Qual Life Res (2013) 22:231–241
DOI 10.1007/s11136-012-0153-3

Characteristics associated with low resilience in patients with depression and/or anxiety disorders

Jung-Ah Min · Young-Eun Jung · Dai-Jin Kim · Hyeon-Woo Yim · Jung-Jin Kim · Tae-Suk Kim · Chang-Uk Lee · Chul Lee · Jeong-Ho Chae

Accepted: 1 March 2012 / Published online: 7 April 2012

Abstract
Purpose Despite a growing body of research on resilience and its clinical significance in depression and anxiety disorders, relatively little is known about contributing factors for resilience in patients with these illnesses. We aimed to find characteristics of patients having low resilience for elucidating its clinical implications in depression and/or anxiety disorders, primarily focused on potentially modifiable variables.
Methods A total of 121 outpatients diagnosed with depression and/or anxiety disorders completed questionnaires measuring socio-demographic, clinical, and positive psychological factors. We divided patients into the three groups based on their Connor–Davidson resilience scale scores and investigated predictors of the low- and medium- versus high-resilience groups using multinomial logistic regression analysis.
Results In the final regression model, low spirituality was revealed as a leading predictor of lower-resilience groups. Additionally, low purpose in life and less frequent exercise were associated with the low- and medium-resilience groups, respectively. Severe trait anxiety characterized the low- and medium-resilience groups, although it was not included in the final model.
Conclusions Spirituality, purpose in life, and trait anxiety contribute to different levels of resilience in patients with depression and/or anxiety disorders. Our results would deepen the understanding of resilience and provide potential targets of resilience-focused intervention in these patients.

Keywords Resilience · Depression · Anxiety disorder · Spirituality · Purpose in life · Trait anxiety

Abbreviations

PTSD	Posttraumatic stress disorder
PCCTS	Parent–child conflict tactics scales
LEC	Life events checklist
CD–RISC	Connor–Davidson resilience scale
LOT-R	Life orientation test-revised
GQ-6	Gratitude questionnaire
SHQ-6	Sense of humor questionnaire
SHS	State hope scale
FACIT–Sp	Functional assessment of chronic illness therapy–spirituality
PIL	"Purpose in life" test
BDI	Beck depression inventory
STAI	State-trait anxiety inventory
SCL-90-R	Symptom checklist 90-revised
AUDIT	Alcohol use disorder identification test
OR	Odds ratio
CI	Confidence interval

Introduction

Substantial numbers of people experience at least one traumatic event during their lifetimes [1]. Although a

J.-A. Min · D.-J. Kim · J.-J. Kim · T.-S. Kim · C.-U. Lee · C. Lee · J.-H. Chae (✉)
Department of Psychiatry, Seoul St. Mary's Hospital, The Catholic University of Korea, College of Medicine, Seoul, Republic of Korea
e-mail: alberto@catholic.ac.kr

Y.-E. Jung
Department of Psychiatry, St. Carollo Hospital, Suncheon, Republic of Korea

H.-W. Yim
Department of Preventive Medicine, The Catholic University of Korea, College of Medicine, Seoul, Republic of Korea

traumatic life event could be a risk factor for the precipitation of various psychiatric disorders, most people can adapt to such an event with little disruption or recover their baseline level of functioning after a transient symptomatic period [2, 3]. Based on such observations, researchers become increasingly interested in determining which factors mediate individual differences in responding to adversity. The term *resilience* refers to the positive side of individual differences in people's responses to stress and adversity [4]. Most early researchers studied it in children who successfully grew up in high-risk environment. Since then, researchers have applied the concept of resilience more broadly to individuals experiencing various traumatic life events, including physical illnesses, such as cancer [5, 6] and mobility disabilities [7] including spinal cord injuries [8], and psychiatric illnesses including posttraumatic stress disorder (PTSD) [9]. Indeed, resilience is important in maintaining quality of life [6, 7], emotional well-being [5], and functional independence [8] in spite of suffering such illnesses.

Although resilience had no clearly established definition, various contributing personal and environmental factors that might seem to work together were found [10]. Researchers have suggested that demographic variables, such as male gender, greater age, and higher education, personal attributes, such as internal locus of control and active coping strategies [11], positive psychological factors, such as hope, optimism, gratitude, and purpose in life [12], and socio-contextual factors, such as supportive relationships and community resources including family cohesion, friendship, and religious activities [4, 13], contribute to resilience in both children and adults. In addition, since resilience is a dynamic concept, interacting with adversity, various traumatic experiences should be considered together. For example, history of childhood maltreatment was reported to predict low resilience in community samples [14], while life-threatening diseases result in posttraumatic growth in some patients [15]. Of the suggested resilience factors, psychological factors, including psychiatric symptoms and positive psychological factors, might have clinical value, because they are potentially modifiable.

Among psychiatric illnesses, substantial research and reviews on resilience have focused on PTSD to date. However, PTSD is not the only pathological flip side of resilience. Indeed, a quantity of epidemiological and biological data has shown that traumatic life events, in either childhood or adulthood, may correlate broadly with depression [16], anxiety disorders [17], psychosomatic disorders [18], substance-related disorders, and antisocial behavior [19]. Therefore, research on resilience in these various trauma-related disorders is needed. Among these disorders, depression and anxiety disorders have clinical importance due to their high prevalence, accompanying substantial disability, and high recurrence rates [20]. Moreover, resilience was reported to mediate reduced depression and anxiety in otherwise healthy individual [21, 22], and researchers have proposed that patients with depression and/or anxiety disorders might receive the greatest benefits from resilience-enhancing interventions [23, 24].

When considering implications of resilience for psychiatric illnesses, researchers regarded resilience as protecting individuals against the development of an illness after adversity at first. Individuals with high resilience had a lower risk of having PTSD after traumatic life events [10, 25]. However, resilience might not completely protect from psychopathology [26]. Given that resilience allow individuals to cope well with traumatic events and to maintain relatively stable levels of functioning and quality of life, resilience in patients who developed psychopathology may be important in management and recovery from their illnesses. In agreement with this hypothesis, resilience has been proposed to have a prognostic value based on the finding that high resilience correlated with the favorable response to treatment in patients with PTSD [27]. In addition, certain studies reported resilience level changed following treatment in patients with depression [28] and with PTSD [27]. Taken together, these studies implied that resilience might influence patient's prognosis, and some aspects of resilience could be enhanced by intervention. However, resilience might be difficult to address in clinical practice because of its complexity. The exact natures of the meaningful factors contributing to resilience in such patient have yet to be elucidated.

Given this background, the present study aimed to investigate characteristics of patients with depression and/or anxiety disorders who showed low resilience. We focused on psychological factors including psychiatric symptoms and positive psychological factors because of their potential modifiability. Researchers have suggested that individual vulnerability and resilience factors, as well as their psychopathologies, should be involved in future diagnostic system for personalized diagnosis and care [29]. Our results could provide a basis for recognizing clinically useful resilience factors and designing resilience-focused interventions in patients with depression and anxiety disorders.

Methods

Participants

During the 12-month study period between May 2009 and April 2010, patients who firstly visited Anxiety and Mood disorder Clinic at Seoul St. Mary's Hospital, The Catholic University of Korea, and met the DSM-IV criteria for

depressive and/or anxiety disorders were recruited consecutively. Diagnosis was conducted by a psychiatrist using semi-structured interviews of the Mini-International Neuropsychiatric Interview (M.I.N.I.) [30]. Eligibility criteria were being 18–65 years of age and literate in Korean. Exclusion criteria included a lifetime diagnosis of psychotic disorder, bipolar disorder, mental retardation, and any mental disorder due to general medical condition [25]. We also excluded individuals with significant personality disorders and/or medical problems likely to interfere with their study participation. A total of 125 psychiatric outpatients who met the inclusion and exclusion criteria consented to participate in this study. Restricting analyses to examining data from who had completed all measures, the final sample included 121 (of 125) patients (mean age, 36.0 ± 13.5; 51.2 % were female). The study procedure was approved by the Institutional Review Boards of the ethical committee of the Seoul St. Mary's Hospital at the Catholic University of Korea.

Demographic, clinical, and psychological measures

During clinical interviews, we assessed patients for the demographic variables (such as education years, marital status, employment status, monthly income, religion, and physical exercise) and clinical characteristics (including medical illness and psychiatric family history) that researchers have suggested may influence resilience [1, 4, 13].

Both childhood maltreatment and other types of trauma experiences were assessed as trauma load because they would influence resilience levels [1, 31]. Parent–child conflict tactics scales (PCCTS) [32] were employed to measure the types and frequencies of childhood maltreatment. Five psychological aggression items, nine physical assault items, and two supplemental items about sexual maltreatment of PCCTS evaluate each participant's experiences regarding maltreatment before the age of 18. Additionally, other potentially traumatic events during the lifetime were measured with the life events checklist (LEC) [33]. The LEC inquires about multiple degrees of exposure to each trauma, using a 5-point nominal scale. Among various degrees of exposure, a score 1 (happened to me) was regarded as an "experienced" trauma with exception that a score of 2 (witnessed it) was regarded as "experienced" in items 14 and 15 in a previous study [34]. Score of LEC was then calculated by summing the numbers of experienced events. The PCCTS [35] and LEC [36] have been translated into Korean and adapted for use in the Korean population.

To measure resilience, the Korean version of Connor–Davidson resilience scale (CD–RISC) was used [37]. The CD–RISC was developed for clinical practice as a measurement of coping ability in the face of adversity [38]. It consists of 25 items, and each item is rated on a 5-point Likert scale, ranging from 0 (not true at all) to 4 (true nearly all the time). Higher total scores indicate greater resilience. The CD–RISC is regarded as one of the resilience measures having the best psychometric properties in a meta-analysis [39]. In addition, it is able to evaluate changes of resilience in response to interventions [40]. We used the total CD–RISC scores due to instability of the 5-factor structure.

We measured positive psychological factors comprising optimism, gratitude, humor, hope, spirituality, and purpose in life using the following self-report questionnaires: the life orientation test-revised (LOT-R) [41], the gratitude questionnaire (GQ-6) [42], the sense of humor questionnaire (SHQ-6) [43], the state hope scale (SHS) [44], the functional assessment of chronic illness therapy–spirituality (FACIT–Sp) [45], and the "purpose in life" test (PIL) [46], respectively. LOT-R [47], SHQ-6 [48], SHS [49], and PIL [50] have been translated and adapted for use in Korean population, and GQ-6 was validated in Korean population [51]. The Korean version of FACIT–Sp was licensed from http://FACIT.org.

Among psychiatric symptoms, we assessed participants' symptoms of depression, anxiety, somatization, hostility, problematic alcohol use using the Beck depression inventory (BDI) [52], the state-trait anxiety inventory (STAI) [53], somatization and hostility subscales of the symptom checklist 90-revised (SCL-90-R) [54], and the alcohol use disorder identification test (AUDIT) [55], respectively, based on their associations with traumatic life events as mentioned above. Korean versions of BDI [56], STAI [57], SCL-90-R [58], and AUDIT [59] were validated.

Data analysis

To identify characteristics of patients having different resilience levels, we divided patients into 3 categories based on their CD–RISC score percentile, as was done in a previous study [60]. We defined *the high-resilience group* as having CD–RISC scores ≥75th percentile, *the medium-resilience group* as having scores ≥25th percentile and <75th percentile, and *the low-resilience group* as having scores <25th percentile. To compare these three groups for continuous and categorical variables, we performed one-way analyses of variance (ANOVA) and χ^2 tests, respectively. Post hoc multiple comparisons were performed by Bonferroni adjustment.

Next, variables associated with the levels of resilience in the univariate analysis ($P < 0.1$) were entered into the multinomial logistic regression models. After designating the low- and medium-resilience group as the outcome and the high-resilience group as the reference, a series of

multinomial logistic regression were performed to examine which variables independently predicted lower resilience (i.e., the low- or medium-resilience groups). Dividing variables into the three categories of demographic and trauma loads, psychiatric symptoms, and positive psychological factors, we attempted to identify the significant predictors of each categories, and then, we attempted to find the most significant predictors of all the variables. Since substantial intercorrelations between psychiatric symptoms and positive psychological factors and possible multicollinearity were expected, forward selection method was used for the regression models including these factors. In the first step, relevant factors including demographic characteristics and traumatic experiences were simultaneously entered into the model. In the second step, psychiatric symptoms and positive psychological factors were entered in separate models using forward selection method after adjusting for the demographic and clinical characteristics (partially adjusted model). In the final model, all psychological variables were entered into a model using forward selection method after adjustment of demographic and trauma load covariates (fully adjusted model). To perform the assumption checking for each model's goodness of fit, we used the likelihood ratio test. Statistical significance was set at $P < 0.05$, two tailed.

Results

The 121 participating patients had the following principal psychiatric diagnoses: 80 (66.1 %) patients had depressive disorders comprising major depressive disorder ($N = 65$), dysthymic disorder ($N = 6$), and depressive disorder not otherwise specified (NOS) ($N = 9$). Remaining 41 (33.9 %) patients had anxiety disorders comprising panic disorder ($N = 26$), generalized anxiety disorder ($N = 10$), obsessive compulsive disorder ($N = 9$), social anxiety disorder ($N = 9$), PTSD ($N = 1$), and anxiety disorder NOS ($N = 5$). Among them, 20 (16.5 %) patients were diagnosed as having both depressive and anxiety disorders. Mean (±SD) scores on the CD–RISC score was 48.5 (±19.8) in all patients. Although CD–RISC score did not significantly differ according to their principal diagnosis ($P = 0.059$), patients with depressive disorders tended to have lower CD–RISC score (46.1 ± 18.7) than those with anxiety disorders (53.6 ± 21.0).

Characteristics of the low-, medium-, and high-resilience groups

Table 1 summarizes the demographic and clinical characteristics of the low-, medium-, and high-resilience groups. Mean age, exercise frequency, and degree of childhood emotional maltreatment differed significantly across the three groups. Post hoc analysis revealed that the low-resilience group had younger age and less frequent exercise than the high-resilience group had ($P = 0.012$ and $P = 0.048$, respectively). The low-resilience group recalled more childhood maltreatment in the form of emotional aggression than did either the medium- or the high-resilience groups ($P = 0.003$ and $P = 0.001$, respectively). The patients' psychiatric symptom scores (except for problematic alcohol use) and scores on all positive psychological factors we considered increased or decreased, respectively, in the following order: the low-, the medium-, and the high-resilience groups.

Predictors of the low- and medium-resilience groups versus high-resilience group

Table 2 summarizes the results of the multinomial logistic regression analyses examining predictors of the low- and medium-resilience groups with the high-resilience group as the reference. Among demographic and trauma loads, younger age ($P = 0.039$) and more numbers of lifetime trauma experiences ($P = 0.049$) were significantly associated with the medium- versus the high-resilience group (model 1). Among psychiatric symptoms, more severe trait anxiety predicted both the low ($P < 0.001$)- and medium-resilience groups ($P = 0.002$) versus the high-resilience group after controlling for demographic and trauma loads (model 2). In positive psychological factors, lower spirituality ($P = 0.005$) and purpose in life ($P = 0.026$) characterized the low- versus high-resilience group, whereas low sense of humor ($P = 0.035$) characterized the medium- versus high-resilience group after controlling for demographic and trauma loads (model 3). In the final model including all variables using the forward stepwise procedure (model 4), spirituality was found to be a key factor predicting both the low ($P = 0.001$)- and medium-resilience groups ($P = 0.029$) versus high-resilience group. In addition, lower purpose in life ($P = 0.021$) and less frequent exercise ($P = 0.043$) were significantly associated with the low- and medium-resilience group, respectively. The likelihood ratio test revealed that the model fits were statistically significant in every model.

Discussion

Although resilience has been extensively studied in developmental perspectives and among healthy individuals, relatively little is known which factors are associated with resilience in patients with psychiatric illnesses [2]. To our knowledge, this study is the first attempt to examine clinical and psychosocial factors associated with different

Table 1 Demographic and clinical characteristics of the low-, medium-, and high-resilience groups in patients with depressive and anxiety disorders

	Low resilience ($N = 29$)	Medium resilience ($N = 61$)	High resilience ($N = 31$)	P value
Resilience (CD–RISC)[a]	24.8 ± 7.4	46.6 ± 7.3	74.9 ± 11.6	<0.001
Demographic and illness-related variables				
Age (years)	31.4 ± 10.8	34.8 ± 13.0	41.2 ± 14.5	0.012
Formal education years	13.6 ± 2.6	13.6 ± 2.7	14.3 ± 2.3	0.470
Gender (female)	19 (65.5)	28 (45.9)	15 (48.3)	0.206
Marital status (married/cohabiting)	17 (60.7)	27 (48.2)	15 (50.0)	0.544
Employment status (Unemployed)	9 (32.1)	13 (22.8)	4 (14.3)	0.283
Monthly family income (US $)				0.735
<2,000	10 (38.5)	14 (26.9)	7 (25.9)	
≥2,000 and <5,000	10 (38.5)	19 (36.5)	11 (40.7)	
≥5,000	6 (23.0)	19 (36.5)	9 (33.3)	
Religion (yes)	10 (34.5)	17 (27.9)	9 (29.0)	0.839
Physical exercise frequency (≤1/week)	22 (78.5)	25 (42.4)	15 (53.6)	0.007
Principal diagnosis				
Depressive disorders	22 (27.5)	41 (51.2)	17 (21.3)	0.221
Anxiety disorders	7 (17.1)	20 (48.8)	14 (34.1)	
Medical illness (yes)	7 (24.1)	21 (34.4)	10 (32.2)	0.780
Psychiatric family history (yes)	8 (27.6)	11 (18.0)	9 (29.0)	0.368
Traumatic life events				
Childhood maltreatment (PCCTS)				
Emotional aggression	42.1 ± 42.6	18.3 ± 26.3	11.7 ± 20.6	0.001
Physical aggression	32.3 ± 38.8	27.1 ± 46.9	12.8 ± 20.6	0.159
Sexual abuse	0.8 ± 0.9	0.7 ± 1.1	0.6 ± 1.1	0.693
Life event checklist (LEC)	3.5 ± 2.4	3.0 ± 2.2	2.1 ± 1.8	0.070
Psychiatric symptoms				
Depression (BDI)	32.8 ± 10.0	21.7 ± 11.7	13.4 ± 7.1	<0.001
State anxiety (SAI)	67.9 ± 8.1	57.3 ± 10.9	46.6 ± 10.4	<0.001
Trait anxiety (TAI)	71.6 ± 6.1	57.6 ± 10.0	46.3 ± 10.8	<0.001
Somatization (SCL-90)	27.5 ± 9.9	24.8 ± 9.4	21.2 ± 9.0	0.049
Hostility (SCL-90)	16.6 ± 5.7	12.7 ± 6.0	9.7 ± 4.1	<0.001
Problematic alcohol use (AUDIT)	5.1 ± 7.5	5.5 ± 6.9	5.4 ± 8.0	0.976
Positive psychological factors				
Optimism (LOT-R)	8.6 ± 4.0	11.9 ± 3.7	15.8 ± 3.3	<0.001
Gratitude (GQ-6)	23.9 ± 6.0	27.3 ± 5.4	33.1 ± 3.6	<0.001
Sense of humor (SHQ)	16.9 ± 2.2	17.7 ± 2.5	19.6 ± 2.4	<0.001
Hope (SHS)	17.6 ± 7.0	26.6 ± 7.3	36.6 ± 7.3	<0.001
Spirituality (FACIT-Sp)	10.4 ± 5.9	20.1 ± 6.8	29.8 ± 7.3	<0.001
Purpose in life (PIL)	57.1 ± 11.3	77.3 ± 15.9	100.8 ± 15.8	<0.001

Analysis of variance and χ^2 tests or Fisher's exact tests were used for continuous variables and categorical variables, respectively. Values are mean ± S.D. or number (%)

[a] CD–RISC was the basis of dividing three groups; the high- resilience group as having CD–RISC scores ≥75th percentile, the medium-resilience group as having scores ≥25th percentile and <75th percentile, and the low-resilience group as having scores <25th percentile

levels of resilience in patients with depression and/or anxiety disorders. We found that low spirituality and purpose in life predicted low- versus medium-resilience group, whereas low spirituality and less frequent physical exercise predicted medium- versus high-resilience group in a sample of outpatients with depression and/or anxiety disorders.

Table 2 Predictors of the low- and medium-resilience group versus the high-resilience group in patients with depression and anxiety disorders

Variables	Low- versus high-resilience group				Medium- versus high-resilience group			
	OR	95 % CI	OR	95 % CI	OR	95 % CI	OR	95 % CI
Demographic and trauma loads	Model 1		Model 4		Model 1		Model 4	
Age (per 10 years)	0.571	0.325–1.002	1.976	0.515–7.588	0.656*	0.439–0.979	0.786	0.438–1.411
Physical exercise frequency								
≤1/week (vs. ≥2/week)	2.272	0.539–9.581	4.674	0.184–119.037	0.462	0.168–1.276	0.199*	0.042–0.951
Emotional abuse (PCCTS)	1.018	0.995–1.042	1.017	0.969–1.066	1.001	0.979–1.023	0.997	0.963–1.032
Lifetime trauma experiences (LEC)	1.222	0.874–1.708	0.975	0.506–1.879	1.324*	1.001–1.751	1.369	0.882–2.125
Psychiatric symptoms	Model 2				Model 2			
Depression (BDI)								
State anxiety (SAI)								
Trait anxiety (TAI)	1.427***	1.222–1.666			1.111**	1.040–1.186		
Somatization (SCL-90)								
Hostility (SCL-90)								
Positive psychological factors	Model 3				Model 3			
Optimism (LOT-R)								
Gratitude (GQ-6)								
Sense of humor (SHQ)	0.876	0.495–1.550			0.681*	0.476–0.974		
Hope (SHS)								
Spirituality (FACIT-Sp)	0.568**	0.384–0.841	0.607**	0.446–0.826	0.915	0.809–1.036	0.848*	0.732–0.983
Purpose in life (PIL)	0.790*	0.642–0.973	0.820**	0.693–0.971	0.960	0.897–1.027	0.962	0.894–1.036

Reference category: high-resilience group

Model 1: variables of demographic and trauma loads were simultaneously entered in to a model ($\chi^2 = 25.812$, $P = 0.001$)

Models 2 and 3: after adjusting for demographic and trauma loads, psychiatric symptoms (model 2, $\chi^2 = 71.503$, $P < 0.001$) and positive psychological factors (model 3, $\chi^2 = 95.237$, $P < 0.001$) were entered into each model using forward stepwise procedure

Model 4: after adjusting demographic and trauma loads, all psychological factors were entered into a model using forward stepwise procedure ($\chi^2 = 84.433$, $P < 0.001$)

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$

Among psychiatric symptoms, trait anxiety characterized low- and medium-resilience group after controlling demographic and trauma factors although it was not included the final model. These factors might help in predicting successful adaptation in response to depression and anxiety disorders. Since depression and anxiety disorders frequently fail to remit, recur easily, and persist [20], such patients might need additional clinical interventions to improve overall prognosis. In this regard, our findings could provide data for use in the development and application of resilience-enhancement interventions in patients with depression and/or anxiety disorders.

While the significance of the majority of positive psychological factors are well established for the general population [61, 62], relatively little is known about their clinical significance in patients with psychiatric illnesses. Most notably in this study, low spirituality was the key independent predictor associated with low resilience in patients with depression and/or anxiety disorders. Spirituality is defined as "the way in which people understand their lives in view of their ultimate meaning and value" [63]. It involves a sense of meaning and purpose, as well as peace and harmony, and stands distinct from religiosity [45]. Given that the purpose in life signifies the ability to find positive meaning in an adverse event [64], spirituality and purpose in life seem to show an overlap. Accordingly, purpose in life also independently predicted the low-resilience group in this study. Based on the definitions of spirituality and purpose in life, one can speculate that cognitive process of meaning finding in the face of adversity as well as emotion regulation ability to maintain peace and harmony may be helpful in keeping relatively high resilience despite their psychiatric illnesses. Our findings well corresponded with previous report in which a sense of meaning and purpose in life contributed to resilience, recovery, and posttraumatic growth after various traumatic life events [25, 65].

Clinical implications of spirituality and purpose in life were also suggested in relation to psychiatric and physical health problems. For instance, the strong inverse relation between spirituality and depression has been reported [66, 67]. Spiritual well-being associates negatively with suicidal

ideation in terminally ill cancer patients [68], whereas purpose in life has been linked to better physical and mental health outcomes [69] and even longevity [70]. Moreover, spirituality has been proposed to be related to serotonin system [71], and purpose in life has been associated with cardiovascular risk factors and immune markers [72]. These results proposed that these two positive psychological factors would be meaningful for applying to various clinical populations. In this context, our findings emphasize the significance of spirituality and purpose in life in enhancing resilience of patients with depression and/or anxiety disorders. Spirituality or meaning-focused intervention, such as logotherapy [64] or meaning-making intervention [73], might be valuable psychosocial interventions in patients with relatively lower resilience.

Of various psychiatric symptoms, severe trait anxiety was the most reliable predictor for lower resilience in patients with depression and/or anxiety disorders. Although trait anxiety was not remained in the final model and this may imply the significance of positive psychological factors over psychiatric symptoms, trait anxiety as the most influencing psychiatric symptom on resilience is still worth mentioning in patients with depression and/or anxiety disorders. Although the majority of previous studies reported a significant negative correlation between resilience and depressive symptoms [74, 75], we found trait anxiety has greater influence on resilience prediction than depressive symptoms have. This finding is consistent with previous report of strong negative relationship between neuroticism and resilience in healthy young adults [76] and the association between high trait anxieties with vulnerability to depression when facing adversity [77].

Trait anxiety refers to general and long-standing feelings of apprehension, tension, nervousness, and worry [53]. Biologically, it occurs in association with amygdala reactivity to threat-related cues [78]. Considering the roles of amygdala in fear conditioning, reconsolidation, and extinction after stressful life events, the relationship between trait anxiety and resilience agrees with the idea that a capacity to avoid overgeneralizing specific stimuli and to facilitate extinction may characterize resilience [79]. Fear circuit centered on amygdala may serve as a convergent neural correlate between trait anxiety and resilience. Our finding addressing trait anxiety has an important implication, in that clinicians would propose the need of evaluation and management of trait anxiety for enhancing patient's resilience in addition to using positive psychological approaches. In spite of the name "trait anxiety", a recent study showed that environmental factors, such as perceived social support, can mitigate trait-like anxiety in healthy subjects [80]. Furthermore, pharmacological interventions, such as benzodiazepine partial agonist, corticosterone, and selective neurokinin-1 receptor agonist, also attenuated enhanced fear response in a mouse model of trait anxiety [81]. Future research on effective pharmacological and psychosocial interventions for trait anxiety is encouraged.

Apart from spirituality and trait anxiety, some possible influencing factors were only significant predicting medium- versus high-resilience group but not in predicting low- versus high-resilience group. Among them, the importance of frequent physical exercise was noted. Physical exercise, especially aerobic exercise training, has been proposed as protective against sensitivity to stress, depression, and anxiety in both clinical and general population [22, 82]. Our finding would proposed that recommending physical exercise would be helpful in enhancing resilience among patients with depression and/or anxiety disorders, especially those with having medium levels of resilience. Additionally, the relationships between greater age, fewer traumatic experiences, and sense of humor with higher resilience were observed, and these were also suggested in previous studies among general populations [1, 14, 16]. However, these factors were only significant in predicting medium- versus high-resilience group and did not remain to be significant in the final model adjusting for all other factors in the sample of patients with depression and/or anxiety disorders. These results differentiating predictors of the low- from medium-resilience group support the notion that meaningful resilience factors could be different according to the characteristics of sample, such as general population or clinical samples. Future replication studies in patients with depression and/or anxiety disorders will be needed to confirm our findings.

In addition, resilience levels of our participants who were outpatients with depression and/or anxiety disorders are needed to be discussed with respect to previous reports. The mean CD–RISC score of 48.7 $\pm$ 19.8 in this study is lower than that of Korean general population including nurse, university students, and firefighter (61.2 $\pm$ 13.0) [37]. Lower resilience in psychiatric outpatients was consistent with the report in US population [38] whereby CD–RISC score of general population (80.4 $\pm$ 12.8) was significantly higher than that of primary care patients (71.8 $\pm$ 18.4) and that of primary care patients was higher than that of psychiatric outpatients (68.0 $\pm$ 15.3), patients with generalized anxiety disorder (47.8 $\pm$ 19.5), and PTSD patients (52.8 $\pm$ 20.4). The fact that patients with high-resilience group (74.9 $\pm$ 11.6) showed comparable levels of resilience to general population is worthy of notice. This may reflect that resilience would be an independent clinical factor from psychiatric illnesses and symptoms. Interestingly, Koreans showed relatively lower-resilience scores both in general population and psychiatric outpatients. Alike, Chinese adolescents experienced earthquake and Turkish earthquake survivors showed the mean CD–RISC

score of 64.9 ± 13.3 [83] and 70.1 ± 14.1 [84], respectively. The fact that Asians were reported to tend to select midpoint on items involving positive emotion than Americans [85] may be one of the possible explanations for the differences in levels of resilience according to the countries. Therefore, levels of resilience might be interpreted in considering the demographic, clinical, and ethnic differences [37].

Several limitations are needed to be addressed in the present study. First, we considered patients with depression and/or anxiety disorders as a whole, although difference in resilience levels according to diagnosis was suggested in a study of Connor and Davidson [38]. However, some researchers have proposed depression and anxiety disorders as just different expressions of an emotional disorder, sharing general vulnerability factors, based on their high rates of comorbidity, and symptomatic overlaps in clinical settings [86]. Moreover, common psychotherapeutic approaches, such as the unified protocol, have also been developed as effective intervention strategies for broad-spectrum patients with depression and anxiety disorders [87, 88]. Second, clinical features of participants, such as outpatient population of a major university hospital and 16.5 % of comorbidity of depression and anxiety disorders, and Korean ethnicity may limit the generalization of our findings. Third, factors influencing resilience, among psychological factors in particular, were correlated with each other to some degrees. For example, strong positive correlations between trait anxiety, state anxiety, and depression were found. Therefore, we used logistic regression analysis with forward selection method in analyzing psychological factors after adjusting demographic and trauma covariates. More distinctive and comprehensive classifications of resilience factors with the involvement cognitive strategies and environmental factors will be desired in future studies. Lastly, an inherent limitation of this study is the inability to establish causality because of the cross-sectional design. Although resilience may be a physiological or psychological process rather than a static characteristic [89], resilience was measured by self-reported questionnaire at certain point. Longitudinal studies are needed to confirm the roles of observed predictors for resilience and the relationship between resilience and better coping in patients with depression and/or anxiety disorders.

Conclusion

Depression and/or anxiety disorders could be regarded as adversity to be dealt with, and thus, resilience factors might be meaningful in coping and recovery processes. We found that spirituality, purpose in life, trait anxiety, and physical exercise might contribute to different levels of resilience in patients with depression and/or anxiety disorders. These results emphaizes the value of positive psychological factors, spirituality, and purpose in life in particular, as well as the possible importance of trait anxiety for predicting and for enhancing resilience in such patients. Although more clinical implications of resilience in these patients need to be elucidated, resilience seems to be modifiable [9, 28] and it has been regarded to be associated with better prognosis and coping with illnesses [9]. In this context, our results might deepen the understanding of resilience in patients with depression and/or anxiety disorders and propose the potential targets for resilience-enhancement intervention, such as enhancing spirituality and purpose in life, in patients with low to medium levels of resilience for better outcome.

Acknowledgments The authors wish to thank A-Young Shin and Su-Yeon Han for their assistance with data collection and management. We also thank Seung Hee Jeong for her comments on statistical analyses. This study was supported by grants from the Korea Research Foundation (2006-2005152 and 2009-0073189).

References

1. Bonanno, G. A., & Mancini, A. D. (2008). The human capacity to thrive in the face of potential trauma. *Pediatrics, 121*(2), 369–375.
2. Bonanno, G. A. (2004). Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events? *The American Psychologist, 59*(1), 20–28.
3. Rutter, M. (1985). Resilience in the face of adversity: Protective factors and resistance to psychiatric disorder. *British Journal of Psychiatry, 147*, 598–611.
4. Rutter, M. (1987). Psychosocial resilience and protective mechanisms. *American Journal of Orthopsychiatry, 57*(3), 316–331.
5. Carver, C. S. (2005). Enhancing adaptation during treatment and the role of individual differences. *Cancer, 104*(11 Suppl), 2602–2607.
6. Chou, L. N., & Hunter, A. (2009). Factors affecting quality of life in Taiwanese survivors of childhood cancer. *Journal of Advanced Nursing, 65*(10), 2131–2141.
7. Alriksson-Schmidt, A. I., Wallander, J., & Biasini, F. (2007). Quality of life and resilience in adolescents with a mobility disability. *Journal of Pediatric Psychology, 32*(3), 370–379.
8. Kennedy, P., Smithson, E., McClelland, M., Short, D., Royle, J., & Wilson, C. (2010). Life satisfaction, appraisals and functional outcomes in spinal cord-injured people living in the community. *Spinal Cord, 48*(2), 144–148.
9. Davidson, J., Payne, V. M., Connor, K. M., Foa, E. B., Rothbaum, B. O., Hertzberg, M. A., et al. (2005). Trauma, resilience and saliostasis: Effects of treatment in post-traumatic stress disorder. *International Clinical Psychopharmacology, 20*(1), 43–48.
10. Hoge, E. A., Austin, E. D., & Pollack, M. H. (2007). Resilience: Research evidence and conceptual considerations for posttraumatic stress disorder. *Depression and Anxiety, 24*(2), 139–152.
11. Luthar, S. S., & Zigler, E. (1991). Vulnerability and competence: A review of research on resilience in childhood. *American Journal of Orthopsychiatry, 61*(1), 6–22.
12. Ai, A. L., Cascio, T., Santangelo, L. K., & Evans-Campbell, T. (2005). Hope, meaning, and growth following the September 11,

2001, terrorist attacks. *Journal of Interpersonal Violence, 20*(5), 523–548.
13. Garmezy, N. (1993). Children in poverty: Resilience despite risk. *Psychiatry, 56*(1), 127–136.
14. Campbell-Sills, L., Forde, D. R., & Stein, M. B. (2009). Demographic and childhood environmental predictors of resilience in a community sample. *Journal of Psychiatric Research, 43*(12), 1007–1012.
15. Barskova, T., & Oesterreich, R. (2009). Post-traumatic growth in people living with a serious medical condition and its relations to physical and mental health: A systematic review. *Disability and Rehabilitation, 31*(21), 1709–1733.
16. Southwick, S. M., Vythilingam, M., & Charney, D. S. (2005). The psychobiology of depression and resilience to stress: Implications for prevention and treatment. *Annual Review of Clinical Psychology, 1*, 255–291.
17. Gibb, B. E., Chelminski, I., & Zimmerman, M. (2007). Childhood emotional, physical, and sexual abuse, and diagnoses of depressive and anxiety disorders in adult psychiatric outpatients. *Depression and Anxiety, 24*(4), 256–263.
18. van der Kolk, B. A., Pelcovitz, D., Roth, S., Mandel, F. S., McFarlane, A., & Herman, J. L. (1996). Dissociation, somatization, and affect dysregulation: The complexity of adaptation of trauma. *The American Journal of Psychiatry, 153*(7 Suppl), 83–93.
19. MacMillan, H. L., Fleming, J. E., Streiner, D. L., Lin, E., Boyle, M. H., Jamieson, E., et al. (2001). Childhood abuse and lifetime psychopathology in a community sample. *The American Journal of Psychiatry, 158*(11), 1878–1883.
20. Lecrubier, Y. (2001). The burden of depression and anxiety in general medicine. *Journal of Clinical Psychiatry, 62*(Suppl 8), 4–9; discussion 10–11.
21. Hjemdal, O., Vogel, P. A., Solem, S., Hagen, K., & Stiles, T. C. (2011). The relationship between resilience and levels of anxiety, depression, and obsessive-compulsive symptoms in adolescents. *Clinical Psychology and Psychotherapy, 18*(4), 314–321.
22. Burton, N. W., Pakenham, K. I., & Brown, W. J. (2009). Evaluating the effectiveness of psychosocial resilience training for heart health, and the added value of promoting physical activity: A cluster randomized trial of the READY program. *BMC Public Health, 9*, 427.
23. Connor, K. M., & Zhang, W. (2006). Recent advances in the understanding and treatment of anxiety disorders. Resilience: Determinants, measurement, and treatment responsiveness. *CNS Spectrum, 11*(10 Suppl 12), 5–12.
24. Fava, G. A., & Tomba, E. (2009). Increasing psychological well-being and resilience by psychotherapeutic methods. *Journal of Personality, 77*(6), 1903–1934.
25. Alim, T. N., Feder, A., Graves, R. E., Wang, Y., Weaver, J., Westphal, M., et al. (2008). Trauma, resilience, and recovery in a high-risk African-American population. *The American Journal of Psychiatry, 165*(12), 1566–1575.
26. Ingram, R. E., & Price, J. M. (2001). The role of vulnerability in understanding psychopathology. In R. E. Ingram & J. M. Price (Eds.), *Vulnerability to psychopathology: Risk across the lifespan* (pp. 3–19). New York: The Guilford Press.
27. Davidson, J. R., Payne, V. M., Connor, K. M., Foa, E. B., Rothbaum, B. O., Hertzberg, M. A., et al. (2005). Trauma, resilience and saliostasis: Effects of treatment in post-traumatic stress disorder. *International Clinical Psychopharmacology, 20*(1), 43–48.
28. Davidson, J., Watkins, L., Owens, M., Krulewicz, S., Connor, K., Carpenter, D., et al. (2005). Effects of paroxetine and venlafaxine XR on heart rate variability in depression. *Journal of Clinical Psychopharmacology, 25*(5), 480–484.
29. Muller-Spahn, F. (2008). Individualized preventive psychiatry: Syndrome and vulnerability diagnostics. *European Archives of Psychiatry and Clinical Neuroscience, 258*(Suppl 5), 92–97.
30. Sheehan, D. V., Lecrubier, Y., Sheehan, K. H., Amorim, P., Janavs, J., Weiller, E., et al. (1998). The mini-international neuropsychiatric interview (MINI): The development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *Journal of Clinical Psychiatry, 59*(Suppl 20), 22–33; quiz 34–57.
31. Bonanno, G. A., Galea, S., Bucciarelli, A., & Vlahov, D. (2007). What predicts psychological resilience after disaster? The role of demographics, resources, and life stress. *Journal of Consulting and Clinical Psychology, 75*(5), 671–682.
32. Straus, M. A., Hamby, S. L., Finkelhor, D., Moore, D. W., & Runyan, D. (1998). Identification of child maltreatment with the parent–child conflict tactics scales: Development and psychometric data for a national sample of American parents. *Child Abuse & Neglect, 22*(4), 249–270.
33. Gray, M. J., Litz, B. T., Hsu, J. L., & Lombardo, T. W. (2004). Psychometric properties of the life events checklist. *Assessment, 11*(4), 330–341.
34. Bae, H., Kim, D., Koh, H., Kim, Y., & Park, J. S. (2008). Psychometric properties of the life events checklist-Korean version. *Psychiatry Investigation, 5*(3), 163–167.
35. Oh, H. J. (2004). *Effect of childhood abuse and exposure to parental violence on problem in drinking in later life*. Seoul: School of Social Welfare, Yonsei University.
36. Lee, Y. J. (1995). *The relationship between stress, social support, self respect, depression, and anxiety*. Seoul: School of Educational Psychology, Seoul Women's University.
37. Baek, H. S., Lee, K. U., Joo, E. J., Lee, M. Y., & Choi, K. S. (2010). Reliability and validity of the Korean version of the Connor–Davidson resilience scale. *Psychiatry Investigation, 7*(2), 109–115.
38. Connor, K. M., & Davidson, J. R. (2003). Development of a new resilience scale: The Connor–Davidson resilience scale (CD–RISC). *Depression and Anxiety, 18*(2), 76–82.
39. Windle, G., Bennett, K. M., & Noyes, J. (2011). A methodological review of resilience measurement scales. *Health and Quality of Life Outcomes, 9*, 8.
40. Davidson, J. R., Baldwin, D. S., Stein, D. J., Pedersen, R., Ahmed, S., Musgnung, J., et al. (2008). Effects of venlafaxine extended release on resilience in posttraumatic stress disorder: An item analysis of the Connor–Davidson resilience scale. *International Clinical Psychopharmacology, 23*(5), 299–303.
41. Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A reevaluation of the life orientation test. *Journal of Personality and Social Psychology, 67*(6), 1063–1078.
42. McCullough, M. E., Emmons, R. A., & Tsang, J. A. (2002). The grateful disposition: A conceptual and empirical topography. *Journal of Personality and Social Psychology, 82*(1), 112–127.
43. Svebak, S. (1996). The development of the sense of humor questionnaire: From SHQ to SHQ-6. *Humor: International Journal of Humor Research, 9*, 341–361.
44. Snyder, C. R., Sympson, S. C., Ybasco, F. C., Borders, T. F., Babyak, M. A., & Higgins, R. L. (1996). Development and validation of the state hope scale. *Journal of Personality and Social Psychology, 70*(2), 321–335.
45. Peterman, A. H., Fitchett, G., Brady, M. J., Hernandez, L., & Cella, D. (2002). Measuring spiritual well-being in people with cancer: The functional assessment of chronic illness therapy–spiritual well-being scale (FACIT–Sp). *Annuls of Behavioral Medicine, 24*(1), 49–58.

46. Crumbaugh, J. C., & Maholick, L. T. (1964). An experimental study in existentialism: The psychometric approach to Frankl's concept of neogenic neurosis. *Journal of Clinical Psychology, 20*, 200–207.
47. Shin, H., Lyu, J., & Lee, M. (2005). Testing the one-factor and two-factor models of optimism and pessimism in Korean adolescents. *Korean Journal of School Psychology, 2*(1), 79–97.
48. Huang, M. (1992). *The relationship between the sense of humor and ways of stress coping*. Iksan: Educational Research, Wonkwang University.
49. Cho, H. (2010). The effects of hope on life stress, psychopathology and life satisfaction. *Korean Journal of Clinical Psychology, 29*(3), 839–852.
50. Shin, H. S. (2002). Effects on depressive disposition of middle-aged women by style of living. *Korean Journal of Women Psychology, 7*(1), 29–45.
51. Kwon, S. J., Kim, K. H., & Lee, H. S. (2006). Validation of the Korean version of gratitude questionnaire. *Korean Journal of Health Psychology, 2006*(1), 177–190.
52. Beck, A. T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry, 4*, 561–571.
53. Spielberger, C. D., Gorsuch, R. L., & Lushene, R. E. (1970). *Manual for the state-trait anxiety inventory*. Palo Alto, CA: Consulting Psychologists Press.
54. Derogatis, L. R. (1977). *Symptom checklist-90-revised (SCL-90-R) manual I*. Baltimore: Clinical Psychometric Research Unit, Johns Hopkins University.
55. Saunders, J. B., Aasland, O. G., Babor, T. F., de la Fuente, J. R., & Grant, M. (1993). Development of the alcohol use disorders identification test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption-II. *Addiction, 88*(6), 791–804.
56. Rhee, M., Lee, Y., Jung, H., Choi, J., Kim, S., Kim, Y., et al. (1995). A standardization study of beck depression inventory II—Korean version (K-BDI): Validity. *Korean Journal of Psychopathology, 4*(1), 96–104.
57. Hahn, D. W., Lee, C. H., & Chon, K. K. (1996). Korean adaptation of Spielberger's STAI (K-STAI). *Korean Journal of Health Psychology, 1*(1), 1–14.
58. Kim, K. I., Won, H. T., Lee, J. H., & Kim, K. Y. (1978). Standardization study of symptom check list-90 in Korea I: Characteristics of normal responses. *Journal of Korean Neuropsychiatric Association, 17*, 449–458.
59. Kim, J. S., Oh, M. K., Park, B. K., Lee, M. K., & Kim, G. J. (1999). Screening criteria of alcoholism by alcohol use disorders identification test (AUDIT) in Korea. *Journal of Korean Academy of Family Medicine, 20*(9), 1152–1159.
60. Wingo, A. P., Wrenn, G., Pelletier, T., Gutman, A. R., Bradley, B., & Ressler, K. J. (2010). Moderating effects of resilience on depression in individuals with a history of childhood abuse or trauma exposure. *Journal of Affective Disorders, 126*(3), 411–414.
61. Seligman, M. E., & Csikszentmihalyi, M. (2000). Positive psychology: An introduction. *The American Psychologist, 55*(1), 5–14.
62. Chida, Y., & Steptoe, A. (2008). Positive psychological well-being and mortality: A quantitative review of prospective observational studies. *Psychosomatic Medicine, 70*(7), 741–756.
63. Muldoon, M., & King, N. (1995). Spirituality, health care, and bioethics. *Journal of Religion and Health, 34*(4), 329–349.
64. Frankl, V. E. (1966). Logotherapy and existential analysis—A review. *The American Journal of Psychotherapy, 20*(2), 252–260.
65. Winter, U., Hauri, D., Huber, S., Jenewein, J., Schnyder, U., & Kraemer, B. (2009). The psychological outcome of religious coping with stressful life events in a Swiss sample of church attendees. *Psychotherapy and Psychosomatics, 78*(4), 240–244.
66. Dew, R. E., Daniel, S. S., Goldston, D. B., McCall, W. V., Kuchibhatla, M., Schleifer, C., et al. (2010). A prospective study of religion/spirituality and depressive symptoms among adolescent psychiatric patients. *Journal of Affective Disorders, 120*(1–3), 149–157.
67. Nelson, C. J., Rosenfeld, B., Breitbart, W., & Galietta, M. (2002). Spirituality, religion, and depression in the terminally ill. *Psychosomatics, 43*(3), 213–220.
68. McClain, C. S., Rosenfeld, B., & Breitbart, W. (2003). Effect of spiritual well-being on end-of-life despair in terminally-ill cancer patients. *Lancet, 361*(9369), 1603–1607.
69. Ryff, C. D., Dienberg, L. G., Urry, H. L., Muller, D., Rosenkranz, M. A., Friedman, E. M., et al. (2006). Psychological well-being and ill-being: Do they have distinct or mirrored biological correlates? *Psychotherapy and Psychosomatics, 75*(2), 85–95.
70. Boyle, P. A., Barnes, L. L., Buchman, A. S., & Bennett, D. A. (2009). Purpose in life is associated with mortality among community-dwelling older persons. *Psychosomatic Medicine, 71*(5), 574–579.
71. Borg, J., Andree, B., Soderstrom, H., & Farde, L. (2003). The serotonin system and spiritual experiences. *The American Journal of Psychiatry, 160*(11), 1965–1969.
72. Ryff, C. D., Singer, B. H., & Dienberg, L. G. (2004). Positive health: Connecting well-being with biology. *Philosophical Transactions of the Royal Society of London, Series B, Biological Science, 359*(1449), 1383–1394.
73. Henry, M., Cohen, S. R., Lee, V., Sauthier, P., Provencher, D., Drouin, P., et al. (2010). The meaning–making intervention (MMI) appears to increase meaning in life in advanced ovarian cancer: A randomized controlled pilot study. *Psychooncology, 19*(12), 1340–1347.
74. Hjemdal, O., Aune, T., Reinfjell, T., Stiles, T. C., & Friborg, O. (2007). Resilience as a predictor of depressive symptoms: A correlational study with young adolescents. *Clinical Child Psychology and Psychiatry, 12*(1), 91–104.
75. Sexton, M. B., Byrd, M. R., & von Kluge, S. (2010). Measuring resilience in women experiencing infertility using the CD–RISC: Examining infertility-related stress, general distress, and coping styles. *Journal of Psychiatric Research, 44*(4), 236–241.
76. Campbell-Sills, L., Cohan, S. L., & Stein, M. B. (2006). Relationship of resilience to personality, coping, and psychiatric symptoms in young adults. *Behavior Research and Therapy, 44*(4), 585–599.
77. Sandi, C., & Richter-Levin, G. (2009). From high anxiety trait to depression: A neurocognitive hypothesis. *Trends in Neuroscience, 32*(6), 312–320.
78. Hariri, A. R. (2009). The neurobiology of individual differences in complex behavioral traits. *Annual Review of Neuroscience, 32*, 225–247.
79. Charney, D. S. (2004). Psychobiological mechanisms of resilience and vulnerability: Implications for successful adaptation to extreme stress. *The American Journal of Psychiatry, 161*(2), 195–216.
80. Hyde, L. W., Gorka, A., Manuck, S. B., & Hariri, A. R. (2011). Perceived social support moderates the link between threat-related amygdala reactivity and trait anxiety. *Neuropsychologia, 49*(4), 651–656.
81. Sartori, S. B., Hauschild, M., Bunck, M., Gaburro, S., Landgraf, R., & Singewald, N. (2011). Enhanced fear expression in a psychopathological mouse model of trait anxiety: Pharmacological interventions. *PLoS ONE, 6*(2), e16849.
82. Salmon, P. (2001). Effects of physical exercise on anxiety, depression, and sensitivity to stress: A unifying theory. *Clinical Psychology Review, 21*(1), 33–61.
83. Yu, X. N., Lau, J. T., Mak, W. W., Zhang, J., & Lui, W. W. (2011). Factor structure and psychometric properties of the

Connor–Davidson resilience scale among Chinese adolescents. *Comprehensive Psychiatry, 52*(2), 218–224.
84. Karairmak, O. (2010). Establishing the psychometric qualities of the Connor–Davidson resilience scale (CD–RISC) using exploratory and confirmatory factor analysis in a trauma survivor sample. *Psychiatry Research, 179*(3), 350–356.
85. Lee, J. W., Jones, P. S., Mineyama, Y., & Zhang, X. E. (2002). Cultural differences in responses to a Likert scale. *Research in Nursing & Health, 25*(4), 295–306.
86. Andrews, G. (1996). Comorbidity and the general neurotic syndrome. *British Journal of Psychiatry, 30*, 76–84.
87. Barlow, D. H., Allen, L. B., & Choate, M. L. (2004). Towards a unified treatment for emotional disorders. *Behavior Therapy, 35*, 205–230.
88. Ehrenreich, J. T., Goldstein, C. M., Wright, L. R., & Barlow, D. H. (2009). Development of a unified protocol for the treatment of emotional disorders in youth. *Child & Family Behavior Therapy, 31*(1), 20–37.
89. Rutter, M. (2006). Implications of resilience concepts for scientific understanding. *Annals of the New York Academy of Science, 1094*, 1–12.