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Personality, Chronic Medical Morbidity, and Health-Related Quality of Life Among Older Persons

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This article examines the main and moderating effects of 3 personality characteristics on the association between chronic medical morbidity and health-related quality of life (HRQL) in a large ($N = 5,279$) community-based older sample. Reasonably high unique contributions of neuroticism, mastery, and self-efficacy to HRQL were found. The additional amounts of variance explained beyond and above medical morbidity and age vary from about 4% (bodily pain) to above 30% (mental health). Little empirical evidence was found for the moderating effects of personality. In conclusion, personality characteristics such as neuroticism, mastery, and self-efficacy influence the reported levels of HRQL. The extent to which this is due to an influence of personality on true versus perceived levels of HRQL is unclear.

Key words: personality, chronic morbidity, health-related quality of life, neuroticism, mastery, self-efficacy

Health-related quality of life (HRQL) is a broad, multidimensional concept covering significant domains of daily functioning and subjective experience, such as physical functioning, role and social functioning, somatic sensation, perceived health, and subjective well-being. It is well documented that chronic medical morbidity has a strong negative impact on functional domains of HRQL (e.g., Stewart et al., 1989; Verbrugge & Patrick, 1995). Chronic medical morbidity can, therefore, be considered an important determinant of physical, social, and role disfunctioning. However, with regard to the affective domains of HRQL (e.g., subjective well-being), the studies do not agree (for review, see Kempen, Ormel, Brilman, & Relyveld, 1997). Some authors reported differences in subjective well-being between persons with and those without a chronic medical condition, and between patients with different chronic conditions (Stewart et al., 1989), whereas others did not (Cassileth et al., 1984). A previous study (Kempen et al., 1997) found empirical support for the hypothesis that the strength of the association of chronic medical disease with HRQL varies in the extent to which the dimension of HRQL is susceptible to adaptive strategies. Compared with the functional domains of HRQL, mental health was by far the least affected by chronic medical conditions. In the present article, we seek to examine whether personality characteristics moderate the effect of chronic medical morbidity on different domains of HRQL in a large community-based older sample.

Previous studies, mainly based on the stress and coping paradigm (Lazarus & Folkman, 1984; Parker, 1986; Pearlin, Lieberman, Menaghan, & Mullan, 1981), showed the importance of individual differences (neuroticism, mastery, self-efficacy) for health outcomes after stressful situations such as the loss of a spouse or the loss of health. Psychological resources such as neuroticism, mastery, and self-efficacy can be considered as major features within the process of coping with (chronic) disease. Clinical and epidemiological studies suggested that psychological factors play a substantial role in the trajectories of functioning after major medical events. For example, personal control seems to play a substantial role in functional recovery after a hip fracture (Furstenberg, 1988). These studies suggest a moderating or buffering effect of personality on the association between morbidity and HRQL. However, other investigations supported the hypothesis that personality traits such as neuroticism were related to the perception of health rather than to the objective health status (Smith & Williams, 1992). Levels of function-

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The research reported in this article is part of the Groningen Longitudinal Aging Study (GLAS). GLAS is conducted by the Northern Centre for Healthcare Research and various departments of the University of Groningen. The primary departments involved are Health Sciences (Gertrudis I. J. M. Kempen and Wim J. A. van den Heuvel), Family Medicine (Betty Meyboom-de Jong), Psychiatry (Johan Ormel), Sociology (Sigi M. Lindenberg), and Human Movement Sciences (Piet Rispens). The Director of GLAS is Johan Ormel (Psychiatry). GLAS and its substudies are financially supported by the Dutch government (through the Netherlands Programme for Research on Aging-NESTOR); the University of Groningen; the School of Medicine, University of Groningen; the Dutch Cancer Foundation; and the Netherlands Organization for Scientific Research.

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ing and health assessed with self-report measures seem to be more sensitive to differences in personality than those assessed with objective health measures. Kempen, Steverink, Ormel, and Deeg (1996), for example, found that perceived physical competence and mastery enlarge the discrepancies between the scores obtained with self-report measures of functioning and the scores obtained with objective, performance-based measures of functioning. Larsen (1992) reported that neuroticism appears to be associated with a tendency to recall physical symptoms as being worse than they really were. These results suggest that self-report levels of functioning and health are more affected or colored by personality characteristics than by biomedical indicators of health or performance-based levels of functioning. The present article was designed to study whether personality characteristics (e.g., neuroticism, mastery, and self-efficacy) moderate the effect of chronic medical morbidity on HRQL. More specifically, we tested (a) whether personality characteristics have unique, additive contributions to different domains of HRQL, that is, whether the main effects of such characteristics on HRQL can be identified; (b) whether the association between chronic medical morbidity and HRQL is moderated or buffered by personality characteristics, that is, whether interaction effects exist between personality characteristics and chronic medical morbidity in their effect on HRQL; or whether both hypotheses are true. Interaction effects would indicate that chronic medical morbidity and personality characteristics (e.g., high levels of neuroticism and low levels of mastery, and self-efficacy) influence each other's effects on HRQL. Main effects would suggest that personality characteristics affect true levels of HRQL, or that personality characteristics influence the perception, the reporting, or both, of levels of HRQL.

Method

The Groningen Longitudinal Aging Study (GLAS) is a population-based prospective follow-up study of the determinants of the HRQL of older people, in particular, physical and social disability and well-being (Ormel et al., 1992). The primary objective of GLAS is to identify the psychosocial factors that influence the trajectory of quality of life, independently of or in interplay with disease-related factors.

Research Participants

The source population consists of late-middle-aged and older persons living independently or in adapted housing for elderly people in the north of The Netherlands. The study population comprised 8,723 persons aged 57 and older on January 1, 1993, who were in the patient panels of the 27 family physicians participating in the Morbidity Registration Network Groningen. In The Netherlands, approximately 99% of the noninstitutionalized elderly are on a family physician's panel. By letter, physicians asked eligible research participants for permission to provide the GLAS research team with their names and addresses. A total of 1,937 refused (22%). Of the remaining 6,786, 1,277 declined cooperation when contacted by the research team, and 152 had died or left the practice by the time contact was initiated. Another 78 participants were excluded because of severe cognitive impairments at baseline (Mini-Mental State Examination Score of 16 or lower; Folstein, Folstein, & McHugh, 1975). Useful baseline data were available for 5,279 research participants (62%; 5,279/[8,723 − 152]). The GLAS baseline assessment was carried out in 1993 and consisted of an interview and a mailed questionnaire. The research participants were interviewed face-to-face in their homes (n = 4,792) or by telephone (n = 487) by well-trained middle-aged women. The interviewers did not know the interviewees in either a clinical or an administrative aspect. Participant nonresponse was not random but associated with age. Table 1 shows the participation rates according to age and gender. These results show that the participation rate among older persons was lower compared with younger persons.

The representativeness of the sample has been studied in two ways. First, baseline participants and nonresponders were compared on four clusters of physician-registered morbidity: malignant neoplasms, ischemic heart diseases and congestive heart failure, chronic respiratory diseases, and chronic diseases of the locomotor apparatus. Multiple logistic regression analyses, including age and gender, showed no significant effects ($p < .05$) of the latter three on nonresponse. A significant ($p < .05$) effect was found for malignant neoplasms (higher proportion of patients among nonresponders), but it was quite small. Second, we found only marginal differences in disability and chronic disease prevalences between older persons in the Dutch General Health Surveys and the participants in our baseline study. The results of both analyses showed no evidence of nonresponse bias relevant to the issues addressed in our study.

Dependent Measures

HRQL was assessed with the Short-Form General Health Survey (SF-20; Stewart, Hays, & Ware, 1988). The SF-20 comprises 20 items representing six domains of HRQL: physical functioning (6 items), role functioning (2), social functioning (1), health perceptions (5), bodily pain (1), and mental health or subjective well-being (5). Physical-, social-, and role-functioning scales capture behavioral dysfunctioning caused by health problems. Measures of perceptions of overall health, bodily pain intensity, and particularly mental health in terms of emotional status reflect more subjective components of health and general well-being (Stewart et al., 1989). The scales for physical functioning and mental health were part of the interview; the other scales were part of the mailed questionnaire, which was returned after the interview (mean number of interval days: 13.6; median: 8.0). All health measures were transformed to a range from 0 to 100, with higher scores indicating better health, except for bodily pain. The internal reliability estimates of the multi-item SF-20 measures vary from .79 (physical

Table 1
Target Population and Participation in Study According to Age and Gender

	Target		Participation	
Age and gender	*n*	%	*n*	%
Age in years				
57–69	4,553	52	3,008	57
70–79	2,805	32	1,683	32
80 and over	1,365	16	588	11
Gender				
Men	3,664	42	2,312	44
Women	5,059	58	2,967	56
Total	8,723	100	5,279	100

functioning) to .89 (health perceptions). The psychometric properties of the Dutch version of the SF-20 were approved in a pilot study in 1992 (Kempen, 1992).

Independent Measures

A checklist of 18 chronic medical conditions was used in the interview part of the baseline data collection. The conditions were: asthma or chronic bronchitis, pulmonary emphysema, heart condition, hypertension, (consequences of) stroke, leg ulcer, stomach ulcer, liver disorder or gallstones, kidney disease, diabetes mellitus, thyroid gland disorder, back problems for at least 3 months or slipped disc, joint conditions or arthritis, migraine or chronic headache, serious dermatologic disorders like psoriasis and eczema, cancer, multiple sclerosis, and Parkinson's disease or epilepsy. Respondents were asked whether they had a specific chronic medical condition in the last 12 months prior to the interview. The same procedure is used by the Dutch Central Office for Statistics (CBS) in the Netherlands in its periodical Health Survey Interviews (CBS, 1989). Results from two Dutch studies showed acceptable agreements between such self-ratings of chronic morbidity and physician-registered conditions except for arthritis (van den Bos, 1995; Kriegsman, Penninx, Van Eijk, Boeke, & Deeg, 1996). In this article, we use the number of chronic medical conditions as an index of morbidity.

Three measures for personality were selected: neuroticism (subscale of the revised version of the Eysenck Personality Questionnaire; Eysenck, Eysenck, & Barrett, 1985), mastery or personal control (Pearlin & Schooler, 1978), and general self-efficacy (Sherer et al., 1982). Mastery concerns the extent to which one regards one's own life changes as being under one's own control in contrast to being fatalistically ruled. Self-efficacy refers to the belief that one can successfully perform specific behaviors. Although both are interrelated (correlation coefficients of .59 for men and .54 for women in the current study), they represent different concepts. Neuroticism is related to a constant preoccupation with things that might go wrong and a strong emotional reaction of anxiety to these thoughts. (Neuroticism is about .38 related to both mastery and self-efficacy.) Higher scores on all scales indicate higher levels of the concept in question. The internal reliability estimates for the three measures are .82 (neuroticism), .84 (general self-efficacy), and .79 (mastery).

Method of Analysis

To answer the first research question of whether personality characteristics make unique, additive contributions to HRQL, hierarchical multiple regression analyses were conducted with the score on each SF-20 domain as the outcome measure. One series of regression analyses comprised only the number of chronic medical conditions as predictor, whereas in another series of analyses, first age and then the three measures for personality were added. So three regressions were conducted for each of the six domains of HRQL. To answer the second research question of whether interaction effects exist between personality characteristics and chronic medical morbidity in their effect on HRQL, two series of regression analyses were conducted. In the first series, separate first-order interaction terms (computed with the number of conditions and each personality measure) were added to regression equations, which already included the number of medical conditions, the three personality measures, and age. These results show whether individual interaction terms add a significant amount of explained variance. In the second series, all 3 first-order interaction terms for each personality measure were added to the equation, which already comprised the number of medical conditions, age, and the three personality measures. The latter results showed whether all interaction terms together added a significant amount of explained variance to the main effects. Given that chronic medical morbidity is related to gender (see Table 2), the analyses were conducted separately by gender. All analyses were conducted with the Statistical Package for the Social Sciences (SPSS/PC+, Version 5.0.2; Norusis, 1992).

Results

The prevalences of the 18 self-reported chronic medical conditions for men and women are presented in Table 2. The highest prevalences were generally found for hypertension, joint conditions or arthritis, and heart conditions, and the lowest prevalences for multiple sclerosis and leg ulcer. Men reported significantly more pulmonary emphysema and heart conditions, whereas hypertension, thyroid gland disorder, back problems, joint conditions or arthritis, liver disorder or gallstones, and migraine or chronic headache were more frequently reported by women.

Table 3 presents the correlation matrix for the number of chronic medical conditions, age, neuroticism, mastery, self-efficacy, and the six domains of HRQL for men and women separately. Although the correlations between age and the domains of HRQL are somewhat stronger for women, the patterns of association are more or less similar for men and women. Generally, the correlations between the measures for personality and chronic medical morbidity are lower compared with the correlations between personality and the domains of HRQL.

Table 4 presents the results of the hierarchical multiple regression analyses, showing the impact of chronic medical morbidity on the six domains of HRQL. For each HRQL domain, the first row shows the results for chronic medical morbidity only, the second row shows the additional impact of age, and the third row shows the results when the measures for personality are added. The results in the first row show that the number of chronic medical conditions explains the most variance in health perceptions and by far the least in mental health for both men and women. Generally, the associations between chronic medical morbidity and HRQL are stronger for women compared with men. The second row for each domain of HRQL shows the additional impact of age. For both men and women, age adds a significant amount of explained variance to physical, role, and social functioning. In contrast, there is no additional impact of age on health perceptions, bodily pain, and mental health. The results in the third row show that the three personality measures add reasonable amounts of variance, varying from 5% (bodily pain) to 31% (mental health) for men and 3% (bodily pain) to 38% (mental health) for women. The other four domains of HRQL are moderately affected by personality, in particular by mastery. The amount of additional variance explained by the three personality measures to HRQL is lower for women compared with men, except for mental health. Mastery makes significant, unique

Table 2
Prevalence and Number of Chronic Medical Conditions for Men and Women in a Community-Based Older Dutch Sample in 1993

Condition	Prevalence				
	Men		Women		
	n	%	*n*	%	χ^2
Hypertension	402	17	836	28	84.5
Joint conditions or arthritis	316	14	879	30	189.0
Heart condition	517	22	457	15	42.0
Back problems	328	14	575	19	24.8
Asthma or chronic bronchitis	291	13	319	11	—
Migraine or chronic headache	122	5	367	12	77.8
Dermatologic disorders	164	7	222	8	—
Diabetes mellitus	145	6	234	8	—
Stomach ulcer	111	5	194	7	—
Pulmonary emphysema	118	5	75	3	24.4
Thyroid gland disorder	34	2	153	5	51.7
Cancer	72	3	110	4	—
Consequences of stroke	72	3	87	3	—
Kidney disease	56	2	81	3	—
Liver disorder or gallstones	35	2	102	3	19.1
Parkinson's disease or epilepsy	36	2	53	2	—
Leg ulcer	23	1	43	1	—
Multiple sclerosis	8	0.3	4	0.1	—
Total	2,312		2,967		
	Number of conditions				
M[a]	1.22		1.61		
SD	1.21		1.44		
Range	0–9		0–10		

Note. Dashes indicate that differences were not significant. Significant differences between men and women, chi-square, $df = 1, p < .001$.
[a]Significant difference between men and women, $t(5223) = -10.23, p < .001$.

contributions to all domains of HRQL. The subjective components of HRQL, particularly mental health, are strongly affected by neuroticism. Neuroticism is hardly associated with the functional domains of HRQL.

Table 5 shows the amounts of additional variance explained by individual first-order interaction terms and all three interaction terms simultaneously (only for *F*-change with $p < .001$) when the number of chronic medical conditions, age, and the three personality measures are included in the equation. Only a few minor interaction effects between the number of medical conditions and personality on HRQL were identified.

Because the number of conditions can be considered as a rather crude measure of morbidity, we conducted additional regression analyses that included the 18 separate disease states as dummy variables instead of the number of conditions in each equation. These additional, more specific analyses revealed the same results as presented in Tables 4 and 5.

Discussion

In this article, the impact of three personality characteristics (i.e., neuroticism, mastery, and self-efficacy) on the association between chronic medical morbidity and six different domains of HRQL was studied. We found reasonably high unique contributions of personality to HRQL. The amounts of variance added by personality, beyond and above medical conditions and age, varied from 5% (bodily pain) to 31% (mental health) for men and from 3% (bodily pain) to 38% (mental health) for women. Physical functioning, role functioning, social functioning, and health perceptions were moderately affected by personality, in particular by mastery. Mastery made significant, unique contributions to all selected domains of HRQL. The subjective components of HRQL, particularly mental health, were affected by neuroticism. Previously reported results that neuroticism has systematic effects on psychological well-being (Costa & McCrae, 1980; McCrae & Costa, 1991) and mental health (Ormel & Wohlfart, 1991) are supported. In contrast, physical and role functioning were not uniquely associated with neuroticism. We found almost no empirical evidence for interaction effects between personality and chronic medical morbidity in their impact on HRQL. The results suggest that personality characteristics affect true levels of HRQL or the perception and/or the reporting of levels of HRQL. Reporting bias suggests that reported levels of functioning and well-being are affected by factors such as complaining behavior, denial, or dissimulation. Perception bias indicates that research participants with higher levels of neuroticism and lower levels of mastery perceive lower levels of functioning and well-being. In a previous study, it was reported that perceived physical competence and mastery enlarge the discrep-

Table 3
Correlation Matrix for Chronic Medical Morbidity, Age, Neuroticism, Mastery, Self-Efficacy, and the Six Domains of Health-Related Quality of Life (HRQL) in a Community-Based Older Dutch Sample in 1993 for Men and Women

Measure	1	2	3	4	5	6	7	8	9	10	11
Men											
1. Chronic medical morbidity[a]	—	.07*	.20*	−.22*	−.14*	−.41*	−.36*	−.32*	−.50*	.35*	−.23*
2. Age		—	−.05	−.20*	−.23*	−.28*	−.11*	−.20*	−.05	−.03	−.01
3. Neuroticism[b]			—	−.38*	−.35*	−.18*	−.18*	−.26*	−.32*	.24*	−.56*
4. Mastery[b]				—	.59*	.37*	.34*	.42*	.45*	−.24*	.41*
5. Self-efficacy[b]					—	.31*	.24*	.33*	.31*	−.13*	.32*
6. Physical functioning[c]						—	.57*	.53*	.53*	−.39*	.26*
7. Role functioning[c]							—	.55*	.57*	−.37*	.25*
8. Social functioning[c]								—	.56*	−.37*	.35*
9. Health perception[c]									—	−.51	.41*
10. Bodily pain[c]										—	−.27*
11. Mental health[c]											—
Women											
1. Chronic medical morbidity[a]	—	.11*	.19*	−.23*	−.14*	−.48*	−.39*	−.36*	−.52	.43*	−.24*
2. Age		—	−.03	−.21*	−.19*	−.40*	−.29*	−.28*	−.10*	.08	−.06
3. Neuroticism[b]			—	−.40*	−.40*	−.14*	−.13*	−.21*	−.31*	.23*	−.63*
4. Mastery[b]				—	.54*	.36*	.34*	.40*	.42*	−.25*	.42*
5. Self-efficacy[b]					—	.25*	.22*	.26*	.28*	−.14*	.32*
6. Physical functioning[c]						—	.64*	.53*	.51*	−.46*	.23*
7. Role functioning[c]							—	.54*	.50*	−.43*	.20*
8. Social functioning[c]								—	.55*	−.41*	.34*
9. Health perceptions[c]									—	−.56	.40*
10. Bodily pain[c]										—	−.26*
11. Mental health[c]											—

[a]Number of chronic medical conditions. [b]Higher scores indicate higher levels of neuroticism, mastery, and self-efficacy. [c]Higher scores for HRQL indicate better functioning, except for bodily pain.
*$p < .001$.

ancies between self-reported and more objective performance-based levels of (physical) functioning (Kempen, Steverink, et al., 1996; Kempen, VanHeuvelen, et al., 1996). Overestimation, that is, higher self-reported levels of functioning as compared with performance-based levels, occurred particularly among participants with higher levels of perceived physical competence and mastery. On the other hand, participants with lower levels of perceived physical competence and mastery tended to report lower levels of functioning as compared with their performance-based levels. The findings of the present study suggest that these latter results can be generalized to the associations between chronic morbidity and the different domains of HRQL.

A higher proportion of patients with malignant neoplasms were found among the nonresponders in our study, although the significance of the effect of malignant neoplasms on nonresponse was quite small. It does reduce the proportion of the study population with cancer, and therefore reduces the impact the disease has on the analysis of HRQL. Cancer patients who participated in the present study ($n = 182$) did worse on all HRQL domains compared with noncancer patients ($n = 5{,}097$): physical functioning, $t(5258) = 4.69$, $p < .001$; role functioning, $t(5041) = 6.82$, $p < .001$; social functioning, $t(5047) = 6.10$, $p < .001$; health perceptions, $t(5051) = 8.96$, $p < .001$; bodily pain, $t(5048) = -3.37$, $p < .01$; and mental health, $t(5246) = 3.41$, $p < .01$. The underrepresentation of patients with malignant neoplasms may have introduced some bias.

The three selected personality measures, in particular mastery and self-efficacy, are interrelated. Correlation coefficients vary from .35 to .59. We found a unique impact of mastery on HRQL, but almost no impact of self-efficacy when mastery was taken into account. Regression analyses that included the number of chronic medical conditions, age, neuroticism, and self-efficacy (but that excluded mastery) revealed statistically significant beta coefficients ($p < .001$) for self-efficacy for five HRQL domains for both men and women. The regression estimates ranged from .14 (mental health) to .21 (social functioning) for men and from .06 (mental health) to .15 (health perceptions) for women. The regression estimate for bodily pain was not significant for men or women. Although these results show that general self-efficacy is related to most HRQL domains when mastery is not taken into account, its role seems to be less important compared with mastery. Feelings of personal control (e.g., mastery) are more strongly related to HRQL than the belief that one can successfully perform specific behavior. Mastery encompasses the effects of self-efficacy.

Chronic medical morbidity (excluding age and the personality measures) explains most variance in health perceptions (around 25%) and by far the least variance in mental health (around 6%). The number of conditions can be considered as a rather crude measure of morbidity. However, as previously mentioned, regression analyses that included the 18 separate disease states as dummy variables instead of the number of conditions in each equation revealed the same results as presented in Tables 4 and 5. The association between chronic morbidity and HRQL is slightly stronger for women com-

Table 4

Hierarchical Multiple Regression Analysis of Chronic Medical Morbidity, Age, Neuroticism, Mastery, and Self-Efficacy on Short-Form General Health Survey (SF–20) Scales in a Community-Based Older Dutch Sample in 1993 for Men and Women

	SF–20 Domains[a]																	
	Physical functioning			Role functioning			Social functioning			Health perceptions			Bodily pain			Mental health		
Measure	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3
Men																		
Chronic medical morbidity[b]	−.41*	−.38*	−.33*	−.36*	−.36*	−.30*	−.32*	−.31*	−.23*	−.50*	−.50*	−.41*	.36*	.36*	.31*	−.23*	−.23*	−.10*
Age	—	−.26*	−.20*	—	−.08*	−.03	—	−.17*	−.11*	—	.00	.05	—	.06	−.07*	—	.02	.03
Neuroticism[c]	—	—	−.02	—	—	−.02	—	—	−.09*	—	—	−.11*	—	—	.12*	—	—	−.44*
Mastery[c]	—	—	.20*	—	—	.23*	—	—	.27*	—	—	.29*	—	—	−.16*	—	—	.19*
Self-efficacy[c]	—	—	.09*	—	—	.05	—	—	.08*	—	—	.05	—	—	.03	—	—	.04
Overall R^2 (%)	16	23	30	13	14	20	11	13	26	25	25	38	13	13	18	5	5	36
Overall F	429.5*	326.6*	183.4*	331.4*	174.1*	111.5*	256.5*	168.8*	151.5*	714.5*	357.1*	267.9*	316.7*	163.5*	92.5*	123.7*	62.3*	245.8*
*df*s	1, 2188	2, 2187	5, 2184	1, 2184	2, 2183	5, 2180	1, 2187	2, 2186	5, 2183	1, 2187	2, 2186	5, 2183	1, 2186	2, 2185	5, 2182	1, 2185	2, 2184	5, 2181
R^2 change (%)	—	7	7	—	0.6	7	—	3	12	—	0	13	—	0.4	5	—	0	31
F change	—	187.3*	67.9*	—	14.8*	60.3*	—	72.8*	121.4*	—	0.0	157.4*	—	9.1	39.4*	—	0.9	348.2*
Women																		
Chronic medical morbidity[b]	.48*	−.44*	−.40*	−.39*	−.37*	−.32*	−.36*	−.33*	−.27*	−.52*	−.52*	−.44*	.43*	.43*	.38*	−.24*	−.24*	−.09*
Age	—	−.35*	−.31*	—	−.25*	−.21	—	−.24*	.19*	—	−.04	.01	—	.03	.02	—	−0.3	−0.3
Neuroticism[c]	—	—	.02	—	—	.02	—	—	−.05	—	—	−.11*	—	—	.11*	—	—	.54*
Mastery[c]	—	—	.18*	—	—	.21*	—	—	.26*	—	—	.25*	—	—	−.13*	—	—	.20*
Self-efficacy[c]	—	—	.05	—	—	.02	—	—	.02	—	—	.05	—	—	.03	—	—	−.02
Overall R^2 (%)	23	35	39	16	22	26	13	19	27	27	27	38	19	19	22	6	6	2
Overall F	824.2*	745.9*	350.6*	514.6*	387.5*	198.2*	415.1*	322.3*	204.1*	1047.4*	526.8*	342.1*	643.1*	323.7*	159.6*	169.2*	85.8*	434.8*
*df*s	1, 2798	2, 2797	5, 2794	1, 2791	2, 2790	5, 2787	1, 2794	2, 2793	5, 2790	1, 2797	2, 2796	5, 2793	1, 2796	2, 2795	5, 2792	1, 2798	2, 2797	5, 2794
R^2 change (%)	—	12	4	—	6	5	—	6	8	—	0.1	11	—	0.1	3	—	0.1	38
F change	—	515.9*	57.1*	—	219.9*	56.5*	—	199.9*	101.9*	—	4.8	159.3*	—	3.7	41.0*	—	2.3	629.0*

Note. Regression 1 included only chronic medical morbidity as predictor. Regression 2 included both chronic medical morbidity and age. Regression 3 included chronic medical morbidity, age, neuroticism, mastery, and self-efficacy. Standardized regression coefficients are reported.

[a]Higher scores for health-related quality of life indicate better functioning, except for bodily pain. [b]Number of chronic medical conditions. [c]Higher scores indicate higher levels of neuroticism, mastery, and self-efficacy.

*$p < .001$.

Table 5
Additional Variance Explained by Separate First-Order Interaction Terms of Chronic Medical Morbidity and Each Personality Measure and by All First-Order Interaction Terms for Men and Women

Interaction	Physical functioning	Role functioning	Social functioning	Health perceptions	Bodily pain	Mental health
			Men			
Chronic Medical Morbidity × Mastery			0.9			
All three interaction terms[a]	0.5		1.0			
			Women			
Chronic Medical Morbidity × Neuroticism				0.3		
Chronic Medical Morbidity × Mastery			0.4			
All three interaction terms[a]			1.0	0.5		

Note. Only significant additional percentages are mentioned (F change, $p < .001$). No effects were found for role functioning, bodily pain, and mental health.
[a]Cumulative effect of the three 2-way interaction terms: Chronic Medical Morbidity × Neuroticism, Chronic Medical Morbidity × Mastery, and Chronic Medical Morbidity × Self-Efficacy.

pared with men. Generally, the proportions of variance explained in HRQL by the number of chronic medical conditions are not very high. This is probably partly due to the fact that we did not include measures of the biomedical severity of the specific chronic conditions.

We conclude that personality characteristics influence the reported levels of HRQL. To what extent this is due to an influence of personality on true levels of HRQL or on the perception of these levels is unclear. Both effects seem to play a role.

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