

## AN EMPIRICAL EXPLORATION OF THE EFFECT OF PERSONALITY ON GENERAL AND JOB-RELATED MENTAL ILL HEALTH

---

JACEK HOCHWÄLDER

*Stockholm Centre of Public Health, Stockholm, Sweden; Sweden and Mid  
Sweden University, Östersund, Sweden*

In the present study we empirically explored how work-situation dimensions, personality dimensions, and personality-by-situation interactions are related to burnout and general mental ill health. Questionnaire data from 694 participants were analyzed using hierarchical multiple linear regression analyses. The results suggest that: (a) personality should not be disregarded in theoretical discussions and empirical studies of burnout and general mental ill health; (b) personality can, to some extent, condition how the work environment dimensions affect an individual with regard to various aspects of burnout and general mental ill health; (c) attention should be given to the fact that some measures of burnout and mental ill health are more dependent on situational factors while other measures are more dependent on personality factors.

*Keywords:* burnout, general mental ill health, work situation, personality, person-by-situation interaction.

The fact that human behavior is a function of both the person and the environment is self-evident to most people, but not always to psychologists - and from time to time either the person factors or the environment factors have been neglected in research. This incomplete approach to the study of human behavior

---

Jacek Hochwälder, Unit of Mental Health, Stockholm Centre of Public Health, Stockholm, Sweden; Department of Social Sciences, Mid Sweden University, Östersund, Sweden.

The author is indebted to Pernilla Forsman, for help with the data collection and to Steve Wicks, who kindly checked the English.

Appreciation is due to reviewers including: Ralph Piedmont, Department of Pastoral Counseling, Loyola College in Maryland, 8890 McGaw Road, Suit 380, Columbia, MD 21045, USA, Email: [rpiedmont@loyola.com](mailto:rpiedmont@loyola.com); Hakan Yaman, Akdeniz University, Faculty of Medicine, Department of Family Medicine, 07059 Antalya, Türkiye, Email: [hakanyaman@akdeniz.edu.tr](mailto:hakanyaman@akdeniz.edu.tr)

Please address correspondence and reprint requests to: Jacek Hochwälder, Unit of Mental Health, Stockholm Centre of Public Health, P.O. Box 175 33, SE - 118 91 Stockholm, Sweden. Email: [jacek.hochwalder@miun.se](mailto:jacek.hochwalder@miun.se)

led to the formulation of the person-by-situation interactional model of research (see e.g., Endler & Magnusson, 1976a, 1976b). The most fundamental axiom of the model is that actual behavior is a function of a continuous process of multi-directional interaction between the individual and the situation encountered. In this paper an interactional perspective is sought by taking into account the person, and the situation, as well as the person-by-situation interaction in studying mental ill health.

Mental ill health can be assessed in terms of many different outcome measures, but one useful distinction is between general measures of mental ill health (e.g., anxiety or depression) and job-related measures of mental ill health (e.g. burnout, see van der Doef & Maes, 1999). In the present study the first category of measures was represented by the General Health Questionnaire 28 (GHQ28) which is a 4-dimensional scale assessing somatic symptoms, anxiety and insomnia, social dysfunction, and severe depression (Goldberg & Hillier, 1979; Goldberg & Williams, 1991) and the second category by the Maslach Burnout Inventory (MBI) which is a 3-dimensional scale assessing emotional exhaustion, depersonalization and personal accomplishment (Maslach & Jackson, 1981, 1986). The situation is a complex phenomenon which may be studied with regard to different aspects and from different perspectives, but one of the more established ways to describe a work situation is in terms of the demand-control-social support model (Karasek & Theorell, 1990). Generally it is assumed that high demands, low control, and low degrees of social support at the workplace result in high levels of strain. Various personality characteristics have been hypothesized to reflect vulnerability to – or resistance factors against – ill health, but it has been suggested that many of these factors may be subsumed under the more general five-factor (neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness) model of personality or the Big Five model (see e.g., Bermudez, 1999; Vollrath, 2001). Neuroticism, which includes the disposition to experience relatively strong negative emotions and vulnerability to stress, is almost tautological to mental distress. Extraverts, due to their higher level of energy and optimism, may have better protection than introverts against mental ill health. Openness may, according to McCrae and Costa (1991), be a double-edged sword because open persons experience both good and bad more intensely. High levels of agreeableness ought to contribute to the development of a social environment that would reduce stress and facilitate the achievement of improved health. Finally, conscientiousness – which is defined in terms of ability to focus on the future, ability to delay immediate gratification, persistence, and goal maintenance – should result in a positive health behavior pattern and thus better mental health. For the 7-outcome variables (the three MBI-dimensions and the four GHQ28-dimensions), the three work situation dimensions (demand, control, and social support) and the five personality dimensions (neuroticism, extraversion, openness to experience,

agreeableness, and conscientiousness) give rise to a total of 105 simple interactions. It is rather difficult to hypothesize in advance the form of each of these 105 interactions and consequently in the present exploratory study only the statistically significant interactions are discussed ad hoc.

Because it has been noted in previous research that the influence of individual characteristics on burnout has largely been ignored (see e.g., Kahill, 1988; Zellars, Perrewé, & Hochwarter, 2000) and that there is a need to study the effects of personality-by-situation interaction on mental ill health or psychological well-being (see e.g. McCrae & Costa, 1991; Piedmont, 1993; Smith & Williams, 1992; van der Doef & Maes, 1999), a review was conducted to consider how much variation among individuals with regard to burnout and general mental ill health could be explained by various situational dimensions, by the Big Five factors and by the interaction between the situational factors and the Big Five factors. In addition, it was also considered whether some distinct patterns could be observed between the measures of burnout and general mental ill health on the one hand, and the situational dimensions, the personality dimensions, and the personality-by-situation terms, on the other. Six studies were located that included the MBI-dimensions as the dependent variable (De Vries & Van Heck, 2002; Eastburg, Williamson, Gorsuch, & Ridley, 1994; Mills & Huebner, 1998; Piedmont, 1993; Zellars & Perrewé, 2001; Zellars, Perrewé, & Hochwarter, 2000) and two studies that had various general mental ill health measures as the dependent variable (Ebert, Tucker, & Roth, 2002; Korotkov & Hannah, 2004). The differences between the studies with regard to various aspects (e.g., variables studied, measures used, analyses performed, results reported) varied considerably but the following approximate tendencies were nevertheless extracted. The various situational aspects – often contaminated by the demographic characteristics of the respondents – explained ( $R^2$ ) on average 25% (0-36%), 14% (0-23%), and 6% (0-9%) of the variance in emotional exhaustion, depersonalization, and personal accomplishment, respectively. No situational dimensions were used in the two studies that had general mental ill health as the criterion variable. The Big Five factors explained uniquely ( $R^2$ ) on average 28% (12-42%), 15% (11-22%), and 17% (8-30%) of the variance in emotional exhaustion, depersonalization, and personal accomplishment, respectively. The only consistent findings concerning the specific relation between the five personality factors and the three burnout dimensions were that neuroticism had a negative relationship with emotional exhaustion, agreeableness had a negative relationship with depersonalization, and that none of the factors had a consistent relationship with personal accomplishment across the studies reviewed. With regard to mental ill health, Korotkov and Hannah (2004) found that the personality dimensions explained on average 8% (0-26%) of the variance with regard to various health

aspects. Neuroticism had the most consistent effect of the five personality factors on mental ill health across the two studies. The interaction between personality dimensions and situational aspects was studied in only 1 of the 8 studies. Eastburg et al. (1994) found an interaction effect between peer social support and extraversion on emotional exhaustion, which implied that extraverts require more peer support than introverts if they are to avoid emotional exhaustion.

In sum, personality has for a long period of time been neglected in work-related ill health research. In this type of research it is even less often that the interaction between personality and situation has been considered. In addition, various indicators of mental ill health can be assumed to be differently affected by work-situational dimensions and by personality dimensions. It may be supposed that the more specific job-related mental ill health measures like MBI are more related to how the individual perceives the work environment, while the more general mental ill health measures like the GHQ28 are more affected by the personality of the individual. Thus, the aim in this study was to contribute to the knowledge in the field of mental ill health by performing an empirical exploration concerned with the extent to which the five personality factors and also the interactions between the work situation factors and the personality factors explain variation among individuals with regard to general and job-related mental ill health above what can be explained by the work situation factors. Consequently, the following four main questions were posed.

1. Apart from the variance that can be explained by demographic variables and by work environment conditions, how much does personality contribute to explain the variance among individuals with regard to burnout and general mental ill health?
2. Are some of the personality dimensions distinctly related to some of the burnout dimensions and the general mental ill health dimensions?
3. Apart from the variance that can be explained by demographic variables, by work environment conditions, and by personality dimensions, how much does the interaction between personality and work environment contribute to explaining the variance among individuals with regard to burnout and general mental ill health?
4. Are some of the personality dimensions distinctly moderating some of the relations between the work environment conditions and the burnout dimensions/the general mental ill health dimensions?

## METHOD

### PARTICIPANTS

A total of 694 individuals participated voluntarily in the study. The participants were nurses and assistants recruited from home service and care service for the elderly in a medium-sized town in the northern part of Sweden. Eighty-two

percent ( $n = 567$ ) of the participants were women (age:  $M = 42.21$  years,  $SD = 11.30$  years,  $min-max = 19-64$  years) and 18% ( $n = 124$ ) were men (age:  $M = 39.11$  years,  $SD = 11.44$ ,  $min-max = 20-62$  years)<sup>1</sup>. The overall response rate was 60%.

## MEASURES

The participants were asked to complete a questionnaire that measured demographic variables, work environment conditions, personality, burnout, and general mental ill health. The variables and how they were measured are described below.

**Background variables** Age and gender were noted. Participants wrote down their age whereas gender was indicated by marking given alternatives.

**Work environment conditions** Work environment was measured using a Swedish translation (Theorell, Michélsen, & Nordemar, 1991) of a scale developed by Karasek and Theorell (1990). The work environment scale measures three dimensions: demand, control, and social support. The scale consists of 17 items and demand is measured by five items (e.g., “Does your work demand that you work very hard?”), control is measured by six items (e.g., “Do you have the freedom to decide how your work should be done?”), and social support is measured by six items (e.g., “I feel comfortable with my workmates”). Responses were given on a 4-point Likert scale ranging from 1 (*no, almost never* alternatively *not at all*) to 4 (*yes, often* alternatively *very well*). An average value on each dimension was computed for each respondent. For each of the three dimensions the theoretical minimum value was 1 and the theoretical maximum value was 4. Higher values indicate higher levels of demand, control, and social support.

**Personality** Personality was measured using a Swedish translation (Hochwälder & Bergsten-Brucefors, 2005) of a scale developed by Shafer (1999). The scale measures the Big Five personality dimensions: extraversion, neuroticism, conscientiousness, agreeableness, and openness. The total scale consists of 30 bipolar items and extraversion (e.g., “Shy-Outgoing”, “Quiet-Talkative”), neuroticism (e.g., “At Ease-Nervous”, “Unagitated-Tense”), conscientiousness (e.g., “Lazy-Hardworking”, “Irresponsible-Responsible”), agreeableness (e.g., “Headstrong-Gentle”, “Vengeful-Forgiving”) and openness (e.g., “Uncreative-Creative”, “Unartistic-Artistic”) are measured using six items each. The response scale was a 9-point semantic differential type scale ranging from 1 (*the left trait in the trait pair describes me very well*) to 9 (*the right trait in the trait pair describes me very well*). An average value on each dimension was computed for each respondent. For each of the five dimensions the theoretical minimum value was 1 and the theoretical

---

<sup>1</sup> 0.4% ( $n = 3$ ) of the participants did not indicate their gender.

maximum value was 9. For each of the five dimensions greater values indicate higher levels of extraversion, neuroticism, conscientiousness, agreeableness, and openness, respectively.

**Burnout** Burnout was measured using a Swedish translation (Söderfeldt, Söderfeldt, Warg, & Ohlson, 1996) of the Maslach Burnout Inventory (MBI) developed by Maslach and Jackson (1981, 1986). The MBI consists of three dimensions: emotional exhaustion, depersonalization, and personal accomplishment. The total scale consists of 22 items and emotional exhaustion is measured by nine items (e.g., "I feel emotionally drained by my work"), depersonalization by five items (e.g., "I feel I treat some recipients as if they were impersonal objects"), and personal accomplishment by eight items (e.g., "In my work, I deal with emotional problems very calmly"). Responses were given on a 7-point Likert scale ranging from 0 (*never*) to 6 (*every day*). An average value on each dimension was computed for each respondent. For each of the three dimensions the theoretical minimum value was 0 and the theoretical maximum value was 6. For the dimensions emotional exhaustion and depersonalization greater values indicate higher levels of burnout, whereas for the dimension personal accomplishment lower values indicate higher levels of burnout.

**Mental ill health** Mental ill health was measured by a Swedish translation of the General Health Questionnaire-28 (GHQ28) developed by Goldberg and Hillier (1979) and also fully described in Goldberg and Williams (1991). The GHQ28 consists of four dimensions: somatic symptoms, anxiety and insomnia, social dysfunction, and severe depression. The total scale consists of 28 items and somatic symptoms (e.g., "Been feeling perfectly well and in good health"), anxiety and insomnia (e.g., "Lost much sleep over worry"), social dysfunction (e.g., "Felt on the whole you were doing things well"), and severe depression (e.g., "Felt that life is completely hopeless") are measured by seven items each. Responses were given on a 4-point Likert scale ranging from 1 to 4. An average value on each dimension was computed for each respondent. For each of the four dimensions the theoretical minimum value was 1 and the theoretical maximum value was 4. Higher values indicate higher levels of somatic symptoms, anxiety and insomnia, social dysfunction, and severe depression.

## PROCEDURE

Written instructions and the questionnaire were distributed to the respondents at their work places. It was emphasized in the instructions that the anonymous participation was completely voluntary and that the respondents could interrupt their participation in the study whenever they liked. The total time needed to respond to the questionnaire was approximately 45 minutes. After 21 consecutive days the questionnaires were collected from the work places by a coworker of the author of this study.

### STATISTICAL ANALYSIS

The study variables were initially described in terms of arithmetic means, standard deviations, correlation coefficients, and Cronbach's alpha reliabilities. The purpose of the regression analyses was to estimate how much of the total variance in the criterion variables could be explained by some group of predictor variables, when the effect of some other group of predictor variables had already been accounted for. Furthermore, it was also intended to study the pattern of regression coefficients regarding the relationship between the criterion variables and the predictor variables. In order to answer the research questions of the study seven hierarchical multiple linear regression analyses (see e.g., Kleinbaum, Kupper, & Mueller, 1988) were performed using SPSS version 12.0 (SPSS, 1990a, 1990b). One regression analysis was performed for each of the three burnout dimensions and the four mental ill health dimensions. In Step 1 of the analyses the two demographic variables were used as the predictor variables. In Step 2, the 3 work environment dimensions were added. In Step 3, the 5 personality dimensions were added. Finally, in Step 4, 15 interactions between the 3 work environment dimensions and the 5 personality dimensions were added. The evaluation of the interactions was restricted (as is usually the case) to bilinear interactions, where the work environment conditions were considered as the focal predictor variables and the personality dimensions were considered as the moderator variables. Thus, the moderator effect of personality on the relation between work environment conditions and burnout/mental ill health was investigated (see e.g., Baron & Kenny, 1986; Jaccard & Turrisi, 2003). In order to avoid problems with nonessential multicollinearity<sup>2</sup> and in order to obtain a standardized solution, all variables (except for gender, which was dummy coded) were *z*-score centered prior to the regression analyses (as recommended by Cohen, Cohen, West, & Aiken, 2003). The data were checked for multicollinearity using two measures of multicollinearity: the tolerance and the variance inflation factor (VIF; see e.g., Kleinbaum et al., 1988).

## RESULTS

### DESCRIPTIVE STATISTICS

The descriptive statistics for all variables of this study are presented in Table 1. The Cronbach's alpha reliabilities (given in the diagonal) were greater than .70 for 13 out of the 15 scales. The intrascale correlation coefficients (written in boldface) were below .55 for 20 out of 22 scales. The most relevant relationships for this study

---

<sup>2</sup> The nonessential multicollinearity between e.g. *X* and *XZ* is due to scaling and disappears when variables are centered. The essential multicollinearity between e.g. *X* and *XZ* is due to skewness in *X* and cannot be removed by centering.

are, however, the correlation between the demographic variables, the work environment conditions, the personality dimensions and the burnout dimensions/the general mental ill health dimensions.

***Correlation between the demographic variables and burnout/general mental ill health*** Gender was significantly related only to emotional exhaustion ( $r = -.09$ ) and to somatic symptoms ( $r = -.15$ ). Thus, women are somewhat more emotionally exhausted and to some extent had higher degrees of somatic symptoms than did men. Age, on the other hand, was statistically related to depersonalization ( $r = -.19$ ), personal accomplishment ( $r = .12$ ), somatic symptoms ( $r = -.09$ ), and anxiety and insomnia ( $r = -.11$ ). This means that older people had, to a less extent, a feeling of depersonalization, diminished personal accomplishment<sup>3</sup>, somatic symptoms, and anxiety and insomnia.

***Correlation between work environment conditions and burnout/general mental ill health*** Demand had a rather low positive and statistical significant correlation (from  $r = .14$  to  $r = .25$ ) with all burnout dimensions, except for personal accomplishment, and with all the four general mental ill health dimensions. Thus, higher demands are associated with higher degrees of burnout and general mental ill health. Both control and social support had a rather low negative but statistically significant relation (from  $r = -.09$  to  $r = -.38$ ) to all three burnout dimensions and to all four general mental ill health dimensions<sup>3</sup>. This means that more control and social support are associated with less burnout and less general mental ill health.

***Correlation between the personality dimensions and burnout/general mental ill health*** Among the five personality dimensions, neuroticism had the highest correlation (.38) with emotional exhaustion. Agreeableness has the highest correlation ( $r = -.16$ ) with depersonalization. Conscientiousness had the highest correlation ( $r = .30$ ) with personal accomplishment. Neuroticism showed by far the highest correlation (from  $r = .29$  to  $r = .46$ ) with all the four general mental ill health dimensions.

## REGRESSION ANALYSES

Before performing the regression analyses, the data were checked for multicollinearity using two measures of multicollinearity: the tolerance and the variance inflation factor (VIF). According to Kleinbaum et al. (1988) VIF values greater than 10 and tolerance values smaller than 0.10 may indicate the presence of multicollinearity. The two measures indicated no signs of multicollinearity for any variable.

---

<sup>3</sup> As may be recalled, lower values on the personal accomplishment dimension indicate higher degrees of burnout.

**TABLE 1**  
**MEANS, STANDARD DEVIATIONS, CORRELATION COEFFICIENTS, AND CRONBACH'S ALPHA RELIABILITIES FOR ALL VARIABLES<sup>1,2</sup>**

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
MBI	1. Emotional exhaustion	1.80	1.15	(.88)															
	2. Depersonalization	0.62	0.84	<b>.46</b>	(.63)														
	3. Personal accomplishment	4.84	0.87	<b>-.22</b>	<b>-.25</b>	(.78)													
GHQ28	4. Somatic symptoms	0.85	0.55	.51	.21	-.14	(.82)												
	5. Anxiety and insomnia	0.75	0.56	.56	.26	-.18	<b>.74</b>	(.86)											
	6. Social dysfunction	1.04	0.29	.29	.13	-.20	<b>.52</b>	<b>.54</b>	(.73)										
Demographic variables	7. Severe depression	0.24	0.42	.35	.22	-.19	<b>.49</b>	<b>.61</b>	<b>.48</b>	(.88)									
	8. Gender <sup>4</sup>	<i>na</i> <sup>3</sup>	<i>na</i> <sup>3</sup>	<b>-.09</b>	<b>.02</b>	<b>-.06</b>	<b>-.15</b>	<b>-.06</b>	<b>.00</b>	<b>.03</b>	( <i>na</i> <sup>3</sup> )								
Work environment conditions	9. Age	41.66	11.38	<b>-.04</b>	<b>-.19</b>	<b>.12</b>	<b>-.09</b>	<b>-.11</b>	<b>-.02</b>	<b>-.04</b>	-.10	( <i>na</i> <sup>3</sup> )							
	10. Demand	2.56	0.59	<b>.54</b>	<b>.22</b>	<b>.02</b>	<b>.25</b>	<b>.31</b>	<b>.14</b>	<b>.17</b>	-.16	.14	(.81)						
Personality dimensions	11. Control	2.91	0.38	<b>-.22</b>	<b>-.21</b>	<b>.23</b>	<b>-.13</b>	<b>-.12</b>	<b>-.12</b>	<b>-.09</b>	.00	.06	<b>-.06</b>	(.59)					
	12. Social support	3.28	0.49	<b>-.38</b>	<b>-.18</b>	<b>.15</b>	<b>-.21</b>	<b>-.24</b>	<b>-.20</b>	<b>-.20</b>	.06	-.06	<b>-.28</b>	<b>.28</b>	(.85)				
	13. Extraversion	6.69	1.43	<b>-.14</b>	<b>-.10</b>	<b>.22</b>	<b>-.12</b>	<b>-.16</b>	<b>-.18</b>	<b>-.16</b>	-.03	-.09	-.03	.09	.15	(.91)			
	14. Neuroticism	3.80	1.37	<b>.38</b>	<b>.14</b>	<b>-.20</b>	<b>.38</b>	<b>.46</b>	<b>.29</b>	<b>.39</b>	-.13	.08	.23	-.10	-.19	<b>-.50</b>	(.89)		
	15. Conscientiousness	7.40	1.09	<b>-.09</b>	<b>-.11</b>	<b>.30</b>	<b>-.12</b>	<b>-.17</b>	<b>-.12</b>	<b>-.18</b>	-.09	.06	.04	.06	.05	<b>.43</b>	<b>-.43</b>	(.85)	
	16. Openness	5.90	1.13	<b>-.03</b>	<b>.00</b>	<b>.20</b>	<b>-.07</b>	<b>-.06</b>	<b>-.13</b>	<b>-.04</b>	.01	-.05	.02	.12	.06	<b>.32</b>	<b>-.27</b>	<b>.26</b>	(.71)
	17. Agreeableness	6.66	1.20	<b>-.18</b>	<b>-.16</b>	<b>.25</b>	<b>-.05</b>	<b>-.14</b>	<b>-.09</b>	<b>-.18</b>	-.05	.04	-.03	.07	.19	<b>.33</b>	<b>-.34</b>	<b>.39</b>	<b>.37</b> (.82)

*Notes:*

<sup>1</sup> Correlation coefficients  $> |.08|$  are significant at  $p < .05$ .

<sup>2</sup> Intrascala correlation coefficients are written in bold face. Correlation coefficients for the relationships between the criterion variables (MBI and GHQ28) and the control variables and predictor variables are written in bold face and are underlined. Cronbach alpha reliabilities are given in the diagonal within parentheses.

<sup>3</sup> *na*: not applicable.

<sup>4</sup> Females were coded with 0 and males were coded with 1.

**The regression models with burnout as the criterion variable** The models for the three dimensions of the MBI are presented in Table 2. The demographic variables which were entered in Step 1 explained only 1-4% of the total variation among the individuals with regard to the three burnout dimensions. Gender was unrelated to the three dimensions, while the regression coefficients for age indicated that older people sensed lower degrees of depersonalization ( $\beta = -0.20$ ) and higher degrees of personal accomplishment ( $\beta = 0.14$ ). The work environment conditions entered in Step 2 explained an additional 6-36% of the variation. As can be observed in Table 2, higher demand, lower control, and lower social support tend to be associated with more burnout as measured by the three MBI-dimensions. The personality dimensions entered in Step 3 accounted for an additional 3-8% of the variation. Of the five personality dimensions, neuroticism was most related to emotional exhaustion ( $\beta = 0.24$ ), agreeableness was most related to depersonalization ( $\beta = -0.16$ ), and conscientiousness was most related to personal accomplishment ( $\beta = 0.14$ ). The interactions between the three work environment conditions and the five personality dimensions entered in Step 4 accounted for an additional 3-6% of the variation. As may be recalled (see e.g., Jaccard & Turrisi, 2003), a regression coefficient for an interaction term ( $XZ$ ) indicated the number of units that the slope of  $Y$  on  $X$  changes given a one-unit increase in  $Z$ . This implies, for example, that the regression coefficient for neuroticism  $\times$  demand ( $\beta = 0.14$ ) can be interpreted to mean that for every unit (standard deviation) that neuroticism increases, the slope of emotional exhaustion on demand is predicted to increase by 0.14 units (standard deviations). Thus, neuroticism moderates the relation between demand and emotional exhaustion ( $\beta = 0.14$ ); between control and emotional exhaustion ( $\beta = 0.09$ ); between social support and depersonalization ( $\beta = 0.17$ ). Conscientiousness moderates the relation between demand and emotional exhaustion ( $\beta = 0.11$ ); between social support and depersonalization ( $\beta = 0.17$ ). Finally, agreeableness moderates the relation between demand and depersonalization ( $\beta = -0.10$ ); between control and depersonalization ( $\beta = 0.16$ ). The regression models for the three burnout dimensions were all statistically significant and explained a total of 20-47% of the variance.

**TABLE 2**  
REGRESSION RESULTS PREDICTING THREE ASPECTS OF BURNOUT (AS MEASURED BY MBI)

Step	Predictors	Emotional Exhaustion $\beta_1$	Depersonalization $\beta$	Personal Accomplishment $\beta$
Step 1:	Intercept 2	0.05	-0.01	0.03
Demographic variables	Gender 3	-0.17	0.02	-0.01
	Age	-0.03	-0.20***	0.14***
	Model F ( <i>df</i> )	1.25 (2, 534)	10.34*** (2, 530)	5.29** (2, 514)

Table 2 continued

Step	Predictors	Emotional Exhaustion $\beta_1$	Depersonalization $\beta$	Personal Accomplishment $\beta$
	$R^2$	0.01	0.04	0.02
	$\Delta R^2$	0.01	0.04***	0.02**
Step 2:	Demand	0.48***	0.23***	0.05
Work	Control	-0.12***	-0.15***	0.19***
environment	Social support	-0.23***	-0.10*	0.11**
conditions	Model F ( <i>df</i> )	62.45*** (5, 531)	17.56*** (5, 527)	9.14*** (5, 511)
	$R^2$	0.37	0.14	0.08
	$\Delta R^2$	0.36***	0.11***	0.06***
Step 3:	Extraversion	0.00	-0.07	0.05
Personality	Neuroticism	0.24***	0.00	-0.02
dimensions	Conscientiousness	0.03	0.00	0.14**
	Openness	0.09**	0.09*	0.07
	Agreeableness	-0.10**	-0.16***	0.11*
	Model F ( <i>df</i> )	40.67*** (10, 526)	10.76*** (10, 522)	10.28*** (10, 506)
	$R^2$	0.44	0.17	0.17
	$\Delta R^2$	0.07***	0.03**	0.08***
Step 4:	Extraversion x Demand	0.04	0.03	-0.05
Interaction	Extraversion x Control	0.03	-0.04	-0.09
terms	Extraversion x Social support	-0.07	0.05	0.02
	Neuroticism x Demand	0.14***	0.08	-0.07
	Neuroticism x Control	0.09*	-0.07	-0.01
	Neuroticism x Social support	-0.08	0.17**	0.07
	Conscientiousness x Demand	0.11**	0.03	-0.08
	Conscientiousness x Control	-0.01	-0.06	0.05
	Conscientiousness x Social support	0.04	0.17**	0.04
	Openness x Demand	-0.06	0.00	0.00
	Openness x Control	0.05	-0.05	0.04
	Openness x Social support	-0.05	0.00	-0.07
	Agreeableness x Demand	-0.06	-0.10*	0.03
	Agreeableness x Control	0.05	0.16***	-0.07
	Agreeableness x Social support	-0.01	-0.09	0.03
	Model F ( <i>df</i> )	18.31*** (25, 511)	6.19*** (25, 507)	4.81*** (25, 491)
	$R^2$	0.47	0.23	0.20
	$\Delta R^2$	0.04**	0.06***	0.03

Notes: 1  $\beta$  = regression coefficient. 2 The nonzero, although nonsignificant, intercepts are due to the correlation between the variables expressed on the original scales. For further technical explanation see Cohen et al. (2003). 3 Women were coded with 0 and men with 1.

\*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$ .

***The regression models with general mental ill health as the criterion variable***

The models for the four dimensions of the GHQ28 are presented in Table 3. The demographic variables which were entered in Step 1 explained 0-4% of the total variation among the individuals with regard to the four general mental ill health dimensions. The regression coefficients for gender indicated that men (as compared to women) sensed lower degrees of somatic symptoms ( $\beta = -0.44$ ) while the regression coefficients for age indicated that older people sensed lower degrees of both somatic symptoms ( $\beta = -0.10$ ) and anxiety and insomnia ( $\beta = -0.10$ ). The work environment conditions entered in Step 2 explained an additional 5-12% of the variation. In Table 3 the same pattern emerges that was observed in Table 2: higher demand, lower control, and lower social support tend to be associated with more general mental ill health as measured by the four GHQ28-dimensions. The personality dimensions entered in Step 3 accounted for an additional 5-15% of the variation. In these analyses, as compared to the analyses for the three MBI-dimensions, neuroticism had an outstanding dominating relation to all the four general mental ill health dimensions (from  $\beta = 0.20$  to  $\beta = 0.45$ ). The interactions between the three work environment conditions and the five personality dimensions entered in Step 4 accounted for an additional 3-5% of the variation. Extraversion moderates the relation between demand and somatic symptoms ( $\beta = 0.12$ ). Neuroticism moderates the relation between demand and somatic symptoms ( $\beta = 0.15$ ); and between control and somatic symptoms ( $\beta = 0.10$ ). Conscientiousness moderates the relation between demand and all the four general mental ill health dimensions (from  $\beta = 0.11$  to  $\beta = 0.14$ ); between control and somatic symptoms ( $\beta = 0.10$ ); and between control and severe depression ( $\beta = 0.11$ ). Openness moderates the relation between demand and somatic symptoms ( $\beta = -0.08$ ); between social support and anxiety and insomnia ( $\beta = -0.08$ ); and between social support and social dysfunction ( $\beta = -0.11$ ). Finally, agreeableness moderates the relation between demand and anxiety and insomnia ( $\beta = -0.11$ ); and between demand and social dysfunction ( $\beta = -0.14$ ). The regression models for the four general mental ill health dimensions were all statistically significant and explained a total of 15-31% of the variance.

**TABLE 3**  
**REGRESSION RESULTS PREDICTING FOUR ASPECTS OF GENERAL MENTAL ILL HEALTH**  
**(AS MEASURED BY GHQ28)**

Step	Predictors	Somatic symptoms $\beta$ 1	Anxiety and insomnia $\beta$	Social dysfunction $\beta$	Severe depression $\beta$
Step 1:					
Demographic variables	Intercept 2	0.08	0.05	0.03	-0.01
	Gender 3	-0.44***	-0.17	-0.06	0.07
	Age	-0.10*	-0.10*	-0.01	-0.05
	Model F ( <i>df</i> )	10.10*** (2, 553)	3.44* (2, 551)	0.18 (2, 545)	0.88 (2, 548)
	$R^2$	0.04	0.01	0.00	0.00
	$\Delta R^2$	0.04***	0.01*	0.00	0.00
Step 2:					
Work environment conditions	Demand	0.21***	0.24***	0.08*	0.14**
	Control	-0.08	-0.06	-0.08	-0.04
	Social support	-0.12*	-0.17***	-0.17***	-0.14**
	Model F ( <i>df</i> )	15.23*** (5, 550)	16.25*** (5, 548)	6.92*** (5, 542)	6.48*** (5, 545)
	$R^2$	0.12	0.13	0.06	0.05
$\Delta R^2$	0.09***	0.12***	0.06***	0.05***	
Step 3:					
Personality dimensions	Extraversion	0.07	0.07	-0.04	0.04
	Neuroticism	0.39***	0.45***	0.20***	0.40***
	Conscientiousness	-0.03	0.00	0.01	0.01
	Openness	0.01	0.03	-0.06	0.08
	Agreeableness	0.09*	0.00	0.04	-0.06
	Model F ( <i>df</i> )	15.98*** (10, 545)	21.06*** (10, 543)	6.47*** (10, 537)	12.04*** (10, 540)
	$R^2$	0.23	0.28	0.11	0.18
	$\Delta R^2$	0.11***	0.15***	0.05***	0.13***
Step 4:					
Interaction terms	Extraversion x Demand	0.12*	0.06	0.06	0.05
	Extraversion x Control	0.06	0.03	0.06	0.02
	Extraversion x Social support	0.00	-0.04	-0.03	0.08
	Neuroticism x Demand	0.15***	0.06	0.07	0.05
	Neuroticism x Control	0.10*	0.06	0.04	-0.02
	Neuroticism x Social support	-0.04	-0.07	-0.07	-0.04
	Conscientiousness x Demand	0.12**	0.11*	0.14**	0.14**
	Conscientiousness x Control	0.10*	0.07	0.06	0.11*
	Conscientiousness x Social support	0.07	0.03	0.03	0.04
	Openness x Demand	-0.08*	0.02	0.01	0.04
	Openness x Control	0.00	0.03	0.02	0.00
	Openness x Social support	-0.07	-0.08*	-0.11*	-0.08
	Agreeableness x Demand	-0.06	-0.11*	-0.14**	-0.09
	Agreeableness x Control	0.00	0.03	-0.02	-0.04
Agreeableness x Social support	-0.05	-0.05	-0.04	-0.04	

Table 3 continued

Step	Predictors	Somatic symptoms	Anxiety and insomnia	Social dysfunction	Severe depression
		$\beta$ 1	$\beta$	$\beta$	$\beta$
	Model F ( <i>df</i> )	8.01*** (25, 530)	9.54*** (25, 528)	3.74*** (25, 522)	6.06*** (25, 525)
	<i>R</i> <sup>2</sup>	0.27	0.31	0.15	0.22
	$\Delta R^2$	0.05**	0.03	0.04*	0.04*

Notes: 1  $\beta$  = regression coefficient. 2 The nonzero, although nonsignificant, intercepts are due to the correlation between the variables expressed on the original scales. For further technical explanation see Cohen et al. (2003). 3 Women were coded with 0 and men with 1.

\*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$ .

## DISCUSSION

The following answers were obtained to the four main research questions of this study.

1. Personality explained 3-6% of the variance with regard to the three burnout dimensions, over and above what could be explained by the demographic variables (1-4%) and the work environment dimensions (6-36%). Personality explained 5-15% of the variance with regard to the four general mental ill health dimensions, over and above what could be explained by the demographic variables (0-4%) and the work environment dimensions (5-12%).
2. A rather distinct pattern emerged among the relations between the personality dimensions and the burnout dimensions: the more neurotic individuals were to a greater extent emotionally exhausted, the more agreeable individuals were to a lesser extent depersonalized, and the more conscientiousness individuals felt a higher degree of personal accomplishment. A quite uniform pattern emerged among the relations between the personality dimensions and the general mental ill health dimensions: the more neurotic individuals had higher degrees of somatic symptoms, anxiety and insomnia, social dysfunction, and severe depression.
3. The interaction between the work environment conditions and the personality dimensions explained 3-6% of the variance with regard to the three burnout dimensions, over and above what could be explained by the demographic variables, the work environment dimensions, and the personality dimensions. The interaction between the work environment conditions and the personality dimensions explained 3-5% of the variance with regard to the four general mental ill health dimensions, over and above what could be explained by the demographic variables, the work environment dimensions, and the personality dimensions.

4. A number of interaction effects were found. In other words a number of personality dimensions were found that moderated the relations between the work environment conditions and the burnout dimensions. Twenty-five of the 105 interactions were found to be statistically significant ( $p < .05$ ). Due to the problem of mass significance only the most statistically significant interactions were interpreted ( $p < .001$ ). In order to interpret the interactions, each interaction was plotted onto a graph (see e.g., Cohen et al., 2003). The plotting was made for the regressions of  $Ys$  (the outcome variables) on  $Xs$  (the work environment variables) at two values of  $Zs$  (the personality variables): a high value of  $Z$  (one standard deviation above the mean) and a low value of  $Z$  (one standard deviation below the mean of  $Z$ ). (The graphs are not presented due to space limitations.) Thus, the following two quite expected interactions may be noted. (a) Individuals with higher levels of neuroticism, as compared to individuals with lower levels of neuroticism, were generally more emotionally exhausted. In the first group, as compared to the latter group, an increase in demands resulted in a greater increase in emotional exhaustion. (b) Individuals with higher levels of neuroticism, as compared to individuals with lower levels of neuroticism, generally reported a higher extent of somatic symptoms. In the first group, as compared to the latter group, an increase in demands resulted in a greater increase in the extent of somatic symptoms. Furthermore, the two following more complex interactions may also be noted. (a) Individuals with higher levels of conscientiousness, as compared to individuals with lower levels of conscientiousness, were generally more depersonalized. In the first group, an increase in social supports resulted in an increase of depersonalization while in the second group an increase in social supports resulted in a decrease of depersonalization. (b) Individuals with higher levels of agreeableness, as compared to individuals with lower levels of agreeableness, were generally less depersonalized. In both groups, an increase in control resulted in a slight increase of depersonalization.

In sum, for 1 of the 3 burnout dimensions (personal accomplishment) and for 3 out of the 4 general mental ill health dimensions (somatic symptoms, anxiety and insomnia, and severe depression) the personality dimensions explained somewhat more variance than the amount of variance already explained by the work conditions. The three burnout dimensions were differently affected by the five personality dimensions but the four mental ill health dimensions were the most strongly affected by neuroticism. These results are in line with the tendencies noted in the previous studies discussed in the first part of this article. The results from this study suggest that personality should not be disregarded in discussions and studies of burnout and general mental ill health.

When, in addition to personality, the interactions are taken into account, it can be observed that for one of the three burnout dimensions (personal accomplishment) and for all four general mental ill health dimensions (somatic symptoms, anxiety and insomnia, social dysfunction, and severe depression) the personality dimensions together with the interactions explained more variance than the amount of variance already explained by the work conditions. When the personality dimensions were used as moderator variables for the relations between the work environment conditions and the three burnout dimensions/the four general mental ill health dimensions some interesting results were obtained. These results make the same point as the results from the study by Eastburg et al. (1994), namely, that whether or not a certain personality dimension may function as a risk or a protection factor depends on which outcome variable and/or focal variables are being studied. The results in the present study suggest that how the three work environment conditions affect different ill health indicators depends to some degree on personality.

Finally, it should be noted that the variation with regard to the job-related health dimension of emotional exhaustion explained by the work-environmental conditions was 36% and that personality and personality-by-situation interaction explained an additional 7% and 4% of the variation, respectively. This result shows that some measures of mental ill health are more sensitive indicators of an unhealthy work environment than others. An effort should be made to use these sensitive indicators in the evaluation of prevention and intervention programs at the workplace when the manipulation of work situation dimensions is in focus.

One of the main strengths of this study may be the systematic approach applied to study the degree of variation in the two criterion variables that could be accounted for by the situational dimensions, the personality dimensions and the situation-by-person interactions. The attempt to synthesize the results from previous studies that dealt with the current questions showed that this had not been done earlier. In addition, the only previous study that had investigated the personality-by-situation interaction aspect of the current problem was the one by Eastburg et al. (1994). A second strength of the present study is that established dimensions and measures of the work situation (the demand-control-social support model) and personality (the Big Five model) were used. The use of rather poorly established dimensions and measures may hinder the acquisition of knowledge within the field of personality psychology (see also Bermudez, 1999; Vollrath, 2001). A third strength is that indicators of both job-related and general mental ill health were used. There are, of course, many aspects and measures of mental ill health, but one useful categorization in the present context is job-related and general measures of mental ill health proposed by van der Doef & Maes (1999). A final and minor strength was that 694 men and women participated in this study. In 6 of the 8 located studies that dealt with the current

questions, the number of respondents varied between 36 and 296 (see Eastburg et al., 1994; Ebert et al., 2002; Mills & Huebner, 1998; Piedmont, 1993; Zellars et al., 2000; Zellars & Perrewé, 2001) and only in the two remaining studies was the number of respondents similar to the number of respondents in the present study ( $n = 765$  in De Vries & Van Heck, 2002;  $n = 706$  in Korotkov & Hannah, 2004).

As to the weaknesses, considerably high correlations were observed between many of the seven criterion dimensions of this study. Nevertheless, when taking this into account it should be observed that even for highly correlated criterion dimensions the amount of variation that was explained by the various groups of predictor variables differs, as well as the patterns of relations between the criterion and the predictor variables. In addition, the MBI is a 3-dimensional and the GHQ28 a 4-dimensional measure and it would thus be incomplete to present results for only some of the dimensions. A weakness of a more general nature is the common-method variance. One of the more challenging tasks for future research is the development of a more objective but easily administrable measure of the work situation. Another weakness, also of a general nature, is the use of cross-sectional data which make assertions concerning causal relations problematic. In future studies an attempt should be made to collect longitudinal data so that causal relations between the predictor variables (especially the work situation dimensions) and the criterion variables could be asserted more clearly. Finally, concerning the exploratory study of the effects of the interactions between the work environment dimensions and the personality dimensions on mental ill health the following points should be kept in mind. (a) The interactional paradigm of research is, of course, not equal to a study of statistical interactions (see Endler & Magnusson, 1976a, 1976b). However, in this study an effort was made to start from the fundamental idea of the paradigm and to study how the person, the situation and the person-by-situation interaction affect both general and job-related mental ill health. (b) The form of each of the 105 interactions computed in this study was, of course, not hypothesized in advance. Based on the results from this study it is left to future research to focus, both theoretically and empirically, on some of these interactions.

To conclude, the results in this study suggest that personality should not be disregarded in theoretical discussions and empirical studies of burnout and general mental ill health. The results also suggest that the way in which work environment conditions affect an individual with regard to some aspect of mental ill health can depend to some degree on the personality of the individual. Attention was drawn to the fact that some measures of mental ill health (like MBI) are more dependent on situational factors, while other measures (like GHQ28) are more dependent on personality factors. Finally, these results are believed to have some implications (a) for the generation of more specific

hypotheses in future studies concerning the effects of the person-by-situation interaction on various ill health measures and (b) for the choice of outcome measures of mental ill health in various contexts when the focus of attention is on the manipulation of situational dimensions or on changing people's approach to stress-provoking situations.

## REFERENCES

- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychology research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, **51**, 1173-1182.
- Bermudez, J. (1999). Personality and health-protective behaviour. *European Journal of Personality*, **13**, 83-103.
- Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Hillsdale, NJ: Erlbaum.
- De Vries, J., & Van Heck, G. L. (2002). Fatigue: Relationships with basic personality and temperament dimensions. *Personality and Individual Differences*, **33**, 1311-1324.
- Eastburg, M. C., Williamson, M., Gorsuch, R., & Ridley, C. (1994). Social support, personality, and burnout in nurses. *Journal of Applied Social Psychology*, **24**, 1233-1250.
- Ebert, S. A., Tucker, D. C., & Roth, D. L. (2002). Psychological resistance factors as predictors of general health status and physical symptom reporting. *Psychology, Health, & Medicine*, **7**, 363-375.
- Endler, N. S., & Magnusson, D. (1976a). *Interactional psychology and personality*. Washington, DC: Wiley.
- Endler, N. S., & Magnusson, D. (1976b). Toward an interactional psychology of personality. *Psychological Bulletin*, **83**, 956-974.
- Goldberg, D. P., & Hillier, V. F. (1979). A scaled version of the General Health Questionnaire. *Psychological Medicine*, **9**, 139-145.
- Goldberg, D., & Williams, P. (1991). *A user's guide to the General Health Questionnaire*. Windsor, Berkshire: NFER-NELSON.
- Hochwalder, J., & Bergsten-Brucefors, A. (2005). A psychometric assessment of a Swedish translation of Spretzer's empowerment scale. *Scandinavian Journal of Psychology*, **46**, 521-529.
- Jaccard, J., & Turrisi, R. (2003). *Interaction effects in multiple regression* (2nd ed.). Sage University Papers Series on Quantitative Applications in the Social Sciences, 07-072. Thousand Oaks, CA: Sage.
- Kahill, S. (1988). Symptoms of professional burnout: A review of the empirical evidence. *Canadian Psychology*, **29**, 284-297.
- Karasek, R. A., & Theorell, T. (1990). *Healthy work: Stress, productivity and the reconstruction of working life*. New York: Basic Books.
- Kleinbaum, D. G., Kupper, L. L., & Mueller, K. E. (1988). *Applied regression analysis and other multivariable methods*. Boston: PWS-KENT Publishing Company.
- Korotkov, D., & Hannah, T. E. (2004). The five-factor model of personality: Strengths and limitations in predicting health status, sick-role and illness behavior. *Personality and Individual Differences*, **36**, 187-199.
- Maslach, C., & Jackson, S. E. (1981). The measurement of experienced burnout. *Journal of Occupational Behavior*, **2**, 99-113.
- Maslach, C., & Jackson, S. E. (1986). *Maslach Burnout Inventory* (2nd ed.). Palo Alto, CA: Consulting Psychologists Press.

- McCrae, R. R., & Costa, P. T. (1991). Adding Liebe und Arbeit: The full five-factor model and well-being. *Personality and Social Psychology Bulletin*, **17**, 227-232.
- Mills, L. B., & Huebner, E. S. (1998). A prospective study of personality characteristics, occupational stressors, and burnout among school psychology practitioners. *Journal of School Psychology*, **36**, 103-120.
- Piedmont, R. L. (1993). A longitudinal analysis of burnout in the health care setting: The role of personal disposition. *Journal of Personality Assessment*, **61**, 457-473.
- Shafer, A. B. (1999). Brief bipolar markers for five-factor model of personality. *Psychological Reports*, **84**, 1173-1179.
- Smith, T. W., & Williams, P. G. (1992). Personality and health: Advantages and limitations of the five-factor model. *Journal of Personality*, **60**, 395-423.
- SPSS. (1990a). *Base system user's guide*. New York: McGraw Hill.
- SPSS. (1990b). *Reference guide*. New York: McGraw Hill.
- Söderfeldt, M., Söderfeldt, B., Warg, L-E., & Ohlson, C-G. (1996). The factor structure of the Maslach Burnout Inventory in two Swedish human service organizations. *Scandinavian Journal of Psychology*, **37**, 437-443.
- Theorell, T., Michélsen, H., & Nordemar, R. (1991). Three work-environment indexes used in the Stockholm study 1. In M. Hagberg & C. Hogstedt (Eds.), *Stockholm Study 1* (pp. 150 - 168). Spånga: Music Books.
- Van der Doef, M., & Maes, S. (1999). The job demand-control-(support) model and psychological well-being: A review of 20 years of empirical research. *Work & Stress*, **13**, 87-114.
- Vollrath, M. (2001). Personality and stress. *Scandinavian Journal of Psychology*, **42**, 335-347.
- Zellars, K. L., Perrewé, P. L., & Hochwarter, W. A. (2000). Burnout in health care: The role of the five factors of personality. *Journal of Applied Social Psychology*, **30**, 1570-1598.
- Zellars, K. L., & Perrewé, P. L. (2001). Affective personality and the content of emotional social support: Coping in organizations. *Journal of Applied Psychology*, **86**, 459-467.

