

The association between neuroticism and self-reported common somatic symptoms in a population cohort

Judith G.M. Rosmalen^{a,c,d,*}, Jan Neeleman^{a,c,d,e}, Reinold O.B. Gans^b, Peter de Jonge^{a,b,c,d}

^aDepartment of Psychiatry, University Medical Center Groningen, University of Groningen, Groningen, The Netherlands

^bDepartment of Internal Medicine, University Medical Center Groningen, University of Groningen, Groningen, The Netherlands

^cGraduate School of Behavioral and Cognitive Neurosciences, University of Groningen, The Netherlands

^dGraduate School for Experimental Psychopathology, The Netherlands

^eJulius Center for Health Sciences and Primary Care, University Medical Center, Utrecht, The Netherlands

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Abstract

Objective: To test the hypotheses that (1) neuroticism is associated with self-reported somatic symptoms; (2) this association is especially found with regard to psychosomatic symptoms; and (3) it is not solely explained by somatic reflections of psychological distress. **Methods:** We studied the cross-sectional association between neuroticism (as measured by EPQ-RSS-N), psychological distress (as measured by GHQ-12 sum score), and the occurrence of 22 common somatic symptoms by linear and logistic regression analyses in a population cohort of 6894 participants. **Results:** Neuroticism is more strongly associated with the total number of somatic symptoms reported ($\beta=.32$) than GHQ-12 sum score ($\beta=.15$) and well-established risk markers such as gender ($\beta=.11$) and age ($\beta=.04$). Neuroti-

cism was associated with all symptoms in individual logistic regressions controlled for age, gender, and psychological distress. Neuroticism is significantly more strongly related to psychosomatic symptoms ($\beta=.36$) than to infectious/allergic symptoms ($\beta=.28$). **Conclusion:** In a large, population-based cohort, we confirmed that neuroticism is associated with self-reported somatic symptoms. The associations were not attributable to somatic reflections of psychological distress associated with neuroticism and were relatively strong with respect to psychosomatic symptoms. Future studies should include both objective and subjective measures of health to study the mechanisms that connect neuroticism and ill health.

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Introduction

Neuroticism, the tendency to experience negative, distressing emotions [1], is prospectively related to various mental health problems including anxiety and depression [2]. Interestingly, neuroticism is also associated with somatic ill health independently of comorbid psychiatric health problems [3,4].

Several explanations have been suggested for the association of neuroticism with somatic ill health: the disability hypothesis, the symptom perception hypothesis, and the psychosomatic hypothesis (reviewed in Ref. [5]). The *disability hypothesis* states that neuroticism is the result and not the cause of health problems. In this model, the adverse consequences associated with accumulated health problems result in an increase in neuroticism. According to the *symptom perception hypothesis*, actual physical differences between people high and low in neuroticism do not necessarily exist. Instead, neurotic individuals are more likely to perceive, overreact to, and/or complain about minor physical problems and sensations. In the relation between

* Corresponding author. Department of Psychiatry, University Medical Center Groningen, University of Groningen, P.O. Box 30-001, NL-9700 RB Groningen, The Netherlands. Tel.: +31 50 3614812; Fax: +31 50 3619722.

E-mail address: j.g.m.rosmalen@med.umcg.nl (J.G.M. Rosmalen).

neuroticism and somatic symptom reporting, mediating mechanisms related to this hypothesis are somatic sensitivity, selective attention, and negative reporting bias [6,7]. The *psychosomatic hypothesis* states that neuroticism causes health problems, implicating that neurotic individuals share characteristics (such as dysregulation of the hypothalamic-pituitary-adrenal axis or autonomic nervous system) that render them vulnerable to actual health problems. As opposed to the previously mentioned explanations, the psychosomatic hypothesis suggests differential associations between neuroticism and specific somatic symptoms.

Several studies have shown that neuroticism or negative affectivity influences self-reported somatic symptoms, generally using the total number of somatic complaints reported as the dependent variable [6,8–10]. Only few studies examined whether neuroticism was differentially related to different types of physical complaints. One study found that neuroticism (operationalized by a measure of negative affect) was uniquely associated with somatic symptoms related to a tense mood state, such as headache, pain in neck and shoulders, and hypertension [11]. In the same line, another study found that the correlations between neuroticism (operationalized by a measure of negative affect) and individual somatic symptoms were variable, with high correlations typically found for symptoms such as fatigue, nausea, and heartburn, and with low correlations for symptoms such as sore throat, coughing, and stuffed nose, especially in females [12].

However, both studies were performed in (predominantly female) students and it is thus not clear whether these results can be generalized to other populations. Moreover, the studied somatic symptoms could be somatic reflections of the psychological distress that accompanies neuroticism. Support for this hypothesis was found in a study in 377 primary care patients with medically unexplained symptoms. In this study, neuroticism did not predict either the persistence or the prospective increase in the number of medically unexplained symptoms if a measure for psychological distress was included in the model [13]. It is unclear whether these results would also apply to the general population, since the included patients were referred by their primary care physician on the basis that their symptoms could not be attributed to a clear organic cause. Thus, somatization and psychological distress are probably over-presented among these patients.

The aim of the current study was to explore the associations between neuroticism and self-reported somatic ill health in a large population-based cohort. We will study the contribution of neuroticism to self-reported somatic symptoms in relation to known risk factors for the reporting of somatic symptoms like gender and age [4,9,14]. Specifically, we will explore the association between neuroticism and (dimensions of) specific somatic symptoms, while adjusting neuroticism scores for current psychological distress in order to reduce the possibility that the association of neuroticism with psychosomatic symp-

toms is largely due to somatic reflections of current distress. We have the following hypotheses. First, neuroticism is associated with the total number of somatic symptoms reported. Second, its association with psychosomatic symptoms, such as stomach ache or fatigue, is stronger than with other symptoms. Third, the association between neuroticism and somatic symptoms is not solemnly explained by somatic reflections of psychological distress.

Methods

Study population

The population of this study was recruited from the ongoing PREVEND study (Prevention of RENal and Vascular ENd stage Disease), running since 1997 in the city of Groningen, the Netherlands. The primary objective of PREVEND is to investigate microalbuminuria as a risk factor for renal and cardiovascular disease. Details of the PREVEND study protocol have been described elsewhere [15]. The study cohort consisted of male and female inhabitants of the city of Groningen, aged 28 to 75 years at inclusion in 1997. These inhabitants were asked to send in a morning urine sample. The sample population consisted of all subjects with a urinary albumin concentration of 10 mg/l together with a randomly selected control group with a urinary albumin concentration of <10 mg/l. There is no association between urinary albumin concentration and neuroticism scores after correction for age and gender. The total screening program in 1997–1998 was completed by 8592 subjects, who were again invited to visit the outpatient clinic in 2001–2003. The 6894 subjects (80.2% of the actual study cohort in 1997–1998) who completed the

Table 1
Socioeconomic characteristics of the study population

	<i>n</i>	%
Living situation		
Alone	1540	22.4
With partner and children	2146	31.2
With partner, without children	2793	40.6
Without partner, with children	265	3.9
Not applicable	138	2.0
Work situation		
Job	3567	52.4
Unemployed/job seeker	300	4.4
No job/housekeeping	919	13.5
No job/unable to work	388	5.7
Retired, had a job	1039	15.3
Older than 65, never had a job	106	1.6
Other	494	7.3
Education		
Higher education	2080	33.1
Average education	1696	27.0
Lower education	1982	31.6
Not applicable	525	8.4

Percentages represent valid % based on nonmissing values for the variable in question.

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