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Anxieties about aging and death and psychological distress: The protective role of emotional complexity

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ABSTRACT

Death and aging anxieties are related to higher psychological distress, but no study has examined whether these relationships are moderated by emotional complexity, an important indicator of adaptive emotional regulation among older adults. Participants (N = 188; mean age = 57; range = 29–100) rated their death and aging anxieties, general psychological distress, and reported their emotions on a daily basis over 14 days. Results showed that emotional complexity moderated the relationship between each of the two anxieties and psychological distress (i.e., the positive relationship between the two anxieties and psychological distress existed only among subjects with low emotional complexity). The findings suggest that emotional complexity buffers against psychological distress, and can be further explored as a facilitating mechanism in protecting against the negative mental health effects of aging and death anxieties.

Emotional complexity is a multifaceted construct, considered as a personal asset and as an important indicator of adaptive emotional regulation among older adults (Bodner, Palgi, & Kaveh, 2012; Grühn, Lumley, Diehl, & Labouvie-Vief, 2013). Yet, there is no agreement upon the theoretical or operational definition of emotional complexity. Two common psychometrically valid approaches to emotional complexity are either concerned with the extent to which individuals simultaneously experience different emotions (report of occurrence of positive and negative affect at the same time; Ong & Bergeman, 2004), or to how clearly they differentiate between them (express a varied and nuanced set of emotions; Grühn et al., 2013). The current study aims to examine if emotional complexity protects against the effects of existential anxieties on psychological distress throughout life, so that higher levels of emotional complexity can buffer the effect of aging and death anxieties on symptoms of psychological distress.

1. Aging anxiety and psychological distress

Aging anxiety is defined as concern and anticipation of adverse physical, mental, and personal losses during the aging process (Lasher & Faulkender, 1993). It can relate to symptoms of depression, anxiety and related somatic manifestations, together defined as psychological distress (Derogatis, 2001). Although worries from adverse physical consequences of aging can be associated with somatic concerns, fear of future mental deterioration can be associated with manifestations of anxiety, and worries about future personal losses may lead to depression, only few studies have examined these relationships. These studies suggest that higher aging anxiety is associated with more psychological distress. One study demonstrated a positive correlation between aging anxiety and depression (Kim & Lee, 2007). Another discovered that health anxieties, and in particular anxiety about loss of attractiveness, were strongly associated with greater psychological distress (Barrett & Robbins, 2008). Finally, higher levels of personal distress predicted higher levels of aging anxiety (Allan, Johnson, & Emerson, 2014).

2. Death anxiety and psychological distress

Death anxiety deals with the fear of the end of life and with the fear of the unknown afterlife (Carmel & Mutran, 1997; Lasher & Faulkender, 1993; Yan, Silverstein, & Wilber, 2011). It describes an emotional state of death awareness, in which people experience terror as a response to the knowledge of their mortality, which is not triggered by an immediate life threat (Russac, Gatliff, Reece,

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& Spottswood, 2007). Several studies have shown the effect of death awareness and death anxiety on psychological distress. In three laboratory studies, induced death awareness, mostly in undergraduate students, increased the intensity of symptoms of anxiety disorders (e.g., Strachan et al., 2007). There are also reports that death anxiety is a central feature of health anxiety that may play a significant role in anxiety disorders and depression (Furer & Walker, 2008). Maxfield, John, and Pyszczynski (2014) argue that death anxiety can also lead to depression, as both are related to existential concerns with the loss of meaning in life. Accordingly, Bachner and his colleagues found that fear of death predicted depressive symptoms among religiously observant caregivers of terminal cancer patients (Bachner, O'Rourke, & Carmel, 2001). Other studies found an association between death anxiety and both depression and suicide risk (Barr & Cacciatore, 2008).

3. Emotional complexity as a moderator

The evidence regarding the direct association between emotional complexity and psychological distress is inconsistent. High emotional complexity was found to be negatively associated with neuroticism (Ready, Anna, Åkerstedt, & Mroczek, 2012), and positively associated with adjustment (Carstensen, Pasupathi, Mayr, & Nesselroade, 2000) and resilience (Ong & Bergeman, 2004). Nevertheless, in a recent lifespan sample, two indices of emotional complexity, emotional co-occurrence and differentiation, were negatively related to measures of well-being (Grühn et al., 2013).

In light of this inconsistency, it is possible that greater emotional complexity contributes to lower psychological distress by interacting with other variables, mainly with stressors. This assumption receives some support from the literature on self-complexity (Linville, 1987). Self-complexity, a more general term than emotional complexity, which focuses on emotions, describes a complex cognitive representation of the self that allows people to mentally distinct their self-knowledge, by separating between thoughts about various traits, behaviors, social roles, or emotions. Linville (1987) found that self-complexity buffers the effect of stress on psychological distress and Koch and Shepperd (2004) suggested a positive, moderating relationship between self-complexity and coping. As emotional complexity is a manifestation of self-complexity, it is possible that it also acts as a buffer of distress. Lately, some researchers found evidence for the role of emotional complexity in moderating the effect of problematic tendencies on various forms of psychological distress. Emotional complexity moderated the effect of rumination tendencies on non-suicidal self-injury acts and self-injury urges in a clinical sample (Zaki, Coifman, Rafaeli, Berenson, & Downey, 2013). It also buffered the effect of direct provocation on aggressive tendencies, and protected people with anger tendencies from potentially harmful conflicts (Pond et al., 2012). However, the abovementioned studies focused on young individuals, and did not examine whether emotional complexity protects against the effects of existential anxieties on psychological distress throughout the adult lifespan.

In line with the previous findings, we suggest that emotional complexity would function as a moderator in the relationship between aging and death anxieties and psychological distress. Therefore, our hypotheses were as follows:

(1) Aging and death anxieties would be positively related to psychological distress.
(2) High emotional complexity would act as a buffering mechanism, and moderate the relationship between aging and death anxieties on the one hand and psychological distress on the other hand.

4. Method

4.1. Participants and procedure

The sample (Shrira, Bodner, & Palgi, 2014) included 188 adults (mean age = 57.84, *SD* = 17.68, range = 29–100). Half of the sample included females (50.3%) and most respondents had an above-high-school or academic education (58.5%), were married (66.3%) and reported good to very good health (65.2%).

Research assistants recruited community-dwelling participants who reported being free from severe cognitive impairment. Participants completed booklets of mental health questionnaires at baseline and at the end of the study, and in between completed measures of emotions each day for a consecutive period of 14 days. Overall, participants completed reports in 2576 days (97.8% of the study days). The study received approval by an ethical review committee in Bar-Ilan University. All participants gave their informed consent.

4.2. Measures

Aging anxiety was measured by a shortened version of Aging Anxiety Scale constructed and validated by Yan et al. (2011). This 6-item scale is rated from 1 (*strongly disagree*) to 5 (*strongly agree*). An average score was computed with higher values indicating higher aging anxiety. Cronbach's α was 0.85.

Death anxiety was measured by the Fear of Death subscale taken from the Death Attitude Profile-Revised questionnaire (Wong, Reker, & Gesser, 1994). This 7-item scale was rated from 1 (*completely disagree*) to 7 (*completely agree*). An average score was computed with higher values indicating higher death anxiety. Cronbach's α was 0.85. Three judges agreed upon the Hebrew adaptation of the above-mentioned two measures: the first completed a translation from English into Hebrew, the second made an independent back-translation into English, and the third reviewed both versions.

Psychological distress was measured by the 18-item Brief Symptom Inventory (BSI-18; Derogatis, 2001). The BSI is a widely used questionnaire. Participants were asked to indicate on a scale ranging from 0 (*not at all*) to 4 (*very much*) to what extent they were troubled by symptoms of depression, anxiety, and somatization during the last two weeks. An average score was computed with higher values indicating higher psychological distress. Cronbach's α was .88.

Indices of emotional complexity were based on daily reports of emotions assessed by the Scale of Positive and Negative Experience (SPANE; Diener et al., 2010). Whereas the frequently used Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988) focuses on high arousal emotions, SPANE was devised to include both high and low arousal emotions (Diener et al., 2010), and may therefore better reflect emotional complexity. Participants were instructed to rate the emotions experienced during the day at the end of each day. Each item was scored on a scale ranging from 1 (*not at all or to a very small degree*) to 5 (*to a very large degree*). Internal consistency coefficients estimated on all 14 days suggest good internal consistency (mean α = .90, *SD* = .02, range = .86–.92 for PA, and mean α = .84, *SD* = .03, range = .79–.88 for NA).

Next, we calculated two indices of emotional complexity. The first, the co-occurrence index, reflected the correlation between each participant's mean scores of positive affect (PA) and mean scores of negative affect (NA) across the 14 days of data (Carstensen et al., 2000; Ong & Bergeman, 2004). A low score refers to negative correlation between PA and NA; a moderate score – to a relative independence between affects (correlations near zero),

and a high score – to co-occurrence of PA and NA, as indicated by positive correlations between them. The second, the differentiation index, reflected the number of principal components with eigenvalues greater than 1 extracted in a within-person principal components analysis on each participant's 12 × 12 emotion ratings correlation matrix (based upon each participant's 14 days of data; Grühn et al., 2013; Ong & Bergeman, 2004). A low score on this index refers to a small number of components and a high score – to a large number of components.

Covariates included background characteristics of age, gender, education (ranging on a scale from 0 [*no formal education*] to 5 [*academic education*]) and marital status. Covariates also included chronic medical conditions, disability and cognitive difficulties. Chronic medical conditions were assessed by a sum of 11 listed illnesses that participants reported to have been diagnosed by a physician (Shrira et al., 2011). Disability was measured by asking respondents to rate difficulties in performing five functional activities (adapted from Nagi, 1976). Each activity was rated on a scale ranging from 1 (*not difficult to perform at all*) to 5 (*extremely difficult to preform*). The final score was based on the average of answers, and higher scores reflect more difficulties. Cronbach's α was 0.89. Cognitive difficulties were self-reported on eight items taken from Pearlin, Mullan, Semple, and Skaff (1990). Participants were asked to rate how difficult they find it to perform cognitive tasks on a scale ranging from 1 (*not difficult at all*) to 4 (*very difficult*). An average score was computed with higher values indicating more cognitive difficulties. Cronbach's α was 0.84.

5. Data analysis

In order to test the study hypotheses, we performed multiple hierarchical regression analyses. All continuous variables were mean-centered before analyses. In order to test the first hypothesis, psychological distress was regressed on covariates in Step 1, and either aging or death anxiety in Step 2.

In order to test the second hypothesis, psychological distress was regressed on covariates in Step 1, one of the emotional complexity indices and either aging or death anxiety in Step 2, and on the interaction between either aging anxiety or death anxiety and one of the emotional complexity indices in Step 3. Significant interactions were probed using the PROCESS computational tool (Hayes, 2013).

6. Results

Table 1 presents descriptive statistics for the study variables. Aging anxiety and death anxiety were moderately correlated, suggesting they are related but distinctive types of anxiety. Both anxieties were moderately correlated with psychological distress. Emotional co-occurrence and emotional differentiation were moderately correlated, suggesting they are related but distinctive markers of emotional complexity.

Next, hierarchical regressions showed that after controlling for covariates ($\Delta R^2 = .22$), the relationship between aging and death anxieties and psychological distress remained significant (aging anxiety: $B = .166$, $SE = .036$, $\beta = .307$, $t(174) = 4.63$, $p < .0001$, $\Delta R^2 = .089$; death anxiety: $B = .081$, $SE = .026$, $\beta = .227$, $t(174) = 3.15$, $p = .002$, $\Delta R^2 = .044$). Thus, Hypothesis 1 was supported, as both anxieties were related to higher psychological distress.

Four additional regressions examined the relationship between aging and death anxieties and psychological distress as a function of emotional complexity. When psychological distress was regressed on aging anxiety, emotional co-occurrence, and their respective interaction, the Aging anxiety × Emotional co-occurrence interaction was significant, $B = -.486$, $SE = .086$, $t(182) = -5.63$, $p < .0001$, $\Delta R^2 = .127$. A similar regression with emotional differentiation also produced a significant interaction, $B = -.123$, $SE = .029$, $t(184) = -4.14$, $p < .0001$, $\Delta R^2 = .073$.

PROCESS further presented the conditional effect of aging anxiety on psychological distress at different values of emotional complexity. Thus, when emotional co-occurrence was 1 *SD* below the mean, aging anxiety significantly related to higher psychological distress, $B = .397$, $SE = .047$, $t(182) = 8.29$, $p < .0001$. However, when emotional co-occurrence was 1 *SD* above the mean, aging anxiety was not related to psychological distress, $B = .005$, $SE = .050$, $t(182) = 0.10$, $p = .919$.

Similarly, when emotional differentiation was 1 *SD* below the mean, aging anxiety significantly related to higher psychological distress, $B = .346$, $SE = .047$, $t(184) = 7.24$, $p < .0001$. However, when emotional differentiation was 1 *SD* above the mean, aging anxiety was related to psychological distress to a much weaker degree, $B = .096$, $SE = .045$, $t(184) = 2.10$, $p = .036$. After controlling for covariates, both the Aging anxiety × Emotional co-occurrence and the Aging anxiety × Emotional differentiation interactions remained significant, $B = -.363$, $SE = .087$, $t(172) = -4.14$, $p = .0001$, $\Delta R^2 = .066$, and $B = -.086$, $SE = .030$, $t(174) = -2.86$, $p = .004$, $\Delta R^2 = .032$, respectively.

When psychological distress was regressed on death anxiety, emotional co-occurrence, and their respective interaction, the Death anxiety × Emotional co-occurrence interaction was significant, $B = -.183$, $SE = .060$, $t(182) = -3.02$, $p = .002$, $\Delta R^2 = .043$. A similar regression with emotional differentiation also produced a significant interaction, $B = -.061$, $SE = .020$, $t(184) = -3.01$, $p = .002$, $\Delta R^2 = .042$.

PROCESS further showed that when emotional co-occurrence was 1 *SD* below the mean, death anxiety significantly related to higher psychological distress, $B = .169$, $SE = .030$, $t(182) = 5.50$, $p < .0001$. However, when emotional co-occurrence was 1 *SD* above the mean, death anxiety was not related to psychological distress, $B = .021$, $SE = .037$, $t(182) = 0.56$, $p = .570$.

Similarly, when emotional differentiation was 1 *SD* below the mean, death anxiety significantly related to higher psychological distress, $B = .173$, $SE = .030$, $t(184) = 5.70$, $p < .0001$. However, when emotional differentiation was 1 *SD* above the mean, death anxiety was unrelated to psychological distress, $B = .049$, $SE = .032$, $t(184) = 1.54$, $p = .124$[1]. After controlling for covariates, both the Death anxiety × Emotional co-occurrence and the Death anxiety × Emotional differentiation interactions remained significant, $B = -.148$, $SE = .061$, $t(172) = -2.40$, $p = .017$, $\Delta R^2 = .025$, and $B = -.041$, $SE = .020$, $t(174) = -2.04$, $p = .042$, $\Delta R^2 = .018$, respectively.

The four significant interactions between aging and death anxieties and the emotional complexity indices are presented in

[1] To assess whether the interactions predicted specific symptoms, we also examined the interactions when using the three subscales of psychological distress (i.e., depressive, anxious, and somatic symptoms) as the outcomes. Almost all interactions were significant, suggesting that the interactions between emotional complexity and death/aging anxiety predicted almost all symptom type (with the exception of the Death anxiety × Emotional co-occurrence, which was marginally significant when predicting depressive symptoms). The findings were as follows. The Death anxiety × Emotional co-occurrence interaction was $B = -.13$, $p = .06$, when predicting depressive symptoms; $B = -.23$, $p = .0007$, when predicting anxiety symptoms, and $B = -.18$, $p = .009$, when predicting somatic symptoms. The Death anxiety × Emotional differentiation interaction was $B = -.04$, $p = .05$, when predicting depressive symptoms; $B = -.05$, $p = .009$, when predicting anxiety symptoms, and $B = -.06$, $p = .003$, when predicting somatic symptoms. The Aging anxiety × Emotional co-occurrence interaction was $B = -.43$, $p = .0001$, when predicting depressive symptoms; $B = -.44$, $p < .00001$, when predicting anxiety symptoms, and $B = -.57$, $p < .00001$, when predicting somatic symptoms. Finally, the Aging anxiety × Emotional differentiation interaction was $B = -.09$, $p = .008$, when predicting depressive symptoms; $B = -.08$, $p = .014$, when predicting anxiety symptoms, and $B = -.17$, $p < .00001$, when predicting somatic symptoms.

Table 1
Means, standard deviation, and intercorrelations among the study variables.

Variable	*M* (%)	*SD*	1	2	3	4	5
1. Aging anxiety	2.87	0.89	–				
2. Death anxiety	3.42	1.41	.46***	–			
3. Psychological distress	0.54	0.48	.39***	.33***	–		
4. Emotional co-occurrence	−0.39	0.40	−.01	−.06	−.11	–	
5. Emotional differentiation	3.42	1.00	.00	−.04	.02	.47***	–
6. Age	57.84	17.68	.12	−.03	.13	−.09	−.03
7. Gender (women)[a]	50.3	–	−.04	.05	−.02	−.12	−.12
8. Education	3.67	1.46	−.10	−.14*	−.17*	.10	.10
9. Marital status (married)[b]	66.3	–	−.01	.05	−.10	.01	.04
10. Chronic medical conditions	0.88	1.41	.13	.27***	.30***	−.21**	−.11
11. Disability	1.63	0.91	.17*	.10	.33***	−.10	−.09
12. Cognitive difficulties	1.10	0.27	.14*	.15*	.25***	−.02	−.07

Note: $N = 188$. Pearson coefficients are presented for continuous variables. For correlations between dichotomous and continuous variables, point-biserial coefficients are presented.

[a] Coded 0 = man, 1 = woman.

[b] Coded 0 = unmarried, 1 = married.

* $p \leqslant .05$.

** $p < .01$.

*** $p < .001$.

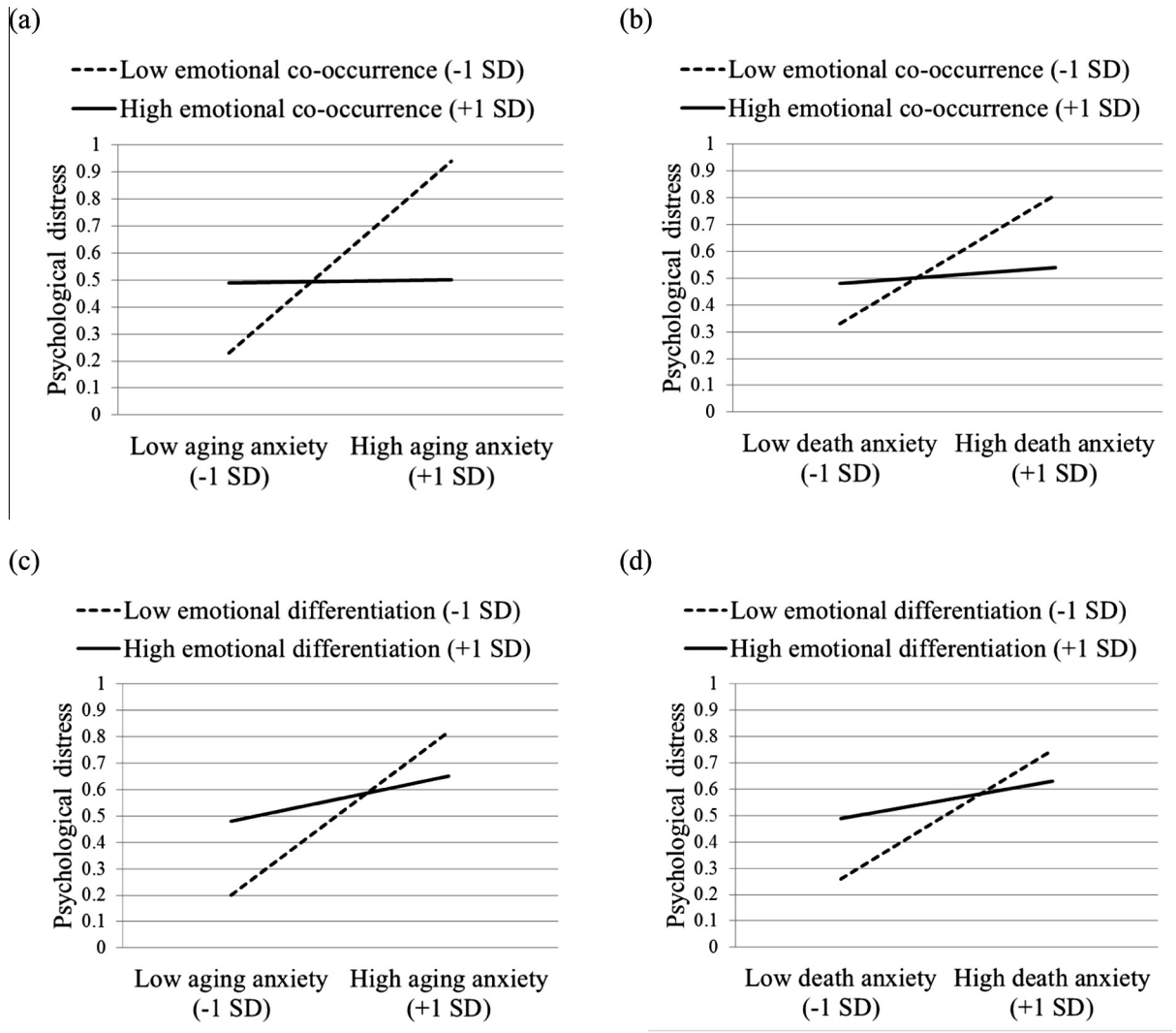

Fig. 1. The two-way interaction between either aging or death anxiety (higher values reflect higher anxiety) and (a–b) emotional co-occurrence (higher values reflect positive affect-negative affect covariation moving towards positive correlations), and (c–d) emotional differentiation (higher values reflect more differentiation) in predicting psychological distress.

Fig. 1a–d. As can be seen, among those with low emotional complexity (i.e., low emotional co-occurrence or low emotional differentiation), there was a strong positive relationship between either aging or death anxiety and psychological distress. On the other hand, among those with high emotional complexity, there was no relationship, or a much weaker relationship, between either aging or death anxiety and psychological distress. Thus, Hypothesis 2 was supported.

7. Supplementary analyses

We were further interested to examine whether the effects of aging and death anxieties on psychological distress differed as a function of age. Therefore, additional regressions examined the interactions between age, either age or death anxiety, and the three-way interactions between age, either aging or death anxiety, and emotional complexity. After controlling for covariates (excluding age) and the main effects of age and either aging or death anxiety, the interactions between age and either anxieties did not predict psychological distress, $B = .003$, $SE = .002$, $t(175) = 1.83$, $p = .068$, for aging anxiety, and $B = .0005$, $SE = .001$, $t(175) = 0.36$, $p = .718$, for death anxiety. Therefore, age did not moderate the effect of aging and death anxiety on psychological distress.

Moreover, after additionally controlling for the three two-way interactions between age, anxieties and emotional complexity, their three-way interactions did not predict psychological distress, $B = -.0008$, $SE = .004$, $t(172) = -0.17$, $p = .842$, for aging anxiety, and $B = .002$, $SE = .003$, $t(172) = 0.56$, $p = .572$, for death anxiety. Similar results were found when using emotional differentiation as an indicator of emotional complexity, $B = .0001$, $SE = .001$, $t(174) = 0.03$, $p = .942$, for aging anxiety, and $B = .0008$, $SE = .001$, $t(174) = 0.65$, $p = .516$, for death anxiety. Therefore, age did not moderate the interactive effect of either aging or death anxiety and emotional complexity on psychological distress.

8. Discussion

Previous efforts to understand the effect of aging and death anxiety on mental health did not examine the role of personal resources in buffering this effect. This study used two indices of emotional complexity and a time-based study design with participants at a wide age-range. Our findings demonstrate that the two different indices of emotional complexity can serve as a buffering mechanism against the negative effect that aging and death anxieties have on the individual's mental health. The intensity of fear of aging and of death positively and significantly contributed to psychological distress among individuals with low, but not with high emotional complexity. The moderation effect of emotional complexity was statistically convincing. First, it was measured by two major indices of emotional complexity. Second, it was based on daily diaries along a period of 14 days. Third, it remained significant after adjusting for covariates. Fourth, it added a considerable amount of variance to psychological distress, with both anxieties and both measures of emotional complexity. Fifth, it found on a wide age-range covering the entire adult lifespan. Finally, its strength was similar across different age groups.

Emotional complexity, as measured by the two complementary indices, is considered a personal asset, because high emotional co-occurrence enables the individual to simultaneously contain both negative and positive emotions, while high emotional differentiation, affords the individual with the ability to distinctively recognize separate emotional experiences (e.g., Bodner et al., 2012). Following this line of thought, we suggest that individuals with high emotional complexity have the capability to differentiate between positive and negative emotional experiences associated with aging and death, and simultaneously experience negative and positive emotions, triggered by these anxieties. Therefore, the intensity of these anxieties would not be associated with psychological distress among these individuals. In contradistinction, people with low emotional complexity cannot effectively regulate these anxieties, and therefore their intensity is positively associated with psychological distress.

Terror management theory (TMT) may suggest a theoretical framework for understanding the relationship between aging/death anxiety and psychological distress (Martens, Greenberg, Schimel, & Landau, 2004; Maxfield et al., 2014). According to the TMT, the origins of our human behaviors, including our anxious reactions to older adults, who remind us of our aging and death anxieties, are routed in our fear of death (Martens et al., 2004). A broaden TMT perspective on the role of death-related anxiety in psychological distress (Maxfield et al., 2014) contents that some individuals cannot efficiently manage their death-related anxieties by activating their distal defenses, i.e., by maintaining sufficient faith in their worldview, by enhancing their self-esteem, or by keeping productive social relations with others. Such individuals may react to these anxieties with psychological distress in the form of depression, phobic and compulsive reactions, or by using self-medication through alcohol and other drugs, somatization, etc. (e.g., Strachan et al., 2007). We suggest that individuals who conform and identify with the modern Western worldview that places special value on unrealistic goals such as staying young, strong, active, rich, and beautiful forever, may also demonstrate higher levels of aging and death concerns, which would lead to higher psychological distress. Moreover, we assume that individuals, who are preoccupied with aging and death anxieties, but also have low emotional complexity, would tend to respond to the unrealistic views of modern society on aging and death with a unidimensional emotional reaction. Therefore, they would feel very happy when they succeed in adjusting to these unrealistic goals, or become depressed when they fail to do so, and would consequently, demonstrate more psychological distress. In contrast, individuals who are suffering from aging and death anxieties, but also have high emotional complexity, would tend to respond to these unrealistic goals in a more balanced way. They may feel sad for getting old and for failing to conform to these standards, but still be able to acknowledge positive experiences that occur in their lives, and would therefore develop less psychological distress. As this study was not designed to examine this theoretical explanation, it should be examined in future laboratory studies.

The moderating role of emotional complexity in the relationship between aging/death anxiety and psychological distress can be theoretically developed by referring to the multidimensionality of its constructs. For example, aging anxiety can be examined according to four different dimensions (fear of old people, physical appearance, psychological concerns, and fear of losses; e.g., Lasher & Faulkender, 1993), and death anxiety – according to three other dimensions (intrapersonal, interpersonal, and transpersonal, e.g., Florian & Mikulincer, 1997). Future studies may focus on such dimensions of aging and death anxieties and examine whether our findings are reproducible with other samples and measures.

The moderating role of emotional complexity in the relationship between aging/death anxiety and psychological distress can be also clinically implemented. Adults with high levels of aging anxiety and death anxiety can be identified, and clinical interventions can be developed in order to improve their emotional complexity as a mean to help them to cope with the inevitability of aging and death, and thereby to mitigate their psychological distress.

Our study used a cross-sectional design, and did not examine the defensive mechanisms (e.g., a misuse of self-esteem enhancement or worldview validation) responsible for the moderating role

of emotional complexity. An inquiry into these mechanisms is still required. Moreover, we used a convenience sample mainly composed of healthy, well-educated, community-dwelling respondents. Future studies can expand the examination to other populations, such as institutionalized people. In addition, it is recommended that future studies will examine people from other cultures.

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