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Personality traits have been shown to influence suicidal behaviour but the literature on '*older*' elderly is sparse. The aim was to compare neuroticism and extroversion in hospitalized suicide attempters aged 75 and above and a general population comparison group. Seventy-two hospitalized suicide attempters (mean age 81 years) were interviewed. Comparison subjects were drawn from participants in population studies on health and ageing. Participants completed the Eysenck Personality Inventory (EPI) and symptoms of depression were rated with the Montgomery–Asberg Depression Rating Scale (MADRS). Depression diagnoses were made in accordance with Diagnostic and Statistical Manual of Mental Disorders, fourth edition. Attempters scored higher on the neuroticism scale than comparison subjects (mean = 9.9 vs. 7.6, $t = 3.74$, $df = 358$, $p < 0.001$) and lower on the extroversion scale (mean = 10.8 vs. 12.0; $t = -2.76$, $df = 358$, $p = 0.006$). While these differences did not remain after adjustment for major depression, attempters with minor depression were less neurotic than comparison subjects with this diagnosis (mean = 6.6 vs. 11.1, $t = -3.35$, $df = 63$, $p = 0.001$) and a negative association with neuroticism remained in a multivariate model. In conclusion cases scored higher on neuroticism and lower on extroversion compared to comparison subjects. The finding that attempters with minor depression were *less* neurotic than comparison subjects with this diagnosis was unexpected and needs to be examined in larger samples.

Keywords: elderly; suicide attempters; neuroticism; extroversion; depression

Introduction

Personality traits influence a number of both physical (Chapman, Duberstein, & Lyness, 2007) and mental (Duberstein, Palsson, Waern, & Skoog, 2008; Weber et al., 2012) health-related factors, including also older persons' response to therapeutic interventions for depression (Korte, Bohlmeijer, Cappeliez, Smit, & Westerhof, 2012). High scores on neuroticism and low scores on extroversion have been shown to be related to lower life satisfaction among the oldest old (Berg, Björk Hassing, Thorvaldsson, & Johansson, 2011). These personality traits might thus be expected to influence feelings of life-worthiness and suicidal behaviour in late life.

Two reviews provide evidence that personality traits may influence suicide risk in mixed-aged populations (Brezo, Paris, & Turecki, 2006; Conner, Duberstein, Conwell, Seidlitz, & Caine, 2001). However, there are only a couple of studies that focus specifically on older age groups. An association between neuroticism and suicide has been demonstrated in a cohort of '*younger*' older adults aged 50–77 years (Duberstein, Conwell, & Caine, 1994). Further, suicide decedents in that study were more likely to score lower on 'openness to experience' compared to age- and sex-matched controls (Duberstein et al., 1994). A Hong Kong study (Tsoh et al., 2005) reported that elderly suicide completers (mean age = 77) scored higher on the neuroticism scale and lower on the extroversion scale than comparison subjects. Further, in a British study the authors reported that suicide victims aged 60 and above had more obsessional and anxious personality traits than their peers who died natural deaths in hospital (Harwood, Hawton, Hope, & Jacoby, 2001).

Regarding *attempted* suicide in late life, despite increased interest in this phenomenon in recent years (Chiu, Lam, Pang, Leung, & Wong, 1996; Kim et al., 2011; Lebret, Perret-Vaille, Mulliez, Gerbaud, & Jalenques, 2006; Suominen, Isometsa, & Lonnqvist, 2004; Takahashi et al., 1995; Ticehurst et al., 2002; Wiktorsson, Runeson, Skoog, Ostling, & Waern, 2010; Yang, Tsai, Chang, & Hwang, 2001), we could identify only one study that examined the influence of personality (Tsoh et al., 2005). The authors reported a positive association with neuroticism and a negative association with extroversion in attempters aged 65 and above. To date, no studies have examined associations in the '*older*' elderly.

This study focuses on persons aged 75 years and above who were hospitalized in connection with a suicide attempt. We hypothesized that suicide attempters would score higher in neuroticism and lower in

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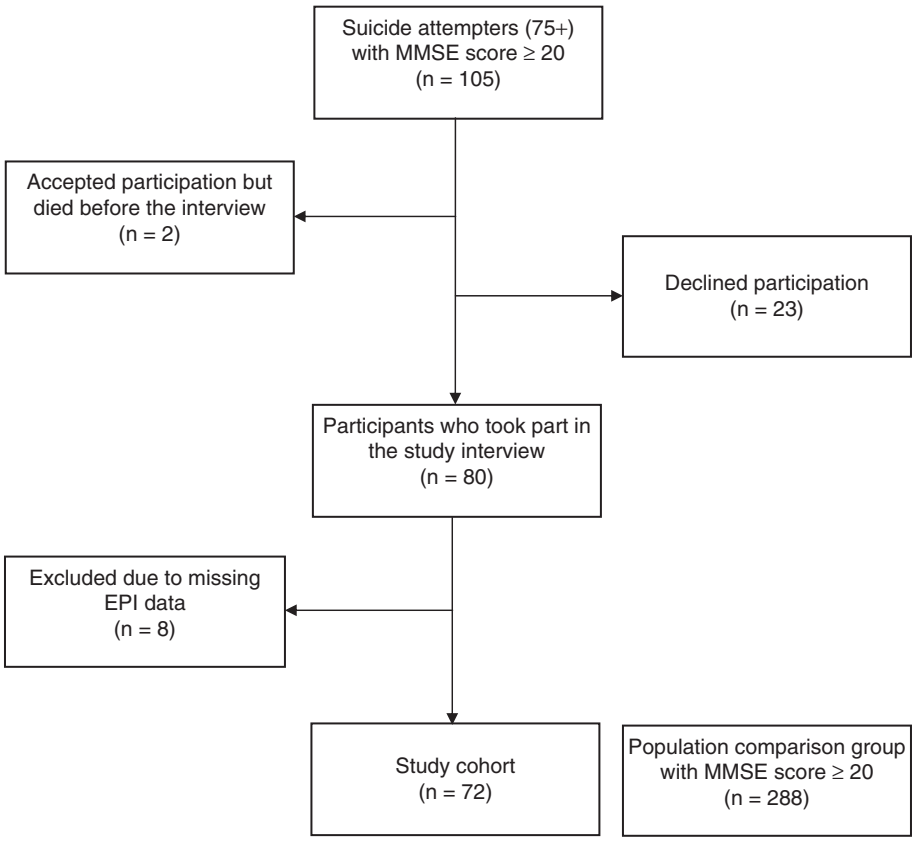

Figure 1. Participant flow.

extroversion than population comparison subjects with no history of suicide attempt.

Methods

Cases

This study is part of a larger investigation on attempted suicide in late life (Wiktorsson et al., 2010). Participants were recruited from emergency departments in connection with a suicide attempt at five hospitals in Western Sweden during a three-year period (2003–2006). According to Statistics Sweden, the study area had a total population of 1.5 million of which 134,402 (8.8%) were aged 75 and above in 2005 (SCB, 2011). A suicide attempt was defined as 'a situation in which a person has performed an actual or seemingly life-threatening behaviour with the intent of jeopardizing his life, or to give the appearance of such an intent but which has not resulted in death' (Beck et al., 1972).

A total of 105 suicide attempters aged 75 and above with a Mini-Mental State Examination (MMSE) (Folstein, Robins, & Helzer, 1983) score $\geq$20 were invited to participate in the study. Cases with MMSE score <20 ($n=3$) were excluded to decrease risk of confounding results due to low cognitive performance (Palmer, Backman, Winblad, & Fratiglioni, 2003) and personality change related to dementia. Twenty-three persons (14 women, 61% and 9 men, 39%, mean age = 82.4 years, range 75–92) declined participation. Figure 1 shows participant flow. The final number of participants with Eysenck Personality Inventory (EPI) data was 72, corresponding to 69% of the potential participants. There were 42 women (58%) and 30 men (42%), mean age 81.4 years, range 75–91.

Comparison subjects

The general population comparison group comprised participants from ongoing epidemiological studies in Gothenburg (Karlsson et al., 2010; Skoog, 2004). Individuals born in 1930, examined in 2005–2006 and 2009–2010, were drawn from the Prospective Population Study of Women and the Gerontological and Geriatric Population Studies. Further, individuals from a study of 85-year-olds born in 1923–1924 and examined in 2009–2010 were also included yielding a total number of 1980 potential comparison subjects. The studies have a longitudinal design and some subjects participated in two study waves. Therefore, duplicates were removed randomly. Participants with an MMSE score <20, those with more than two missing items on the EPI, and those who reported a history of attempted suicide were excluded, leaving a total number of 944 potential comparison subjects. Four comparison subjects per case were randomly selected from this group, yielding a final comparison group of 288. There were 107 men (36%) and 181

Table 1. Comparison of sociodemographic and clinical characteristics of hospitalized suicide attempters aged 75 and above ($n = 72$) and a population comparison group ($n = 288$).

	Suicide attempters		Comparison subjects		Test results[a]
Characteristics	$n = 72$	(%)	$n = 288$	(%)	p-Value
Women	42	(58)	181	(64)	0.481
Married/cohabiting	26	(36)	146	(51)	0.028
Living alone	47	(65)	133	(47)	0.005
Education, mandatory only	44	(61)	132	(46)	0.054
History of psychiatric treatment	37	(51)	17	(6)	<0.001
Loneliness	41	(57)	104	(37)	0.004
Major depression	49	(68)	12	(4)	<0.001
Minor depression	18	(25)	47	(17)	0.089
	Mean	(SD)	mean	(SD)	p-Value
Montgomery–Asberg Depression Rating Scale (MADRS)	26.4	(10.6)	5.6	(5.4)	<0.001
Brief Scale of Anxiety (BSA)	9.1	(5.4)	6.4	(5.2)	<0.001

Note: [a]Univariate logistic regression.

women (64%), age range, 75–85. Cases and comparison subjects did not differ regarding age (mean = 81.4 years, SD ± 4.4 vs. mean = 80.4 years, SD ± 4.2, $t = 1.827$, $df = 3$, $p = 0.069$) and sex (Table 1). The table presents further that there were a number of other differences between cases and comparison subjects, in line with our previous report (Wiktorsson et al., 2010).

Procedure – suicide attempters

Cases were interviewed by the first author, a psychologist, in connection with the index attempt. The median time between the suicide attempt and the interview was 11 days (range 3–68 days). The time point for the interview was determined by nursing staff in connection with the wishes of the patient. Most interviews were performed on the hospital ward ($n = 63$), but nine were carried out after discharge. Settings included the participants' homes ($n = 7$), a psychiatric outpatient clinic ($n = 1$) and a nursing home ($n = 1$).

Procedure – comparison subjects

For the comparison subjects, interviews were performed by psychiatric nurses at a neuropsychiatric outpatient department or at the home of the participant. These procedures, which took place in the context of a general health survey on ageing, have been described in more detail previously (Skoog, 2004).

Eysenck Personality Inventory

The EPI (H.J. Eysenck & S.G.G. Eysenck, 1964) was administered to measure two personality dimensions: neuroticism–emotional stability and extroversion–introversion. Both dimensions are thought to be biologically mediated (Eysenck, 1981). High scores on the neuroticism scale correspond to personalities characterized by emotional reactivity, anxiety and psychosomatic concerns, low ego-strength and guilt proneness. Persons characterized as sociable, outgoing, impulsive and uninhibited score high on extroversion (H.J. Eysenck & S.G.G. Eysenck, 1975). Each of these two personality dimensions includes 24 dichotomous (Yes/No) items. A 9-item lie scale is also included in order to detect persons who are overly concerned with their self-presentation. Due to the frailty of the attempters, the interviewer (Stefan Wiktorsson) read the EPI questionnaire out loud and participants' responses were recorded. For comparison subjects, the EPI questionnaire was sent by mail to be completed prior to the health examination.

Psychiatric examination

The Comprehensive Psychopathological Rating Scale (CPRS) (Asberg, Montgomery, Perris, Schalling, & Sedvall, 1978) was administered and the MADRS (Montgomery & Asberg, 1979) was derived to rate depressive symptoms during the month preceding the index attempt, and for the comparison subjects during the month prior to the research examination. The MADRS includes 10-items scored 0–6, with 6 indicating the most severe level of symptoms, yielding a maximum score of 60.

A slightly modified version of the BSA (Tyrer, Owen, & Cicchetti, 1984), also derived from CPRS, was used to investigate anxiety symptoms during the month prior to the attempt. The original BSA comprises 10-items rated 0–6, with 6 corresponding to the most severe level of symptoms. For the purpose of this study we used all items (inner feelings, hostile feelings, hypochondriasis, worrying over trifles, reduced sleep, autonomic disturbances (reported and observed), aches and pains and muscular tension) with the exception of the phobia item, yielding a maximum total score of 54. Current perceived loneliness was measured using a single question ('Do you feel lonely?') which was scored dichotomously.

Additional instruments, suicide attempters only

Suicide intent at the index attempt was rated using the Suicide Intent Scale (Beck, Resnik, & Lettieri, 1974). This scale comprises eight objective items and seven subjective circumstances of the attempt. Items are scored from 0 (low intent) to 2 (high intent) with a maximum score of 30. A single item ('Do you think your situation is hopeless?') from the Geriatric Depression Scale (Yesavage et al., 1982) was used to evaluate current hopelessness. Interview data and medical records were reviewed by the first and last authors to make ratings in accordance with the Cumulative Illness Rating Scale for Geriatrics (Miller et al., 1992). A score ranging from 0 (no pathology) to 4 (extremely severe illness/impairment) was generated for each organ system. For the purpose of this study, a person was considered to have a serious physical illness/disability if scoring 3 or 4 in any of the 13 (non-psychiatric) organ categories. Age at first suicide attempt was identified by interview data and/or medical record review. In cases with conflicting information regarding the time of the first attempt, the earliest date was chosen. A person who acknowledged attempted or completed suicide in any first degree relative was considered to have a family history of suicidal behaviour. Medical records were reviewed for evidence of ongoing antidepressant prescriptions at the time of the suicide attempt.

Diagnostics

An algorithm based on selected CPRS (Asberg et al., 1978) items and in accordance with the Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV) was used for diagnosis of major depression (Skoog, Nilsson, Palmertz, Andreasson, & Svanborg, 1993). The algorithm for minor depression (Wiktorsson et al., 2010) was constructed in accordance with DSM-IV research criteria. A lifetime history of alcohol use disorder was identified using interview data, medical records and the hospital discharge register and this diagnosis was made in accordance with DSM-IV (Morin et al., 2012).

Ethical approval

All participants received oral and written information about the study. They were assured that they had the right to withdraw from the study at any time, and written consent was obtained. The Research Ethics Committee at the University of Gothenburg approved the study.

Statistical analyses

Sociodemographic data were dichotomized as follows: marital status: married/cohabiting vs. no partner, living situation: living alone vs. living with others and education level: mandatory only vs. beyond mandatory (>six years for those born before 1930 and >seven years for those born 1930 and later). All cases ($n = 72$) had complete EPI data. For comparison subjects with up to two missing items in the neuroticism and extroversion scales and up to one missing item in the lie scale scores were imputed using an expectation-maximization SPSS algorithm.

Differences in proportions were tested with Pearson χ^2-test and the t-test was used to compare means of continuous variables. Logistic regression was employed to calculate odds ratios (ORs) with 95% confidence intervals (CI) for suicide attempt. Potential confounders and other covariates were entered in multivariate models to determine whether these factors affected associations.

Spearman's non-parametric correlation coefficient was utilized in analyses of correlations within the attempter group. All exploratory and formal statistical tests were carried out using SPSS for Windows (version 15, SPSS Inc., Chicago, IL, USA). All tests were two-tailed and p-values < 0.05 were considered statistically significant.

Results

Case – comparison group analyses

Table 2 presents that suicide attempters scored higher than comparison subjects on the neuroticism scale. This was the case for both men and women. Attempters scored lower on the extroversion scale. When the sexes were analyzed separately, this was the case for women but not for men. Table 2 presents further that no differences could be shown regarding the lie scale.

After including neuroticism, extroversion, major depression, age and sex in a multivariate logistic regression model, neither personality trait was associated with suicide attempt (Table 3). Major depression was the main determinant explaining the suicide attempt outcome. Focusing on persons with major depression ($n = 61$), mean neuroticism scores did not differ between attempters ($n = 49$) and comparison subjects ($n = 12$) (mean = 11.6 vs. 10.6, $t = 0.75$, $df = 58$, $p = 0.449$). Extroversion scores were virtually identical in cases and comparison subjects with major depression (mean = 10.7 vs. 10.7, $t = -0.10$, $df = 58$, $p = 0.994$). Again, neither trait was associated with suicide attempt in the multivariate model (Table 3). Attempters with minor depression ($n = 18$) scored *lower* on neuroticism than comparison subjects ($n = 47$) with the same diagnosis (mean = 6.6 vs. 11.1, $t = -3.35$, $df = 63$, $p = 0.001$). A negative association with neuroticism remained in the multivariate model (Table 3).

As some persons might show mild personality changes in connection with cognitive decline we stratified the group and tested for differences in personality scores between persons with low MMSE scores (20–25, $n = 28$) and high MMSE scores (26–30, $n = 44$).

Table 2. Mean EPI scores in hospitalized suicide attempters ($n=72$) and in population comparison subjects ($n=288$) aged 75 and above.

	Suicide attempters			Comparison subjects			Test results[a]		
	n	Mean	(SD)	*n*	Mean	(SD)	*t*	*df*	*p*-Value
Neuroticism									
Men	30	9.0	(4.8)	105	6.9	(4.6)	2.18	135	0.031
Women	42	10.5	(4.2)	179	8.0	(4.7)	3.18	221	0.002
All	72	9.9	(4.5)	288	7.6	(4.7)	3.74	358	0.000
Extroversion									
Men	30	11.3	(3.6)	105	12.2	(3.1)	−1.27	135	0.206
Women	42	10.5	(3.1)	179	11.9	(3.3)	−2.58	221	0.011
All	72	10.8	(3.3)	288	12.0	(3.3)	−2.76	358	0.006
Lie scale									
Men	30	3.6	(1.3)	105	3.6	(1.8)	0.13	135	0.900
Women	42	3.6	(1.6)	179	4.0	(1.8)	−1.24	221	0.216
All	72	3.6	(1.5)	288	3.8	(1.8)	−0.951	358	0.342

Note: [a]*t*-test.

Table 3. Results of the logistic regression models. ORs and 95% Confidence Interval for attempted suicide.

	Attempters and comparison subjects[a]				Attempters and comparison subjects with major depression[b]				Attempters and comparison subjects with minor depression[c]			
	OR (95% CI)	Wald	*df*	*p*-Value	OR (95% CI)	Wald	*df*	*p*-Value	OR (95% CI)	Wald	*df*	*p*-Value
Neuroticism	0.96 (0.88–1.05)	0.88	1	0.348	1.10 (0.92–1.33)	1.07	1	0.301	0.81 (0.69–0.96)	6.31	1	0.012
Extroversion	0.92 (0.82–1.03)	2.19	1	0.139	1.03 (0.84–1.27)	0.07	1	0.791	0.92 (0.75–1.12)	0.74	1	0.390
Major depression	58.99 (24.32–143.08)	81.34	1	0.000	–	–	–	–	–	–	–	–
Age	1.07 (0.98–1.17)	2.54	1	0.111	0.41 (0.86–1.10)	1.35	1	0.246	0.43 (0.97–1.30)	1.56	1	0.212
Sex	0.63 (0.30–1.32)	1.50	1	0.211	0.94 (0.90–1.86)	0.60	1	0.438	1.13 (0.12–1.61)	2.57	1	0.109

Notes: [a]Attempters, $n=72$, comparison subjects, $n=288$; [b]attempters, $n=49$, comparison subjects, $n=12$; and [c]attempters, $n=18$, comparison subjects, $n=47$.

This procedure showed no differences between the two groups regarding neuroticism (low, mean = 10.4 vs. high = 9.6, $t=.78$, $df=70$, $p=.439$) and extroversion (low, mean = 11.5 vs. high 10.3, $t=1.52$, $df=70$, $p=0.133$).

Comparisons within the attempter group

Modest negative correlations were observed with neuroticism score for both age at index attempt ($r=-0.24$, $p=0.041$) and for age at first suicide attempt ($r=-0.31$, $p=0.009$). There were no such correlations for extroversion (age at index attempt, $r=0.05$, $p=0.689$, age at first attempt, $r=0.12$, $p=0.308$). Suicide intent was not significantly correlated with neuroticism ($r=0.02$, $p=0.858$) or extroversion ($r=-0.17$, $p=0.162$).

Categorical variables and associations with neuroticism and extroversion within the attempter group are presented in Table 4. A history of psychiatric treatment was associated with lower extroversion. Loneliness was related to both higher neuroticism and lower extroversion. Major depression and hopelessness were associated with higher neuroticism. Attempters with a family history of suicidal behaviour scored numerically lower on the neuroticism scale than those without such a history, but a significant association could not be shown ($p=0.073$). Those with a history of suicide attempt prior to the index attempt scored numerically higher on neuroticism compared to those who had not. Again, the association did not reach significance ($p=0.065$).

Discussion

We examined neuroticism and extroversion in a cohort of '*older*' elderly and found that suicide attempters scored higher on neuroticism and lower on extroversion compared to comparison subjects from the general population. Unexpectedly, *lower* neuroticism score was observed in attempters with minor depression.

Main strengths of this study are the high age of the participants and the use of a population comparison

Table 4. Characteristics associated with neuroticism and extroversion in hospitalized suicide attempters aged 75 and above ($n = 72$).

				Neuroticism					Extroversion				
						Test results[a]					Test results[a]		
		n	(%)	Mean	(SD)	*t*	*df*	*p*-Value	Mean	(SD)	*t*	*df*	*p*-Value
All		72		9.9	(4.5)				10.8	(3.3)			
Characteristics													
Sex	Men	30	(42)	9.0	(4.8)	−1.41	70	0.164	11.3	(3.6)	1.08	70	0.283
	Women	42	(58)	10.5	(4.2)				10.5	(3.1)			
Living alone	No	25	(35)	9.7	(4.7)	−0.27	70	0.790	11.7	(3.1)	1.749	70	0.085
	Yes	47	(65)	10.0	(4.4)				10.3	(3.3)			
History of psychiatric treatment	No	35	(49)	8.9	(4.5)	−1.85	70	0.069	11.7	(3.2)	2.28	70	0.026
	Yes	37	(51)	10.8	(4.4)				10.0	(3.2)			
Loneliness	No	29	(40)	7.9	(4.5)	−3.61	69	0.001	12.1	(3.2)	2.98	69	0.004
	Yes	41	(60)	11.5	(3.9)				9.9	(3.1)			
Major depression	No	23	(32)	6.3	(3.3)	−5.48	70	<0.001	11.1	(3.2)	0.50	70	0.622
	Yes	49	(68)	11.6	(4.0)				10.7	(3.4)			
Hopelessness	No	28	(39)	7.4	(4.0)	4.07	70	<0.001	11.4	(3.4)	1.29	70	0.201
	Yes	44	(61)	11.4	(4.1)				10.4	(3.1)			
Alcohol use disorder	No	58	(81)	9.9	(4.7)	−0.96	70	0.961	10.6	(3.3)	−0.97	70	0.334
	Yes	14	(19)	9.9	(3.6)				11.6	(3.1)			
Family history of suicidal behaviour	No	67	(93)	10.1	(4.5)	1.82	70	0.073	10.8	(3.3)	−0.28	70	0.783
	Yes	5	(7)	6.4	(1.9)				11.2	(3.2)			
Previous suicide attempt	No	52	(72)	9.3	(4.6)	−1.88	70	0.065	11.3	(3.2)	1.89	70	0.064
	Yes	20	(28)	11.5	(3.9)				9.7	(3.3)			
SSRI[b] prescription	No	33	(46)	9.1	(4.6)	−0.88	52	0.386	10.9	(3.1)	−0.55	52	0.588
	Yes	21	(29)	10.1	(4.1)				10.4	(3.9)			
Serious physical illness[c]	No	23	(32)	9.4	(4.1)	−0.57	70	0.573	10.1	(3.1)	−1.20	70	0.235
	Yes	49	(68)	10.1	(4.7)				11.1	(3.4)			

Notes: [a]*t*-test; [b]selective serotonin reuptake inhibitor; and [c]defined as a score of ≥3 on any non-psychiatric category on the Cumulative Illness Rating Scale for Geriatrics.

group that rendered it possible to generate risk estimates. Samples in previous waves of our population studies have been shown to be representative of the general population (Skoog, 2004). Another strength is the use of the MADRS which is a validated and widely used rating scale for the quantification of depressive symptom burden. Both the MADRS and the BSA have been shown to retain clinical relevance for elderly populations (van der Laan, Schimmel, & Heeren, 2005). The psychologist who interviewed the attempters had served as an interviewer in the population studies from which the comparison subjects were drawn, and interrater agreement concerning symptom assessments between the psychologist and the research nurses who interviewed the comparison subjects was high (Wiktorsson et al., 2010).

Mean age and sex distribution were similar in those who did and did not choose to participate. We could not investigate other possible biases for ethical reasons. We had access to national and regional data on suicide attempters aged 70 and above (personal communication). The proportion of females in the national register was 57%, and the corresponding figure for Western Sweden was 58%. These figures correspond closely to the proportion of women in the current study. Results cannot be directly generalized to settings outside Sweden.

The EPI questionnaire was administered differently in cases and comparison subjects. While the cases responded verbally to the EPI during a face-to-face interview that took place shortly after a traumatic life event (the attempt), comparison subjects completed the EPI at home during ordinary life circumstances. It is unlikely that this methodological difference influenced the results, which are consistent with a prior hypothesis. Although the face-to-face interview (attempters) might be more conducive to 'positive presentation' than the posted questionnaire (comparison group), such a bias would have made it more difficult for us to observe statistically significant differences. Current findings might thus represent an under-estimate of the true effect.

The originators of the EPI suggested that high lie score might be considered a personality characteristic in itself (S.B.G. Eysenck & H.J. Eysenck, 1963) and self-presentation strategies are seen as core elements of personality (Costa, McCrae, & Psychological Assessment Resources, 1992). We note, however, that the lie scale scores did not differ between attempters and comparison subjects. An important limitation is the number of suicide attempters and the study was underpowered for some analyses. Given our study design, it is not possible to draw any conclusions about the possible causative role of neuroticism and

extroversion for depression and suicidality in late life. Further, we used a dimensional measure of the two personality traits; personality disorders were not examined. Finally, it must be remembered that results from this study cannot be extrapolated directly to other forms of suicidal behaviour (Useda et al., 2007).

Our study expands on the findings regarding somewhat younger cohorts of hospitalized suicide attempters (Tsoh et al., 2005; Useda, Duberstein, Conner, & Conwell, 2004). While results are not directly comparable as the latter two studies used the NEO Five-Factor Inventory (Costa et al., 1992) findings regarding neuroticism and extroversion may be considered similar. The EPI dimensions of neuroticism and extroversion have been shown to correlate well with the NEO Five Factor traits of neuroticism and extroversion (Heller, Schmidtke, Nitschke, Koven, & Miller, 2002; McCrae & Costa, 1985). As in the Hong Kong study (Tsoh et al., 2005), the rate of major depression was extremely high, which might help to explain the lack of significant findings once depression was included in the model. Interestingly, proportions with major depression among cases and population comparison subjects in our study (68% vs. 4.2%) were almost identical to those in the Hong Kong study (68% vs. 3.3%). It is possible that the high neuroticism scores in our study were secondary to the major depressive episode. However, older persons high in neuroticism have been shown to be more likely to develop depression and anxiety (Duberstein et al., 2008; Gale et al., 2011; Weber et al., 2012). The latter study found also that depressed elderly showed higher neuroticism facets and lower extroversion scores than comparison subjects even after remission in depression. Neurotic persons are more likely than others to experience stressful life events (Kendler, Gardner, & Prescott, 2003). One can assume that persons with high neuroticism would be less likely to cope successfully with negative events and this mechanism among others (over-arousal/emotional dysregulation, poor help-seeking skills) may help to explain an increased risk for suicidal behaviour (Duberstein, 1995).

The EPI examines only 2 of the Big 5 (Digman, 1990) personality traits. It does not capture agreeableness, conscientiousness, or openness to experience. The latter has previously been shown to be associated with suicide deaths in somewhat younger individuals (Duberstein et al., 1994; Tsoh et al., 2005). The finding that attempters with minor depression were *less* neurotic than comparison subjects with this diagnosis was new and unexpected and needs to be tested in larger samples. This finding may suggest a novel subgroup of at-risk patients. There might be several populations of elderly characterized by different personality traits, for example those with predominant depression symptoms and others with less affective symptoms and with loss of control as a key issue. A broader personality inventory would be necessary to examine this. Openness to experience would be one personality trait candidate (Duberstein, 1995).

Persons with higher neuroticism scores were younger at age of first suicide attempt. We noted non-significant trends in both personality traits regarding first time attempters suggesting lower neuroticism and higher extroversion in 'first timers'. The non-significant result could possibly be caused by lack of power. The lack of personality data at time of first suicide attempt is also a limitation. In younger populations, neuroticism has been shown to predict both suicidal ideation and attempt (Fergusson, Woodward, & Horwood, 2000). A life course approach to the study of suicidal behaviour in late life is rarely employed and this is an important avenue for further research.

Personality was not associated with suicide intent. Suicide attempts characterized by low intent are more common among highly impulsive individuals, but the EPI does not assess impulsiveness. To the best of our knowledge, the personality characteristics of individuals who survive suicide attempts characterized by high intent have not been examined. This issue could be explored in future research.

Attempters who reported hopelessness in our study had higher neuroticism scores than those who did not. No association was seen regarding extroversion. The latter result is not consistent with the findings in a US study (Duberstein, Conner, Conwell, & Cox, 2001) that demonstrated an association between low extroversion and hopelessness in depressed inpatients. Disparate findings might be partly explained by methodological differences including measures of hopelessness and personality traits. Participants were recruited to our study regardless of diagnosis while the US study focused on inpatients with major depression. Importantly, there was a great difference in the lowest age cut-off for study participation (75+ vs. 50+).

As expected (Cacioppo, Hawkley, & Thisted, 2010), loneliness was associated higher neuroticism. An inverse association was seen with extroversion, and loneliness might be a consequence of the avoidance of emotional support from others. Loneliness cannot be explained by high age alone as proportions reporting loneliness were significantly lower in the population comparison subjects.

Treatment with SSRI's might have influenced personality scores. It has been suggested that SSRI's may have specific pharmacological effects on neuroticism and extroversion above and beyond effects on depression (Tang et al., 2009). Personality change is not merely a byproduct of changes in depression. However, we found no differences in neuroticism and extroversion scores between those with and without a prescription for SSRI at the time of the index attempt.

Qualitative studies can provide clues for understanding themes and motives that might influence susceptibility to suicidal behaviour. Regarding elderly suicide attempters (65+) one qualitative study (Crocker, Clare, & Evans, 2006) found that struggle, control and visibility were three prominent themes characterizing the experience around the time

of their attempt. Next of kin were interviewed in a qualitative psychological autopsy study on elderly suicide completers (age range 65–90). Suicide decedents were described as being obstinate and controlling others (Kjolseth, Ekeberg, & Steihaug, 2009) and action-oriented (Kjolseth, Ekeberg, & Steihaug, 2010), characteristics less likely to be associated with neuroticism.

In conclusion, longstanding personality traits are associated with risk for attempted suicide also in the '*older*' elderly. Thus, it is not accurate to conceptualize suicide attempts among the '*older*' elderly merely as understandable responses to functional decline or other age-related changes. Studies with a prospective design are needed to investigate interactions of personality traits and other factors involved in the development of suicidal behaviour over time. The finding regarding lower neuroticism in attempters with minor depression needs to be investigated in larger studies.

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