

## ORIGINAL PAPER

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# Does neuroticism explain variations in care service use for mental health problems in the general population?

## Results from the Netherlands Mental Health Survey and Incidence Study (NEMESIS)

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**Abstract** *Background* Little is known about the role of personality characteristics in service utilisation for mental health problems. We investigate whether neuroticism: 1) predicts the use of primary and specialised care services for mental health problems, independently of whether a person has an emotional disorder; and 2) modifies any association between emotional disorder and service use. *Methods* Data were derived from the Netherlands Mental Health Survey and Incidence Study (NEMESIS) a prospective cohort study in the general population aged 18–64. Neuroticism was recorded at baseline, and emotional disorder and service use at 12-month follow-up, in a representative sample (N = 7076), using the Composite International Diagnostic Interview. *Results* People with high neuroticism were more likely to receive care in the specialised mental health sector, and after entry to care they made more visits to the services, whether or not they had an emotional disorder. If they had an emotional disorder, their likelihood of receiving specialised mental health care showed an additional increase. Neuroticism also predicted the use of primary care for mental health problems, but greater numbers of visits were made only by clients with both high neuroticism and an emotional disorder. *Conclusions* It would be useful to incorporate personality characteristics into models to understand variations in service utilisation for mental health problems. The findings suggest that professionals would be wise to focus not just on their clients' emotional problems and disorders,

but also on strengthening their problem-solving abilities through approaches like cognitive behavioural therapy.

**Key words** cohort studies – mental health services – personality – mental disorders – mental health

### Introduction

Research on service utilisation for mental health problems has not only examined factors directly linked to the illness, but has also focused considerable attention on how demographic and environmental vulnerability factors, such as insufficient social support and low socioeconomic status, may affect the receipt of professional care [1–5]. These studies have made four things clear: 1) the presence or absence of a disorder does not adequately explain differences in service use; 2) environmental vulnerability appears to be a major determinant of such differences; 3) an accumulation of risk factors, such as the presence of a disorder combined with high environmental vulnerability, substantially increases the likelihood of service use (interaction effects); and 4) determinants of primary care utilisation may differ from those for the use of specialised mental health care.

Although environmental vulnerability indicators have often been investigated, relatively little research has focused on the role of psychological vulnerability as a determinant of mental health care utilisation. Neuroticism is a personality trait and has proven to be a powerful marker of psychological vulnerability for emotional disorders [6–8]. It can be considered a major feature in the process of coping with stressors. People with higher neuroticism appear less capable of tasks such as solving problems or avoiding feelings of distress [9], and this could lead to higher service use. Indeed, various studies in the USA, Australia and Europe have found that people with higher neuroticism are more likely to use health care or mental health care services [10–13]. Two major limitations of these studies are that they are strictly de-

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scriptive (and did not test models with interaction effects, for example) and that they did not investigate variations in the amounts of service use. Moreover, all but one study recorded service utilisation and its determinants simultaneously, and some did not adjust the effect of neuroticism for the presence or absence of mental disorder.

This article analyses data from the Netherlands Mental Health Survey and Incidence Study (NEMESIS). The longitudinal nature of this general population study enables us to take into account the temporal sequence in which determinants and service use occur, thus improving our understanding of the direction of any associations. We address two questions in particular:

- 1) Does neuroticism influence service use, irrespective of the presence of an emotional disorder?
- 2) Does neuroticism modify the effect of emotional disorder on service use?

We address these questions separately for two health care sectors (primary care and specialised mental health care) and, within these sectors, for two stages of the care process (presence of a mental health contact and, after entry into care, the number of mental health visits). Our conceptual model is depicted in the adjacent figure. The model illuminates one side of the coin: the role of potential or actual patients. We are aware that the role of treatment providers is also critical to understanding variations in service use. However, in NEMESIS, we had no access to the general practitioners or mental health providers of respondents, nor to their medical files – sources that could have given us additional information on service utilisation and its determinants (Fig. 1).

## Subjects and methods

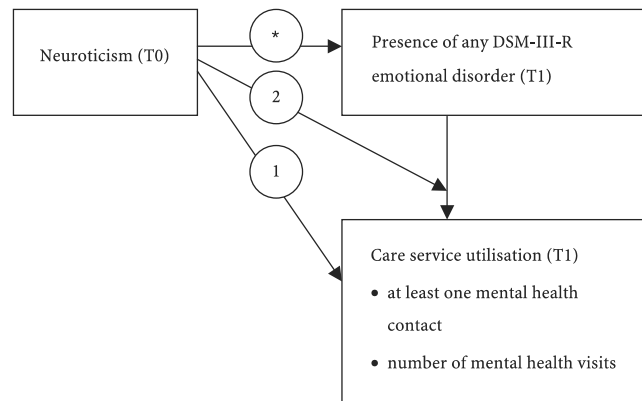
### ■ Sample

Data were derived from the first two waves of NEMESIS. Methods have been reported elsewhere [14]. Briefly, NEMESIS is a prospective psychiatric epidemiologic survey in the Dutch general population aged 18–64 with three waves in 1996, 1997 and 1999. It is based on a multistage, stratified, random sampling procedure of households, with one respondent randomly chosen in each household.

In the first wave, a total of 7076 persons were interviewed (response rate 69.7%). They accurately reflected the population in terms of gender, civil status and urbanicity [14]. The second wave included 5618 respondents (79.4%). With sociodemographic characteristics held constant, sample attrition was only weakly linked to psychopathology [15].

### ■ Diagnostic instrument

The Composite International Diagnostic Interview (CIDI), computerised version 1.1 [16], was used to determine DSM-III-R diagnoses. This is a fully structured interview, designed for use by trained non-clinicians [17, 18]. Research has demonstrated acceptable reliability [19, 20] and validity for virtually all CIDI diagnoses, including emotional disorders [21, 22].



### Potential confounders

- gender
- age
- education
- income
- living alone
- paid employment
- number of somatic disorders

- 1) Independent effect: the link between neuroticism and service use is significant even after the influence of emotional disorder and confounder variables is taken into account
  - 2) Effect modification: a high level of neuroticism intensifies the link between emotional disorder and service use after adjustment for confounder variables
- \*) Mediation: after adjustment for confounder variables, the link between neuroticism and service use operates partly via the effect of emotional disorder on service use

Fig. 1 Conceptual model

### ■ Service use

‘Service use’ refers to the utilisation of primary care or specialised mental health care for emotional or addiction problems. It was recorded in the second wave of the study with questions such as: ‘In the past 12 months (since the first interview), what was the first [second, etc.] professional care provider or agency that you spoke to about emotional problems?’ and ‘How many contacts did you have with that professional or agency in the past 12 months?’. Service use was assessed on the basis of the first three services visited. The primary care sector included general practitioners, company doctors, primary care psychologists, crisis centres, social work, home care and district nursing. The specialised mental health care sector included regional ambulatory mental health institutes, psychiatric clinics, ambulatory addiction care, psychiatrists, psychologists and psychotherapists in private practice, part-time psychiatric treatment and hospitalisation in mental hospitals.

We defined two dependent variables for service use in each care sector: 1) ‘mental health contact’: at least one contact made for mental health problems in the preceding 12 months (0 = no, 1 = yes); and 2) ‘number of mental health visits’: the number of contacts in the sector after entry into care in the preceding 12 months. This variable ranged from 1 to 85 visits in primary care and from 1 to 300 visits in specialised mental health care. (Results were no different when we temporarily recoded 53 or more visits per sector to 52 to reduce the impact of outliers.)

### ■ Predictors of service use

The two predictor variables were: 1) ‘neuroticism’: recorded in the first wave, and assessed by the Groningen Neuroticism Questionnaire [6, 9, 23, 24], a 14-item, 3-point scale (minimum = 1; maximum = 3; mean = 1.3; median = 1.2; standard deviation = 0.3; skewness = 1.7)

with a Cronbach's alpha reliability coefficient of 0.80. To facilitate interpretation of the interaction effects of neuroticism and emotional disorder on service use, we dichotomised the neuroticism scores, choosing the median as the cut-off point (0 = at or below the median, defined as 'low neuroticism'; 1 = above the median, defined as 'high neuroticism'); and 2) 'emotional disorder': recorded in the second wave, and defined as the prevalence of one or more DSM-III-R mood or anxiety disorders in the preceding 12 months (0 = no, 1 = yes). We took these two diagnostic groupings together as one variable because they have a single underlying dimension – the 'internalising factor' [25].

We did not define substance use disorders as a variable, because they have a different underlying dimension – the 'externalising factor' [25] – and have also been shown to be less strongly associated with service use [3, 5, 26]. Nor did we investigate schizophrenia, other non-affective psychotic disorders, or eating disorders, because the numbers of respondents reporting them in NEMESIS were very small.

We recorded emotional disorder a year after neuroticism rather than in the same wave (analogously to Ormel and Wohlfarth 1991 [6]), as experiencing such a disorder might potentially elevate neuroticism scores [27]. Assessing emotional disorder after neuroticism enabled clearer identification of the two independent effects.

## ■ Statistical analyses

### Mental health contact

To investigate whether neuroticism played an independent role in explaining service use (research question 1), we performed multiple logistic regression analyses, controlling for any confounder variables inducing a change of 10% or more in the effect of neuroticism on service use. Assuming seven potential confounders (see figure), we first performed the analysis with each of them separately, comparing the effects of neuroticism before and after each incorporation to detect confounding. The only variable clearly affecting the effect of neuroticism on the use of primary care was the number of somatic disorders treated or monitored by a physician. To maximise the comparability of the results over the two care sectors, we controlled for it in all our analyses of service contact.

To analyse whether neuroticism modified the effect of emotional disorder on service use (research question 2) – in other words, whether neuroticism interacted with disorder – we employed an additive model, rather than a multiplicative one (comparably to our previous studies [4, 5]). Additive interaction was said to exist if the interaction effect of emotional disorder and neuroticism on service contact was stronger than the sum of the separate effects. We estimated these effects by using generalised linear models with binomial distributions and identity link functions. The coefficients generated by this technique can be interpreted in the same way as those of linear regression analysis.

### Number of mental health visits

To address research question 1 in terms of the number of mental health visits made after entry into care, we performed multiple negative binomial regression analyses, controlling for confounder variables inducing a 10% or greater change in the effect of neuroticism on the number of visits. Income and living alone emerged as distinctly influencing the effect of neuroticism on the number of visits made in the specialised mental health sector. To enable comparison of the results for both care sectors, we also controlled for these confounders in analysing the amount of primary care use. We used robust estimators, which can better deal with skewed distributions in numbers of visits. A trial with zero-truncated negative binomial regression produced virtually the same results. Although such a model would have been better suited for analysing datasets such as ours which cannot contain zeros (all service users made at least one visit), there is no analogous generalised linear model to study additive interaction effects. This is one reason why we opted for negative binomial regression.

To examine research question 2 in terms of number of mental health visits, we again used generalised linear models, now with neg-

ative binomial distributions and identity link functions. Here, too, the coefficients could be interpreted like those of linear regression.

We performed two series of analyses focused on respondents who used some type of care service for their mental health problems during the interval between the first and the second wave of the study. The first analyses involved those using primary care only, and the second involved those using specialised mental health care (regardless of whether they also used primary care). In the analyses of service contact in both care sectors, the comparison group was made up of respondents who used neither type of care in the period in question. All analyses used two-tailed testing procedures with 0.05 alpha levels.

## Results

### ■ Descriptive analyses

Table 1 shows that service users, and especially mental health care users, had greater prevalences of high neuroticism and emotional disorder than non-service users. Whereas only 6.5% of the latter had an emotional disorder, the figure rose to 64% for the users of specialised mental health care.

Half of the primary care users with either high neuroticism or an emotional disorder made four or more mental health visits in the primary sector. Their counterparts using the mental health sector averaged more visits, but they also showed a wider variation in the numbers of visits.

Expressed in terms of service utilisation for mental health problems, 11.8% of the people with high neuroticism had used exclusively primary care services, 7.5% had used specialised mental health care, and 80.7% had not received any professional help for their mental health problems in the past 12 months. These percentages were respectively 26.4%, 21.7% and 51.9% for the people with one or more emotional disorders.

### ■ Mental health contact

#### Does neuroticism influence whether people contact services for their mental health problems, irrespective of whether they have an emotional disorder?

Neuroticism indeed had its own independent effect on service contact in both care sectors, albeit that the odds ratios sharply decreased after adjustment for the number of somatic disorders and for emotional disorder – declining from 3.51 to 2.38 for primary care, a reduction of 47%  $\{[(3.51/2.38)-1]*100\}$ ; and from 6.51 to 3.40 for specialised mental health care, a reduction of 91%  $\{[(6.51/3.40)-1]*100\}$ . In other words, even after adjustment for emotional disorder, people with high neuroticism were more likely to contact services for their mental health problems; the sharp decrease in odds ratios after adjustment reveals that the association between neuroticism and service contact was partially mediated by the presence of an emotional disorder (Table 2).

**Table 1** Description of 5016 people utilising no professional care and 602 people using primary care or specialised mental health care for mental health problems. Results of summary statistics, column<sup>1</sup> and row<sup>2</sup> percentages, means (with standard deviation) and medians

	Professional help sought for mental health problems?					
	No n = 5016		Yes, primary care only n = 388		Yes, specialised mental health care n = 214	
	Column %	Row %	Column %	Row %	Column %	Row %
High neuroticism	36.7	80.7	69.3	11.8	79.9	7.5
Any emotional disorder	6.5	51.9	43.0	26.4	64.0	21.7
	Number of visits in primary care <sup>3</sup> n = 388 Mean (sd), median		Number of visits in specialised mental health care <sup>4</sup> n = 214 Mean (sd), median			
High neuroticism	5.9 (6.3), 4		20.9 (35.5), 10			
Any emotional disorder	6.1 (5.7), 4		19.1 (35.5), 9			

<sup>1</sup> Second-column percentages indicate, for example, that 43 % of the group using primary care only had one or more emotional disorders

<sup>2</sup> Second-row percentages indicate, for example, that 26.4 % of the people with one or more emotional disorders used primary care only

<sup>3</sup> Number of visits for mental health problems in primary care by users of primary care only

<sup>4</sup> Number of visits for mental health problems in specialised mental health care

**Table 2** Determinants of service contact for mental health problems among 5618 respondents. Results of multiple logistic regression analyses using the same reference group (those with no professional care), adjusted odds ratios (OR) and 95 % confidence intervals (CI)

	Primary care only <sup>1</sup> n = 388		Primary care only <sup>1</sup> n = 388	
	Adjusted OR (95% CI)*	p =	Adjusted OR (95% CI)**	p =
High neuroticism	3.51 (2.79–4.40)	0.000	2.38 (1.87–3.03)	0.000
Any emotional disorder	10.06 (7.97–12.69)	0.000	7.82 (6.14–9.95)	0.000
	Specialised mental health care <sup>2</sup> n = 214		Specialised mental health care <sup>2</sup> n = 214	
	Adjusted OR (95% CI)*	p =	Adjusted OR (95% CI)**	p =
High neuroticism	6.51 (4.62–9.17)	0.000	3.40 (2.35–4.90)	0.000
Any emotional disorder	24.56 (18.12–33.27)	0.000	17.22 (12.56–23.60)	0.000

<sup>1</sup> Contact with primary care but not with specialised mental health care, compared to no service contact

<sup>2</sup> Contact with specialised mental health care, compared to no service contact

\* Controlled for the influence of number of somatic disorders (confounder); \*\* Controlled for the influence of all variables in this analysis as well as for number of somatic disorders (confounder)

### Does neuroticism modify the effect of emotional disorder on mental health contact?

With respect to specialised mental health care, we indeed found an additive interaction effect of neuroticism and emotional disorder (data not tabulated): the likelihood of specialised care use showed an extra increase if an emotional disorder occurred in people with high neuroticism. The interaction coefficient adjusted for the influence of the number of somatic disorders was 0.10 (95 % CI: 0.01–0.19,  $p = 0.026$ ). Expressed differently, the estimated probability of specialised mental health care for people with both emotional disorder and high neuroticism was 10 % higher than the sum total of estimated probabilities for those with emotional disorder and low neuroticism and those without emotional disorder but with high neuroticism. No significant interaction effect was found for the use of primary care.

### ■ Number of mental health visits

#### Does neuroticism influence the number of mental health visits made after entry into care, irrespective of the presence of an emotional disorder?

With respect to specialised mental health services, neuroticism indeed showed an independent effect on the number of visits made. After adjustment for income, living alone and emotional disorder, the incidence rate ratio remained virtually unchanged: moving from 2.07 to 2.06, a reduction of 0.5 %  $\{[(2.07/2.06)-1]*100\}$ . People with high neuroticism hence made more visits to specialised mental health services than people with low neuroticism, and the association between neuroticism and number of visits was not mediated by the presence of an emotional disorder. Neuroticism showed no effect on the number of mental health visits made to primary care (Table 3).

**Table 3** Determinants of the number of visits for mental health problems among 602 people utilising primary care only or specialised mental health care services. Results of multiple negative binomial regression analyses, adjusted incidence rate ratios (IRR) and 95 % confidence intervals (CI)

	Number of visits in primary care <sup>1</sup> n = 388		Number of visits in primary care <sup>1</sup> n = 388	
	Adjusted IRR (95 % CI)*	p =	Adjusted IRR (95 % CI)**	p =
High neuroticism	1.03 (0.71–1.49)	ns	1.00 (0.70–1.44)	ns
Any emotional disorder	1.11 (0.84–1.48)	ns	1.11 (0.85–1.46)	ns
	Number of visits in specialised mental health care <sup>2</sup> n = 214		Number of visits in specialised mental health care <sup>2</sup> n = 214	
	Adjusted IRR (95 % CI)*	p =	Adjusted IRR (95 % CI)**	p =
High neuroticism	2.07 (1.19–3.59)	0.010	2.06 (1.19–3.58)	0.010
Any emotional disorder	1.09 (0.70–1.69)	ns	1.02 (0.66–1.56)	ns

ns IRR not significantly different from 1.00 (alpha = 0.05 two-tailed)

<sup>1</sup> Number of visits for mental health problems in primary care by users of primary care only

<sup>2</sup> Number of visits for mental health problems in specialised mental health care

\* Controlled for the influence of income and living alone (confounders)

\*\* Controlled for the influence of all variables in this analysis as well as income and living alone (confounders)

### Does neuroticism modify the effect of emotional disorder on the number of mental health visits made after entry into care?

Although none of the main effects of emotional disorder on the number of visits was significant, neuroticism did modify the relationship between emotional disorder and mental health visits in primary care: visits increased when emotional disorder occurred in people with high neuroticism. The interaction coefficient adjusted for the influence of income and living alone was 2.66 (95 % CI: 0.45–4.86,  $p = 0.019$ ). Additional analyses showed that emotional disorder did not affect the number of mental health visits made in primary care by people with low neuroticism. The interaction coefficient shows that the estimated number of mental health visits made in primary care by people with both emotional disorder and high neuroticism was 2.66 higher than the sum total of estimates for those with emotional disorder and low neuroticism and those without emotional disorder but with high neuroticism. No significant additive interaction effect was found for the number of visits made in the specialised mental health care sector.

## Discussion

Studying the determinants of health service utilisation for mental health problems is of vital importance in relation to such issues as the adequate allocation of mental health resources. The role of personality characteristics in service use has received relatively little attention in existing research, except in several studies on the influence of neuroticism and mental disorder on service uptake [11–13]. To our knowledge, our study is the first to examine the effect of neuroticism on the number of mental health visits made.

### Independent effects

Neuroticism showed an independent effect on whether or not people use primary care and specialised mental health care for mental health problems, a finding in line with previous research [11, 13]. After entry into care, neuroticism also had an independent effect on the number of visits in specialised care, but not in primary care. These findings underscore the importance of including personality characteristics such as neuroticism when analysing service use.

In contrast, and unexpectedly, the presence of an emotional disorder was found to have no independent effect on the number of visits made after entry into specialised mental health care. As neuroticism was significantly associated with the number of specialised mental health visits made, these findings may be explained by interpreting neuroticism as an indicator of how people deal with stress – adequate coping abilities appear to have a stronger effect on the number of visits made to specialised mental health care than the question of whether a client has a full-blown emotional disorder.

### Effect modification

High neuroticism strengthened the association between emotional disorder and the use of specialised mental health care, but not primary care. This suggests that people with both an emotional disorder and higher neuroticism are referred more readily to specialised care, and that such care may serve better than primary care as a partial substitute for inadequate personal resources.

One previous study did not find neuroticism to have an effect on mental health care use by people with a mental disorder, although it did find such an effect in people not meeting the criteria for common mental disorders [12]. This contrast with our findings could derive

from differences in research design between that study and NEMESIS (inclusion vs. non-inclusion of elderly people; telephone interviews and mail questionnaires vs. face-to-face interviews; CIDI Short-Form scales vs. CIDI; 4-item vs. 12-item neuroticism scale; cross-sectional vs. longitudinal design).

After entry into primary care, we found no independent effects of either neuroticism or emotional disorder on the numbers of mental health visits made in that sector. However, additive interaction between neuroticism and disorder did affect the number of visits. Whilst having a disorder did not affect the number of primary care visits by people with low neuroticism, it did have such an effect in people with high neuroticism. This implies that neuroticism masked the main effect of emotional disorder on the number of mental health visits made in primary care.

### ■ Design issues

Although the NEMESIS sample was representative of Dutch society on most parameters, people with an insufficient mastery of Dutch, people with no fixed address and institutionalised people were underrepresented. It is difficult to infer how that might have affected the results of the present study.

People with a mental disorder were more likely to be lost to follow-up in NEMESIS, but the effect of mental health on attrition was weak after adjustment for sociodemographic characteristics [15]. Since the emphasis in the present article is on the interrelationships between neuroticism, emotional disorder and service use, we have no reason to believe that dropouts would have had substantially different likelihoods of service use than their counterparts who stayed in the study.

Recall problems might conceivably have compromised respondents' estimations of their service use in the past year, and especially their number of visits, but it is difficult to gauge how recall bias might have influenced the results of our study. We did not have access to medical files that could help us ascertain the scale of this problem (and they are not always accurate and up-to-date anyway). Yet it does appear unlikely that people with high neuroticism and/or emotional disorder would systematically over- or underestimate their visits to services. Otherwise we should have seen significant effects of either neuroticism or disorder on the numbers of visits in both care sectors.

The results were controlled for the influence of seven potential confounders: gender, age, education, income, living alone, paid employment and number of somatic disorders. However, it is still possible that another factor influenced the reported association between neuroticism and service use.

Unfortunately, no data are available on treatment adequacy and compliance, provider characteristics, the available volume of care, or other structural and organisational characteristics of the care system [28]. Such in-

formation might throw more light on variations in numbers of visits.

### ■ Implications

Notwithstanding these potential limitations, we believe this study demonstrates the usefulness of incorporating neuroticism into models to understand variations in mental health care utilisation. Future research could benefit from including additional personality characteristics (as in the five-factor personality model [29]) to more fully understand mechanisms underlying their possible associations with emotional disorders and service use uptake. This study implies that psychological vulnerability may foster mental health problems and additional service use. Professionals would, therefore, be wise to focus not just on their clients' emotional problems and disorders, but also on strengthening their problem-solving abilities through approaches like cognitive behavioural therapy.

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