of physical and psychological health outcomes. For example, greater social support has been linked with greater subjective life expectancy.[26] Moreover, social support played a moderating role in the relations between optimism and psychosocial functioning in one study,[27] and discrimination and distress in another.[28] The positive effects of social support on various health outcomes may reflect that social support facilitates engagement in health promoting behaviors such as exercise, eating right, and not smoking; as well as greater adherence to medical regimens.[29,30] However, the extent to which perceived social support might buffer an association between loneliness and self-rated health among African Americans is not known. Loneliness has been linked with minimal availability of social support in general,[31] but perceived social support may still vary substantially among those experiencing loneliness.[32]

Conceptual models, such as the one proposed by Cacioppo and colleagues, outline the psychological and social consequences of loneliness and the negative impact it ultimately has on health.[8,33] Consistent with this conceptual model, several studies support associations between loneliness and anxiety,[7] loneliness and stress,[34,35] and loneliness and depression.[36,37] Likewise, there has been significant support for the role of anxiety/stress and depression on negative health outcomes[38,39] and poorer self-rated health[23,39–41] in the literature. However, to our knowledge, no previous studies have examined whether perceived stress and depressive symptoms account for the associations of loneliness and self-rated health. A better understanding of this association might be particularly important when studying African Americans, given their exposure to various social stressors (eg, discrimination and oppression) that have been found to negatively impact mental and physical health.[42,43] For example, it is possible that African Americans who experience loneliness may be at a greater risk of psychological distress and negative health outcomes due to the psychologically taxing processes associated with both loneliness and other social stressors.

The current study examined associations between loneliness and self-rated health among a large sample of African American adults and investigated whether these associations were moderated by perceived social support. Based on the literature, we hypothesized that greater

loneliness would be associated with poorer self-rated health, even after controlling for the influence of sociodemographics and depressive symptoms. We also hypothesized that social support would moderate these associations, such that the expected inverse relation between loneliness and self-rated health would be attenuated among those reporting greater social support. A secondary aim of this study was to assess if the expected association between loneliness and self-rated health was mediated by elevated stress and/or depressive symptoms. We hypothesized that higher levels of stress and depression would help to explain the relationship between loneliness and self-rated health.

METHODS

Participants and Procedures

Data were from the second year of a longitudinal cohort study focused on African American health. Data from this wave were analyzed because it represented the first year that loneliness was assessed. Participants represented a convenience sample originally recruited into the cohort study from a large Methodist mega-church in Houston, Texas. Recruitment strategies included printed and televised media within the church and in-person solicitation during church services and at a church health fair. Recruitment took place in the fall of 2008. Individuals were eligible to participate if they were 18 years old, residents of the Houston area, had a functional telephone number, and attended church.

Following enrollment, participants (N = 1501) completed the first wave of data collection. Approximately one year later, they were contacted via e-mail, phone, and/or mail to participate in the second wave. In total, 1375 participants (91.6% of the original sample) participated in the second wave. As with the first wave, surveys were completed in person at the church. Participants viewed questionnaire items on a computer screen and entered responses into the computer using the keyboard, and they were compensated with a $30 gift card following survey completion. Only participants with complete data on the measures described below (N = 1343, 89.5% of the original sample) were included in the current study. Data for the second wave were collected between January and August 2010.

Measures

Sociodemographics—Sociodemographics included age, sex, partner status (married/living with partner or single/widowed/divorced), total annual household income (<$40,000, $40,000–79,999, or $80,000), educational level (<Bachelor's degree, Bachelor's degree, or Master's degree), and employment status (employed or unemployed).

Loneliness—Loneliness was assessed using a 3-item scale that asks respondents to indicate how often they "feel that [they] lack companionship," "feel left out," and "feel isolated from others."[44] Response categories were 1=hardly ever, 2=some of the time, and 3=often. Total scores could range from 3 to 9, with higher scores indicative of greater perceived loneliness. Cronbach's alpha for the 3-Item Loneliness Scale in this sample was 0.80.

Social support—Social support was measured using the Interpersonal Support Evaluation List (ISEL).[45] The ISEL is a 12-item measure of functional social support that assesses the perceived availability of appraisal, tangible, and belonging types of support. Appraisal support items assess the availability of someone to talk with about problems and include: "I feel that there is no one I can share my most private worries and fears with." Belonging support items assess the availability of people with whom one can do activities and include: "I don't often get invited to do things with others." Tangible support items assess instrumental aid and include: "If I were sick, I could easily find someone to help me with my daily chores" (reverse scored). Response options for each item were as follows: 1=definitely true, 2=probably true, 3=probably false, and 4=definitely false. Total scores could range from 12 to 48, with higher scores indicative of greater social support. Cronbach's alpha for the ISEL-12 in this sample was 0.84.

Perceived stress—The Perceived Stress Scale-4 (PSS-4) was used to assess perceived stress.[46] The PSS-4 is a 4-item self-report scale that was designed to assess the degree to which respondents find their lives to be stressful. The PSS-4 asks respondents to indicate how often they experienced certain situations, such as "In the last month, how often have you felt that you were unable to control the important things in your life?" and "In the last month, how often have you felt that things were going your way?" (reverse scored). Response categories were: 0=never, 1=almost never, 2=sometimes, 3=fairly often, and 4=very often. Responses were summed with a potential range of 0 to 16, where higher scores are indicative of greater perceived stress. Cronbach's alpha for the PSS-4 in this sample was 0.73.

Depressive symptoms—The Center for Epidemiological Studies Depression 10-item scale (CESD-10) was used to assess depressive symptoms.[47,48] The CESD was developed to measure depressive symptoms in community non-clinical populations, and assesses the degree of depressive symptoms experienced over the past week. It includes items such as "I was bothered by things that usually don't bother me," and "I felt hopeful about the future" (reverse scored). Response categories were: 0=rarely or none of the time (< 1 day), 1=some or a little of the time (1–2 days), 2=occasionally or a moderate amount of time (3–4 days), and 3=all the time (5–7 days). Responses were summed with a potential range of 0 to 30, where higher scores are indicative of more depressive symptoms. Cronbach's alpha for the CESD-10 in this sample was 0.54.

Self-rated health—Self-rated health was assessed with a single item asking participants to rate their health in general, with 5 response options: 1= poor, 2=fair, 3=good, 4=very good, and 5=excellent. Research suggests this item is a reasonable substitute for multi-item measures and has good psychometric utility for the assessment of general health.[15,49–54]

Data Analysis

Preliminary analyses assessed participant characteristics using frequencies and descriptive statistics. A preliminary linear regression analysis was conducted to explore the relations between each sociodemographic variable and loneliness while controlling for the other sociodemographic variables.

Three linear regression models were conducted to assess the association between loneliness and self-rated health. The first model was adjusted for the covariates of age, sex, partner status, income, education, and employment status, and the second model was additionally adjusted for depressive symptoms. A final model added an interaction term along with the main effects of social support and all covariates to examine whether the association between loneliness and self-rated health was moderated by perceived social support.

Finally, the indirect effects of loneliness on self-rated health through stress and depressive symptoms were assessed using 2 single mediation models for stress and depressive symptoms, respectively, and a multiple mediator analysis that included both stress and depressive symptoms in the same model. Indirect effects were tested using a non-parametric, bias-corrected bootstrapping procedure.[55] The bootstrapping procedure generated an empirical approximation of the sampling distribution of the product of the estimated coefficients in the indirect paths using 5000 resamples from the data set. Indirect effect models were adjusted for sociodemographics, including age, sex, partner status, income, education, and employment status.

All analyses were performed using Statistical Analysis Software version 9.3 (SAS Institute, Cary, NC). The statistical significance level was set at p .05.

RESULTS

Preliminary Analyses

Participants were 46.5 (±12.7 years) years old on average and were predominately women (76.3%). The age distribution of the sample was as follows: 18–25 (6.6%), 26–35 (13.4%), 36–45 (23.6%), 46–55 (32.1%), 56–66 (19.8%), and 67–87 (4.5%). Three quarters of participants were employed, 51.1% reported at least a Bachelor's Degree, and 37.7% reported an annual household income of at least $80,000. Participant characteristics are displayed in Table 1. In this sample, 7.4% reported excellent health, 33.6% reported very good health, 44.5% reported good health, 13.0% reported fair health, and 1.5% reported poor health.

Results of a preliminary analysis assessing differences in loneliness as a function of sociodemographic variables are shown in Table 2. Controlling for the other sociodemographic variables, results indicated that women reported significantly greater loneliness than men (means = 4.6 versus 4.1), those without partners reported significantly greater loneliness than those who had partners (means = 4.9 versus 4.0), and those with annual incomes less than $40,000 a year reported significantly greater loneliness than those with annual incomes of $80,000 or more (means = 4.9 versus 4.2).

Main Analyses

Results indicated that greater loneliness was associated with poorer self-rated health in analyses adjusted for sociodemographics (p < .0001). See Table 3. Further adjusting this model for depressive symptoms did change the pattern of results (β=−.043, SE=.016, t = −2.67, p = .008). Social support was not a significant moderator of the association between loneliness and self-rated health (p = .818).

Indirect Effect Analyses

In single mediator models, stress and depressive symptoms each yielded significant indirect effects in the association between loneliness and self-rated health (p values   .05; see Table 4). Greater loneliness was associated with greater perceived stress (β=.747, SE=.515, t = 15.63, p < .0001) and more severe depressive symptoms (β=1.034, SE=.055, t = 18.87, p < .0001), and greater stress and more severe depressive symptoms were each associated with poorer self-rated health (stress: β=−.063, SE=.008, t =−7.80, p < .0001; depressive symptoms: β= −.054, SE=.007, t = −7.60, p < .0001). Additionally controlling for depressive symptoms in the indirect effect model for stress yielded similar results (β= −.010, SE=.003, CIs.$_{95}$ = −.0180, −.0049).

Although stress and depressive symptoms are conceptually distinct, they were significantly correlated (r = .66, p < .01). A multiple mediator analysis was conducted to take into account any shared variance. Results indicated that stress and depressive symptoms were independently as well as jointly significant mediators of the total effect (p values   .05; see Table 4 and Figure 1). Again, greater loneliness was associated with greater stress and more severe depressive symptoms, and greater stress and more severe depressive symptoms were associated with poorer self-rated health.

DISCUSSION

To our knowledge, this study was the first to investigate the association between loneliness and self-rated health among a large and diversely aged African American sample. As hypothesized, loneliness was negatively associated with self-rated health over and above the influence of several sociodemographic variables. Moreover, the association between loneliness and self-rated health remained significant after depressive symptoms were taken into account. This finding provides further support for the negative association between loneliness and self-rated health and extends those relations to a diversely aged, predominately female sample of African American mega-church attendees.

Although religiosity has been linked to less loneliness in previous research among the elderly, the current study suggests that mega-church attendees are not immune from experiencing loneliness, and that loneliness may be implicated in African Americans' poorer self-rated health.[56] Therefore, it may be helpful to provide and integrate interventions to address loneliness within the church setting to help attenuate the potential effects of loneliness on health. Previous research suggests that interventions to address loneliness might include improving social skills, developing strategies to enhance social support, and increasing opportunities for social interaction.[7,11] These issues seem potentially addressable within a church setting through support groups, Bible study, and other ministry efforts. Openly discussing the subject of loneliness within these platforms may lessen any stigmatizing feelings associated with experiencing loneliness. In addition, previous studies suggest that loneliness interventions might also entail the correction of maladaptive thinking (eg, negative attributions) via a more formalized intervention, such as cognitive-behavioral therapy.[57] This type of intervention may be especially relevant for persons who have co-morbid depressive symptomology. This may be accomplished via referral to community mental health professionals; however, since church members often seek out the leaders of

their church for both spiritual and personal problems,[58] equipping the clergy with the appropriate skills to create and implement tailored mental health-behavior interventions (eg, cognitive restructuring exercises) might also be useful. Because some African Americans may consider loneliness and affective symptomatology to be the result of a loss of faith,[59] clergy have an important role to play in de-stigmatizing loneliness and helping parishioners overcome various barriers to seeking help.

Interestingly, perceived social support was not supported as a moderator of the relationship between loneliness and self-rated health. This finding is contrary to results from previous studies in the area.[60–62] However, it may be that the relationship between loneliness and social support is more dependent on the perceived quality of social support rather than its presence.[63] Therefore, it may be that satisfaction with social support (not assessed in this study) may matter more in the association between loneliness and self-reported health than the mere availability of social support. This may be especially true among African Americans, who tend to benefit from a large and extended familial social structure,[25] making the availability of social support less of a concern than might be the case with Whites. In addition, a previous study found that men and women have differences in the relational provisions that were linked with loneliness. For example, whereas men may feel lonely if they perceive a deficit in the social integration offered by relationships, women feel lonely if they feel that their relationships lack attachment.[31] Therefore, men and women may perceive social support differently and may need varying relationship qualities to feel supported. These suppositions may provide direction for future research.

The current study also provides support for the potential role of stress and depressive symptoms in the association between loneliness and self-rated health. This finding suggests that interventions to reduce stress and depressive symptoms may be a helpful approach for reducing the potential effects of loneliness on self-rated health. This may be accomplished via formal referrals to community treatment professionals, and facilitated by the sponsorship of workshops and presentations in the church setting focused on psychoeducational information about mental health problems, its health-related sequelae, and empirically-based treatment options. Because mental health treatment may be more stigmatizing among African Americans compared to Whites,[64] discussing psychological distress and associated treatment options within the church setting may feel less threatening than when introduced in other settings (eg, the physician's office). However, these suggestions are speculative and require additional research. Future research should also investigate the role of stress and depressive symptoms in the association between loneliness and self-rated health using longitudinal designs (eg, cross-lagged panel designs, 2-dimensional modeling) to capture temporal processes and causal relations.

Limitations of the current study include the cross-sectional design, which precludes causal assumptions. Additionally, while this study extends the literature through the use of a large and diversely aged African American sample, the participants of the study were all attendees of a large Methodist church. Since this sample represents a subset of the larger African American population, results may not generalize to the larger African American population, as there may be substantive differences among African Americans who attend church, those who do not attend church and those who ascribe to varying faiths and denominations.

Another limitation of the study is the low internal consistency produced by the depressive symptoms measure (CESD-10). While previous studies have used the CESD with an African American population and produced a more acceptable Cronbach's alpha,[65,66] clinical research has found that African Americans may exhibit atypical depressive symptomology,[67] which may have influenced our results. In addition, this study's use of the 10-item version of the CESD as opposed to the 20-item scale may have led to the less than desirable reliability. Regardless, the validity of these results should be considered in light of the reliability weaknesses of the CESD in this sample. However, given the dearth of research assessing relations between loneliness, depression, and self-rated health among African Americans, these results may at least provide direction for future work. Moreover, future research can expand upon the information obtained from this study by including a more diverse sample in future studies. While African Americans are a specific minority group, they are not representative of every minority group; therefore, more studies using other populations would lend additional support for the association between loneliness and self-rated health. Despite the fact that this sample identified as being primarily healthy, an association was still found between loneliness and self-rated health. While this provides stronger support for the connection between the 2 variables, an association between loneliness and health among African American groups and other ethnic minorities who are less healthy should be explored. In addition, future studies might compare relations between racial/ethnic groups, incorporate qualitative research to better understand how individuals experience loneliness and evaluate their health status, and use longitudinal designs to further extend the literature in this area. Finally, the current study investigated only 2 potential mediators of the relation between loneliness and self-rated health, and the variance accounted for by these psychosocial factors is likely to be low, as is commonly the case in behavioral research. Future work should strive to develop and evaluate more comprehensive conceptual frameworks to explain the noted associations.

In summary, the current study may be the first to examine the relationship between loneliness and self-rated health, as well as explore the moderating effect of social support and the indirect effects of stress and depressive symptoms, among a sample of African American church attendees. Results support a link between greater loneliness and poorer self-rated health that may be attributable, at least in part, to stress and depressive symptoms. This study extends the existing literature and suggests directions for future intervention research. However, additional studies are needed in order to add greater depth to our understanding of the association between loneliness and self-rated health, potentially by examining more comprehensive conceptual models and using longitudinal data.

Acknowledgments

References

1. Pinquart, M.; Sörensen, S. Risk factors for loneliness in adulthood and old age-a meta-analysis. In: Shohov, SP., editor. Advances in Psychology Research. Hauppauge: Nova Science Publishers; 2003. p. 111-143.

2. Theeke LA. Predictors of loneliness in U.S. adults over age sixty-five. Arch Psychiat Nurs. 2009; 23(5):387–396.

3. Savikko N, Routasalo P, Tilvis RS, et al. Predictors and subjective causes of loneliness in an aged population. Arch Gerontol Geriat. 2005; 41(3):223–233.

4. Hawkley LC, Thisted RA, Cacioppo JT. Loneliness predicts reduced physical activity: cross-sectional & longitudinal analyses. Health Psychol. 2009; 28(3):354–363. [PubMed: 19450042]

5. Hawkley LC, Thisted RA, Masi CM, Cacioppo JT. Loneliness predicts increased blood pressure: 5-year cross-lagged analyses in middle-aged and older adults. Psychol Aging. 2010; 25(1):132–141. [PubMed: 20230134]

6. Hawkley LC, Preacher KJ, Cacioppo JT. Loneliness impairs daytime functioning but not sleep duration. Health Psychol. 2010; 29(2):124–129. [PubMed: 20230084]

7. Segrin C, Kinney T. Social skills deficits among the socially anxious: rejection from others and loneliness. Motiv Emot. 1995; 19(1):1–24.

8. Cacioppo JT, Hawkley LC, Ernst JM, et al. Loneliness within a nomological net: an evolutionary perspective. J Res Pers. 2006; 40(6):1054–1085.

9. Nolen-Hoeksema S, Ahrens C. Age differences and similarities in the correlates of depressive symptoms. Psychol Aging. 2002; 17(1):116–124. [PubMed: 11931280]

10. Chou KL, Chi I. Childlessness and psychological well-being in Chinese older adults. Int J Geriatr Psych. 2004; 19(5):449–457.

11. Edwards R, Bello R, Brandau-Brown F, Hollems D. The effects of loneliness and verbal aggressiveness on message interpretation. South J Comm. 2001; 66(2):139–150.

12. Pedersen PV, Grønbæk M, Curtis T. Associations between deprived life circumstances, wellbeing and self-rated health in a socially marginalized population. Eur J Public Health. 2012; 22(5):647–652. [PubMed: 21920848]

13. Nummela O, Seppanen M, Uutela A. The effect of loneliness and change in loneliness on self-rated health (SRH): a longitudinal study among aging people. Arch Gerontol Geriat. 2011; 53(2):163–167.

14. Luo Y, Hawkley LC, Waite LJ, Cacioppo JT. Loneliness, health, and mortality in old age: a national longitudinal study. Soc Sci Med. 2012; 74(6):907–914. [PubMed: 22326307]

15. Jylha M. What is self-rated health and why does it predict mortality? Towards a unified conceptual model. Soc Sci Med. 2009; 69(3):307–316. [PubMed: 19520474]

16. Budrys, G. Unequal Health: How Inequality Contributes to Health or Illness. Lanham: Rowman & Littlefield; 2010.

17. Roger VL, Go AS, Lloyd-Jones DM, et al. Heart disease and stroke statistics-2012 update: a report from the American Heart Association. Circulation. 2012; 125(1):e2–e220. [PubMed: 22179539]

18. Centers for Disease Control and Prevention. [Accessed August 8, 2013] Breast cancer disparities (on-line). Available at: http://www.cdc.gov/features/vitalsigns/breastcancer/

19. Nelson CJ, Balk EM, Roth AJ. Distress, anxiety, depression, and emotional well-being in African-American men with prostate cancer. Psycho-oncol. 2010; 19(10):1052–1060.

20. Haiman CA, Stram DO, Wilkens LR, et al. Ethnic and racial differences in the smoking-related risk of lung cancer. New Engl J Med. 2006; 354(4):333–342. [PubMed: 16436765]

21. Centers for Disease Control and Prevention. [Accessed August 12, 2013] United States cancer statistics (on-line). Available at: http://apps.nccd.cdc.gov/uscs/

22. Liang J, Quinones AR, Bennett JM, et al. Evolving self-rated health in middle and old age: how does it differ across black, hispanic, and white Americans? J Aging Health. 2010; 22(1):3–26. [PubMed: 19952367]

23. Cuevas AG, Reitzel LR, Cao Y, et al. Mediators of discrimination and self-rated health among African Americans. Am J Health Behav. 2013; 37(6):745–754. [PubMed: 24001623]

24. Ayyagari P, Ullrich F, Malmstrom TK, et al. Self-rated health trajectories in the African American health cohort. PloS one. 2012; 7(12):e53278. [PubMed: 23300906]

25. Billingsley, A. Climbing Jacob's Ladder: The Enduring Legacies of African-American Families. New York: Simon and Schuster; 1994.

26. Irby-Shasanmi A. Predictors of subjective life expectancy among African Americans. Res Aging. 2013; 35(3):322–347.

27. Shelby RA, Crespin TR, Wells-Di Gregorio SM, et al. Optimism, social support, and adjustment in African American women with breast cancer. J Behav Med. 2008; 31(5):433–444. [PubMed: 18712591]

28. Ajrouch KJ, Reisine S, Lim S, et al. Perceived everyday discrimination and psychological distress: does social support matter? Ethn Health. 2010; 15(4):417–434. [PubMed: 20582775]

29. Albrecht, TL.; Goldsmith, DJ.; Thompson, T. Social support, social networks, and health. In: Thompson, T.; Miller, K.; Dorsey, A.; Parrott, R., editors. Handbook of Health Communication. Hillsdale: Lawrence J. Erlbaum Associates; 2003. p. 263-284.

30. Uchino BN. Social support and health: a review of physiological processes potentially underlying links to disease outcomes. J Behav Med. 2006; 29(4):377–387. [PubMed: 16758315]

31. Bell RA, Gonzalez MC. Loneliness, negative life events, and the provisions of social relationships. Communication Quarterly. 1988; 36(1):1–15.

32. Segrin C, Domschke T. Social support, loneliness, recuperative processes, and their direct and indirect effects on health. Health Commun. 2011; 26(3):221–232. [PubMed: 21318918]

33. Cacioppo JT, Hawkley LC. Perceived social isolation and cognition. Trends Cogn Sci. 2009; 13(10):447–454. [PubMed: 19726219]

34. Aanes MM, Mittelmark MB, Hetland J. Interpersonal stress and poor health: the mediating role of loneliness. Eur Psychol. 2010; 15(1):3.

35. Scott SB, Jackson BR, Bergeman CS. What contributes to perceived stress in later life? A recursive partitioning approach. Psychol Aging. 2011; 26(4):830–843. [PubMed: 21604885]

36. Jaremka LM, Fagundes CP, Glaser R, et al. Loneliness predicts pain, depression, and fatigue: understanding the role of immune dysregulation. Psychoneuroendocrino. 2013; 38(8):1310–1317.

37. Izgar H. An investigation of depression and loneliness among school principals. Educ Sci Theor Pract. 2009; 9(1):247–258.

38. Jaremka LM, Fagundes CP, Peng J, et al. Loneliness promotes inflammation during acute stress. Psychol Sci. 2013; 24(7):1089–1097. [PubMed: 23630220]

39. Naicker K, Galambos NL, Zeng Y, et al. Social, demographic, and health outcomes in the 10 years following adolescent depression. J Adolesc Health. 2013; 52(5):533–538. [PubMed: 23499382]

40. Wiklund M, Malmgren-Olsson EB, Ohman A, et al. Subjective health complaints in older adolescents are related to perceived stress, anxiety and gender - a cross-sectional school study in northern Sweden. BMC Public Health. 2012; 12:993. [PubMed: 23158724]

41. Theme Filha MM, Costa MA, Guilam MC. Occupational stress and self-rated health among nurses. Rev Lat-Am Enferm. 2013; 21(2):475–483.

42. Bureau of Justice Statistics. [Accessed August 8, 2013] Criminal Victimization, 2008 (on-line). Available at: http://www.bjs.gov/index.cfm?ty=pbdetail&iid=1975

43. Centers for Disease Control and Prevention. [Accessed August 8, 2013] Age-sex-adjusted percentage of adults aged 18 and over who experienced serious psychological distress during the past 30 days, by race/ethnicity: United States, 2012 (on-line). Available at: http://www.cdc.gov/nchs/data/nhis/earlyrelease/earlyrelease201306_13.pdf

44. Hughes ME, Waite LJ, Hawkley LC, Cacioppo JT. A short scale for measuring loneliness in large surveys: Results from two population-based studies. Res Aging. 2004; 26(6):655–672. [PubMed: 18504506]

45. Cohen, S.; Mermelstein, R.; Kamarck, T.; Hoberman, H. Measuring the functional components of social support. In: Sarason, I.; Sarason, BR., editors. Social Support: Theory, Research and Application. New York: Springer; 1985. p. 73-94.

46. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. J Health Soc Behav. 1983; 24(4):385–396. [PubMed: 6668417]

47. Radloff LS. The CES-D scale a self-report depression scale for research in the general population. Appl Psych Meas. 1977; 1(3):385–401.

48. Andresen EM, Malmgren JA, Carter WB, Patrick DL. Screening for depression in well older adults: Evaluation of a short form of the CES-D (center for epidemiologic studies depression scale). Am J Prev Med. 1994; 10(2):77–84. [PubMed: 8037935]

49. DeSalvo KB, Fisher WP, Tran K, et al. Assessing measurement properties of two single-item general health measures. Qual Life Res. 2006; 15(2):191–201. [PubMed: 16468076]

50. McHorney CA. Health status assessment methods for adults: past accomplishments and future challenges. Annu Rev Publ Health. 1999; 20:309–335.

51. Kempen GI. The MOS Short-Form General Health Survey: single item vs multiple measures of health-related quality of life: some nuances. Psychol Rep. 1992; 70(2):608–610. [PubMed: 1598378]

52. Cunny KA, Perri M. Single-item vs multiple-item measures of health-related quality of life. Psychol Rep. 1991; 69(1):127–130. [PubMed: 1961779]

53. Bierman AS, Bubolz TA, Fisher ES, Wasson JH. How well does a single question about health predict the financial health of medicare managed care plans? Eff Clin Pract. 1999; 2(2):56–62. [PubMed: 10538477]

54. Salomon JA, Nordhagen S, Oza S, Murray CJ. Are Americans feeling less healthy? The puzzle of trends in self-rated health. Am J Epidemiol. 2009; 170(3):343–351. [PubMed: 19564169]

55. Preacher KJ, Hayes AF. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. Beh Res Meth. 2008; 40(3):879–891.

56. Johnson DP, Mullins LC. Subjective and social dimensions of religiosity and loneliness among the well elderly. Rev Relig Res. 1989; 31(1):3–15.

57. Masi CM, Chen HY, Hawkley LC, Cacioppo JT. A meta-analysis of interventions to reduce loneliness. Pers Social Psychol Rev. 2011; 15(3):219–266.

58. Taylor RJ, Ellison CG, Chatters LM, et al. Mental health services in faith communities: the role of clergy in black churches. Soc Work. 2000; 45(1):73–87. [PubMed: 10634088]

59. Wittink MN, Jin Hui J, Lewis LM, Barg FK. Losing faith and using faith: older African Americans discuss spirituality, religious activities, and depression. J Gen Intern Med. 2009; 24(3):402–407. [PubMed: 19156471]

60. Kool MB, Geenen R. Loneliness in patients with rheumatic diseases: the significance of invalidation and lack of social support. J Psychol. 2012; 146(1–2):229–241. [PubMed: 22303622]

61. Kalkan M, Epli-Koc H. Perceived social support from friends as determinant of loneliness in a sample of primary school. US-China Education Review. 2011; 8(4):547–551.

62. Schnittger RI, Wherton J, Prendergast D, Lawlor BA. Risk factors and mediating pathways of loneliness and social support in community-dwelling older adults. Aging Mental Health. 2012; 16(3):335–346. [PubMed: 22129431]

63. Segrin C, Passalacqua SA. Functions of loneliness, social support, health behaviors, and stress in association with poor health. Health Commun. 2010; 25(4):312–322. [PubMed: 20512713]

64. Anglin DM, Link BG, Phelan JC. Racial differences in stigmatizing attitudes toward people with mental illness. Psychiat Serv. 2006; 57(6):857–862.

65. Long Foley K, Reed PS, Mutran EJ, DeVellis RF. Measurement adequacy of the CES-D among a sample of older African-Americans. Psychiat Res. 2002; 109(1):61–69.

66. Conerly RC, Baker F, Dye J, et al. Measuring depression in African American cancer survivors: The reliability and validity of the center for epidemiologic study-depression (CES-D) scale. J Health Psychol. 2002; 7(1):107–114. [PubMed: 22114231]

67. Wohi M, Lesser I, Smith M. Clinical presentations of depression in African American and white outpatients. Cult Divers Ment Health. 1997; 3(4):279–284. [PubMed: 9409073]
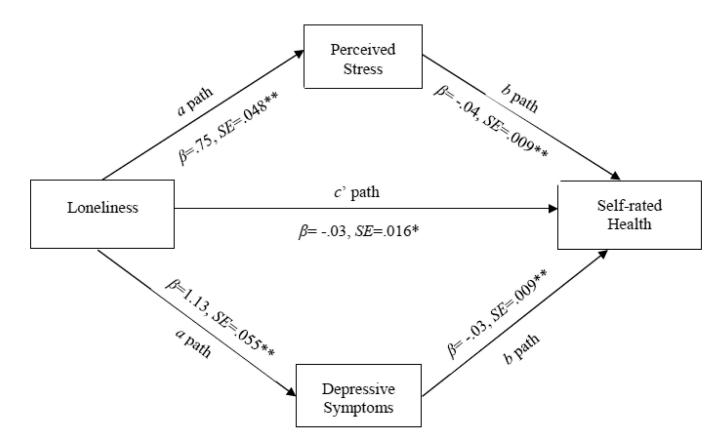
Figure 1.
Hypothesized Conceptual Model of the Direct (*c'* path) and Indirect Effect (*ab* paths) of Loneliness on Self-rated Health through Proposed Mediators
**p .0001, *p < .05
Note.
Mediational results presented in Figure 1 represent those from the multiple mediator analysis.

Table 1

Participant Characteristics

Participant Characteristics	Total Sample	
	N = 1343	
	Mean (Std)	N [%]
Age	46.5 (12.7)	-
Sex		
Female	-	1025 [76.3]
Male	-	318 [23.7]
Education		
< Bachelor's Degree	-	656 [48.8]
Bachelor's Degree	-	406 [30.2]
Master's Degree	-	281 [20.9]
Income		
< $40,000	-	344 [25.6]
$40,000–79,999	-	493 [36.7]
$80,000	-	506 [37.7]
Partner status		
Married/Living with partner	-	606 [45.1]
Single/Widowed/Divorced	-	737 [54.9]
Employment status		
Employed	-	1008 [75.1]
Unemployed	-	335 [24.9]
Self-rated Health	3.3 (8.6)	-
Loneliness	4.5 (1.6)	-
Stress	4.6 (3.0)	-
Depressive Symptoms	9.2 (3.6)	-
Social Support	38.9 (4.7)	

Note.

Std = standard deviation. Loneliness = The 3-Item Loneliness Scale; Stress = Perceived Stress Scale; Depressive Symptoms = Center for Epidemiological Studies Depression 10-item scale; Social Support = The Interpersonal Support Evaluation List 12-item scale.

Table 2

Adjusted Relations of Sociodemographics and Loneliness

Variables	Unstandardized Coefficients			
	β	Std. Error	t	p
Age	−.00	.00	−.09	.93
Sex				
Female	.23	.10	2.27	.02
Male (REF)				
Education				
< Bachelor's Degree (REF)				
Bachelor's Degree	−.08	.10	−.76	.44
Master's Degree	−.08	.12	−.66	.51
Income				
< $40,000 (REF)				
$40,000–79,999	−.22	.12	−1.90	.06
$80,000	−.36	.13	−2.76	<.01
Partner status				
Married/Living with partner	−.77	.10	−8.06	<.001
Single/Widowed/Divorced (REF)				
Employment status				
Employed	.14	.10	1.33	.18
Unemployed (REF)				

Note.

Results represent relations between each sociodemographic variable and loneliness controlling for the other sociodemographic variables, as assessed using multiple linear regression. Loneliness = The 3-Item Loneliness Scale

Table 3

Adjusted Relations of Loneliness and Self-rated Health

Variables	β	Std. Error	t	p
Loneliness	−.098	.01	−6.79	<.0001
Age	−.003	.00	−1.79	.07
Sex				
Female	−.090	.05	−1.65	.10
Male (REF)				
Education				
< Bachelor's Degree (REF)				
Bachelor's Degree	.115	.05	2.12	.03
Master's Degree	.214	.06	3.45	<.01
Income				
< $40,000 (REF)				
$40,000–79,999	.048	.06	0.77	.44
$80,000	.153	.07	2.23	.03
Partner status				
Married/Living with partner	−.103	.05	−2.00	.05
Single/Widowed/Divorced (REF)				
Employment status				
Employed	.153	.06	2.77	.01
Unemployed (REF)				

Note.

Results represent those from a linear regression examining relations of loneliness and self-rated health in covariate adjusted analysis. Loneliness = The 3-Item Loneliness Scale

Table 4

Indirect Effects of Loneliness on Self-rated Health through Stress and Depressive Symptoms

Proposed Mediator	Estimate of indirect effect		BCa 95% CI	
	Effect Estimate	SE	Lower	Upper
Stress	−.047	.007	−.063	−.034
Depressive Symptoms	−.056	.008	−.073	−.040
Proposed Mediators	Estimate of indirect effect		BCa 95% CI	
	Effect Estimate	SE	Lower	Upper
Stress	−.031	.008	−.047	−.017
Depressive Symptoms	−.035	.009	−.053	−.018
Combined	−.066	.009	−.084	−.049

Note.

Effect Estimate = The mean of the indirect effect estimates calculated across 5000 bootstrap samples. SE = The standard deviation of the 5000 bootstrap estimates of the indirect effect. BCa 95% CI= Bias corrected and accelerated 95% confidence interval. Loneliness = The 3-Item Loneliness Scale; Stress = Perceived Stress Scale; Depressive Symptoms = Center for Epidemiological Studies Depression 10-item scale.