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Clinical Correlates of Resilience Factors in Geriatric Depression

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Abstract

Background—Traditional perspectives conceptualize resilience as a trait and depression as resulting from resilience deficiency. However, research indicates that resilience varies substantially even among adults who are clinically depressed, as well as across the lifespan of an individual. Few studies have investigated resilience in depression, and even fewer have examined resilience in depressed older adults.

Methods—Three hundred thirty-seven adults ≥60 years with major depressive disorder completed the Connor-Davidson Resilience Scale (CD-RISC) and measures of mental health,

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quality of life, and medical comorbidity. Exploratory Factor Analysis was used to explore the factor structure of the CD-RISC. Correlations and general linear models were used to examine associations between resilience and other variables.

Results—The rotated component matrix indicated a four-factor model. Sorting of items by highest factor loading revealed constructs associated with (1) grit, (2) active coping self-efficacy, (3) accommodative coping self-efficacy, and (4) spirituality. Resilience was significantly correlated with increased age, lower cognitive functioning, greater cerebrovascular risk, and greater medical comorbidity. Resilience was negatively associated with mental health symptoms (depression, apathy, and anxiety) and positively associated with quality of life (QOL). The final optimal model identified less depression, less apathy, greater medical comorbidity, higher QOL, and minority (non-White) race as factors that significantly explained variability in resilience.

Conclusions—Resilience was significantly associated with a range of mental health constructs in a sample of older adults with depression. Future clinical trials and dismantling studies may help determine whether interventions targeting grit, active coping, accommodative coping, and spirituality can increase resilience and help prevent and treat depression in older adults.

Introduction

Resilience has been broadly defined as the ability to adapt and thrive in the face of adversity (Fernandez, Fehon, Treloar, Ng, & Sledge, 2015). Originally conceptualized as a stable, trait-like characteristic (Klohnen, 1996; Ong, Bergeman, Bisconti, & Wallace, 2006; Waugh, Fredrickson, & Taylor, 2008), resilience is now recognized as a multidimensional, dynamic capacity that is influenced by both internal and environmental resources (Windle, 2011). However, attempts to determine the major components of resilience have varied. A recent systematic review of resilience scales identified the Connor-Davidson Resilience Scale (CD-RISC; Connor & Davidson, 2003) as having the best psychometric properties out of the 17 scales identified (Windle, Bennett, & Noyes, 2011). However, of the seven known exploratory factor analyses (EFAs) that have been conducted with various populations since the development of the CD-RISC (Campbell-Sills & Stein, 2007; Connor & Davidson, 2003; Fernandez et al., 2015; Green et al., 2014; Jorgensen & Seedat, 2008; Lamond et al., 2008; Mealer & Meek, 2016), each has reported a different factor structure, and the results of one study indicate that the factor structure may differ according to ethnic group (Jorgensen & Seedat, 2008).

Depression has traditionally been conceptualized as resilience failure (Waugh & Koster, 2015). However, resilience has been shown to vary substantially even among adults who are clinically depressed (Min et al., 2013). A recent meta-analysis reported that roughly 53% of depressed individuals experience spontaneous remission within one year, suggesting that many depressed individuals display lingering aspects of resilience (Whiteford et al., 2013). Furthermore, clinical trials of adults with PTSD have shown that individuals with higher resilience scores respond significantly better to (both pharmacological and psychological) therapy (Davidson et al., 2005). This suggests that resilience-enhancing interventions may be effective not only for preventing depression but for promoting recovery and sustained remission after a depressive episode (Waugh & Koster, 2015).

Pioneering research in resilience focused on childhood adversity; gradually, this literature has expanded to include an investigation of resilience across the lifespan (Herrman et al., 2011). However, few studies to date have assessed resilience in older adults with depression (Fontes & Neri, 2015; Mehta et al., 2008). Major Depressive Disorder (MDD) affects 1–10% of adults over the age of 60, with higher rates among those with medical illness, disability, pain, and social isolation (Raue, McGovern, Kiosses, & Sirey, 2017). Research suggests that the course of late-life depression is more chronic compared to depression experienced earlier in life (Haigh, Bogucki, Sigmon, & Blazer, 2017). Increasing our understanding of the components and predictors of resilience in older adults with depression could inform interventions to promote more stable remission. The current study aimed to investigate the facets and correlates of resilience using the CD-RISC in a large sample of older adults with depression. We predicted that resilience and resilience factors would be negatively associated with symptoms of anxiety, depression and apathy. Associations of resilience with demographic and physical health variables were exploratory.

Methods

Participants

Data comprised baseline diagnostic interviews from three clinical trials (one published (Lavretsky et al., 2015; NCT00602290) and two ongoing (NCT02460666, NCT01902004)) conducted with depressed adults aged 60 and over at UCLA. The interventions tested in these trials included Methylphenidate, Memantine, and tai chi. Interviews took place between 2008–2017. All three trials employed the same inclusion and exclusion criteria. Eligibility criteria included: (1) diagnosis of MDD as defined by Diagnostic and Statistical Manual (DSM)-IV-TR (American Psychiatric, American Psychiatric, & Task Force on, 2000) or DSM 5 (American Psychiatric, 2013) criteria; (2) Mini-Mental State Exam (MMSE) score of 24 or greater. Exclusion criteria included: (1) history of any psychiatric disorder (with the exception of a stable comorbid anxiety disorder or stable comorbid insomnia, which were permitted); (2) acute suicidal ideation or suicide attempt within the past year; (3) severe or acute unstable medical illness or neurological disorder; (4) dementia.

Variables

Cognitive functioning was assessed via the MMSE (Folstein, Anthony, Parhad, Duffy, & Gruenberg, 1985; Folstein, Folstein, & McHugh, 1975). Resilience was assessed via the 25-item CD-RISC (Connor & Davidson, 2003) using a one-month recall period. Possible CD-RISC total scores range from 0–100, with higher scores indicating greater resilience. Severity of depressive symptoms was assessed with the self-report Geriatric Depression Scale (GDS; Brink et al., 1982; Yesavage et al., 1982) and the 24-item clinician-rated HAM-D (Baer & Blais, 2009; Hamilton, 1960, 1967; Moberg et al., 2001). Anxiety symptoms were assessed via the 14-item clinician-rated Hamilton Anxiety Rating Scale (HAM-A; Hamilton, 1959; Maier, Buller, Philipp, & Heuser, 1988). Apathy was evaluated using the clinician-rated Apathy Evaluation Scale, (AES; Marin, Biedrzycki, & Firinciogullari, 1991). AES total scores range from 18–72, with lower scores indicating greater apathy. Medical comorbidity was quantified using the clinician-rated Cumulative Illness Rating Scale for Geriatrics (CIRS; Miller et al., 1992); higher scores indicate greater illness severity.

Cerebrovascular risk was assessed via the 'Stroke Risk Factor Prediction Chart' from the Framingham Study to calculate 10-year risk of stroke (Wolf, D'Agostino, Belanger, & Kannel, 1991). Quality of life (QOL) was assessed via the Quality of Life Enjoyment and Satisfaction Questionnaire-Short Form (QLES; Endicott, Nee, Harrison, & Blumenthal, 1993) and the 36-item short form of the Medical Outcomes Study questionnaire (SF-36; McHorney, Ware, & Raczek, 1993; Ware, Snow, Kosinski, Gandek, & Institute, 1993). The SF-36 comprises eight scales: physical functioning, role limitation due to physical health, role limitations due to emotional problems, vitality, mental health, social functioning, bodily pain, and general health.

Analyses

Prior to analyses, data were inspected for outliers, skewness, and homogeneity of variance to ensure appropriateness of parametric statistical tests. EFA was conducted using the iterated principal factor method with varimax rotation. Weak loadings were defined as those below 0.3. The number of factors was determined by using two criteria: (1) use of a scree plot (plot of eigenvalues on the y-axis and the number of factors on the x-axis) to determine the point where the slope of the curve leveled off to indicate the number of factors that should be kept, and (2) the total amount of variability of the original items explained by each factor solution. We then calculated a series of bivariate Pearson correlation coefficients (r) between CD-RISC measures (total and the factors we obtained from the EFA) and demographic, clinical and QOL variables. Significance was set at $p < .05$ for all inferences. The magnitude of correlations were interpreted using Cohen's (Cohen, 1977) guidelines (correlations of 0.10 as "small", 0.30 as "moderate", and 0.50 or larger as "strong"). Fisher z transformation was used to convert Pearson's r to a normally distributed variable, and for estimating the confidence interval of the correlation coefficients.

We used the following model-building strategy to determine which of the demographic, clinical and QOL variables significantly explained variability in total CD-RISC score. First, all factors were entered simultaneously in a general linear model. Next, we used a combination of a stepwise strategy (in which the variables were selected for either inclusion or exclusion from the model in a sequential fashion based solely on statistical criteria) and inclusion or exclusion of variables based on careful scrutiny of the resulting model. Thus, after the fit of the model from stepwise selection, the importance of each variable included in the model was verified. We also confirmed that no variables' coefficients changed markedly in magnitude when other variables were excluded.

Results

Sample Characteristics

Characteristics of the sample ($N = 337$) are summarized in Table 1. The average age of participants was 70.45 ($SD = 7.04$; range = 60–89 years). The majority of participants were White (78.93%), female (59.94%), and highly educated, with an average of nearly 16 years of education.

Exploratory Factor Analysis (EFA)

The rotated component matrix indicated a multi-dimensional, four-factor structural model (see Table 2 for factor loadings). While the two-factor solution (with all CD-RISC items except the ones relating to spirituality loading on one factor and the two items 'I believe things happen for a reason' and 'I believe that sometimes fate or God can help me' loading on a separate factor) explained approximately 80% of the total variance, the four-factor solution explained close to 100% of the total variance. A three-factor solution was not considered because the third and fourth eigenvalue were very similar and without any a priori reason to postulate a three-factor solution, a four-factor model was determined to be the most appropriate. In addition, the rotated factors made theoretical sense in terms of deconstructing total resilience into separate meaningful components.

In order to more easily characterize the factors, we used the approach of sorting individual items according to the factor on which they loaded most strongly. Items with weak loadings (less than 0.3) on all factors were not sorted (only one item – 'I have close and secure relationships' – met this criterion). Inspection of the resulting pattern matrix revealed that Factor 1 included items related to a strong sense of purpose and determination; this factor was therefore labeled "Grit". Factor 2 included items related to strength, leadership, problem solving and control. We termed this factor "Active Coping Self-efficacy". Factor 3 included items related to adaptation, acceptance, and cognitive reappraisal. We therefore termed this factor "Accommodative Coping Self-efficacy". Finally, the two items sorted into Factor 4 each reflected spiritual faith. This factor was titled "Spirituality".

Correlates of Resilience Factors

Associations between resilience, demographic variables, and clinical variables are summarized in Table 3. Significant negative correlations between resilience and mental health variables (depression, anxiety, and apathy) were consistently observed for the first three resilience factors. The pattern of significant correlations was also consistent across the first three resilience factors with regard to QOL variables. However, some differences emerged in the strength of these associations. For example, GDS score was strongly associated with Factor 1 (Grit; $r = -0.50$, 95% CI = [−0.58, −0.42]), but only moderately associated with Factor 2 (Active Coping; $r = -0.36$ [−0.45, −0.27]). Similarly, QLES was more strongly associated with Factor 1 ($r = 0.47$ [0.38, 0.55]) and 3 ("Accommodative Coping"; $r = 0.46$ [0.37, 0.54]) than Factor 2 ($r = 0.31$ [0.21, 0.41]).

Exploratory Analyses

As shown in Table 3, the strength of the relation between total resilience and depressive symptoms differed according to the source of report; this association was large for self-reported depressive symptoms (GDS $r = -0.63$ [−0.69, −0.56]), but moderate for clinician-reported symptoms (HAM-D $r = -0.36$ [−0.45, −0.26]). We conducted exploratory analyses to determine whether the patient's self-perception of positive general mental health (as assessed by the SF-36 mental health scale) may account for the stronger relation of resilience with self-reported vs. clinician-reported depressive symptoms. After partialing out the effect of SF-36 mental health, total resilience continued to be significantly associated with both self-reported (GDS $r = -0.41$, $p < .0001$) and clinician-reported depressive

symptoms (HAMD $r = -0.17$, $p = .002$). Thus, after attempting to account for self-perceptions of global mental health, resilience continued to be more strongly associated with self-reported vs. clinician-reported depressive symptoms.

We also explored whether total resilience significantly differed according to age of first depressive episode. There was no statistically significant difference in resilience between participants who experienced onset of depression at less than 50 years ($M = 57.4$, $SD = 15.6$; $N = 192$) vs. at or above 50 years of age ($M = 59.4$, $SD = 16.5$, $N = 145$; $t(335) = 1.13$, $p = 0.26$).

Modeling of Total Resilience

The final general linear model for total CD-RISC score identified depression (GDS: $F(1,318) = 14.11$, $\beta = -0.59$, $p = 0.0002$), apathy ($F(1,318) = 4.87$, $\beta = 0.13$, $p = 0.03$), medical comorbidity ($F(1,318) = 10.55$, $\beta = 0.59$, $p = 0.001$), and multiple QOL measures (QLESQ: $F(1,318) = 13.92$, $\beta = 0.41$, $p = 0.0002$; SF-36 mental health: $F(1,318) = 4.35$, $\beta = 0.10$, $p = 0.04$; SF-36 general health: $F(1,318) = 8.48$, $\beta = 0.13$, $p = 0.004$) as factors significantly and independently explaining variability in resilience. In addition, minority (non-White) race was associated with higher total CD-RISC score ($F(1,318) = 5.41$, $p = 0.02$). The model was statistically significant, $F(7, 318) = 43.09$, $p < 0.0001$, and explained nearly half the variance in total resilience ($R^2 = 0.49$).

Discussion

The aim of the current study was to investigate the components and correlates of resilience in a large sample of older adults with depression. As expected, average resilience was lower in our sample of depressed older adults (total CD-RISC $M = 58.2$; $SD = 16.0$) compared to a study of community-dwelling older women that did not screen for depression ($M = 75.7$; $SD = 13.0$; Lamond et al., 2009). EFA revealed a four-factor model. Sorting of individual items according to the factor on which they loaded most strongly revealed constructs associated with (1) grit, (2) active coping self-efficacy, (3) accommodative coping self-efficacy, and (4) spirituality. These findings are consistent with the overlap between theoretical conceptualizations of resilience and coping (Campbell-Sills, Cohan, & Stein, 2006). While coping refers to the cognitive and behavioral strategies used to manage a stressor, resilience signifies favorable outcomes in the face of adversity (Campbell-Sills et al., 2006). “Grit” has been defined as “perseverance and passion for long-term goals” in the face of setbacks (Duckworth, Peterson, Matthews, & Kelly, 2007), a construct most strongly reflected in Factor 1. Previous EFAs of the CD-RISC have identifying factors of “persistence” (Campbell-Sills & Stein, 2007) and “perseverance” (Mealer & Meek, 2016). Our use of the term “grit” expands upon these constructs in an effort to more accurately reflect some of this factor’s most strongly-loaded items (e.g., “I have a strong sense of purpose”). This factor is consistent with research indicating that a sense of purpose is associated with better mental health (Batthyany & Russo-Netzer, 2014).

Our conceptualizations of Factor 2 and Factor 3 are consistent with studies indicating that coping self-efficacy (that is, the individual’s confidence in his/her ability to cope with a stressor) is a significant predictor of resilience (Benight & Cieslak, 2011; Cassidy, 2015).

Active or “problem-focused” coping (efforts to act on the source of stress) has been associated with resilience (Campbell-Sills et al., 2006; Li & Nishikawa, 2012; Popa-Velea, Diaconescu, Jidveian Popescu, & Truţescu, 2017). However, research indicates that while an active approach is adaptive for controllable stressors, such efforts become maladaptive in the context of uncontrollable stress (Forsythe & Compas, 1987). In these cases, efforts to adapt or “accommodate” to the source of stress (e.g., through cognitive reappraisal or acceptance (Thomsen & Greve, 2013)) are associated with enhanced well-being (Seltzer, Greenberg, Floyd, & Hong, 2004). Research indicates that individuals who are able to flexibly apply active vs. accommodative coping depending on the stressor have more favorable mental health outcomes (Cheng, Lau, & Chan, 2014; Forsythe & Compas, 1987; Zakowski, Hall, Klein, & Baum, 2001), which is consistent with the emergence of self-efficacy in both coping styles as factors in our EFA (each of which was significantly associated with mental health and QOL).

Finally, our results are in line with previous research identifying spirituality as a component of resilience. For example, spirituality was associated with resilience in a mixed sample of adults with depression and anxiety disorders (Min et al., 2013). Spirituality has also been associated with decreased risk of depression in a number of populations including U.S. military veterans (Sharma et al., 2017), homebound older adults, (Han & Richardson, 2010), and older adults participating in the Berkeley Guidance Study (Wink, Dillon, & Larsen, 2005). Our results are also consistent with previous EFAs of the CD-RISC that have identified a spirituality factor (Connor & Davidson, 2003; Lamond et al., 2008).

With regard to demographic variables, total CD-RISC score had a small positive association with age. This is in contrast to results of a study of similarly-aged community dwelling women, which found that CD-RISC total score was weakly and negatively correlated with chronological age (Lamond et al., 2008). However, the correlation of age with both our grit factor and our accommodative coping factor is consistent with research suggesting that both grit (Duckworth et al., 2007) and accommodative coping (Seltzer et al., 2004) increase with age. Although education was not associated with total CD-RISC score, it had a small positive association with Factor 2 (“active coping”). This makes sense if one conceptualizes the process of educational achievement as a source of controllable stress that is most effectively managed by those with high active coping self-efficacy. Education also had a small negative association with Factor 4 (“spirituality”), a finding which is supported by several previous studies (Lassiter et al., 2017; Vahia et al., 2011).

Surprisingly, total CD-RISC had a small but significant negative association with MMSE score, indicating that on average, individuals with higher degrees of cognitive functioning were less resilient. Although no studies to our knowledge have investigated the association of psychological resilience to cognitive functioning in older adults, research on undergraduate students indicates that resilience is positively associated with cognitive flexibility (Genet & Siemer, 2011). All participants in the current study scored within the normal range of cognitive functioning, and the magnitude of effect was small, so this finding should be interpreted with caution.

Consistent with study hypotheses and previous research, depressive symptoms and apathy were significantly negatively related to total resilience (moderate-to-strong associations) as well as individual resilience factors. The exception to this was that clinician-rated depressive symptoms (as assessed by the HAM-D) were not significantly related to Factor 4, "spirituality" (the association between this factor and GDS score, although statistically significant, was low). Furthermore, the strength of the relation between total resilience and depressive symptoms depended on the source of report. That is, overall resilience was more strongly associated with self-reported vs. clinician-reported depressive symptoms, and this effect could not be accounted for by self-perceptions of global mental health as assessed by the SF-36 mental health scale.

Also consistent with study hypotheses, anxiety was significantly related to lower total resilience and resilience factors (again with the exception of the spirituality factor). The size of these associations were small. Greater cerebrovascular risk had a small but significant association with greater total resilience. This result was unexpected, as (1) resilience was negatively associated with depression, (2) depression has been prospectively associated with greater cerebrovascular risk (Daskalopoulou et al., 2016; Lavretsky et al., 2010; Schneider, Ercoli, Siddarth, & Lavretsky, 2012), and (3) cerebrovascular disease may lead to cognitive and personality changes that reduce an individual's resilience (Lavretsky et al., 2010; Schneider et al., 2012). In our sample, we observed a small negative association between depressive symptom severity and cardiovascular risk, although this effect was statistically significant for only one of our two depression measures (GDS $r = -0.18$, $p = 0.0008$; HAM-D $r = -0.07$, $p = 0.18$). The magnitude of the correlation between cerebrovascular risk and resilience in the current study was small, and cerebrovascular risk was no longer a significant predictor of resilience in the general linear model. Thus, this result should be interpreted with caution. One possible explanation is that the CD-RISC (particularly items with strong loadings on our "grit" factor) is also sensitive to personality characteristics (e.g., competitiveness) that have been shown to increase cardiovascular and cerebrovascular risk (Lohse et al., 2017).

Similarly to the above results reported for depression, the association of resilience to physical heath differed depending on whether the health assessment was made by a clinician (as in the case of the CIRS-G) or by subjective self-report (SF-36). Clinician ratings of physical health had a small negative association with total resilience, whereas subjective perceptions of general health were positively associated with resilience. The positive relation between self-perceived general health and resilience is consistent with previous research using these same measures (Kukihara, Yamawaki, Uchiyama, Arai, & Horikawa, 2014) as well as with the association of both of these self-report constructs with dispositional optimism (Efklides & Moraitou, 2012).

The pattern of significant associations of resilience factors with mental health variables (depression, anxiety, and apathy) and QOL variables was consistent across the first three resilience factors, raising questions as to the utility of a four-factor (as opposed to two-factor) model. However, differences emerged in the strengths of these associations, supporting these factors' differentiation. Self-reported depressive symptoms as assessed via the GDS were more strongly associated with Factor 1 ("Grit") than Factor 2 ("Active

Coping"). This finding is consistent with previous research indicating that personal meaning/purpose was strongly associated with reduced depressive symptoms in a sample of institutionalized older adults (Reker, 1997). Similarly, QOL as assessed by the QLES was more strongly associated with Factors 1 and 3 ("Accommodative Coping") than Factor 2. It is possible that this difference reflects the types of challenges typically encountered in geriatric populations (e.g., chronic health problems, financial strain, and role changes including decreased independence). Research indicates that older adults rate their sources of stress as less controllable compared to younger adults (Aldwin, 1991; Blanchard-Fields & Robinson, 1987). If the sources of stress encountered by participants in our sample was largely uncontrollable, we would expect efforts to accommodate to – rather than actively attempt to solve – sources of stress would be associated with increased well-being. From a practical perspective, we believe that three factors ("Grit", "Active Coping", and "Accommodative Coping") are more meaningful than one and will prove more useful in advancing research by acknowledging the complex, multidimensional nature of resilience.

The final optimal model identified lower depression severity, less apathy, greater clinician-rated medical comorbidity, and multiple QOL indicators as factors accounting for significant variability in total resilience. In addition, minority race was significantly associated with resilience. This finding is in contrast to a study of 701 South African adolescents, which found that Black participants had significantly lower CD-RISC scores compared to White and mixed-race participants (Jorgensen & Seedat, 2008). However, a study of nearly 30,000 older U.S. women found that Black women had a lower risk of late-life depression compared to Whites (Chang et al., 2016). Another study of 7,690 adults ages 54–65 found that among those participants with similar sociodemographic, health, and economic profiles, MDD was significantly less prevalent among Blacks than Whites, and similarly prevalent among Hispanics and Whites (Dunlop, Song, Lyons, Manheim, & Chang, 2003). These results may be interpreted as support for the "resilience training" hypothesis, which postulates that early life exposure to mild-to-moderate adversity often serves as resilience training for later life (Santarelli et al., 2017).

It is important to consider several limitations when interpreting the current findings. First, because of the cross-sectional study design, we are unable to determine the directionality of observed effects. Future studies should employ longitudinal designs in order to better characterize the factors that influence resilience across the lifespan. Second, resilience in the current study was measured via self-report. Future directions include using brain, physiological and behavioral measures of coping with stress in order to corroborate these findings. Third, our sample was relatively homogenous with regards to race and education. Future research should attempt to recruit more racially and socioeconomically diverse samples to test for possible group differences in the degree, components, and predictors of resilience. Finally, our exclusion criteria resulted in a fairly "clean" sample of depressed older adults without significant psychiatric comorbidity. Whether our results generalize to depressed older adults with co-occurring psychiatric conditions (e.g., substance use disorder, posttraumatic stress disorder) or cognitive impairment is an open question for future research.

The current study contributes uniquely to the literature by exploring the factor structure of a frequently-used resilience measure in older adults with depression. Recent research demonstrating the malleability of resilience across the lifespan indicates a need for more research on how best to cultivate resilience in older adults. Our study suggests that interventions designed to help older adults cultivate grit, active coping self-efficacy, accommodative coping self-efficacy, and spirituality may be effective in enhancing resilience in this population. Future clinical studies will help to test these hypotheses.

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References

Aldwin CM. 1991; Does age affect the stress and coping process? Implications of age differences in perceived control. Journal of Gerontology. 46(4):P174–P180. [PubMed: 2071843]

American Psychiatric Association. Diagnostic and statistical manual of mental disorders (DSM-5®). American Psychiatric Pub; 2013.

American Psychiatric Association. Diagnostic and statistical manual of mental disorders (DSM-IV-TR). Washington, DC: American Psychiatric Association; 2000.

Baer, L, Blais, MA. Handbook of Clinical Rating Scales and Assessment in Psychiatry and Mental Health. Humana Press; 2009.

Batthyany, A, Russo-Netzer, P. Meaning in positive and existential psychology. Springer Science & Business; 2014.

Benight, CC, Cieslak, R. Cognitive factors and resilience: How self-efficacy contributes to coping with adversities. In: Southwick, SM, Litz, BT, Charney, D, editors. Resilience and Mental Health: Challenges Across the Lifespan. Cambridge: Cambridge University Press; 2011. 45–55.

Blanchard-Fields F, Robinson SL. 1987; Age differences in the relation between controllability and coping. Journal of Gerontology. 42(5):497–501. [PubMed: 3624807]

Brink TL, Yesavage JA, Lum O, Heersema PH, Adey M, Rose TL. 1982; Screening Tests for Geriatric Depression. Clinical Gerontologist. 1(1):37–43. DOI: 10.1300/J018v01n01_06

Campbell-Sills L, Cohan SL, Stein MB. 2006; Relationship of resilience to personality, coping, and psychiatric symptoms in young adults. Behaviour Research and Therapy. 44(4):585–599. [PubMed: 15998508]

Campbell-Sills L, Stein MB. 2007; Psychometric analysis and refinement of the connor-davidson resilience scale (CD-RISC): Validation of a 10-item measure of resilience. Journal of Traumatic Stress. 20(6):1019–1028. [PubMed: 18157881]

Cassidy S. 2015Resilience building in students: the role of academic self-efficacy. Frontiers in psychology. :6. [PubMed: 25759672]

Chang SC, Wang W, Pan A, Jones RN, Kawachi I, Okereke OI. 2016; Racial Variation in Depression Risk Factors and Symptom Trajectories among Older Women. The American Journal of Geriatric Psychiatry. 24(11):1051–1062. [PubMed: 27639290]

Cheng, C, Lau, H-PB, Chan, M-PS. Coping flexibility and psychological adjustment to stressful life changes: A meta-analytic review. American Psychological Association; 2014.

Cohen, J. Statistical power analysis for the behavioral sciences. Lawrence Erlbaum Associates, Inc; 1977.

Connor KM, Davidson JRT. 2003; Development of a new resilience scale: The Connor-Davidson resilience scale (CD-RISC). Depress Anxiety. 18(2):76–82. [PubMed: 12964174]

Daskalopoulou M, George J, Walters K, Osborn DP, Batty GD, Stogiannis D, … Udumyan R. 2016; Depression as a risk factor for the initial presentation of twelve cardiac, cerebrovascular, and

peripheral arterial diseases: data linkage study of 1.9 million women and men. Plos One. 11(4):e0153838. [PubMed: 27105076]

Davidson JRT, Payne VM, Connor KM, Foa EB, Rothbaum BO, Hertzberg MA, Weisler RH. 2005; Trauma, resilience and saliostasis: effects of treatment in post-traumatic stress disorder. International clinical psychopharmacology. 20(1):43–48. [PubMed: 15602116]

Duckworth AL, Peterson C, Matthews MD, Kelly DR. 2007; Grit: perseverance and passion for long-term goals. Journal of Personality and Social Psychology. 92(6):1087. [PubMed: 17547490]

Dunlop DD, Song J, Lyons JS, Manheim LM, Chang RW. 2003; Racial/ethnic differences in rates of depression among preretirement adults. American journal of public health. 93(11):1945–1952. [PubMed: 14600071]

Efklides, A, Moraitou, D. A positive psychology perspective on quality of life. Vol. 51. Springer Science & Business Media; 2012.

Endicott J, Nee J, Harrison W, Blumenthal R. 1993Quality of Life Enjoyment and Satisfaction Questionnaire: a new measure. Psychopharmacology bulletin.

Fernandez AC, Fehon DC, Treloar H, Ng R, Sledge WH. 2015; Resilience in organ transplantation: An application of the Connor–Davidson Resilience Scale (CD–RISC) with liver transplant candidates. Journal of personality assessment. 97(5):487–493. [PubMed: 25915726]

Folstein MF, Anthony JC, Parhad I, Duffy B, Gruenberg EM. 1985; The Meaning of Cognitive Impairment in the Elderly. Journal of the American Geriatrics Society. 33(4):228–235. DOI: 10.1111/j.1532-5415.1985.tb07109.x [PubMed: 3989183]

Folstein MF, Folstein SE, McHugh PR. 1975; “Mini-mental state”. A practical method for grading the cognitive state of patients for the clinician. J Psychiatr Res. 12(3):189–198. [PubMed: 1202204]

Fontes AP, Neri AL. 2015; Resilience in aging: literature review. Ciencia & saude coletiva. 20(5): 1475–1495. [PubMed: 26017950]

Forsythe CJ, Compas BE. 1987; Interaction of cognitive appraisals of stressful events and coping: Testing the goodness of fit hypothesis. Cognitive therapy and research. 11(4):473–485.

Genet JJ, Siemer M. 2011; Flexible control in processing affective and non-affective material predicts individual differences in trait resilience. Cognition and emotion. 25(2):380–388. [PubMed: 21432680]

Green KT, Hayward LC, Williams AM, Dennis PA, Bryan BC, Taber KH, … Calhoun PS. 2014; Examining the factor structure of the Connor–Davidson Resilience Scale (CD-RISC) in a post-9/11 US military veteran sample. Assessment. 21(4):443–451. [PubMed: 24586090]

Haigh EAP, Bogucki OE, Sigmon ST, Blazer DG. 2017Depression among Older Adults: a 20-Year Update on Five Common Myths and Misconceptions. The American Journal of Geriatric Psychiatry.

Hamilton M. 1959; The assessment of anxiety states by rating. Br J Med Psychol. 32(1):50–55. [PubMed: 13638508]

Hamilton M. 1960; A rating scale for depression. J Neurol Neurosurg Psychiatry. 23:56–62. [PubMed: 14399272]

Hamilton M. 1967; Development of a rating scale for primary depressive illness. Br J Soc Clin Psychol. 6(4):278–296. [PubMed: 6080235]

Han J, Richardson VE. 2010; The relationship between depression and loneliness among homebound older persons: Does spirituality moderate this relationship? Journal of Religion & Spirituality in Social Work: Social Thought. 29(3):218–236.

Herrman H, Stewart DE, Diaz-Granados N, Berger EL, Jackson B, Yuen T. 2011; What is resilience? The Canadian Journal of Psychiatry. 56(5):258–265. [PubMed: 21586191]

Jorgensen IE, Seedat S. 2008Factor structure of the Connor-Davidson resilience scale in South African adolescents.

Klohnen EC. 1996; Conceptual analysis and measurement of the construct of ego-resiliency. Journal of Personality and Social Psychology. 70(5):1067. [PubMed: 8656335]

Kukihara H, Yamawaki N, Uchiyama K, Arai S, Horikawa E. 2014; Trauma, depression, and resilience of earthquake/tsunami/nuclear disaster survivors of Hirono, Fukushima, Japan. Psychiatry and clinical neurosciences. 68(7):524–533. [PubMed: 24444298]

Lamond AJ, Depp CA, Allison M, Langer R, Reichstadt J, Moore DJ, … Jeste DV. 2008; Measurement and predictors of resilience among community-dwelling older women. Journal of psychiatric research. 43(2):148–154. [PubMed: 18455190]

Lassiter JM, Saleh L, Starks T, Grov C, Ventuneac A, Parsons JT. 2017Race, Ethnicity, Religious Affiliation, and Education Are Associated With Gay and Bisexual Men's Religious and Spiritual Participation and Beliefs: Results From the One Thousand Strong Cohort. Cultural diversity & ethnic minority psychology.

Lavretsky H, Reinlieb M, St Cyr N, Siddarth P, Ercoli LM, Senturk D. 2015; Citalopram, methylphenidate, or their combination in geriatric depression: a randomized, double-blind, placebo-controlled trial. Am J Psychiatry. 172(6):561–569. DOI: 10.1176/appi.ajp.2014.14070889 [PubMed: 25677354]

Lavretsky H, Zheng L, Weiner MW, Mungas D, Reed B, Kramer JH, … Mack WJ. 2010; Association of depressed mood and mortality in older adults with and without cognitive impairment in a prospective naturalistic study. American Journal of Psychiatry. 167(5):589–597. [PubMed: 20160005]

Li MH, Nishikawa T. 2012; The relationship between active coping and trait resilience across US and Taiwanese college student samples. Journal of College Counseling. 15(2):157–171.

Lohse T, Rohrmann S, Richard A, Bopp M, Faeh D. Swiss National Cohort Study G. 2017; Type A personality and mortality: Competitiveness but not speed is associated with increased risk. Atherosclerosis. 262:19–24. [PubMed: 28478195]

Maier W, Buller R, Philipp M, Heuser I. 1988; The Hamilton Anxiety Scale: reliability, validity and sensitivity to change in anxiety and depressive disorders. J Affect Disord. 14(1):61–68. [PubMed: 2963053]

Marin RS, Biedrzycki RC, Firinciogullari S. 1991; Reliability and validity of the Apathy Evaluation Scale. Psychiatry Res. 38(2):143–162. [PubMed: 1754629]

McHorney CA, Ware JE Jr, Raczek AE. 1993; The MOS 36-Item Short-Form Health Survey (SF-36): II. Psychometric and clinical tests of validity in measuring physical and mental health constructs. Med Care. 31(3):247–263. [PubMed: 8450681]

Mealer M, Meek P. 2016; The Connor-Davidson Resilience Scale in critical care nurses: a psychometric analysis. Journal of nursing measurement. 24(1):28. [PubMed: 27103241]

Mehta M, Whyte E, Lenze E, Hardy S, Roumani Y, Subashan P, … Studenski S. 2008; Depressive symptoms in late life: associations with apathy, resilience and disability vary between young-old and old-old. International journal of geriatric psychiatry. 23(3):238–243. [PubMed: 17676651]

Miller MD, Paradis CF, Houck PR, Mazumdar S, Stack JA, Rifai AH, … Reynolds CF. 1992; Rating chronic medical illness burden in geropsychiatric practice and research: application of the Cumulative Illness Rating Scale. Psychiatry research. 41(3):237–248. [PubMed: 1594710]

Min JA, Jung YE, Kim DJ, Yim HW, Kim JJ, Kim TS, … Chae J-H. 2013; Characteristics associated with low resilience in patients with depression and/or anxiety disorders. Quality of Life Research. 22(2):231–241. [PubMed: 22485024]

Moberg PJ, Lazarus LW, Mesholam RI, Bilker W, Chuy IL, Neyman I, Markvart V. 2001; Comparison of the Standard and Structured Interview Guide for the Hamilton Depression Rating Scale in Depressed Geriatric Inpatients. The American Journal of Geriatric Psychiatry. 9(1):35–40. DOI: 10.1097/00019442-200102000-00006 [PubMed: 11156750]

Ong AD, Bergeman CS, Bisconti TL, Wallace KA. 2006; Psychological resilience, positive emotions, and successful adaptation to stress in later life. Journal of Personality and Social Psychology. 91(4):730. [PubMed: 17014296]

Popa-Velea O, Diaconescu L, Jidveian Popescu M, Truţescu C. 2017; Resilience and active coping style: Effects on the self-reported quality of life in cancer patients. The international journal of psychiatry in medicine. 52(2):124–136. [PubMed: 28792288]

Raue PJ, McGovern AR, Kiosses DN, Sirey JA. 2017; Advances in psychotherapy for depressed older adults. Curr Psychiatry Rep. 19(9):57. [PubMed: 28726061]

Reker GT. 1997; Personal meaning, optimism, and choice: Existential predictors of depression in community and institutional elderly. The Gerontologist. 37(6):709–716. [PubMed: 9432987]

Santarelli S, Zimmermann C, Kalideris G, Lesuis SL, Arloth J, Uribe A, … Masana M. 2017; An adverse early life environment can enhance stress resilience in adulthood. Psychoneuroendocrinology. 78:213–221. [PubMed: 28219813]

Schneider B, Ercoli L, Siddarth P, Lavretsky H. 2012; Vascular burden and cognitive functioning in depressed older adults. The American Journal of Geriatric Psychiatry. 20(8):673–681. [PubMed: 21857219]

Seltzer MM, Greenberg JS, Floyd FJ, Hong J. 2004; Accommodative coping and well-being of midlife parents of children with mental health problems or developmental disabilities. American Journal of Orthopsychiatry. 74(2):187. [PubMed: 15113247]

Sharma V, Marin DB, Koenig HK, Feder A, Iacoviello BM, Southwick SM, Pietrzak RH. 2017; Religion, spirituality, and mental health of US military veterans: Results from the National Health and Resilience in Veterans Study. Journal of affective disorders. 217:197–204. [PubMed: 28415007]

Thomsen T, Greve W. 2013; Accommodative coping in early adolescence: An investigation of possible developmental components. Journal of adolescence. 36(5):971–981. [PubMed: 24011113]

Vahia IV, Depp CA, Palmer BW, Fellows I, Golshan S, Thompson W, … Jeste DV. 2011; Correlates of spirituality in older women. Aging & mental health. 15(1):97–102. [PubMed: 20924814]

Ware, JE, Snow, KK, Kosinski, M, Gandek, B. Institute NEMCHH. SF-36 health survey: manual and interpretation guide. The Health Institute, New England Medical Center; 1993.

Waugh CE, Fredrickson BL, Taylor SF. 2008; Adapting to life's slings and arrows: Individual differences in resilience when recovering from an anticipated threat. Journal of research in personality. 42(4):1031–1046. [PubMed: 19649310]

Waugh CE, Koster EHW. 2015; A resilience framework for promoting stable remission from depression. Clin Psychol Rev. 41:49–60. [PubMed: 24930712]

Whiteford HA, Harris MG, McKeon G, Baxter A, Pennell C, Barendregt JJ, Wang J. 2013; Estimating remission from untreated major depression: a systematic review and meta-analysis. Psychol Med. 43(8):1569–1585. [PubMed: 22883473]

Windle G. 2011; What is resilience? A review and concept analysis. Reviews in Clinical Gerontology. 21(2):152–169.

Windle G, Bennett KM, Noyes J. 2011; A methodological review of resilience measurement scales. Health Qual Life Outcomes. 9(1):8. [PubMed: 21294858]

Wink P, Dillon M, Larsen B. 2005; Religion as moderator of the depression-health connection: Findings from a longitudinal study. Research on Aging. 27(2):197–220.

Wolf PA, D'Agostino RB, Belanger AJ, Kannel WB. 1991; Probability of stroke: a risk profile from the Framingham Study. Stroke. 22(3):312–318. [PubMed: 2003301]

Yesavage JA, Brink TL, Rose TL, Lum O, Huang V, Adey M, Leirer VO. 1982; Development and validation of a geriatric depression screening scale: a preliminary report. J Psychiatr Res. 17(1): 37–49. [PubMed: 7183759]

Zakowski SG, Hall MH, Klein LC, Baum A. 2001; Appraised control, coping, and stress in a community sample: A test of the goodness-of-fit hypothesis. Annals of Behavioral Medicine. 23(3):158–165. [PubMed: 11495216]

Table 1

Sample Characteristics

	Mean(SD)/N(%)
Sex	
Female	202 (59.94%)
Male	135 (40.06%)
Race	
White	266 (78.93%)
Hispanic	27 (8.01%)
Black	26 (7.72%)
Asian	12 (3.56%)
Other	6 (1.78%)
Age	70.45 (7.04)
Education (Years)	15.80 (2.46)
MMSE	28.42 (1.47)
GDS	17.03 (6.95)
HAM-D	18.25 (3.17)
HAM-A	9.34 (3.29)
AES	41.37 (13.35)
QLES-Q	49.31 (9.66)
SF-36 Scales	
Physical Functioning	74.59 (26.67)
Role Physical	62.31 (40.99)
Bodily Pain	67.05 (25.22)
General Health	60.76 (17.06)
Vitality	36.59 (21.25)
Social Functioning	51.90 (26.07)
Role Emotional	35.39 (34.26)
Mental Health	49.27 (18.77)
Cerebrovascular Risk	10.84 (5.00)
CIRS	5.43 (3.78)

Note. Total sample N = 337. MMSE = Mini-Mental State Exam; GDS = Geriatric Depression Scale; HAM-D = Hamilton Depression Rating Scale; HAM-A = Hamilton Anxiety Rating Scale; AES = Apathy Evaluation Scale; QLES = Quality of Life Enjoyment and Satisfaction Questionnaire; CIRS = Cumulative Illness Rating Scale for Geriatrics.

Table 2

Rotated Factor Pattern Matrix

	Factor 1: “Grit”	Factor 2: “Control Coping Self-Efficacy”	Factor 3: “Accommodative Coping Self-Efficacy”	Factor 4: “Spirituality”
Variance Explained Items	30.40%	29.73%	28.50%	11.36%
I work to attain my goals	**0.64**	0.30	0.23	0.04
I have a strong sense of purpose	**0.55**	0.41	0.12	0.22
When things look hopeless, I don’t give up	**0.52**	0.20	0.23	0.14
I take pride in my achievements	**0.49**	0.22	0.20	0.11
I give my best effort no matter what	**0.49**	0.07	0.30	0.27
I am not easily discouraged by failure	**0.48**	0.43	0.38	0.11
I believe I can achieve my goals	**0.41**	0.35	0.35	0.24
I have close and secure relationships	0.29	0.02	0.24	0.15
I make unpopular or difficult decisions	0.13	**0.66**	0.17	0.06
I think of myself as a strong person	0.42	**0.49**	0.33	0.07
I like challenges	0.39	**0.47**	0.21	−0.10
I have to act on a hunch	0.09	**0.46**	0.18	0.19
I am in control of my life	0.43	**0.45**	0.28	0.13
I can handle unpleasant feelings	0.31	**0.40**	0.34	0.13
I prefer to take the lead in problem solving	0.25	**0.62**	0.32	−0.08
Under pressure, I can focus and think clearly	0.22	0.42	**0.42**	0.09
Past success gives me confidence for new challenges	0.36	0.17	**0.50**	0.18
I know where to turn for help	0.33	0.13	**0.38**	0.24
I am able to adapt to change	0.25	0.28	**0.54**	0.06
I tend to bounce back after illness or hardship	0.24	0.34	**0.59**	0.12
I see the humorous side of things	0.24	0.24	**0.42**	0.05
I believe coping with stress strengthens me	0.23	0.31	**0.44**	0.21
I can deal with whatever comes my way	0.16	0.26	**0.57**	0.13
I believe things happen for a reason	0.13	0.07	0.10	**0.59**
I believe that sometimes fate or God can help me	0.11	0.03	0.11	**0.58**

Note. Bolded cells indicate the highest factor loading for each item (items with weak loadings on all factors were disregarded).

Table 3

Observed Pearson Correlations Between Resilience, Demographic Variables, and Clinical Factors

	CD-RISC Total	Factor 1: "Grit"	Factor 2: "Active Coping"	Factor 3: "Accommodative Coping"	Factor 4: "Spirituality"
Demographic Factors					
Age	0.13*	0.11*	0.07	0.12*	−0.01
Education	0.07	0.05	0.12*	0.10	−0.18**
Clinical Factors					
MMSE	−0.15**	−0.09	−0.12*	−0.03	−0.16**
Depression (GDS)	−0.63**	−0.50**	−0.36**	−0.45**	−0.11*
Depression (HAM-D)	−0.36**	−0.24**	−0.20**	−0.31**	−0.08
Apathy (AES)	0.45**	0.34**	0.27**	0.28**	0.12*
Anxiety (HAM-A)	−0.20**	−0.11*	−0.15**	−0.24**	0.09
Cerebrovascular Risk	0.16**	0.12*	0.07	0.09	0.11
Cumulative Illness (CIRS)	0.11*	0.11*	0.05	0.05	0.02
Quality of Life (QOL) Factors					
QLES	0.60**	0.47**	0.31**	0.46**	0.14**
Role Emotional	0.35**	0.29**	0.18**	0.26**	0.13*
Vitality	0.48**	0.41**	0.29**	0.28**	0.12*
Mental Health	0.54**	0.42**	0.31**	0.42**	0.06
Social Functioning	0.37**	0.30**	0.21**	0.32**	−0.02
General Health	0.34**	0.19**	0.20**	0.31**	0.10
Physical Functioning	<0.01	0.07	0.01	−0.01	−0.09
Role Physical	0.06	0.10	0.03	0.06	−0.08
Bodily Pain	0.05	0.07	0.06	0.04	−0.10

Note.

*Correlation is significant at the 0.05 level (two-tailed).

** Correlation is significant at the 0.01 level (two-tailed).

QLES = Quality of Life Enjoyment and Satisfaction Questionnaire. All other QOL scales are from the SF-36.