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Relationship Between Subjectively Evaluated Health and Fear of Death Among Elderly in Three Cultural Contexts: Effects of Internal and External Resources

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Abstract

It is often argued that declining health in elderly people makes death more salient and threatening. However, we argue that health, optimism, and social support interact to predict fear of death in samples from Cameroon, the Czech Republic, and Germany. Low health was associated with enhanced fear of death for participants who received only little social support. As the measure of optimism did not comply with psychometric requirements in the Cameroonian sample, the three-way interaction was tested only in the Czech and German samples. It was found that the two-way interaction was further qualified by optimism in that low health was associated with enhanced fear of death for participants with little social support unless they reported pronounced optimism. Thus, internal and external resources, respectively, can serve to buffer the effect of declining health on the fear of death in the elderly.

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Introduction

Although death is inevitable, fear is probably among the most commonly expressed, maybe natural responses of humans to the threat of death and dying (Becker, 1973; Moore & Williamson, 2003), leading to all sorts of inner furor such as anger, despair, and depression. Although death has long been a neglected area in psychology (Feifel, 1990), recent decades have witnessed a major increase in research on all sorts of aspects associated with humans' death. Nevertheless, cross-cultural studies on attitudes toward death are scarce, particularly with respect to older people. In the present study, we examine the relationship between subjectively evaluated health and fear of death among elderly persons from Cameroon, the Czech Republic, and Germany. In doing so, we hypothesize that regardless of the cultural background, individuals' level of optimism as well as the quality of their social support system qualifies the assumed link between health and fear of death.

According to Tomer (1994), fear of death can be defined as the anxiety caused by the anticipation of the state of being dead. It thus refers to the general disposition to be afraid and worried about death rather than an actual state caused by a concrete threat to one's life (Wittkowski, 2001). Although the terms fear of death and death anxiety are often used interchangeably in the psychological literature, throughout the present article, we use the term fear of death in the way defined earlier. The instruments for the assessment of individuals' fear of death clearly reflect the multifaceted character of the construct but also the diversity of the construct's conceptualizations (see Neimeyer & Van Brunt, 1995). Typically, measurements include subscales assessing various facets of death anxiety such as fear of the dying process, fear of own versus others' death, fear of being destroyed, or death acceptance (for an overview, see Neimeyer, Moser, & Wittkowski, 2003). Research in old age has focused primarily on effects of socio-demographic variables (e.g., age, gender) on fear of death while effects of personality dispositions have rarely been examined (Cicirelli, 2002a).

Existing studies do not indicate that fear of death increases with age among elderly people (Fortner, Neimeyer, & Rybarczyk, 2000). In fact, cross-sectional data suggest that fear of death decreases rather than increases with age from younger adulthood to old age (Cicirelli, 2002a; see also Maxfield et al., 2007). According to Erikson (1963), lower levels of death anxiety and greater acceptance of mortality reflect a successful psychosocial development. Older people who have managed to create or nurture things that will outlast them

(generativity) and who view their life with satisfaction and contentment (ego-integrity) are emotionally prepared for death. Also, gender effects on fear of death among adults (i.e., women typically report higher levels of fear) could not consistently be verified among elderly people (Fortner et al., 2000; see, however, Missler et al., 2012, for gender effects on fear of death). With respect to the focus of the study at hand, research on the link between physical and mental health and fear of death has provided evidence that poorer health is often associated with greater death anxiety in old age (Fortner & Neimeyer, 1999; Fortner et al., 2000; Tomer & Eliason, 2000).

It is important, however, to distinguish between objective criteria of health such as the diagnosis of a terminal illness and subjectively perceived health. As Feifel, Freilich, and Hermann (1973) demonstrated, terminally ill people may think more about death, but they do not report more fear of death than healthy participants. Similarly, a meta-analytical study showed that the HIV-diagnosis in itself is somewhat related to fear of death, but moderator variables play an important role in this relationship: Interestingly, social support is of relevance, among other variables as, for example, time since diagnosis (Miller, Lee, & Henderson, 2012). Thus, moderator variables can have a strong impact on how objective health relates to fear of death (cf. Gonen et al., 2012, who come to a similar conclusion in their study on cancer patients).

Indeed, fear of death rather relates to subjective evaluations of health than to objective health criteria (Wu, Tang, & Kwok, 2002). Similar to the experiences of other symbolic and actual losses (Florian & Mikulincer, 1997) which result in psychological distress, loss of health may activate schemata associated with death and dying and subsequently lead to more fear of death. Again, however, the salience of death aroused by a subjectively perceived declining health, which often is associated with increased levels of physical and psychological dependence, may not always result in enhanced fear of death (Cicirelli, 2002a). Research indicates that available resources might help an individual to cope with death: For example, Cicirelli (2002b) suggested that death anxiety among elderly people is related to weak religiosity, lack of social support, and low self-esteem. Whereas, however, religiosity does not reliably predict lower levels of death anxiety in elderly people (Fortner & Neimeyer, 1999), there is clear evidence that social support helps to cope with the salience of death successfully (e.g., Azaiza, Ron, Shoman, & Gigini, 2010). In contrast, individuals who are lacking social support are at risk to feel isolated and lonely, which seems to make it much harder for them to disable the link between death salience and fear of death (Besser & Priel, 2008). Generally, social support has been found to have beneficial effects on physical and psychological health, which is likely to be caused by a combination of biological (i.e., the presence of others reduces physiological effects of stressors), psychological (i.e., others affect a person's appraisal of a stressor), and behavioral (i.e., the presence of others motivates a person to act in a way that protects oneself against a stressor) processes

(House, Umberson, & Landis, 1988). In the present context, fear of death could be alleviated by social support because others promote a more accepting view of death or motivate the person to prepare for death.

Yet, not only individuals' external social resources seem to help them to cope successfully with the salience of death and associated fears. Studies also show that certain personality dispositions seem to buffer against fear of death. Whereas, for example, neuroticism and an external of locus control relate to higher levels of fear of death (Cicirelli, 1999), self-regulation capacities and self-esteem protect against the experience of death anxiety (Gailliot, Schmeichel, & Baumeister, 2006; Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004). Moreover, dispositional optimism has been linked to fear of death (e.g., Kurdek & Siesky, 1990; Vaughan & Kinnier, 1996). Dispositional optimism reflects the extent to which people hold generalized favorable expectancies for their future (Carver, Scheier, & Segerstrom, 2010). Thus, dispositional optimism may be associated with death anxiety because individuals' positive future-oriented expectations may help to temper negative views of death and to ease fears of what will happen after death (Sigal et al., 2007). Also, optimism has been linked to higher levels of adaptive coping strategies: Optimistic individuals take proactive steps to protect their health but also manage to show a faster recovery after a major life event (Carver et al., 2010; Kivimäki et al., 2005). In contrast, pessimists tend to give up in stressful situations (Brissette, Scheier, & Carver, 2002). That is, less optimistic people might see in death only the inevitable threat, whereas more optimistic people might keep their chances to optimally prepare for death in view.

The Present Research

Based on the literature reviewed earlier, we hypothesize a negative relationship between subjectively evaluated health and fear of death. However, we suggest that the direct link between health and fear of death is moderated by internal (i.e., dispositional optimism) and external resources (i.e., social support). Either resource is supposed to help older people to successfully cope with life events arousing fear of death. In other words, declining health is assumed to be associated with enhanced levels of fear of death among elderly people lacking both, dispositional optimism and social support.

Up to now, most research on fear of death has been conducted with young adults in Western cultural contexts. In contrast, research on fear of death in non-Western cultural contexts, particularly in old age, is still rare (e.g., Abdel-Khalek, 1991; Schumaker, Warren, & Groth-Marnat, 1991; Wu et al., 2002). It is widely acknowledged that each culture aims to provide protection against fear of death (Becker, 1973). Yet, different psychological and behavioral dimensions associated with death and dying (e.g., shared religious dogmas and rituals) have evolved in diverse cultural settings (Lehto & Stein, 2009).

Thus, individuals from various cultural contexts may differ from each other in ways of articulating and coping with death-related fears. Despite such cultural differences, however, we assume that personal and social resources help the individual to cope with fears related to death and dying. Thus, we hypothesize that dispositional optimism (e.g., Kurdek & Siesky, 1990) and universally highly valued social support (Mikulincer, Florian, & Hirschberger, 2003) qualify the link between bad health and fear of death regardless of individuals' culture of origin. To the best of our knowledge, this study is the first that examines the link between subjectively evaluated health status and fear of death by considering individuals' external and internal resources of elderly people recruited in different cultural contexts in Europe and sub-Saharan Africa.

Selection of Cultural Contexts

The present data were assessed as part of a cross-cultural project on successful aging. Even though there is still a marked bias toward the identification of differences (Brouwers, Van Hemert, Breugelmans, & Van de Vijver, 2004), cross-cultural research offers the opportunity to look at basic psychological and behavioral processes that people share despite their various cultural backgrounds (Brown, 1991). The main aim of the project was to identify such common psychological processes related to successful aging in diverse cultural contexts. Thus, cultural samples had to be chosen that represent a wide range of ecological and socio-economic conditions (e.g., Human Development Index, see United Nations Development Programme, 2015) and markedly differ in well-established cultural markers such as socio-cultural orientations, norms, beliefs, and values (Van de Vijver & Leung, 1997; see also Hofstede, 2011). Thus, samples were recruited in Cameroon, China (Hong Kong), Czech Republic, and Germany (see, e.g., Hofer et al., 2014). However, the present analyses only include samples from Cameroon, the Czech Republic, and Germany as data on fear of death were not collected in the Chinese sample. Various psychological constructs typically used in cross-cultural research have yielded convincing evidence for differences between the cultural groups that were selected for the present study.

In the present project, value orientations (Schwartz, 1992) were assessed. These show substantial overlap with other cultural markers at both the national and individual level (e.g., individualism). Findings validate the assumptions guiding the selection of the cultural contexts: Participants from Cameroon and the Czech Republic place more emphasis on guiding principles in life accentuating self-restriction, preservation of the past, and resistance to change than German participants. Furthermore, elderly people from Germany and, to a somewhat lesser extent, the Czech Republic assign more importance to values reflecting a readiness for change and an independence of thought, action, and feelings than Cameroonian participants (see Hofer et al., 2014).

Method

Sample Characteristics

Although research indicates similar conceptions regarding the chronological onset of old age in Western and sub-Saharan African cultural contexts (Togunu-Bickersteth, 1987, 1988), 60 years of age was chosen as a marker for the beginning of old age in the study at hand (e.g., United Nations, Department of Economic and Social Affairs, Population Division, 2013) to account for varying conceptions in different cultural contexts (World Health Organization [WHO], 2014).

In total, data of 639 participants were available (see Table 1). In detail, 232 participants were recruited in Cameroon, 166 in the Czech Republic, and 241 in Germany. All participants were non-institutionalized, that is, they lived in their own household. Within the total sample, participants' age ranged from 59 to 93 years ($M = 67.42$; $SD = 6.30$). Four German participants who were aged 59 but close to turning 60 were included in the study sample. In total, 325 participants indicated a low level (less than secondary education) and 314 a high level of formal education (secondary school or university education). With respect to partnership status, 427 participants reported to live with a steady partner (married: $n = 409$) and 212 participants reported to be single. Within the total sample, only 43 were childless, whereas 596 indicated to have at least one child (total sample: $M = 3.37$; $SD = 2.67$).

Procedure

German participants were recruited in Lower Saxony (Osnabrück) with the help of ads in local newspapers. Elderly people in the Czech Republic were contacted via notes in senior centers in Prague and Olomouc. In Cameroon, elderly people usually return to their home village after retirement, so research assistants visited

Table 1. Sociodemographic Characteristics Within Each of the Three Cultural Samples.

	Cameroon	Czech Republic	Germany
Mean age (*SD*; range)	64.57 (5.64; 60–90)	71.55 (5.76; 62–93)	67.33 (5.70; 59–83)
Gender[a]	113 (48.7%)	92 (55.4%)	135 (56%)
Level of education[a]	185 (79.7%)	17 (10.2%)	123 (51%)
Partnership status[a]	54 (23.3%)	71 (42.8%)	87 (36.1%)
Mean number of children (*SD*; range)	5.83 (2.79; 0–18)	1.96 (.93; 0–5)	1.98 (1.29; 0–8)

[a]Number (percentage) of female participants, participants with a low level of education, and without partner, respectively.

villages near major cities in the North-Province of Cameroon to recruit participants. To guarantee ethnic and cultural homogeneity within each of the study samples, we recruited only native participants at each of the research sites. Consequently, recruitment in Cameroon which is a multiethnic nation was restricted to ethnic Grassfield Bantus (Nso) from the Anglophone North-West province.

As the project involved the assessment of many psychological and behavioral constructs associated with aging, there were two data collection sessions per participant. Whereas data collection took place at university premises for the German sample, Czech and Cameroonian participants were visited at their homes. Trained local research assistants were present during data collection to help if any questions should arise. Elderly people voluntarily participated in the study. Confidentiality and anonymity of information was guaranteed. Cameroonian and German participants received monetary compensation. Czech participants received coupons for local supermarkets. Measurements were administered in mother tongues in the Czech Republic and in Germany. In Cameroon, English versions of instruments were used as English represents the official language and is predominantly used by the Nso in everyday life. Furthermore, most Nso are not able to read or write in Lamnso, their native tongue. However, research assistants who were all ethnic Nso were trained to give (standardized) illustrations of instructions and questionnaire items in Lamnso or Pidgin-English in case of difficulties in understanding.

Measurements

Measurements were administered to participants individually. Whereas data on dispositional optimism and fear of death were collected during the first session, participants indicated their social support, evaluated their health, and gave information on socio-demographic characteristics in the second session. Czech, English, and German versions were available for most of the instruments. Only a Czech version of the fear of death scale was developed by a professional translator in Prague. The quality of the translated material was ensured by a back-translation procedure.

Dispositional optimism. To assess individual differences in generalized optimism, the revised Life Orientation test (LOT-R; Scheier, Carver, & Bridges, 1994) was used. The LOT-R consists of 10 items; four of these are filler items (e.g., I enjoy my friends a lot) and, thus, are not used to build the index on optimism that reflects the extent to which individuals hold generalized favorable expectancies for their future. For each item, participants are asked to indicate the extent of their agreement on a 5-point Likert scale ranging from 0 (*strongly disagree*) to 4 (*strongly agree*). The mean score of six items (three reversed coded: e.g., I hardly ever expect things to go my way) is used as an index of dispositional optimism.

Even if there is an argument about the dimensionality of the LOT-R (e.g., Herzberg, Glaesmer, & Hoyer, 2006), the scale is widely used as a unidimensional index in research on behavioral, affective, and health consequences of dispositional optimism/pessimism (see, e.g., Carver et al., 2010).

An initial screening of the psychometric properties of instruments after 50 data assessments pointed to a very low reliability of the optimism scale (Cronbach's $\alpha = .37$) with low item-total correlations of most items ($rs_{it} < .3$) in the Cameroonian sample. Moreover, the exclusion of single items did not lead to a significant increment in internal consistency. Thus, it was decided not to use the LOT-R in subsequent data assessments anymore to reduce participants' workload. Initial values of psychometric properties were unproblematic in the two other cultural samples. In total, data were collected from 403 Czech and German participants. Two Czech and two German participants, respectively, did not respond to items on dispositional optimism.

Preliminary findings derived from exploratory factor analyses separately conducted in the total samples recruited in the Czech Republic and in Germany indicated that one item (In uncertain times, I usually expect the best) should not be considered for the final score of dispositional optimism because of an insignificant factor loading (.19) in the German sample (with a value of .39, the item also showed the lowest factor loading in the Czech sample). Cronbach's α for the reduced five-item scale of LOT-R was .64 in the German and .71 in the Czech sample.

Fear of death. Fear of death was assessed with the six items of the affective fear of death scale (e.g., The thought that I will be dead someday makes me apprehensive) from the Multidimensional Orientation toward Dying and Death Inventory (MODDI-F; Wittkowski, 2001). Each item is evaluated on a 4-point Likert scale ranging from 0 (*I do not agree at all*) to 3 (*I agree almost totally*).

Preliminary exploratory factor analyses support unidimensionality of the scale in each of the cultural samples with factor loading ranging from .36 to .82. Cronbach's α was .74 in the Cameroonian, .85 in the Czech, and .87 in the German samples.

Social support. Perceived social support was measured by six items loosely based on the assessment of social satisfaction and perceived social strain by Lang and Carstensen (2002). Participants were asked to indicate their general satisfaction with social partners and possibilities to openly talk with social partners about personal experiences and feelings on a 5-point Likert scale ranging from 0 (*not at all*) to 4 (*extremely*). Furthermore, four items (reversed coded) highlighted unfulfilled need for support. In detail, participants were asked to indicate on a Likert scale ranging from 0 (*never*) to 4 (*very often*) the lack of supportive experiences (help/advice, self-esteem support, desired tenderness, and prevention of loneliness).

Findings derived by exploratory factor analyses which were separately conducted for each of the three cultural samples showed that all items significantly loaded on a single factor. Factor loadings ranged from .47 to .80. Values of Cronbach's α were .59 (German sample), .68 (Czech sample), and .76 (Cameroonian sample).

Subjective health. Subjectively evaluated health was assessed by five items. Participants were asked to rate their health in general (0 = *very bad*; 5 = *very good*). Furthermore, they indicated on a 6-point Likert scale (0 = *never*; 5 = *always*) how often they feel sick and unwell (reverse coded), aches and pain (reverse coded), and active and full of energy. Finally, participants compared their general health with that of same-aged people of their gender (0 = *much worse*; 5 = *much better*). Within each of the cultural samples, all five items significantly loaded on a single factor with factor loadings ranging from .63 to .85. Values of Cronbach's α for the subjectively evaluated of health scale were .78 (German sample), .84 (Czech sample), and .87 (Cameroonian sample).

Additional Analyses on Measurement Invariance

Even if the present article focuses on analyses examining relationships among psychological constructs across cultural groups (structure-oriented approach) rather than cultural differences in mean levels of test scores, measurements were scrutinized for invariance across cultural samples to guarantee the use of psychometrically sound variables in analyses. Measurement equivalence was further scrutinized by multigroup confirmatory factor analyses (CFA). Given that data on fear of death, social support, and subjective health were available for all three cultural samples, equivalence of test scores was examined in a single CFA. Measurement invariance of dispositional optimism, which was assessed only in the Czech and German samples, was scrutinized in a separate CFA. In CFAs, two increasingly restrictive measurement models were tested, that is, an unconstrained model with no equality constraints across cultural samples and a measurement weights model with measurement weights constrained to be equal across cultural samples but variances and covariance of the latent score to be estimated separately for each cultural sample.

In the CFA using data on fear of death, social support, and subjective health, item parcels were used. The ratio of cases/observations to number of parameters to be estimated should be at least 10 (Kline, 1998). Even if somewhat controversially discussed (see Little, Cunningham, Shahar, & Widaman, 2002), item parceling is an adequate procedure if unidimensionality of constructs at hand is established (e.g., Bandalos, 2002). Three parcels each with two items were built for each of the measurements. However, with respect to subjective health, the third parcel included only one item. Item parcels were

built by random assignment resulting in homogenous samples that were similar in variance.

Results of the first CFA indicated that the unconstrained model (135 data points; 63 unknown parameters) adequately fit the data ($\chi^2 = 106.92$; *df*: 72; Comparative Fit Index (CFI): .983; Root Mean Square Error of Approximation (RMSEA): .028) with all item parcels significantly loading on the specified factor (critical ratio (CR) ≥ 5.08; $p < .001$). In addition, the implementation of constraints on factor loadings did not lead to a significant impairment of fit ($\Delta\chi^2$ (12) = 14.04; $p = .30$; measurement weight model: CFI: .982; RMSEA: .027).

In the CFA on data of dispositional optimism, the reduced set of five items was used. Findings also suggest measurement equivalence: the unconstrained model (30 data points, 20 unknown parameters) fit the data ($\chi^2 = 37.51$; *df*: 10; CFI: .913; RMSEA: .083) with all items showing significant loadings on the specified factor ($CR \geq 2.75$; $p < .01$). Moreover, constraining factor loadings to be equal across cultural samples did not lead to a significant impairment of fit ($\Delta\chi^2(4) = 9.34$; $p = .053$; measurement weight model: CFI: .896; RMSEA: .076).

To briefly summarize, analyses point to construct and measurement equivalence of scales. Thus, given the level of equivalence, hypotheses on structural relationships among constructs across cultural samples at hand can be tested but not on mean differences between cultural groups (see Van de Vijver & Leung, 1997).

Results

Results are presented in the following order: First, general statistics of and correlations among measures are given. Next, effects of participants' sociodemographic characteristics on fear of death, that is, the dependent variable in the hypothesized moderation models, are reported. Subsequently, two-way and three-way moderation effects are presented. These were examined by use of PROCESS for SPSS (version 2.16; Hayes, 2013) which is a computational tool for path analysis–based moderation and mediation analysis. Finally, the hypothesized moderation effects of social support and both, social support and dispositional optimism, respectively, on the relationship between health and fear of death are tested and scrutinized for equivalence across cultural samples by multigroup structural equation modeling (SEM).

Descriptive Statistics of and Correlations Among Measures

Descriptive data and correlations among measures for the total sample are given in Table 2.

Findings presented in Table 2 show for the total sample that higher levels of fear of death were significantly associated with lower levels of health, social

Table 2. Descriptive Statistics of and Correlations (Total Sample and Cultural Subsamples) Among Measurements.[a]

	M (*SD*) Cameroon	*M* (*SD*) Czech Rep.	*M* (*SD*) Germany	1	2	3
1. Fear of death	.53 (.52)	.66 (.70)	.56 (.64)	–		
2. Subjective health	3.19 (.71)	2.96 (.84)	3.54 (.71)	−.14** −.03; −.31***; −.05	–	
3. Social support	2.65 (.59)	2.80 (.61)	2.83 (.52)	−.09* −.03; −.23**; −.05	.18*** .05; .18*; .31**	–
4. Optimism[b]	–	2.35 (.68)	2.81 (.55)	−.25*** –; −.29***; −.20**	.32*** –; .23**; .16*	.28*** –; .28***; .34***

[a]Correlations are given in the following order: total sample (upper row), among Cameroonian, Czech, and German participants (lower row).
[b]Optimism was not measured in the Cameroonian sample. Thus, correlations including optimism only include only Czech and German data.
*$p < .05$. **$p < .01$. *** $p < .001$.

support, and optimism. Furthermore, significant positive relations among health, social support, and optimism were found.

Table 2 also gives correlations among measures within each of the cultural samples. We tested differences between cultural samples in strength of correlations between health, social support, and optimism (Czech and German samples) by employing Fisher *r*-to-*z* transformation: Only the association between health and social support was more pronounced among German ($r = .31$***) than among Cameroonian participants ($r = .05$; $z = 2.91$**). The equivalence of relationships between measures including fear of death is examined in analyses on the main hypotheses of the study. Thus, no Fisher *r*-to-*z* transformation was conducted on them.

Effects of Socio-Demographic Characteristics on Fear of Death

Correlational analyses as well as findings derived by analyses of covariance with participants' gender, level of education, and partnership status as factors and age and number of children as covariates pointed to a weak but significant effect of gender on fear of death ($r = -.09$*; $F_{1,\ 629} = 3.16$; $p = .07$; $\eta^2 = .01$) in the total sample: Women reported more fear of death ($M = .63$; $SD = .64$) than men ($M = .52$; $SD = .59$). None of the other main effects and interactions was significant (η^2s $< .002$). Thus, the effect of gender on the level of fear of death was controlled for in subsequent analyses.

Testing the Moderating Effect of Social Support on the Relationship Between Health and Fear of Death

By including all three cultural samples, we examined whether social support qualifies the link between health status and fear of death by PROCESS (Model 1). Gender was entered as a control variable in analyses. Predictor variables, that is, health status and social support, were centered across cultural groups (Table 3).

The assumed model was significant ($F_{(4,634)} = 6.59$; $R^2 = .04$; $p < .001$). Indices in Table 2 show that there was a marginally significant gender effect on fear of death. Furthermore, there was a significant negative main effect of health status on fear of death. Most importantly, the main effect of health was moderated by perceived social support ($F_{change\ (1,634)} = 8.28$; $R^2_{change} = .01$; $p < .01$).

Following recommendations suggested by Cohen, Cohen, West, and Aiken (2003), the nature of the significant interaction term was examined by calculating scores for fear of death at the mean value, and at values one standard deviation below and above the mean for predictor variables in the significant interaction term.

Simple slope tests with effects of gender partialled out indicated that the slopes corresponding to low ($B = -.18$; $SE = .04$; $t_{635} = -4.11$; $p < .001$) and medium levels of social support ($B = -.10$; $SE = .03$; $t_{635} = -3.07$; $p < .01$) significantly differed from zero. Hence, lower levels of self-rated health were associated with higher levels of fear of death among participants characterized by lower levels of social support (see Figure 1). In contrast, at high levels of social support, no significant association between health and fear of death could be verified ($B = -.01$; $SE = .04$; $t_{635} = -.23$; $p = .83$).

Table 3. Fear of Death: Effects of Health and Social Support in Three Cultural Samples.

Fear of death			
Predictor variables	*B*	*SE*	*t* value
Gender	−.09	.05	−1.74 (*)
Health	−.10	.03	−3.07**
Social support	−.06	.04	−1.50
Health × Social Support	.15	.05	2.88**

(*) $p < .10$, **$p < .01$.

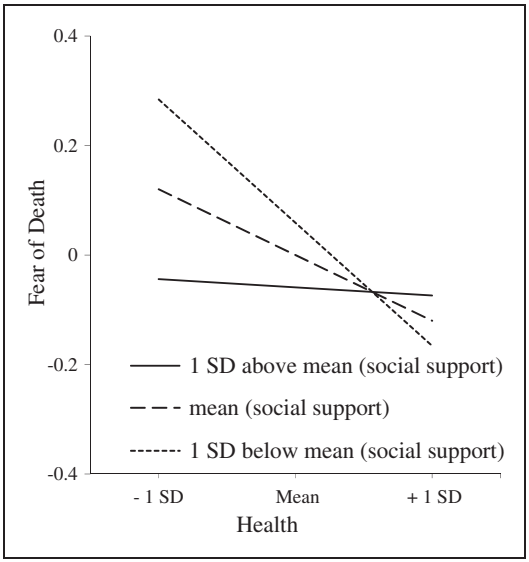

Figure 1. Effects of health and social support on fear of death.

Testing the Moderating Effects of Social Support and Optimism on the Relationship Between Health and Fear of Death

Next, the moderating effects of both social support and dispositional optimism were tested for the Czech and German data by use of PROCESS (Model 3). Again, fear of death was entered as dependent variable and gender (control variable), measures of health, social support, dispositional optimism, two-way interaction terms, and the three-way interaction coefficient (Health × Social Support × Optimism) were entered as predictors. Predictors were centered across cultural groups.

Again, the hypothesized model significantly explained variance in fear of death ($F_{(8,394)} = 7.06$; $R^2 = .13$; $p < .001$). There were significant main effects of gender and dispositional optimism on fear of death. Moreover, the three-way interaction term significantly explained additional variance of fear of death ($F_{change\ (1,394)} = 4.37$; $R^2_{change} = .01$; $p < .05$) (Table 4).

To further elaborate the significant three-way pattern, conditional effects of the Health × Optimism interaction were calculated at the mean value, and at values one standard deviation below and above the mean for social support. Whereas significant effects of the interaction term were not found at medium ($t = 1.59$) and high ($t = -.20$) levels of social support, analyses pointed to a significant moderation effect of optimism on the link between health and fear of death for elderly people with low social support ($B = .22$; $SE = .08$; $t = 2.74$;

Table 4. Fear of Death: Effects of Health, Social Support, and Dispositional Optimism Among Czech and German Participants.

Fear of death			
Predictor variables	*B*	*SE*	*t* value
Gender	−.17	.06	−2.55*
Health	−.02	.04	−.52
Social support	−.01	.07	−.17
Optimism	−.22	.05	−4.12***
Health × Social Support	.07	.09	.77
Health × Optimism	.10	.06	1.59
Social Support × Optimism	−.01	.09	−.03
Health × Social Support × Optimism	−.22	.11	−2.09*

*$p < .05$, ***$p < .001$.

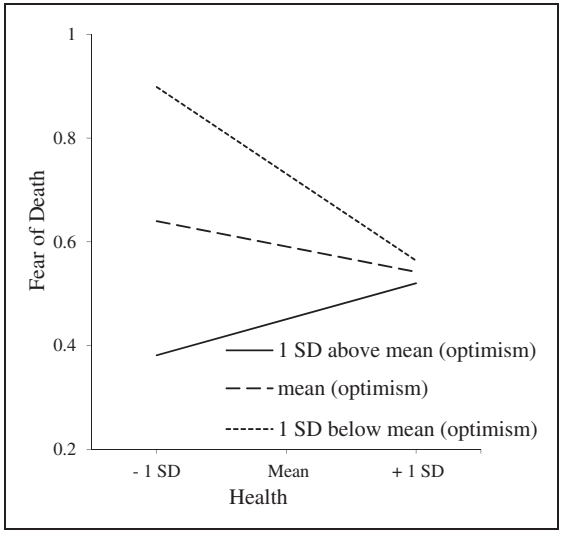

Figure 2. Effects of health and optimism on fear of death when social support is low.

$p < .01$). Thereby, the slope corresponding to low levels of dispositional optimism ($B = -.20$; $SE = .06$; $t = -3.52$; $p < .001$) significantly differed from zero.

Thus, declining health was associated with fear of death when dispositional optimism was not well-pronounced (see Figure 2). Yet, when optimism was high,

there was no association between health and fear of death even if social support was low.[1,2]

Equivalence of Moderation Effects Across Cultural Samples

Finally, the equivalence of regression coefficients, particularly the moderation effects, across cultural groups was examined by applying multi-group SEM with maximum likelihood estimation (AMOS). Analyses were conducted by multigroup path analyses with manifest variables.

First, the simple moderation effect of social support was tested for equivalence across the Cameroonian, Czech, and German samples. Health, social support, and the interaction term were treated as exogenous variables and fear of death with effects of gender partialled out was treated as endogenous variable. In analyses, the fit of an unconstrained model with no equality constraints was compared with the fit of a so-called structural weights model in which paths were set to be equal in all three cultural groups. Exogenous variables were allowed to correlate with each other.

After equality constraints were placed across groups (intercepts were left free to vary), the constrained models gained six degrees of freedom (30 data points minus 24 parameters to be estimated). The defined structural weights model fit the data sufficiently well ($\chi^2 = 11.75$; *df*: 6; CFI: .941; RMSEA: .039). Most importantly, nested model comparisons showed that the structural weights models did not fit worse than the unconstrained models ($p = .07$). Referring to the structural weights model, the link between health and fear of death was significant ($CR = -2.66$; $p < .01$; β values ranging from −.10 to −.12). The link between social support and fear of death was marginally significant ($CR = -1.74$; $p < .10$; β values ranging from −.06 to −.08). Finally, the interaction term was significantly associated with fear of death ($CR = 2.50$; $p < .05$; β values ranging from .08 to .11). Thus, findings indicate that predictors of fear of death did not differ between cultural samples.

Next, we tested equivalence of effects that were found in regression analyses including data on dispositional optimism assessed from Czech and German participants. The structural weights model which gained seven degrees of freedom (72 data points minus 65 parameters to be estimated) adequately fit the data ($\chi^2 = 7.78$; df: 7; CFI: .999; RMSEA: .017) and did not fit worse than the unconstrained model ($p = .35$). Thus, findings were not qualified by participants' culture of origin. Analyses indicated significance of the paths linking fear of death to optimism ($CR = -4.05$; $p < .001$; β values ranging from −.19 to −.22) and the three-way interaction term ($CR = -2.07$; $p < .05$; β values ranging from −.08 to −.17). Furthermore, there was a marginally significant path between the two-way interaction term (Health × Optimism) and fear of death ($CR = -1.69$; $p < .10$; β values ranging from .08 to .10). All other structural relations were non-significant ($CR < 1.23$).

To conclude, the analyses clearly indicate that the structural relations among measurements hold true regardless of individuals' cultural background.

Discussion

Recent research produced convincing evidence that individuals' fear of death is activated by experiences of threat and losses. Accordingly, it was found that declining health is associated with higher levels of fear of death among elderly people (e.g., Fortner et al., 2000). Yet, there is also evidence that personal and social resources moderate the link between loss experiences and fear of death. Thus, we hypothesized that social support as well as dispositional optimism protect against fear of death even when confronted with a decline of health. In our cross-cultural study, this pattern of relationships was assumed to be verified regardless of individuals' cultural background. Initial analyses suggested the applicability of measures of health, social support, and fear of death in each of the three cultural contexts. The scale for dispositional optimism, however, achieved only an insufficient reliability in the Cameroonian sample. Thus, unfortunately, our hypothesis on the moderating effect of dispositional optimism on the link between subjectively perceived health and fear of death could only be tested among Czech and German elderly persons.

With respect to social support, results confirmed our hypothesis: Declining health is associated with enhanced levels of fear of death but only among elderly participants with low and moderate social support. In contrast, high social support buffers against effects of declining health on fear on death in each of the three cultural samples that were investigated. The buffering effect confirms the significance of interpersonal aspects of regulation of distress (Besser & Priel, 2008). Feeling cared for and having someone to turn to for help thus alleviates the impact of distressing situations such as impaired health on fear of death (Mikulincer et al., 2003). Furthermore, social support helps to overcome a fundamental fear associated with death, that is, the fear of loneliness (Conte, Weiner, & Plutchik, 1982).

As mentioned earlier, effects of dispositional optimism could only be examined within the Czech and German subsamples. In line with our hypothesis, we found that higher levels of optimism relate to lower levels of fear of death. Moreover, a significant three-way interaction indicates a moderating effect of dispositional optimism among people with low social support: While declining health significantly relates to enhanced fear of death when dispositional optimism is low, no significant link between health and fear of death is found for elderly people high in optimism. It seems that stressors like poor health may only trigger fear of death if people do not have the resources to successfully cope with aversive situations in life. As found in the present study and in others (e.g., Assad, Donnellan, & Conger, 2007; Brissette et al., 2002; Kivimäki et al., 2005), positive future-oriented expectations are a prominent example of such a resource.

In sum, our cross-cultural study adds to research showing that elderly people are quite resilient and effective in coping with stress through personal and social resources (Brandtstaedter, 1999). Given findings on measurement invariance, we were able to examine the role of social support in two European samples and a so-called non-Western sample recruited in sub-Saharan Africa. Unfortunately, effects of dispositional optimism could not be examined in the Cameroonian sample. Thus, we cannot conclude that dispositional optimism represents a personal resource to successfully cope with poor health among Cameroonian participants. Hence, we cannot make a statement about the importance of personal resources in this particular cultural context, which is characterized by a strong interdependent self-construal emphasizing interpersonal relatedness and responsibility (Busch & Hofer, 2011; Markus & Kitayama, 1991). The last-mentioned issue points to limitations that are addressed in the following.

Limitations and Outlook

As available data indicated that the LOT-R is problematic for the assessment of dispositional optimism among elderly people in Cameroon, future cross-cultural studies examining the link between stressful life events, fear of death, and personal dispositions might assess different psychological constructs such as self-esteem and purpose in life that show overlap with dispositional optimism (Vaughan & Kinnier, 1996) but are less problematic with respect to measurement invariance (see also Maxfield, Solomon, Pyszczynski, & Greenberg, 2010, for effects of neuroticism on mortality salience). But, of course, the development of a cross-culturally applicable measure of dispositional optimism is an important issue.

Generally, the Cronbach α values of dispositional optimism and the social support scale are somewhat low. The latter one shows an internal consistency that, according to guidelines proposed by Nunnally (1978), falls slightly below an acceptable value of .60 within the German subsample. As analyses have shown that low α value does not result from multidimensionality of the scale, it is rather likely that the low internal consistency coefficient reflects the assessment of the broad construct social support with only few items (see, e.g., Johnston & Finney, 2010). Although moderate α values do not necessarily point to a low quality of a measure, they nevertheless represent a potential limitation of the study at hand. Thus, future studies ought to (develop and) use measures of psychological constructs that yield α values of .7 or .8 to reduce measurement error.

In addition, a more detailed assessment of the social support system ought to be implemented in future studies. For example, given the significant role of generativity for successful development in old age (Erikson, Erikson, & Kivnick, 1986; Versey, Stewart, & Duncan, 2013) as well as its association with fear of death (e.g., Richardson & Sands, 1987), satisfying social interactions

with younger generations might be particularly associated with reduced fear of death as those encounters are more likely to fulfill generative needs of the aging individual and help the individual to attain symbolic immortality (McAdams & de St. Aubin, 1992). Furthermore, future studies, which might also aim to recruit elderly people in additional cultural contexts, ought to assess not only fear of death but additional facets of individuals' attitudes toward death and dying to enhance our understanding of psychological processes associated with death in older adulthood in diverse cultural contexts.

Above all, future studies ought to implement longitudinal designs to broaden our understanding of the interplay of personal and social resources when coping with stressful events in old age. Our results were obtained in a cross-sectional design and do not allow drawing conclusions on those processes.

To conclude, the importance of social support and optimism as resources for successful coping with poor health could be verified in elderly samples from Germany, the Czech Republic, and Cameroon (for the lattermost sample only social support, as optimism could not be measured reliably). That is, internal and external resources affect our response to stressful situations. Moreover, examining fear of death in relation to poor health, the present study contributes to the literature on orientations toward death. This field, given that death is of relevance for all human beings, offers a great potential to examine both universal and culture-specific responses to the threat of death.

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Notes

1. Given that the interaction term was in the vicinity of $p = .10$ at medium levels of social support ($B = .10$; $SE = .06$; $t = 1.59$; $p = .12$), we further explored the nature of the interaction. None of the slopes reached level of significance, however. Yet, the slope corresponding to low levels of dispositional optimism ($B = -.09$; $SE = .06$; $t = -1.56$; $p = .12$) indicated a nonsignificant trend that declining health relates to enhanced fear of death when level of social support is medium.

2. Participants' age did not significantly relate to self-reported fear of death. Given the wide age range within our cultural samples, however, in additional analyses, we scrutinized whether age moderates any of the links between fear of death and (a) health and social support within three cultural samples and (b) health, social support, and optimism when considering only data assessed within Czech and German samples. As the interpretation of a four-way interaction is at the limit of even an experienced researcher's processing ability (Halford, Baker, McCredden, & Bain, 2005), referring to the latter analyses, we tested age-related effects in three separate analyses by considering age and two of the three independent variables at a time, that is, health, social support, and optimism, respectively. Analyses did not indicate a moderating effect of age: None of the two- and three-way interaction terms involving age were significant.

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