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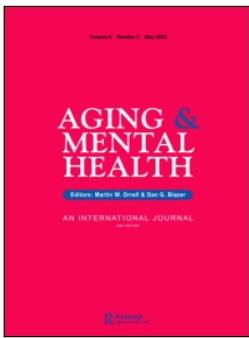
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The importance of personality and life-events in anxious depression: from trait to state anxiety

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ABSTRACT

Objectives: Anxious depression is associated with severe impairment and bad prognoses. We hypothesize that recent life-events are associated with more anxiety in late-life depression and that this is conditional upon the level of certain personality traits.

Method: Baseline data of the Netherlands Study of Depression in Older Persons (NESDO) were used. In 333 patients (≥ 60 years) suffering from a major depressive disorder, anxiety was assessed with the BAI, personality traits with the NEO-FFI and the Mastery Scale, and life-events with the Brugha questionnaire. Multiple linear regression analyses were applied with anxiety severity as dependent and life-events and personality traits as independent variables.

Results: 147 patients (44.1%) had recently experienced one or more life-events. The presence of a life-event is not associated with anxiety ($p = .161$) or depression severity ($p = .440$). However, certain personality traits interacted with life-events in explaining anxiety severity. Stratified analyses showed that life-events were associated with higher anxiety levels in case of high levels of neuroticism and openness and low levels of conscientiousness or mastery.

Conclusions: In the face of a life-event, personality traits may play a central role in increased anxiety levels in late-life depression.

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Anxious depression;
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Introduction

Anxious depression has been defined as a major depressive disorder with high levels of anxiety symptoms based on symptom severity scales (Baumeister & Parker, 2010; Ionescu, Niciu, Henter, & Zarate, 2013). Albeit high anxiety levels in depression and comorbid anxiety disorders are often lumped together when studying anxious depression, we previously showed that among depressed older patients, comorbid anxious distress or comorbid anxiety disorders, identify completely different patients (van der Veen, Comijs, Schoevers, van Zelst, & Voshaar, 2014). In the present study, we will focus high anxiety symptoms in line with the DSM-V specifier for anxious distress (American Psychiatric Association, 2013). High anxiety levels in depression refer to a common subtype of depression (Fava et al., 2004) that is associated with more impairment, suicidality and treatment resistance, both in younger and older adults (Farabaugh et al., 2012; Fava et al., 2008; Lenze, Mulsant, Shear, Houck, & Reynolds III, 2002).

Personality traits and life-events have been extensively studied in depressive disorder, while the specific association with the anxiety specifier in depression is scarce. Among adult samples, depression and anxiety disorders are consistently associated with high levels of neuroticism (Gale et al., 2011; Lahey, 2009), low levels of conscientiousness (Kotov, Gamez, Schmidt, & Watson, 2010) and a lower sense of mastery (Benassi, Sweeney, & Dufour, 1988). Although personality traits and mastery have been less studied in older population, results seem comparable to those found in younger age

groups. Late-life depression is associated with higher levels of neuroticism (Steunenberg, Braam, Beekman, Deeg, & Kerkhof, 2009; Vink et al., 2009), and lower levels of extraversion (Weber et al., 2010; Weber, Giannakopoulos, & Canuto, 2011), conscientiousness (Hayward, Taylor, Smoski, Steffens, & Payne, 2013; Weber et al., 2012) and openness (Weber et al., 2012).

Interestingly, in an older adult sample, a low sense of mastery was the only common risk factor for pure depression, pure anxiety disorders and their comorbidity (Beekman et al., 2000).

Life-events have consistently been identified as determinants for the onset and course of depressive disorder in both adult and older samples (Kraaij, Arensman, & Spinhoven, 2002; Moreno-Peral et al., 2014; Paykel, 2003; Vink et al., 2009). Dealing successfully with life-events, in terms of not developing enduring depressive or anxiety symptoms, is largely dependent on one's personality traits and sense of mastery. From this perspective neuroticism can be defined as the degree of emotional stability, one's tendency to experience negative emotions and cope (poorly) with life-events. Individuals with high levels of neuroticism tend to perceive even moderate events as stressful and their neuropsychological responses (e.g. their attentional and memory bias, hyper-responsiveness behaviorally and of amygdala activation) are stronger than those of individuals with lower levels of neuroticism (Sandi & Richter-Levin, 2009). In other words, in the face of life-events trait anxiety ergo

neuroticism could develop into state anxiety. In adult samples the impact of recent life-events on both the course of depressive symptoms as well as anxiety symptoms is conditional upon the level of neuroticism, with more impact in case of a high neuroticism level (Kendler, Kuhn, & Prescott, 2004; Spinhoven et al., 2011). Nonetheless, among infantry troops, individuals with high neuroticism were not more reactive to adverse events in terms of the development of post-traumatic stress symptomatology (Engelhard et al., 2009).

Sense of mastery (or locus of control) involves 'the extent to which one regards one's life chances as being under one's own control in contrast to being fatalistically ruled' (Pearlin & Schooler, 1978). A higher level of mastery is generally considered as a resilience factor for daily stressors (Neupert, Almeida, & Charles, 2007). Whether the impact of life-events on anxiety levels in depression is also conditional on the level of mastery has not been explored yet.

This proof-of-concept study examines the association between recent life-events and the level of anxiety in depressed older patients specifically looking at whether this association is conditional upon the personality profile of the patient. We hypothesize that recent life-events are associated with the severity of anxiety in late-life depression. We further hypothesize that recent life-events are more strongly associated with anxiety symptoms in the presence of high levels of neuroticism as well as a low sense of mastery, whereas other personality characteristics are expected to have no conclusive moderating effects.

Methods

Study design and participants

This cross-sectional study is based on baseline data from the Netherlands Study of Depression in Older persons (NESDO), is a multi-site naturalistic cohort study that includes 378 depressed (including major and minor depressive disorders and dysthymia) and 132 non-depressed subjects aged 60–93 years (Comijs et al., 2011). Persons with a clinical diagnosis of dementia or who were suspect for dementia, a primary diagnoses of psychotic or bipolar disorder, a Mini Mental State Examination score (Folstein, Folstein, & McHugh, 1975) under 18 (out of 30 points) and insufficient command of the Dutch language were excluded.

Psychiatric diagnoses were assessed with the Composite International Diagnostic Interview (Wittchen et al., 1991) according to DSM-IV-R criteria. The severity of anxiety symptoms was measured using the Beck Anxiety Inventory (BAI) (Beck, Epstein, Brown, & Steer, 1988), a 21-item, self-report questionnaire primarily addressing somatic anxiety symptoms.

For the present paper we first selected those patients who met the criteria for a major depressive episode within the past 6 months ($n = 359$, 95%), therefore we excluded 19 patients who met the criteria for a minor depression of dysthymia only. We also excluded 26 patients who had missing data with respect to recent life-events, neuroticism and mastery, leaving a final study sample of 333 patients.

Recent life-events

The occurrence of recent stressful life-events was assessed using the Brugha questionnaire (Brugha, Bebbington,

Tennant, & Hurry, 1985). These events reflect the presence of life stressors during the past year, such as serious illness and injury, death of a close friend or relative, unemployment, major financial loss and loss of important relationships. The Brugha questionnaire has good test–retest reliability, high agreement between participant and informant ratings, and good agreement with interview-based ratings (Brugha & Cragg, 1990). Since we hypothesized that the occurrence of a recent life-event is associated with the severity of anxiety in late-life depression we dichotomized the number of life-events in the past year as none versus one or more life-events. Eventually we also explored associations with recent life-events as a continuous independent variable and checked for a cumulative effect when more than one life-event occurred in the past year.

Personality

The big five personality domains, i.e. neuroticism, extraversion, openness to experience, agreeableness and conscientiousness, were assessed with the 60-item NEO-Five Factor Inventory (NEO-FFI) (Costa & McCrae, 1995). The psychometric properties of the Dutch version of the NEO-FFI are generally good (Hoekstra, Ormel, & Fruyt, 2003). The internal consistencies of all domains range from acceptable to good, and are comparable to those of the American version.

Since neuroticism partly overlaps with concepts of anxiety as well as depression, we also tested the association with specific facets of neuroticism according to the empirically derived model. This model describes the facets negative affect (pertaining to anxiety and depression) and self-reproach (self-conscious negative emotions, e.g. shame and guilt). The psychometric properties of the model fit well (Chapman, 2007).

In addition, sense of mastery (or locus of control) was assessed with the five-item Dutch version of the Pearlin and Schooler Mastery Scale. A higher score on the Mastery Scale indicates a low sense of mastery (Pearlin & Schooler, 1978).

Covariates

In all the analyses sex (male–female), age (years) and level of education (number of years) were added as the basic covariates.

Since depression partly overlaps with anxiety and may confound, but also obscure results, we will repeat all analyses with correction for depression severity (sensitivity analyses). The severity of depressive symptoms was assessed with the 28-item self-report version of the Inventory of Depressive Symptomatology (IDS-SR) (Rush, Gullion, Basco, Jarrett, & Trivedi, 1996).

Analyses

Differences between depressed participants with or without the presence of one or more life-events in the last year were analyzed by independent *t*-tests or chi-square statistics.

First a linear regression analysis was applied to examine the possible association between anxiety (BAI sum score) as the dependent variable and life-event(s) as the independent variable.

Subsequently, we tested in multiple linear regression models whether the presence of a recent life-event (yes/no) interacted with the personality domains under study (neuroticism

total score and facets, extraversion, openness, agreeableness, conscientiousness and mastery) in its potential association with anxiety as the dependent variable. In these analyses, the personality trait under study and the presence of a life-event were included as independent variables, in addition to the interaction term between both variables. When the interaction terms with a certain personality trait were significant ($p < .10$) analyses were repeated, stratified by the presence of a recent life-event.

Finally, we tested in multiple linear regression models whether the presence of a recent life-event (dichotomized and continuously) interacted with the dichotomized personality traits (median split: high/low) in its potential association with anxiety as the dependent variable.

All analyses were adjusted for socio-demographic variables (age, sex and level of education) and depression severity (IDS-SR sum score). A p -value $< .05$ was considered statistically significant; whereas, as noted above $p < .10$ was considered significant for interaction terms (Aiken & West, 1991). The analyses were conducted in SPSS 22 for Mac (IBM, Armonk, NY, USA).

Results

Patient characteristics

The mean (standard deviation) age of these 333 patients was 70.6 (sd = 7.3) years old; 220 (66.1%) were female. A total of 147 patients (44.1%) had experienced one or more life-event in the past year. Table 1 presents all characteristics of the study population stratified by the presence of any recent life-event(s).

Associations between life-event(s), personality and anxiety symptoms

Linear regression with anxiety as the dependent variable showed that the presence of a recent life-event was not associated with the severity of anxiety after correction for age, sex, level of education and depression severity (beta = 0.06, $t_{[330]} = 1.38$, $p = .169$).

Subsequently, we tested in multiple linear regression models whether the presence of a recent life-event (yes/no) interacted with the personality domains under study in its potential association with anxiety as the dependent variable. We found a significant interaction between recent life-events

Table 2. Associations of personality domains and level of anxiety (dependent variable) by linear regression^a stratified by presence of life-event(s) in case of significant interaction with the personality trait under study.

Personality characteristics	Stratified sample by presence of life-event(s) ^b					
	No life-event ($n = 183$)		Any life-event ($n = 145$)			
	<i>B</i> (SE)	Beta	<i>p</i>	<i>B</i> (SE)	Beta	<i>p</i>
<i>Big-5 personality traits</i>						
• Neuroticism	0.41 (0.13)	.27	.001	0.65 (0.13)	.36	<.001
○ Self-reproach	0.51 (0.17)	.24	.003	0.76 (0.17)	.31	<.001
• Openness	-0.27 (0.15)	-.13	.069	-0.01 (0.16)	-.01	.964
• Conscientiousness	-0.04 (0.13)	-.02	.775	-0.34 (0.15)	-.15	.026
<i>Sense of mastery</i>						
• Pearlman Mastery Scale	0.75 (0.26)	.22	.005	1.11 (0.29)	.28	<.001

Note: ^aAdjusted for age, sex, level of education (years) and severity of depression (IDS-SR sum score).

^bStratified analyses by presence of life-event(s) only reported in case of a significant interaction term between life-event (no/any) and the personality trait.

and neuroticism (beta = 0.63, $t_{[329]} = 2.26$, $p = .024$), with its facet self-reproach (beta = 0.41, $t_{[330]} = 1.79$, $p = .074$), openness (beta = 0.51, $t_{[326]} = 1.79$, $p = .074$), conscientiousness (beta = -0.66, $t_{[328]} = -1.98$, $p = .049$) and mastery (beta = 0.48, $t_{[323]} = 1.87$, $p = .062$). Meaning that when a life-event occurred in the past year, higher neuroticism, more self-reproach and openness, less conscientiousness and a lower sense of mastery were associated with more anxiety. When no life-event had occurred this effect was not found. No significant interaction was found with the neuroticism facet negative affect (beta = 0.33, $t_{[317]} = 1.20$, $p = .233$), extraversion (beta = -0.30, $t_{[328]} = -1.04$, $p = .298$) and agreeableness (beta = 0.11, $t_{[327]} = 0.27$, $p = .787$).

Table 2 shows the results, with respect to neuroticism, the facet subscale self-reproach, openness, conscientiousness and mastery, stratified by the presence of a recent life-event. Higher levels of neuroticism and its facet self-reproach and a lower sense of mastery are associated with more anxiety in both groups. A higher level of openness is associated with more anxiety in the no life-event group, while a higher level of conscientiousness is associated with more anxiety in the any life-event group. Table 3 shows the results of multiple linear regression models with the presence of a recent life-event (yes/no) and their interaction with the dichotomized personality traits (median split: high/low) and with anxiety as the dependent variable. In the group that experienced a recent life-event, belonging to the high neuroticism group was associated with more anxiety. The same results were found for the low self-reproach group and the low conscientiousness group.

Table 1. Patient characteristics for those with and without any life-event(s) in past year.

Characteristics	Presence of life-events in last year		Statistics
	No ($n = 186$)	Yes ($n = 147$)	
<i>Demographics:</i>			
• Mean (SD) age (years)	71.1 (7.2)	69.9 (7.4)	$t = 1.5$, $df = 331$, $p = .137$
• Female sex, n (%)	118 (63.4)	102 (69.4)	$\chi^2 = 1.3$, $df = 1$, $p = .255$
• Mean (SD) level of education (years)	10.2 (3.4)	10.5 (3.5)	$t = -0.70$, $df = 331$, $p = .484$
<i>Life-events:</i>			
• Median (IQR) number of life-events	—	1 (58)	Not applicable
<i>Psychopathology:</i>			
• Mean (SD) anxiety level (BAI)	16.8 (11.2)	18.6 (12.0)	$t = -1.4$, $df = 331$, $p = .160$
• Mean (SD) depression severity (IDS)	29.8 (12.7)	30.9 (13.4)	$t = -0.8$, $df = 329$, $p = .440$
<i>Personality:</i>			
Mean (SD) neuroticism	39.1 (7.3)	39.1 (6.6)	$t = 0.01$, $df = 330$, $p = .996$
Mean (SD) extraversion	33.3 (6.2)	34.1 (7.0)	$t = -1.1$, $df = 329$, $p = .268$
Mean (SD) openness	29.1 (5.2)	29.4 (5.6)	$t = -0.6$, $df = 327$, $p = .583$
Mean (SD) agreeableness	43.8 (5.0)	44.4 (5.4)	$t = -1.1$, $df = 328$, $p = .288$
Mean (SD) conscientiousness	36.3 (5.8)	36.8 (5.4)	$t = -0.8$, $df = 329$, $p = .404$
Mean (SD) mastery	15.2 (3.3)	15.3 (3.0)	$t = -0.3$, $df = 324$, $p = .777$

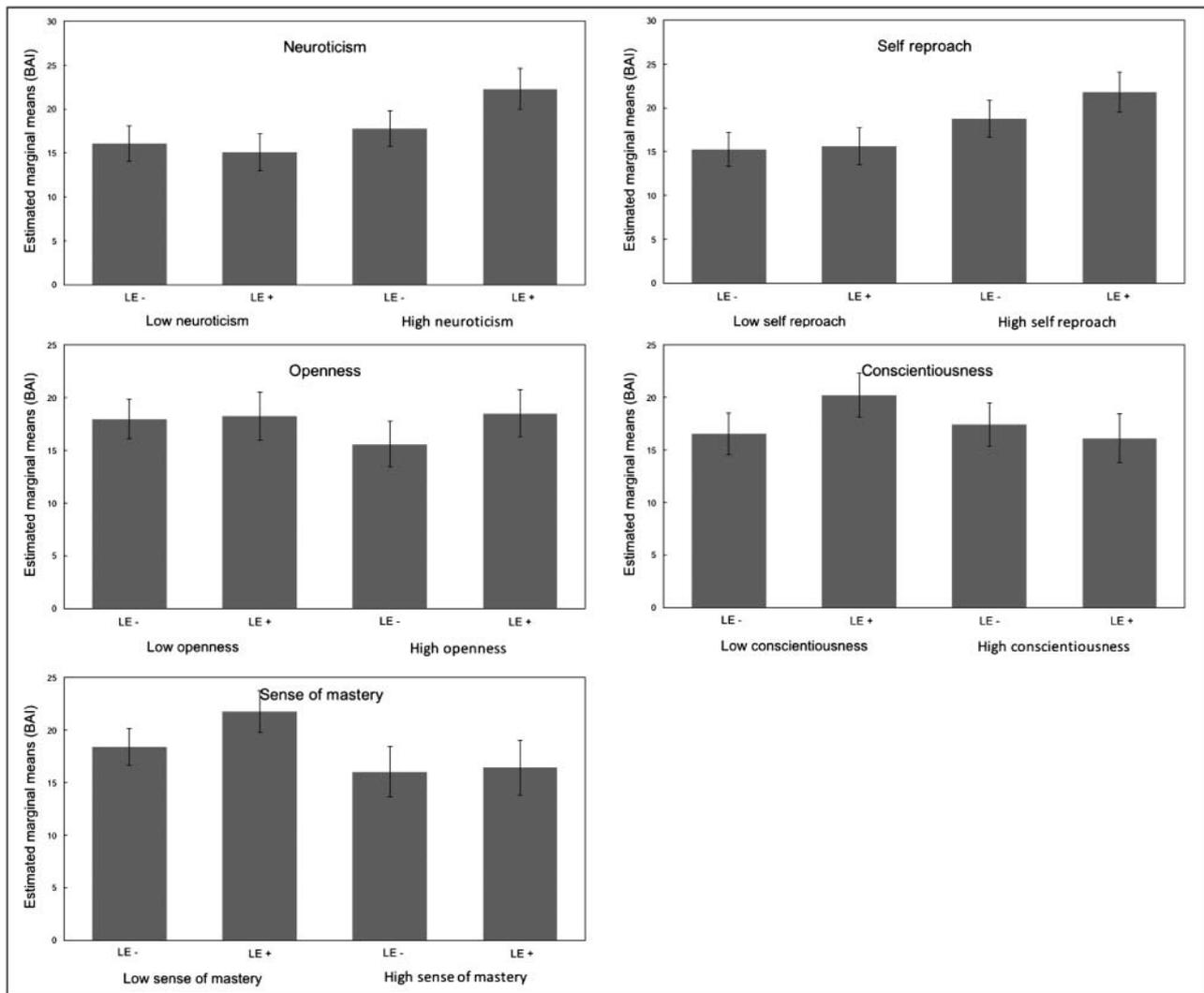
Note: Abbreviations: SD, standard deviation; IQR, interquartile range.

Table 3. Associations of the dichotomized personality traits and level of anxiety (dependent variable) by linear regression^a with the presence of life-event(s) continuously and stratified in case of significant interaction with the personality trait under study.

	Stratified sample by Big-5 personality traits (high/low) ^b					
	B (SE)	Beta	p	B (SE)	Beta	p
	Neuroticism					
	Low (n = 173)			High (n = 156)		
Live-events (yes/no)	-0.86 (1.32)	-.05	.517	4.52 (1.62)	.19	.006
Live-events (continuously)	-0.72 (0.64)	-.08	.261	2.00 (0.86)	.16	.021
	Self-reproach (facet of neuroticism)					
	Low (n = 177)			High (n = 152)		
Live-events (yes/no)	3.15 (1.60)	.14	.051	1.40 (0.81)	.12	.089
Live-events (continuously)	0.49 (1.34)	.03	.713	-0.39 (0.67)	-.04	.557
	Openness					
	Low (n = 176)			High (n = 153)		
Live-events (yes/no)	0.15 (1.46)	.01	.919	2.87 (1.51)	.14	.060
Live-events (continuously)	0.26 (0.84)	.02	.756	0.22 (0.68)	.02	.746
	Conscientiousness					
	Low (n = 181)			High (n = 148)		
Live-events (yes/no)	3.66 (1.46)	.15	.013	-0.85 (1.47)	-.04	.564
Live-events (continuously)	0.66 (0.72)	.06	.359	-0.41 (0.78)	-.04	.601
	Sense of mastery					
	Low (n = 121)			High (n = 208)		
Live-events (yes/no)	0.50 (1.26)	.02	.694	2.95 (1.82)	.13	.108
Live-events (continuously)	-0.16 (0.69)	-.01	.820	0.59 (0.82)	.06	.475

Note: ^aAdjusted for age, sex, level of education (years) and severity of depression (IDS-SR sum score).

^bThose personality traits that showed significant interaction with life-event.



Bars with 95% C.I. based on standard error of the mean (SEM)

Figure 1. Graphs of the analyses where both recent life-events and the personality traits are dichotomized.

Finally, we repeated these analyses with life-events as a continuous variable in the interaction with these dichotomized personality traits and with anxiety as the dependent variable. Belonging to the high neuroticism group is associated with more anxiety. The results are also shown in Table 3.

For facilitating the interpretation of the interaction terms, Figure 1 shows the graphs of the analyses where both recent life-events and the personality traits are dichotomized. These figures show the differential relationship between life-events and anxiety in for example low and high neurotic patients.

Discussion

Main findings

This study shows that in late life the presence of anxious depression is related to recent life-events, but only in subjects with either high levels of neuroticism, low levels of openness to experience and conscientiousness or a poor sense of mastery. This is the first study showing this association between recent life-events, personality characteristics and anxiety levels in depression.

Comparison with the literature

Considerable research has shown the association between depression (severity) and personality characteristics (Hakulinen et al., 2015). In many of these studies, the anxiety dimension is not specifically taken into account when looking at depression severity. Our study suggests that it is especially this anxiety dimension in depression that is associated with personality. This is in line with the results of a systematic comparison of risk profiles for late-life depression and late-life anxiety disorders, showing that personality characteristics such as neuroticism and mastery are risk factors for both types of disorders (Vink, Aartsen, & Schoevers, 2008). With respect to neuroticism, *post hoc* analyses on the different facets showed that the impact of life-events on anxiety levels seems to be determined by the facet self-reproach (especially when the operationalization of self-reproach is applied in which theoretical items related to negative affect are removed). Self-reproach can be conceived as a vulnerability factor that, in the face of a life-event, increases anxiety. Studies focusing on personality relation transaction show that people who are high in self-reproach tend to withdraw from others (Bolger & Zuckerman, 1995; Park & Maner, 2009), thereby reducing important coping abilities (Roohafza et al., 2014). Furthermore, research has repeatedly established that neuroticism is associated with a greater risk of exposure to life-events as well as a poor ability to cope with them effectively, or to regulate the negative emotional states induced by these life-events (Bolger, 1990; Watson & Hubbard, 1996).

Additionally, there is evidence that cumulative stress exposure through life-events leads to a 'wear and tear' of the stress system. This has more impact on vulnerable people with high levels of trait neuroticism, thereby increasing their depressive symptomatology, which also includes the anxiety dimension in depression (Vinkers et al., 2014). Yoon et al. (Yoon, Maltby, & Joormann, 2013) showed that the use of maladaptive forms of emotion regulation, but not reappraisal, fully mediated the association between neuroticism and the severity of depressive symptoms. The same results were found in relation to anxiety disorders (Amstadter, 2008). With regard to these

coping and emotion regulation strategies, several studies have shown that (the absence of) social support is associated with anxiety (Vink, Aartsen, & Schoevers, 2008; Vink et al., 2009).

Results also show that a high level of openness to experience was negatively associated with anxiety when no life-event had occurred in the preceding year. Openness is described by novelty-seeking, intellectual curiosity, a vivid imagination, awareness of inner emotional states, and deep appreciation for the arts (John & Gross, 2004). High openness seems to be a protective factor when dealing with daily hassles. This effect however was no longer significant after having been confronted with a life-event. In contrast to the other personality domains, the conclusions based on different studies concerning openness in relation to health are contradictory. Eldesouky (2012) reviews these results and advocates the use of facet models concerning the domain openness to experiences. As we have applied the NEO-FFI, the condensed version of the NEO-PI, further exploration of our finding was limited.

Finally, we found that a high level of conscientiousness is associated with a lower level of anxiety in the face of a life-event. High conscientiousness, a trait that describes self-discipline, achievement orientation and orderliness is associated with an increased appraisal of coping abilities, as well as higher levels of control in the context of stressors (Penley & Tomaka, 2002). Moreover conscientious individuals tend to find stressful situations less demanding than less conscientious individuals. Similarly, in stressful contexts, higher levels of conscientiousness are associated with using more adaptive coping strategies, such as instrumental problem solving and effective cognitive restructuring (Connor-Smith & Flachsbart, 2007).

Methodological considerations

The strengths of our study are the large number of older persons suffering from depression and high quality of data collection. Depressed persons were recruited from both mental health care institutes and general practices in order to include persons with late-life depression in various developmental and severity stages (Comijs et al., 2011).

Although personality traits are considered stable over years and we assessed life-events retrospectively over the past year, one can assume a longitudinal association of personality traits interacting with life-events on the development of current level of anxiety. Nonetheless, our study design is still cross-sectional design in nature, limiting causal interpretations. For example, it might be that patients with high neuroticism are more prone to experience negative life-events, thereby resulting in reverse causality. The measurement of personality traits may be partly biased due to a depressed state. Although, personality traits are stable, the presence of depression is known to amplify the personality profile of people prone to depression. After recovery of depression, however, the overall shape of the profile does not change (Santor, Bagby, & Joffe, 1997). Nonetheless, the relationship between change in personality and change in depressive symptoms is at most moderate (Costa, Bagby, Herbst, & McCrae, 2005; Ormel, Oldehinkel, & Vollebergh, 2004; Spinhoven, Penelo, de Rooij, Penninx, & Ormel, 2014). Furthermore, life-events may simply mark periods of improvement or deterioration in anxiety. With respect to the measurement of

life-events, we should also acknowledge that negative life-events may trigger an anxious/depressive episode typically within maximal 3 months (e.g. Faravelli, Catena, Scarpato, & Ricca, 2007). This indicates that our time frame of 12 months as applied by the Brugha questionnaire is a subsequent limitation. Moreover, the subjective stressfulness or other characteristics of the life-event were not assessed. Nonetheless, since subjective stressfulness partly depends on the personality profile, taking this into account may also lead to overcorrection in the analyses.

Conclusion

Anxiety symptoms greatly add to the burden of depression. Vulnerable patients, such as older adults with high levels of neuroticism and a low sense of mastery, are more prone to experience negative effects of the exposure to life-events. In the face of these life-events, they have a greater risk of developing anxious depression, which is a more severe form of depression in terms of disability and clinical prognosis. Clinical experience, supported by an accumulating amount of studies, shows that the treatment and care for these patients is challenging, as high anxiety levels in depression are associated with more impairment and a worse prognosis (Ionescu, Niciu, Mathews, Richards, & Zarate, 2013). Although exceeding the result of this study, these findings suggest that proper identification of the vulnerability that derives from the personality of the patient may be of clinical use. Guided by an exploration of the personal coping strategies, interventions may be chosen that help the patient to develop new ways of dealing with life-events. Likewise, focusing on the patient's social network can strengthen resilience. Finally, in patients with prior depressive episodes, it is important to create a clear relapse prevention plan to detect early (subclinical) symptomatology including proactive strategies to prevent a cascade of symptoms that results in the recurrence of the anxious depressive state. Given that the number of older adults with dysfunctional personality traits – and the corresponding demand for care – will only increase in the future, clear indication criteria for specific therapies and the use of more appropriate behavioral counseling are needed.

Disclosure Statement

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