

Stress on health-related quality of life in older adults: the protective nature of mindfulness

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Objectives: The current study examined whether the link between stress and health-related quality of life was buffered by protective factors, namely mindfulness, in a sample of middle-aged and older adults.

Methods: In this cross-sectional study, 134 healthy, community-dwelling adults (ages 50–85 years) were recruited from Dallas, TX. The participants were screened for depressive symptoms and severity (using the Patient Health Questionnaire [PHQ-9]). All participants completed measures of self-reported health status (i.e. SF36v2: mental and physical health composites), life stress (using the Elders Life Stress Inventory [ELSI]), and trait mindfulness (i.e. Mindful Attention Awareness Scale).

Results: Hierarchical regressions (covarying for age, gender, and education) showed that life stress was inversely related to physical and mental health. Mindfulness was positively related to mental health. The negative effect of life stress on mental health was weakened for those individuals with higher levels of trait mindfulness.

Conclusions: The results suggest that mindfulness is a powerful, adaptive strategy that may protect middle-aged and older adults from the well-known harmful effects of stress on mental health.

Keywords: aging; mental health; mindfulness; stress

Introduction

The road to successful aging may be determined by optimal health outcomes (Rowe & Kahn, 1997), proactive adaptations (Kahana, Kelley-Moore, & Kahana, 2012), or by drawing on mechanisms that overcome life challenges (Baltes & Baltes, 1993; de Frias, 2013). A variety of psychosocial stressors in late life may hinder health-related quality of life: a crucial ingredient for successful aging. Chronic stress (e.g. hassles of caregiving) and negative life events (e.g. deterioration in memory or finances) have been found to increase the risk of illness and diseases (Almeida, Piazza, Stawski, & Klein, 2011; Baum & Posluszny, 1999). Protective factors may serve as resources or mechanisms to buffer against the negative effects of life stress on health in older adults. Mindfulness is a mechanism for effective self-regulation and stress reduction (Kabat-Zinn, 2003). The aim of this study was to examine individual differences in life stress on health-related quality of life in middle-aged and older adults, and the potential moderating effect of trait mindfulness.

Psychological stressors are a public health concern as they are adversely associated with poor physical and mental health (Aldwin, 1990; Almeida et al., 2011; Charles, Piazza, Mogle, Sliwinski, & Almeida, 2013; Dautovich, Dzierzewski, & Gum, 2013; Krause, 1986; McEwen, 2006; Piazza, Charles, Sliwinski, Mogle, & Almeida, 2013). Perceived stress symptoms (e.g. lack of energy), lifetime traumatic events (e.g. abuse or assault), or chronic stressors, and daily stressors or hassles (e.g. spousal conflict) have been associated with poorer physical functioning

in mid-life or late life (Kulmala et al., 2013; Piazza et al., 2013; Scott et al., 2013). Moreover, stressful life events negatively impact mental health and well-being (Charles et al., 2013; Couto, Koller, & Novo, 2011; Dautovich et al., 2013; Kahana et al., 2012). Stressful life events are typically major events that require significant adjustment by the individual, whereas chronic or daily stressors are minor events that accumulate overtime having proximal effects on health (Almeida et al., 2011). The mechanisms or pathways by which these stressors have a prolonged impact on health are stressor exposure (i.e. likelihood of experiencing an event based on situational or vulnerability factors) and stressor reactivity (i.e. likelihood of showing reactions (emotional or physical) to the stressors). The types of stressors that are examined in this study pertain to exposure. Stressful life events (i.e. stressor exposure) consume limited resources in aging which may weaken one's resilience to manage environmental challenges.

The availability of psychosocial resources may ease one's adaptation to perceived losses in late life (Aldwin, Spiro, & Park, 2006; Baltes & Baltes, 1993; de Frias, 2013). Adaptive mechanisms may protect individuals from a cascade of poor health outcomes. One viable protective factor to curtail the hazards of life stress is termed mindfulness. Mindfulness is a complex and adaptive process that necessitates paying attention to the present moment in a receptive and non-judgmental attitude (Brown & Ryan, 2003; Kabat-Zinn, 1994, 2003). Mindfulness has been shown to alleviate the symptoms of clinical conditions (e.g. relapse reduction in depression;

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Piet & Hougaard, 2011) and to be beneficial in multiple domains of functioning, including improvement in health (e.g. Kabat-Zinn, Lipworth, & Burney, 1985; Teasdale et al., 2000); psychological well-being in healthy young adults (e.g. Brown & Ryan, 2003); stress reduction (e.g. Epel, Daubenmier, Moskowitz, Folkman, & Blackburn, 2009; Gallegos, Hoerger, Talbot, Moynihan, & Duberstein, 2013); better cognitive functioning (e.g. see Chiesa, Calati, & Serretti, 2011, for review; Greenberg, Reiner, & Meiran, 2012); and cognitive resilience via less need for compensatory strategy use in older adults (de Frias, 2013). The way an individual reacts to an event may be more important in predicting emotional health than the event itself. Mindfulness meditation techniques tend to shift the appraisal of a situation (i.e. stressor reactivity) such that it is no longer perceived as a threat. Mindfulness is an emotion-regulation strategy that disarms the pathways of stressor reactivity such that exposure to a stressor is no longer hazardous to health. In this way, mindfulness as a protective psychological process alters the stress pathways which would otherwise contribute to cellular aging (Epel et al., 2009). In sum, mindfulness has been linked to numerous health, psychosocial, and cognitive outcomes, but no study to date has examined the synergistic effects between trait mindfulness and life stress on health outcomes in middle-aged and older adults.

This study explores the additive and interactive effects of stressful life events and trait mindfulness on mental and physical health functioning in middle-aged and older adults. First, similar to other studies, we expected that those adults who experience more stressful life events will also have poorer health. In addition, trait mindfulness is expected to positively impact health functioning. Second, we expected that trait mindfulness would have a moderating effect on the stress-health link. It is expected that higher trait mindfulness will alleviate the negative path between life stress and health functioning.

Method

Participants

A total of 134 community-dwelling adults (93 women, 41 men) were recruited from Dallas, TX. The participants

were 50–85 years of age ($M = 65.43$, $SD = 9.50$) and the average level of education was 15.51 years ($SD = 2.62$). The participants were screened prior to recruitment and were excluded if there was a self-report of concurrent or history of health conditions known to impair cognitive health (i.e. dementia, Parkinson's disease, stroke, brain injury, schizophrenia) as well as taking antipsychotic medications. All participants attained scores above 23 ($M = 27.68$, $SD = 1.79$) on the Mini-Mental Status Examination (Folstein, Folstein, & McHugh, 1975), a screening measure of global cognition. Participants reported their general health as being good to very good (on a scale of 1–5) relative to a perfect state ($M = 4.37$, $SD = .62$) and relative to same age peers ($M = 4.48$, $SD = .62$). All participants scored below 15 ($M = 2.47$, $SD = 3.04$) on the Patient Health Questionnaire (PHQ-9; Kroenke, Spitzer, & Williams, 2001), a screening measure of depressive symptoms and severity. The participants were recruited from the local community via advertisements (e.g. flyers distributed in local community centers, public libraries) and online newsletters. The overarching study examines multiple influences on healthy aging. The study was approved by the University of Texas at Dallas Ethics Review Board. A description of the sample is presented in Table 1.

Procedure

Participants who met initial screening criteria (e.g. during a telephone interview) were later invited to receive a battery of tests at the University of Texas at Dallas. As part of the telephone screening procedure, the tester asked if the participants were fluent in English and if they said no, or the tester was not convinced of their fluency based on the telephone conversation, then the participant was excluded from the study. Participants drove to campus, and a research assistant met with them at the campus parking lot and walked with them to the laboratory. The testing session lasted approximately three hours. The same order of test administration was provided for all participants. Both paper-and-pencil and computerized tasks were administered. Participants received a nominal fee for their time. Written informed consent was obtained from all participants before test administration.

Table 1. Descriptive statistics for background and performance variables ($n = 134$).

Measure	<i>M</i>	<i>SD</i>	Range	Skewness	Kurtosis
Age (in years)	65.43	9.50	50.41–85.11	.13	–1.05
Education (in years)	15.51	2.62	8–22	–.24	–.30
Health (relative to peers)	4.48	.62	3–5	–.77	–.38
Health (relative to perfect state)	4.37	.62	3–5	–.44	–.64
MMSE	27.68	1.79	24–30	–.38	–.93
PHQ-9	2.47	3.04	0–14	1.58	2.26
SF36v2: PCS	49.04	9.07	24.07–69.28	–.77	.07
SF36v2: MCS	52.11	8.93	20.47–65.60	–1.46	2.10
MAAS	4.33	.78	2–6	–.25	–.07
ELSI	4.99	3.14	0–1	.56	–.27

Note. MMSE = Mini-Mental Status Examination; PHQ-9 = Patient Health Questionnaire; PCS = Physical Composite Score; MCS = Mental Composite Score; MAAS = Mindfulness Attention Awareness Scale; ELSI = Elder's Life Stress Inventory (total events).

Measures

Medical outcomes study 36-item short form version (SF36v2)

The SF36v2 (Ware, Kosinski, & Dewey, 2000) is a self-report questionnaire which measures eight functional health domains and two psychometrically based summary scores [i.e. physical component summary (PCS) and mental component summary (MCS)]. The eight health domains which consist of Likert-scale items are as follows: mental health (MH; five items); role limitations due to emotional problems (RE; three items); general health perceptions (GH; five items); vitality (VT; four items); physical functioning (PF; 10 items); role limitations due to physical problems (RP; four items); social functioning (SF; two items); and bodily pain (BP; two items). The SF36v2 time frame used in this study was one-week recall. The SF36v2 uses norm-based scoring for the scales and derives two psychometrically based component summary scores. For each subscale, higher scores indicate better health. For this study, the physical health (PCS: subscales PF, RP, BP, and GH) and mental health (MCS: subscales MH, RE, SF, and VT) standardized composite scores were used in the analyses.

Elders life stress inventory (ELSI)

The ELSI (Aldwin, 1990) is a 31-item self-report inventory that measures the number of stressful events experienced in the last year. Items in the ELSI represent stressful life events relevant to older adults (e.g. death of a spouse, retirement, divorce, poor health, financial hardship, changes in job or residence). A total of 10% of the ELSI items pertained to health-related events. The total number of events experienced was analyzed in this study.

Mindful attention awareness scale (MAAS)

The MAAS (Brown & Ryan, 2003) is a 15-item self-report questionnaire that assesses trait mindfulness, namely, open or receptive awareness of and attention to what is occurring in the present moment. Each item consists of a 6-point Likert scale (1 = almost always; 6 = almost never). A sample item includes, 'I find it difficult to stay focused on what's happening in the present'. Items reflect inattention across several everyday situations and domains (e.g. cognitive, physical, emotional, general). The scale was scored by computing a mean of the 15 items. In this study, the internal consistency was high ($\alpha = .87$).

Data analyses

A series of concurrent hierarchical regression analyses was conducted separately for the physical-health and mental-health composites. The purpose was to examine the independent and relative contributions of the two quality of life indices. The first cluster of correlates included demographic information (age, gender, and education) (Block 1). The second cluster of correlates was life stress

Table 2. Associations (standardized betas) among health, life stress, and trait mindfulness scores.

Correlates	Quality of life	
	Physical health	Mental health
Block 1		
Age	-.09	.17
Gender	-.07	-.09
Education	.07	-.06
R^2	.02	.04
F	.89	1.57
Block 2		
Age	-.17*	.07
Gender	-.05	-.05
Education	.11	.04
Stress	-.33***	-.25***
Trait mindfulness	.06	.45***
R^2	.13	.32
ΔR^2	.11***	.29***
F	3.85**	12.25***
Block 3		
Age	-.16	.05
Gender	-.06	-.01
Education	.11	.04
Stress	-.31***	-.30***
Trait mindfulness	.06	.45***
stress \times mindfulness	-.10	.21**
R^2	.14	.36
ΔR^2	.01	.04**
F	3.43**	12.03***

Note. * $p < .05$. ** $p < .01$. *** $p < .001$.

(ELSI total events) and trait mindfulness (MAAS) (Block 2). The third correlate was the life stress \times trait mindfulness interaction (Block 3). The main effect terms were centered before the interaction term was computed.

Alpha levels of $p < .05$ were specified as the threshold to indicate statistical significance. The results are discussed for those models with a significant change in R^2 . Results for the analyses are reported in Table 2 and the correlations between correlates are presented in Table 3.

Results

Demographics

Gender, age, and education were not significant predictors of physical health or mental health. The demographic characteristics did not account for significant variance in the quality of life composite scales.

Life stress and mindfulness

Life stress was a significant predictor of physical health and mental health. Higher ELSI (total events) was related to poorer physical and mental health. Trait mindfulness was significantly related to mental health, but not physical health. Higher dispositional mindfulness was related to better mental health. Life stress and trait mindfulness

Table 3. Pearson product–moment correlations for continuous measures.

Measure	1	2	3	4	5	6
1. Age	–					
2. Education	.01	–				
3. PCS	–.10	.08	–			
4. MCS	.16	–.03	.01	–		
5. MAAS	.08	–.13	.08	.50***	–	
6. ELSI	–.22*	.10	–.29**	–.34***	–.16	–

Note. * $p < .05$. ** $p < .01$. *** $p < .001$.

accounted for an additional 11%–29% of the variance in physical and mental health, after controlling for the background variables.

Moderating effects of mindfulness

Trait mindfulness moderated the effect of life stress on mental health. In order to probe the significant interaction between the two continuous variables, the trait mindfulness composite variable was split into two groups: low-MAAS skill (below the mean) versus moderate-to-high-MAAS skill (above the mean). (The MAAS mean (4.33) and MAAS median (4.37) scores were nearly identical.) *Post hoc* analyses of simple slopes for levels of MAAS skill showed that the strength of the stress–health association was stronger for individuals lower in MAAS ($\beta = -.42, p < .001$) compared to those individuals who were more mindful ($\beta = -.25, p < .05$). The MAAS–stress interaction on health accounted for an additional 4% of the variance in mental health, after controlling for demographic variables, life stress, and trait mindfulness.

Discussion

This study examined additive and interactive effects of life stress and trait mindfulness on two indicators of health-related quality of life (i.e. mental and physical health), after controlling for age, gender, and education, in middle-aged and older adults. The results of this study are consistent with our hypotheses. The additive effects showed that life stress was inversely related to mental health and physical health, and trait mindfulness had a positive effect on mental health. More importantly, life stress and trait mindfulness had a synergistic effect on mental-health functioning.

The detrimental effect of stress on mental health and physical health in middle-aged and older adults is consistent with numerous studies. Other researchers have reported the negative effects of stressful life events or stressors on well-being (e.g. Couto et al., 2011; Kahana et al., 2012; Mancini, Bonanno, & Clark, 2011). Stressful life events may affect physical and mental health through biochemical pathways, such as elevated cortisol levels (Epel et al., 2009) and neurotoxicity (Lupien, McEwan, Gunnar, & Heim, 2009). The accumulation of stressful life events may be associated with prolonged physiological arousal, resulting in a wear and tear of the human

body (McEwan, 2006). Moreover, the cognitive theories of emotional health advise that how an individual responds to a stressful situation may lead to more deleterious health outcomes than the event itself.

The second predictor of health-related quality of life was trait mindfulness which was strongly related to mental health in this study. Individuals, who have a greater unbiased awareness of their actions (i.e. are more mindful), reported better emotional health in late life. Our findings are similar to several other studies showing the positive mindfulness–health link in adulthood (e.g. Davidson et al., 2003; Kabat-Zinn et al., 1985; Teasdale et al., 2000). Mindfulness lowers rumination and reduces excessive elaborative processing of negative information in the face of emotional challenge; therefore, it may buffer against stresses that limit resources (Epel et al., 2009). A recent study by de Frias (2013) showed that having a more mindful pre-disposition was related to less frequent use of memory compensatory efforts in older adults, indicating that mindfulness may serve as a mechanism for resiliency in late life. The protective effects of trait mindfulness (as a between-person resiliency factor) may be most evident in situations when an aging individual is accumulating stressful life events, which would otherwise further deplete one's quality of life.

The significant life stress \times trait mindfulness interaction for mental health supports the finding that mindfulness has a buffering effect on the hazardous effects of stress on mental health. In this study, the link between stressful life events and mental health was weaker among more mindful individuals. In fact, the stress–health link was nearly twice as strong for less mindful older adults. Life stress and mindfulness accounted for nearly one-third of the variance in mental health. Exposure to a given stressor may be differentially experienced depending on person-level characteristics, and this study shows that mindful individuals are less encumbered by the mere exposure of a stressor which benefits health functioning. Mindfulness cultivates cognitive and emotional skills which is especially important when stressful life events may lead to the depletion of resources (e.g. social, cognitive, financial). Less mindful individuals may be more prone to the negative effects of stressors. Mindful individuals are less likely to form habits of negative thinking or rumination which tend to increase distress (Epel et al., 2009), indicating that when exposed to stressors these individuals regulate their attention to the present moment which functions to optimize emotional well-being. The most frequently endorsed stressful life events were a combination of egocentric (e.g. deterioration of memory and finances) and non-egocentric (illness of a friend/relative), all of which are ongoing stressors in late life. The discrete events (e.g. divorce) were endorsed less frequent. The accumulation of these types of stressors is known to have the most adverse effect on health functioning (Almeida et al., 2011). The benefits of mindfulness training on lowering stress responses (e.g. lower cortisol) in patient samples has been reported elsewhere (e.g. Carlson, Speca, Faris, & Patel, 2007). For older adults with severe depression, the benefits of mindfulness-based stress reduction

may be slightly weakened (Gallegos et al., 2013) and our study shows mindfulness is effective in reducing the negative effects of stress on mental health in older adults who are screened for depression. By being mindful of momentary physical, affective, and cognitive experiences, the individual may improve affect regulation in stressful situations which would then protect mental-health functioning and boost successful aging.

A few limitations of this study are worth noting. First, the study focused exclusively on stressful life events. Future research could examine the benefits of mindfulness as a buffer to other dimensions of stress (e.g. daily hassles, chronic stressors). Second, since participants were screened for clinical depression and were generally healthy, the results may not generalize to older adults with depression. Third, the effects on physical health were minimal and other research may examine older adults with known physical limitations. All testing for this study was conducted at the university campus and participants were mobile.

Strengths of this study are also noted. First, this study extends prior research by showing that the detrimental effects of exposure to stressors on mental health in mid-life and late adulthood are buffered by mindfulness, a resiliency factor. The results from this study offer targets for mental-health interventions aimed at promoting healthy aging. Second, all participants were screened for clinical depression.

In sum, this study found that individual differences in mindfulness had a moderating effect on the life stress mental-health link. The clinical impact of the synergistic effect is that older adults experiencing high levels of stress would benefit most from formal mindfulness meditation training as a means to gain or maintain a healthy mind. Targeting vulnerable older adults (e.g. those who have recently lost a loved one) early may be the key to preventing more serious mental disorders.

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