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Personality, Work Characteristics, and Employee Well-Being: A Longitudinal Analysis of Additive and Moderating Effects

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This study tested the longitudinal influence of personality (measured by the characteristics growth need strength, negative affectivity [NA], and upward striving) on 3 psychological outcomes (intrinsic work motivation, emotional exhaustion, and turnover intention), using a pattern of specific relationships between work characteristics and these outcomes as a framework. The study hypotheses were tested in a multioccupational sample consisting of bank employees and teachers, using a 2-wave panel design with a 1-year time interval and structural equation modeling. NA had a cross-lagged direct and additive relationship with emotional exhaustion and also moderated the relationship between Time 1 workload and Time 2 emotional exhaustion. The authors concluded that NA may have multiple effects on emotional exhaustion that persist over time.

Numerous changes such as increased global competition and the development of the service sector are affecting today's world of work (cf. Cooper, 1998; Howard, 1995). As a result of this transformation of work, people are increasingly exposed to mental work demands (e.g., Howard, 1995; Merllié & Paoli, 2001). High levels of demands, in turn, may lead to several stress reactions, such as burnout and depression, which may eventually result in sickness absence, disability for work, and turnover (cf. Cooper, 1998; Schaufeli & Enzmann, 1998). Because the latter outcomes are known to be detrimental to an organization's effectiveness, it is recommended that organizations take systematic action to prevent these problems. These preventive efforts may benefit substantially from conceptually integrated measures that cover the area of work-related stressors and stress reactions (cf. Cooper, 1998; Schaefer & Moos, 1993).

To describe and explain the psychological well-being of people at work, researchers have developed several heuristic stress models (e.g., the Michigan model; Kahn & Byosiere, 1992) in which work stressors are related to employees' health. These models and the empirical studies directed at the validation of these models have yielded valuable insights regarding work stress experiences and outcomes (see Cooper, 1998) but have also been the subject of criticism regarding, for instance, specificity. Most of these models are based on global theoretical frameworks. They encompass many different (categories of) variables, and in many cases, the relationships between these categories of variables are defined only globally (cf. Buunk, de Jonge, Ybema, & de Wolff, 1998; Cooper, 1998). In this light, Janssen, de Jonge, and Bakker (1999) and Houkes, Janssen, de Jonge, and Nijhuis (2001) concluded that an interesting step forward in the refinement of the above-mentioned conceptual models might be the development of a theoretical model that incorporates both the general insights regarding the influence of work on the health and well-being of employees and more refined theories regarding specific relationships between work characteristics and outcome variables (see also Cooper, 1998; Kasl, 1996).

Hence, they developed a theoretical model that formulates more precisely the pattern of relationships between work-related variables and three theoretically and socially important outcome variables regarding psychological well-being: *intrinsic work motivation*, *emotional exhaustion*, and *turnover intention*. Janssen et al. (1999) selected four work characteristics that were considered the most important predictors of these outcome variables: work content, working conditions, labor relations, and conditions of employment (Kompier & Marcelissen, 1990), which were operationalized as task characteristics, workload, social support, and unmet career

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expectations, respectively. An extensive literature study revealed the following pattern of specific relationships. Intrinsic work motivation appears to be primarily related to task characteristics, that is, autonomy, job feedback, skill variety, task identity, and task significance, combined in the motivating potential score (MPS; Hackman & Oldham, 1980; e.g., Fried & Ferris, 1987; Tiegs, Tetrick, & Fried, 1992). With regard to emotional exhaustion, reviews of Schaufeli and Enzmann (1998) and Lee and Ashforth (1996) suggest that emotional exhaustion is primarily predicted by workload and lack of social support. Finally, literature regarding turnover intention suggests that conditions of employment (e.g., salary, career opportunities), in particular, are important work-related determinants of turnover intention (e.g., van Breukelen, 1989; Rosse & Miller, 1984). This proposed pattern of relationships has been validated in several samples (e.g., Houkes et al., 2001; Janssen et al., 1999).

In addition, literature suggests that *personal characteristics* may contribute substantially to the emergence of psychological well-being. These insights, however, are still quite "general." According to Kasl (1996) and Parkes (1994), knowledge about the specific role of relevant personal characteristics may improve the prediction of psychological outcome variables. In the present study, the research question is whether there are certain personal characteristics that are particularly salient with regard to the three above-mentioned outcome variables (Janssen et al., 1999). The primary aim of this study was to test the specific influence of several important personal characteristics longitudinally, using the pattern of relationships developed by Janssen et al. as a framework.

Influence of Personal Characteristics: Some Theoretical Elaborations

According to Kasl (1996) and Parkes (1994), personal characteristics that are stable and have a theoretically sound relationship with the variables under study are important. Moreover, it is not sufficient to know *what* personal characteristics are of influence, but it is also relevant to know *how* these personal characteristics exert their influence. Most research points at additive and moderating (interactive) effects of personal characteristics (see Parkes, 1994). An additive effect implies that both work characteristics and personal characteristics are directly related to an outcome variable, each contributing independently to the explained variance (Gaillard, 1996; Parkes, 1994). A moderating effect implies that certain categories of people are more sensitive to the influence of work characteristics than others: The magnitude or direction of the relationship between the work characteristic and the outcome depends on the level of the personal characteristic (Gaillard, 1996; Parkes, 1994).

Now the question remains what personal characteristics are of influence. With regard to intrinsic work motivation, the personal characteristic *growth need strength* (GNS) seems to be a particularly promising factor. This stable personal characteristic was first proposed by Hackman and Oldham (1980) and refers to a need for learning and developing oneself. People scoring high on GNS are better positioned to take advantage of the opportunities offered to them by motivating jobs than people scoring low on GNS. Several studies regarding the concept of GNS reported additive as well as moderating effects (e.g., Fried & Ferris, 1987; Hackman & Oldham, 1980). Regarding the additive effect of GNS, it might indeed be plausible that people who are eager to learn and develop themselves are in any case highly motivated to work and to perform well (see Janssen, Nijhuis, Peeters, & de Jonge, 1996). Other studies only report moderating effects of GNS (i.e., the higher the level of GNS, the stronger the relationship between task characteristics and intrinsic work motivation; e.g., Algera, 1990; Landeweerd, de Jonge, & Stikvoort, 1995). On the basis of the theory and empirical studies described earlier, and using Janssen et al.'s (1999) model as a framework, we formulated the following hypotheses:

> *Hypothesis 1a:* GNS has a positive relationship with intrinsic work motivation, in addition to the relationship between task characteristics (combined in the MPS) and intrinsic work motivation.

> *Hypothesis 1b:* GNS moderates the relationship between the MPS and intrinsic work motivation (the higher the level of GNS, the stronger the relationship between the MPS and intrinsic work motivation).

With regard to emotional exhaustion, several personal characteristics have been studied (e.g., neuroticism, coping, negative affectivity, and self-esteem; see Parkes, 1994; Schaufeli & Enzmann, 1998). However, in their review of more than 250 studies

regarding burnout, Schaufeli and Enzmann (1998) found that the personal characteristic neuroticism was one of the strongest personality correlates of burnout, in particular of emotional exhaustion. A recent variant of neuroticism is *negative affectivity* (NA; see Brief, Burke, George, Robinson, & Webster, 1988; Hofstee, de Raad, & Goldberg, 1992; Moyle, 1995; Watson & Tellegen, 1985). NA can be defined as a mood-dispositional dimension that reflects the focus on negative aspects of oneself, other people, and the world in general (Brief et al., 1988). NA seems to be a stable personality trait that is predictive of cross-situational stress (Costa & McCrae, 1980). In earlier research, NA was mainly considered as a potential confounder in stress research (see Moyle, 1995; Watson & Tellegen, 1985). However, recent literature suggests that NA has a substantive direct or interactive (moderating) influence on health-related outcomes (e.g., Cassar & Tattersall, 1998; Heinisch & Jex, 1997; Jex & Spector, 1996; Moyle, 1995; Spector, Zapf, Chen, & Frese, 2000). The moderating influence of NA has, for instance, been described by Heinisch and Jex (1997) and Spector et al. (2000): Relations between job stressors (e.g., workload and a lack of social support) and strains (e.g., emotional exhaustion) will be stronger for high NA individuals than for low NA individuals. NA might also have a direct relationship with health: A high level of NA might well have a bad influence on a person's health (Schaufeli & Enzmann, 1998). Empirical studies indicate direct as well as moderating effects of NA on burnout and other, related health concepts (e.g., Caudill, 1996/1997; Heinisch & Jex, 1997; Iverson, Olekalns, & Erwin, 1998; Moyle, 1995; Parkes, 1990; Zellars, Perrewé, & Hochwarter, 1999). Using Janssen et al.'s (1999) model as a framework, we formulated the following hypotheses:

> *Hypothesis 2a:* NA has a positive relationship with emotional exhaustion, in addition to the relationships between workload and social support on the one hand and emotional exhaustion on the other.
>
> *Hypothesis 2b:* NA moderates the relationship between workload and emotional exhaustion (the higher the level of NA, the stronger the relationship between workload and emotional exhaustion).
>
> *Hypothesis 2c:* NA moderates the relationship between social support and emotional exhaustion (the higher the level of NA, the stronger the relationship between social support and emotional exhaustion; lack of social support is considered a stressor in this hypothesis).

The literature about individual determinants of turnover intention is somewhat limited. However, one personal characteristic seems to be especially promising: *upward striving* (US; Mathieu & Zajac, 1990; Wollack, Goodale, Wijting, & Smith, 1971). The concept of US refers to the degree to which a person is focused on his or her career, upward mobility, and promotion (career commitment) and seems to be a stable construct (Wollack et al., 1971). A lack of career possibilities in an organization may lead to turnover intention, especially for people with high US (i.e., a moderating effect of US; Tremblay, Roger, & Toulouse, 1995). In addition, it seems plausible that people scoring high on US have a high level of turnover intention, because they are, more than people scoring low on US, preoccupied with their careers and looking for other opportunities (i.e., an additive effect). Several empirical studies report additive as well as moderating effects of US (e.g., Mathieu & Zajac, 1990; Tremblay et al., 1995). With regard to US, we formulated the following hypotheses:

> *Hypothesis 3a:* US has a positive relationship with turnover intention, in addition to the relationship between unmet career expectations and turnover intention.
>
> *Hypothesis 3b:* US moderates the relationship between unmet career expectations and turnover intention (the higher the level of US, the stronger the relationship between unmet career expectations and turnover intention).

Overall, taking the characteristics GNS, NA, and US into consideration, we make the following final hypothesis:

> *Hypothesis 4:* We hypothesize that personal characteristics influence the outcome variables and not the other way around.

In general, most research regarding personal characteristics is cross-sectional (see Zapf, Dormann, & Frese, 1996). Cross-sectional research, however, is not suitable to demonstrate causal relationships; only

associations between variables can be shown (Zapf et al., 1996). Longitudinal designs provide more opportunities to validate theoretically hypothesized (regular) causal relationships, by means of rejecting alternative explanations (e.g., reverse causation, reciprocal causation), although it ought to be mentioned that in nonexperimental research causation *cannot* be proven (Frese & Zapf, 1988; Zapf et al., 1996). In the present study, we follow the recommendations with regard to the "ideal longitudinal design and analyses" formulated by Zapf et al. (1996) as much as possible.

Method

Design and Participants

We conducted a full panel design with two waves and used self-report questionnaires to measure the study variables. The questionnaires were administered at two time points with an interval of 1 year (April 1998 and April 1999). In line with de Jonge et al. (2001), who studied a similar research question as ours, we decided to use a 1-year interval. This period seems long enough to measure possible changes in individual scores and not too long for too many nonresponses (see de Jonge et al., 2001; Frese & Zapf, 1988). Furthermore, to prevent multiple testing from threatening the internal validity of the study, we left a sufficient time interval between the measurement points (Daniels & de Jonge, 2001). Time misspecifications may especially lead to problems when the time lag is too short (Kessler & Greenberg, 1981). In addition, a 1-year interval ensures that seasonal influences are stable (cf. Frese & Zapf, 1988; Hagenaars, 1990). Finally, emotional exhaustion is a particularly slowly developing process, which does not develop within a week but more likely within a year (see Schaufeli & Enzmann, 1998).

The questionnaires contained a code to identify participants in the second wave. Participants were guaranteed, however, that their responses would remain confidential. The study population consisted of bank employees working at the local offices of a large Dutch bank and teachers working at a center for technical and vocational training for 16–18-year-olds and adults. At Time 1, self-report questionnaires and endorsement letters signed by the management boards were administered to 1,144 employees by mail. Participants filled out the questionnaires at home. In total, 627 (55%) usable questionnaires were returned by means of a prepaid return envelope addressed to the researchers. At Time 2, 1,082 employees from the initial sample were still working at their organizations. They all received the second questionnaire, again by mail. This time, 426 (39%) questionnaires were returned. Our final study sample (the *panel* group) consists of 338 employees who filled out both questionnaires (i.e., 30% of the initial group). Unfortunately, a common feature of many panel studies is that a large part of the initial sample is lost due to attrition (cf. Hagenaars, 1990; Kessler & Greenberg, 1981). This issue is addressed in the Results and Discussion sections. The mean age in the panel group at Time 1 was 43.80 years (SD = 8.3). Sixty-five percent of this group were male.

Measures

All of the measures were administered in Dutch. Several scales had to be translated from English. Some of these scales had already been translated in previous research projects; we (the present authors) translated the scales of the personal characteristics. All Dutch translations used in the present study were checked by a native speaker of English.

Personal characteristics. The following measures of personal characteristics were used.

GNS was measured by means of a Dutch translation of a six-item-scale (range = 1–7) from the Job Diagnostic Survey (Hackman & Oldham, 1980). An example item is "I would like to have stimulating and challenging work."

NA was measured by means of a Dutch translation of a 10-item scale derived from the Positive Affectivity and Negative Affectivity Scale (PANAS; Watson, Clark, & Tellegen, 1988). Participants were asked to rate on a 5-point response scale the extent to which they, in general, experienced several mood states. Examples of the mood states are guilty, ashamed, nervous, and distressed.

US was measured by means of a Dutch translation of a nine-item scale (range = 1–5) developed by Wollack et al. (1971). An example item is "A worker who turns down a promotion is probably making a mistake." Factorial and reliability analysis indicated that the reliability and factorial validity of this scale were much better when one item was left out (i.e., "In choosing a job, a person ought to consider chances for advancement as well as other factors"). Inspection of this item revealed that it was an ambiguous item; that is, both people scoring high and low on US might agree with this item. Therefore, we decided to omit this item from the scale.

Work characteristics. The following measures of work characteristics were used.

Task characteristics were measured by means of a Dutch translation of a 15-item-scale of the Job Diagnostic Survey (Hackman & Oldham, 1980). This scale measures five task characteristics: autonomy, task variety, job feedback, task identity, and task significance (range = 1–7). An example item is "The job gives me considerable opportunity for independence and freedom in how I do the work." In line with suggestions of Fried and Ferris (1987), we combined these five task characteristics into a single, unweighted, additive index that reflects the motivating potential of a job (MPS additive index). According to Fried and Ferris, this simple additive index is a better predictor of work outcomes than the multiplicative MPS index, which was suggested by Hackman and Oldham (1980). In addition, the multiplicative MPS contains two cross-product terms, which may unnecessarily increase measurement error (Evans, 1991). Second-order factor analysis of the five task characteristics (i.e., factor analysis of the average sum scores of the five task characteristics using principal-axis factoring) showed that a one-factor solution was admissible at both measurement points, indicating that it is permitted to combine the five task characteristics into one index (explained variance was 40% at Time 1 and 47% at Time 2).

Workload was measured by means of a Dutch eight-item

scale (range = 1–5) that was developed by de Jonge, Landeweerd, and Nijhuis (1993). This scale consists of a range of quantitative and qualitative demanding aspects in the work situation, such as working under time pressure, working hard, and strenuous work. An example item is "In the organization where I work, work is carried out under pressure of time."

Social support was measured by means of a 10-item scale (range = 1–4) measuring emotional, informative, and appreciative support from both supervisors and colleagues. This scale was derived from a Dutch questionnaire on organizational stress (Questionnaire on Organizational Stress—Doetinchem; Bergers, Marcelissen, & de Wolff, 1986). An example item is "If problems exist at your work, can you discuss them with your colleagues?"

Unmet career expectations were measured by means of a five-item scale (range = 1–5) derived from an existing Dutch questionnaire (Buunk & Janssen, 1992). We selected five out of the eight items of this scale: unmet expectations regarding salary, responsibility, opportunities to develop knowledge and skills, job security, and position. For reasons of item overlap with other measures, the three remaining items (i.e., unmet expectations regarding support, self-determination, and creativity) were not included.

Outcome variables. The following measures of outcome variables were used.

Intrinsic work motivation was measured by means of a Dutch translation (i.e., translated and validated by Janssen et al., 1999) of a six-item scale (range = 1–7) derived from a questionnaire developed by Warr, Cook, and Wall (1979). An example item is "I take pride in doing my job as well as I can."

Emotional exhaustion was measured by means of a Dutch version of a five-item subscale (range = 1–7) of the Maslach Burnout Inventory—General Survey (Schaufeli, Leiter, Maslach, & Jackson, 1996). This version of the Maslach Burnout Inventory is suitable for use in all professions. An example item is "I feel tired when I get up in the morning and have to face another day on the job."

Turnover intention was measured by means of a four-item scale (range = 1–2) derived from a Dutch questionnaire on the experience of work (Questionnaire on the Experience and Evaluation of Work; van Veldhoven & Meijman, 1994). An example item is "I intend to leave this organization this year."

As mentioned earlier, the scales measuring the personal characteristics GNS, NA, and US were translated for the purpose of this study. Hence, we performed confirmatory factor analysis (using LISREL 8) to determine the construct validity of the Dutch versions of these scales. The results of these analyses are shown in Table 1.

Table 1 shows that all chi-square statistics (except one) are significant. However, when sample sizes are large, chi-square tends to be significant. The practical fit measures indicate a reasonable fit for all personal characteristics at both Time 1 and Time 2. All factor loadings in all models appeared to be significant ($p \leq .05$). In some models, we added several paths between correlated error terms, indicating similarity of the items concerned (de Jonge, 1995). The remaining measures used in the present study have proved to be valid and reliable in several other studies (e.g., de Jonge, 1995; Fried & Ferris, 1987; Janssen et al., 1999; Warr et al., 1979; Watson et al., 1988).

Data Analyses

Generally, we used covariance structure modeling (using LISREL 8) to analyze the data. A full covariance structure model basically consists of two components: (a) the measurement or factor-analytic model, which reduces observed measured variables to a smaller number of latent variables or factors, and (b) the structural equation model, which defines (causal) relationships among these latent variables (see Jöreskog & Sörbom, 1993b). However, simultaneous consideration of all observed variables (i.e., including all measurement models and covariance structure models in one analysis) may result in unreliable parameter estimates and insufficient power (Anderson & Gerbing, 1988; de Jonge et al., 2001; Jaccard & Wan, 1996; Schumacker & Lomax, 1996). Therefore, the present study simplifies the covariance structure model by assuming that the latent and observed variables are identical. In other words, there are no specified measurement models in the analyses. This procedure seems justified because the measures used in this study have generally proved to be valid, unidimensional, and reliable in the current or in previous research. Moreover, we did analyze the measurement models of the personal characteristics in the Method section.

Table 1
Confirmatory Factor Analyses of the Scales Measuring the Personal Characteristics at Time 1 and Time 2

Model	χ^2	*df*	RMSEA	AIC	AGFI	NNFI	CFI
GNS Time 1	12.21	8	.039	38.04	.97	.99	1.00
GNS Time 2	19.62*	8	.061	43.81	.95	.98	.99
NA Time 1	89.54*	32	.075	137.02	.91	.93	.95
NA Time 2	110.80*	32	.080	157.60	.89	.91	.93
US Time 1	31.95*	17	.053	70.68	.95	.93	.96
US Time 2	30.66*	15	.058	73.43	.94	.91	.95

Note. RMSEA = root-mean-square error of approximation; AIC = Akaike Information Criterion; AGFI = adjusted goodness-of-fit index; NNFI = nonnormed fit index; CFI = comparative fit index; GNS = growth need strength; NA = negative affectivity; US = upward striving.
* $p \leq .05$.

Results

Preliminary Analyses

First, we performed several dropout analyses[1] to test whether there were differences between the panel group and the dropouts (i.e., employees who participated in the first wave but not in the second). We concluded that the dropouts were comparable with the panel group and that no serious selection problems due to panel loss seem to have occurred.

To gain a first insight into the panel data, we computed the means, standard deviations, internal reliabilities, and zero-order Pearson correlations of the study variables (see Table 2). Table 2 shows that three variables had reasonable alphas (US at Time 1 and Time 2, unmet career expectations at Time 2, and intrinsic work motivation at Time 1), and all other variables had acceptable alphas (see Nunnally, 1978). Furthermore, Table 2 shows that the test–retest correlations between the personal characteristics at Time 1 and Time 2 are rather high. This finding supports our assumption that the personal characteristics are stable over time. The work characteristics and outcome variables appear to have high test–retest reliability also. In addition, the cross-sectional correlations show that the associations between work characteristics and personal characteristics on the one hand and outcome variables on the other generally meet our expectations.

Testing the Direct Longitudinal Relationships Between Personal Characteristics and Outcomes

Testing all longitudinal additive effects of all personal characteristics at once (i.e., including the longitudinal effects of the work characteristics) would yield a complex structural equation model, which can hardly be interpreted (Saris & Stronkhorst, 1984). A possible solution to this problem is to test a model including only personal characteristics and outcomes (i.e., testing direct relationships) prior to testing the additive effects over and above the effects of the work characteristics (i.e., simplifying the theory or model; see Saris & Stronkhorst, 1984). If direct longitudinal relationships between personal characteristics and the outcome variables appear not to be significant, it seems meaningless to go on testing for additive effects of personal characteristics (see Jöreskog & Sörbom, 1993a). A possible drawback of this procedure, however, is that the direct relationships between the personal characteristics and outcome variables can be attenuated. As a result, the personal characteristic may erroneously be excluded from further analyses (see Spector et al., 2000). According to Williams and Brown (1994), however, attenuation will only occur when the correlation between the work characteristic and the personal characteristic and the correlation between the work characteristic and the outcome have a different sign. As can be concluded from Table 2, this situation is not present in this study.

To test the *direct longitudinal* relationships between the personal characteristics and the outcomes, we used a cross-lagged panel model (using structural equation modeling; see Figure 1). We controlled for the variables gender and age (at Time 1), because these demographic variables may confound the results (cf. Brief et al., 1988; de Jonge et al., 2001; Schaufeli & Enzmann, 1998; Spector et al., 2000; Zapf et al., 1996). Consequently, in the LISREL models, these variables have to be labeled as exogenous, whereas all other variables (i.e., work characteristics, personal characteristics, and outcome variables) have to be labeled as endogenous (see Bollen, 1989, p. 126). We corrected for stability effects in all models to ascertain that the synchronous and cross-lagged relationships we may find were not influenced by high stability levels of the personal characteristics or the other variables.

In line with suggestions of Zapf et al. (1996), we

[1] The *t* tests revealed no significant differences with regard to the mean values of the work characteristics, most personal characteristics, and outcome variables: MPS (additive index), $t(584) = 1.39$, $p = .17$; workload, $t(584) = 0.63$, $p = .53$; social support, $t(584) = 0.95$, $p = .34$; unmet career expectations, $t(584) = 1.46$, $p = .14$; GNS, $t(584) = 1.63$, $p = .10$; NA, $t(584) = -2.44$, $p = .02$; US, $t(584) = -0.94$, $p = .35$; intrinsic work motivation: $t(584) = 0.21$, $p = .84$; emotional exhaustion, $t(584) = -1.04$, $p = .30$; and turnover intention, $t(584) = -1.52$, $p = .13$. In line with recommendations of Kessler and Greenberg (1981), we further examined whether the interrelationships among the Time 1 study variables were homogeneous for the dropouts and the panel group. We performed a cross-sectional, multigroup structural equation analysis using two corresponding correlation matrices (one for the panel group and one for the dropouts). We compared a model in which we specified the intercorrelations between the study variables as invariant for both the dropouts and the panel group with a model in which we specified the intercorrelations as noninvariant across both groups, by means of the chi-square difference test (Jöreskog & Sörbom, 1993b). The invariant model appeared to be the best model: $\Delta\chi^2(55) = 62.24$, *ns*.

Table 2
Means, Standard Deviations, Internal Reliabilities, and Pearson Correlations of the Study Variables (N = 323)

Variable	*M*	*SD*	α	1	2	3	4	5	6
Time 1									
1. MPS (add.)	5.14	0.66	.74	—					
2. Workload	3.39	0.63	.89	−.07	—				
3. Social support	3.05	0.42	.83	.39**	−.18**	—			
4. Unmet career expectations	3.39	0.77	.74	−.01	.18**	−.17**	—		
5. GNS	5.88	0.72	.88	.20**	.24**	−.08	.50**	—	
6. NA	2.08	0.61	.86	−.36**	.32**	−.34**	.00	−.08	—
7. US	2.86	0.49	.66[a]	.11*	.01	−.04	.39**	.31**	−.21**
8. Intrinsic work motivation	6.01	0.63	.67[a]	.16**	.17**	.01	.03	.14*	.08
9. Emotional exhaustion	2.81	1.13	.90	−.28**	.44**	−.37**	.02	−.03	.58**
10. Turnover intention	1.29	0.31	.73[b]	−.11*	.11*	−.23**	.26**	.26**	.12*
Time 2									
11. MPS (add.)	5.23	0.67	.79	.58**	−.05	.28**	.05	.15**	−.39**
12. Workload	3.48	0.61	.88	−.05	.65**	−.11	.12*	.21**	.27**
13. Social support	3.12	0.42	.83	.32**	−.12*	.56**	−.11	.01	−.26**
14. Unmet career expectations	3.27	0.69	.68[a]	−.02	.07	−.12*	.67**	.45**	−.07
15. GNS	5.74	0.86	.91	.12*	.20**	−.08	.39**	.63**	−.02
16. NA	2.10	0.60	.86	−.37**	.24**	−.30**	.02	−.09	.70**
17. US	2.81	0.48	.63[a]	.08	−.07	−.01	.26**	.24**	−.21**
18. Intrinsic work motivation	5.99	0.60	.71	.15**	.07	.04	−.01	.14*	.05
19. Emotional exhaustion	2.81	1.09	.90	−.21**	.29**	−.26**	.01	−.06	.47**
20. Turnover intention	1.30	0.32	.76[b]	−.15**	.05	−.13*	.19**	.24**	.08

Note. Missing values were handled by listwise deletion. MPS (add.) = motivating potential score (additive index); GNS = growth need strength; NA = negative affectivity; US = upward striving.
[a] According to Cortina (1993), Cronbach's alpha should be interpreted with caution. When the number of items in a scale is lower than approximately 12 items, Cronbach's alpha may be low also. Therefore, we computed the average item–inter (which should have values between .20 and .40) and item–total (which should have values between .20 and .80) correlations of the variables with an alpha level below .70. These were, respectively, US1 = .20/.40; US2 = .20/.32; unmet career expectations (2) = .30/.44; intrinsic work motivation (1) = .30/.43. These values are acceptable.
[b] KR20, which is a measure of internal reliability that is particularly appropriate for scales with dichotomous items. Its interpretation is equal to the interpretation of Cronbach's alpha.
* $p < .05$. ** $p < .01$.

compared the following nested structural equation models (these comparisons partly provide the opportunity to test Hypothesis 4):

M1: a model with synchronous paths between personal characteristics and outcomes, and temporal stabilities, but without cross-lagged structural paths (Arrows 1 and 2 in Figure 1).

M2: a model that is identical to M1 but also includes cross-lagged paths from Time 1 personal characteristics to Time 2 outcomes (regular causation, Arrows 3).

M3: a model that is identical to M1 but also includes cross-lagged paths from Time 1 outcome variables to Time 2 personal characteristics (reverse causation, Arrows 4).

M4: a model that is identical to M1 but also includes both cross-lagged patterns of relationships (reciprocal causation, Arrows 3 and 4).

Maximum likelihood was used to estimate the fit of the structural equation models (Jöreskog & Sörbom, 1993b). The results of the model comparisons are depicted in Table 3.

We may conclude from Table 3 that M2 (i.e., regular causation) had the best model fit. Although the chi-square statistic of M2 was still significant, fit indices that are less sensitive to sample size (e.g., nonnormed fit index [NNFI]) indicated a good fit (see Table 3). These results provide some support for Hypothesis 4. The power of Models M1 to M4 is ≥.80 for tests of close fit as well as not close fit,

7	8	9	10	11	12	13	14	15	16	17	18	19	20
—													
−.08	—												
−.11	.12*	—											
.21**	−.09	−.15**	—										
.13*	.18*	−.24**	−.10	—									
−.02	.14*	.31**	.14*	−.14*	—								
.01	−.03	−.29**	−.13*	.32**	−.26**	—							
.37**	−.11	−.04	.27**	−.01	.07	−.14*	—						
.28**	.10	.00	.18**	.15**	.19**	.01	.34**	—					
−.16**	.06	.46**	.14**	−.38*	.38**	−.36**	.00	−.02	—				
.69**	−.09	−.19**	.13*	.11*	−.11*	−.03	.37**	.24**	−.16**	—			
−.08	.50**	.11*	−.11*	.23**	.07	.06	−.06	.18**	.02	−.07	—		
−.12*	.06	.68**	.09	−.34*	.45**	−.34**	−.01	−.01	.58**	−.17**	.03	—	
.12*	−.03	.04	.55**	−.29*	.17**	−.23**	.31**	.14*	.19**	.11	−.13*	.14*	—

which is an acceptable power level[2] (MacCallum, Browne, & Sugawara, 1996).

Furthermore, it appeared that all synchronous relationships we specified in M2 were significant. The only significant *cross-lagged* path (after controlling for stability effects), however, was the relationship between Time 1 NA and Time 2 emotional exhaustion. Therefore, in testing the additive effects, we focused on NA. The beta coefficients of the significant structural paths in M2, as well as the explained variances of the outcome variables, are depicted in Table 4.

Table 4 shows that the beta coefficient of the cross-lagged relationship between Time 1 NA and Time 2 emotional exhaustion is negative, which is contrary to our expectations and does not line up with the sign of the synchronous paths between NA and emotional exhaustion and the bivariate relationship between Time 1 NA and Time 2 emotional exhaustion (see Table 2). This finding is probably due to *negative suppression*, a statistical artifact (see Maassen & Bakker, 2000). According to Maassen and Bakker, there is a fair chance of suppression in a structural equation model that includes variables that are measured at two time points, and in which the stability coefficients and synchronous path coefficients are substantially

[2] The power level reflects the likelihood of drawing a correct conclusion about a false null hypothesis (MacCallum et al., 1996). The power estimates given in this article are based on an alpha level of .05. For the test of close fit, $\varepsilon_0 = .05$ and $\varepsilon_a = .08$, where ε_0 is the null value of root-mean-square error of approximation (RMSEA) and ε_a is the alternative value of RMSEA. For the test of not close fit, $\varepsilon_0 = .05$ and $\varepsilon_a = .01$.

larger than the cross-lagged path coefficients. It is likely that this situation has occurred in our study and blurred the results. A possible way to interpret the results is suggested by Saris and Stronkhorst (1984), who recommended taking both direct and total effects of variables into account. When only direct effects are considered, it is possible to overlook certain relevant effects, especially when the direct effect and total effect do not have (approximately) the same magnitude (see also de Jonge, 1995; Jöreskog & Sörbom, 1993b; Schumacker & Lomax, 1996). It can be concluded from Figure 1 that the indirect effect of Time 1 NA on Time 2 emotional exhaustion consists of the following pathways: (a) Time 1 NA → Time 2 NA → Time 2 emotional exhaustion, and (b) Time 1 NA → Time 1 emotional exhaustion → Time 2 emotional exhaustion. The sum of the indirect effects was .63. Thus, the total effect of Time 1 NA on Time 2 emotional exhaustion was .63 – .17 = .46: Higher levels of NA at Time 1 lead to higher levels of emotional exhaustion at Time 2.

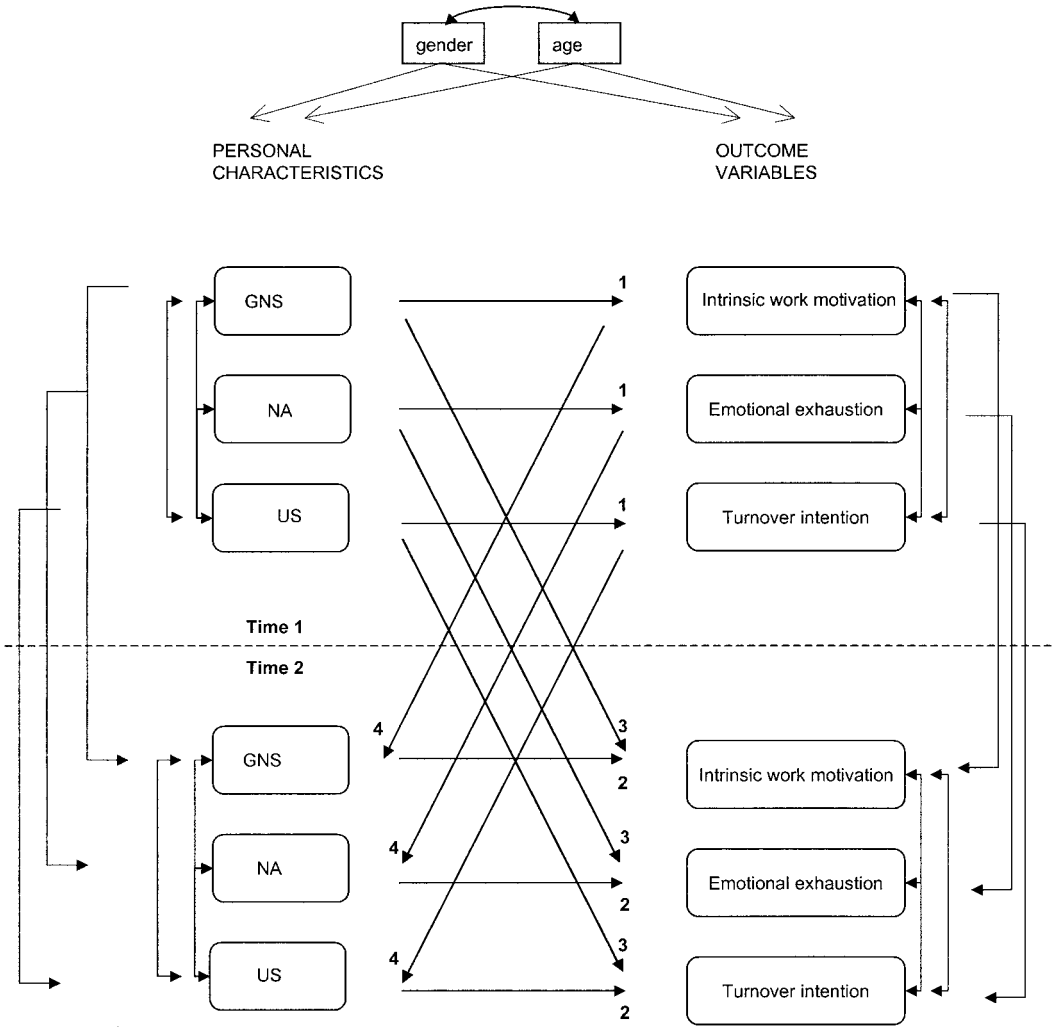

Figure 1. Cross-lagged panel model of personal characteristics and psychological outcome variables. GNS = growth need strength; NA = negative affectivity; US = upward striving.

Table 3
Fit Measures and Likelihood Ratio Tests of Nested Structural Equation Models in Testing the Direct Relationships Between Personal Characteristics and Outcomes

Model	χ^2	*df*	Comparison	$\Delta\chi^2$	Δdf	RMSEA	AIC	AGFI	NNFI	CFI
M1: no cross-lagged	95.87*	42				.061	218.36	.90	.92	.96
M2: cross PC_{T1} − OV_{T2}	85.14*	39	M1–M2	10.73*	3	.058	212.13	.91	.92	.97
M3: cross OV_{T2} − PC_{T1}	93.23*	39	M1–M3	2.64	3	.064	222.31	.90	.91	.96
M4: both cross	82.50*	36	M1–M4	13.37*	6	.061	216.44	.90	.92	.97
			M2–M4	2.64	3					

Note. RMSEA = root-mean-square error of approximation; AIC = Akaike Information Criterion; AGFI = adjusted goodness-of-fit index; NNFI = nonnormed fit index; CFI = comparative fit index; PC = personal characteristics; OV = outcome variables; T1 = Time 1; T2 = Time 2.
* $p \le .05$.

Testing the Additive Effect of NA

To test the longitudinal relationship between NA and emotional exhaustion, in addition to the relationships between workload and social support and emotional exhaustion (i.e., the additive effect of NA), we added NA to a structural equation model containing work characteristics and outcome variables (Janssen et al., 1999) at both Time 1 and Time 2. We compared the following nested models by means of the chi-square difference test:

M1: a model with synchronous and reciprocal cross-lagged paths between work characteristics and outcome variables.

M2: a model that is identical to M1 but also includes the synchronous paths between NA and emotional exhaustion (at both Time 1 and Time 2).

M3: a model that is identical to M2 but also includes the cross-lagged relationship between Time 1 NA and Time 2 emotional exhaustion (regular causation of NA).

M4: a model that is identical to M2 but also includes the cross-lagged relationship between Time 1 emotional exhaustion and Time 2 NA (reverse causation of NA).

M5: a model that is identical to M2 but also includes both cross-lagged relationships between NA and emotional exhaustion (reciprocal causation of NA).

The model comparisons indicated that M3 is the best model: M1 versus M2, $\Delta\chi^2(2) = 108.34$, $p \le .05$; M2 versus M3, $\Delta\chi^2(1) = 6.36$, $p \le .05$; M2 versus M4, $\Delta\chi^2(1) = 2.95$, *ns*; M2 versus M5, $\Delta\chi^2(2) = 9.31$, $p \le .05$; and M3 versus M5, $\Delta\chi^2(1) = 2.95$, *ns*. Hence, Time 1 NA has a longitudinal relationship with Time 2 emotional exhaustion, in addition to the relationships between workload and social support on the one hand and emotional exhaustion on the other[3] (i.e., Hypothesis

[3] Explained variances of emotional exhaustion in the Models M1 to M5 were as follows: for M1, R^2 Time 1 exhaustion = .28, R^2 Time 2 exhaustion = .57; for M2, R^2 Time 1 exhaustion = .44, R^2 Time 2 exhaustion = .60; for M3, R^2 Time 1 exhaustion = .44, R^2 Time 2 exhaustion = .61; for M4, R^2 Time 1 exhaustion = .44, R^2 Time 2 exhaustion = .61; and for M5, R^2 Time 1 exhaustion = .44, R^2 Time 2 exhaustion = .62.

Table 4
Beta Coefficients and Explained Variances of Model M2 (Regular Causation Model of Personal Characteristics and Outcome Variables)

Structural path	β	R^2 outcome variable
Time 1 GNS → Time 1 intrinsic work motivation	.17	.04
Time 1 NA → Time 1 emotional exhaustion	.55	.35
Time 1 US → Time 1 turnover intention	.13	.08
Time 2 GNS → Time 2 intrinsic work motivation	.15	.28
Time 2 NA → Time 2 emotional exhaustion	.42	.56
Time 2 US → Time 2 turnover intention	.07	.33
Time 1 NA → Time 2 emotional exhaustion	−.17	.56

Note. GNS = growth need strength; NA = negative affectivity; US = upward striving.

2a seems to be confirmed; Hypotheses 1a and 3a are not confirmed, however). The power of Models M1 to M5 in this test is higher than .90 for tests of close fit as well as not close fit (see Footnote 2). The practical fit indices of Model M3 were within acceptable limits: RMSEA = .067; Akaike Information Criterion (AIC) = 371.92; adjusted goodness-of-fit index (AGFI) = .86; NNFI = .89; comparative fit index (CFI) = .95. Therefore, we decided not to adjust the model any further. M3 is depicted in Figure 2 (only significant cross-lagged paths are shown, and we left out the arrows connecting the error variances between the endogenous variables).

It can be concluded from Figure 2 that both regular cross-lagged relationships have a negative sign. It seems likely that negative suppression has occurred again. The total effect of Time 1 NA on Time 2 emotional exhaustion was .36 (indirect effect is .50). In addition, the total effect of Time 1 workload on Time 2 emotional exhaustion was .15 (indirect effect is .37).

Testing the Moderating Effects of Personal Characteristics

The absence of direct or additive relationships does not imply that moderating effects do not exist (Aiken & West, 1991). Hence, we tested the moderating effects of all personal characteristics by means of subgroup analysis (Jaccard & Wan, 1996; Schumacker & Lomax, 1996). Subgroup analysis consists of two steps. In Step 1, a multigroup procedure is performed in which LISREL derives parameter estimates for two groups, without any constraints: a group scoring high on a certain personal characteristic and a group scoring low on this characteristic. In Step 2, however, the constraint is imposed that a specific path between a work characteristics and an outcome variable (i.e., the path that is hypothesized to be moderated by the personal characteristic under study) is invariant over the high and the low group. If this constraint adversely affects model fit, there is an interaction effect. For each personal characteristic, we divided our sample into three subgroups (scoring high, middle, and low on this personal characteristics), based on the values of the tertiles at Time 1. Each subgroup consisted of about 110 participants. To include groups that clearly differ regarding the scores on the personal characteristics, we used the high and the low group in our multigroup analyses (cf. Aguinis, 2001; Schumacker & Lomax, 1996).

In the first step, we entered a cross-lagged panel model with work characteristics and outcome variables at both Time 1 and Time 2 into the multigroup structural equation model (see Figure 3; cf. Jaccard & Wan, 1996; Schumacker & Lomax, 1996). We specified the structural paths between work characteristics and outcome variables according to the propositions of Janssen et al. (1999). Prior to testing the interaction effects of the personal characteristics, we tested the causal order of the work characteristics and outcome variables. To do so, we compared several nested structural equation models: M1 (no cross-lagged paths between work characteristics and outcomes), M2 (a model with regular causation: Time 1 work characteristics influence Time 2 outcome variables), M3 (a model with reverse causation: Time 1 outcome variables influence Time 2 work characteristics), and M4 (a model with reciprocal causation: both types of causation are specified). The model that appeared to be the best model in this first step, called Ma, was entered into the second step of analysis. In this second step, we tested whether applying invariance constraints on the synchronous (Mb) or synchronous and cross-lagged paths (Mc) significantly worsened the model fit of Ma. These constraints

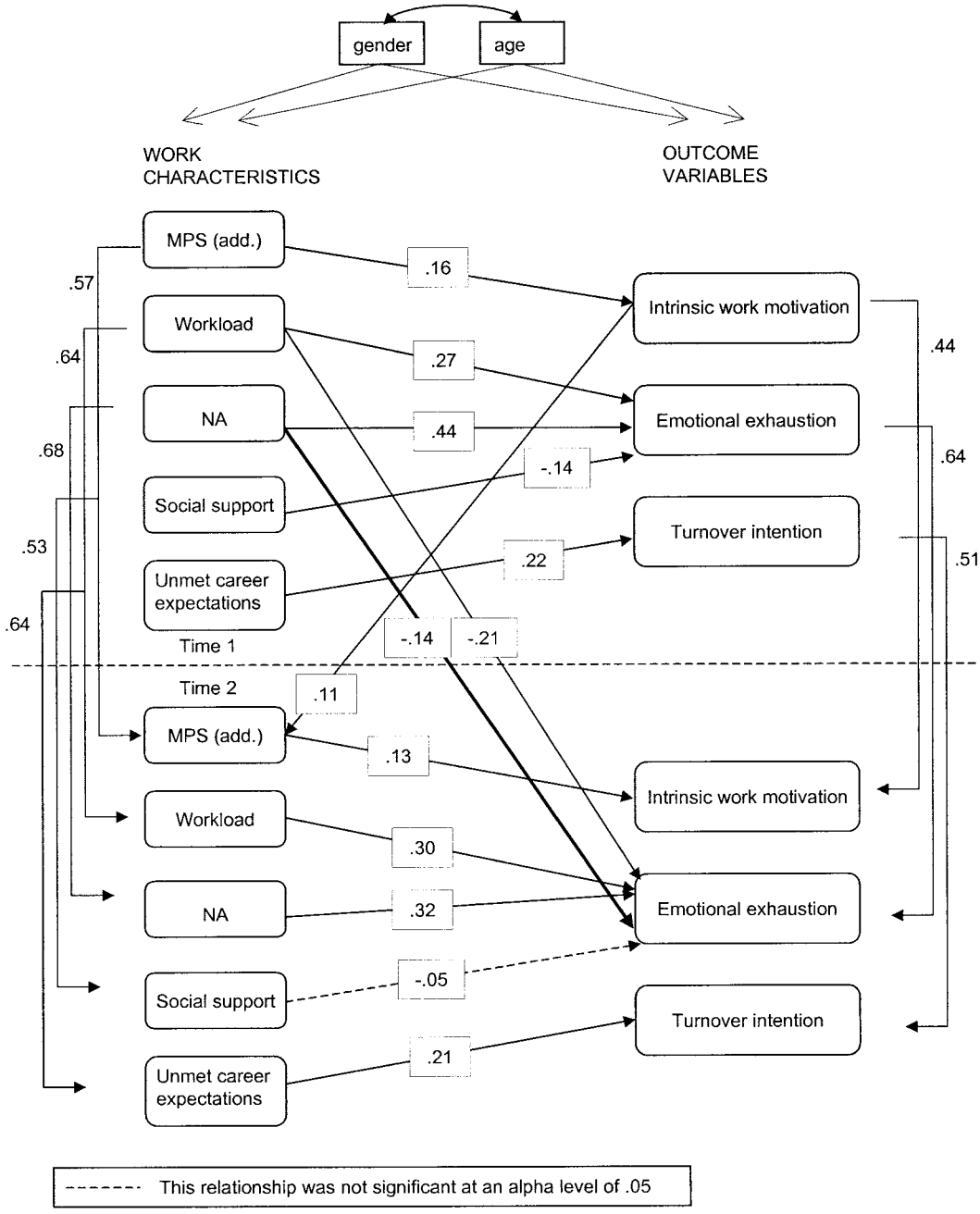

Figure 2. Final structural equation model of the additive relationship between negative affectivity (NA) and emotional exhaustion. MPS (add.) = motivating potential score (additive index).

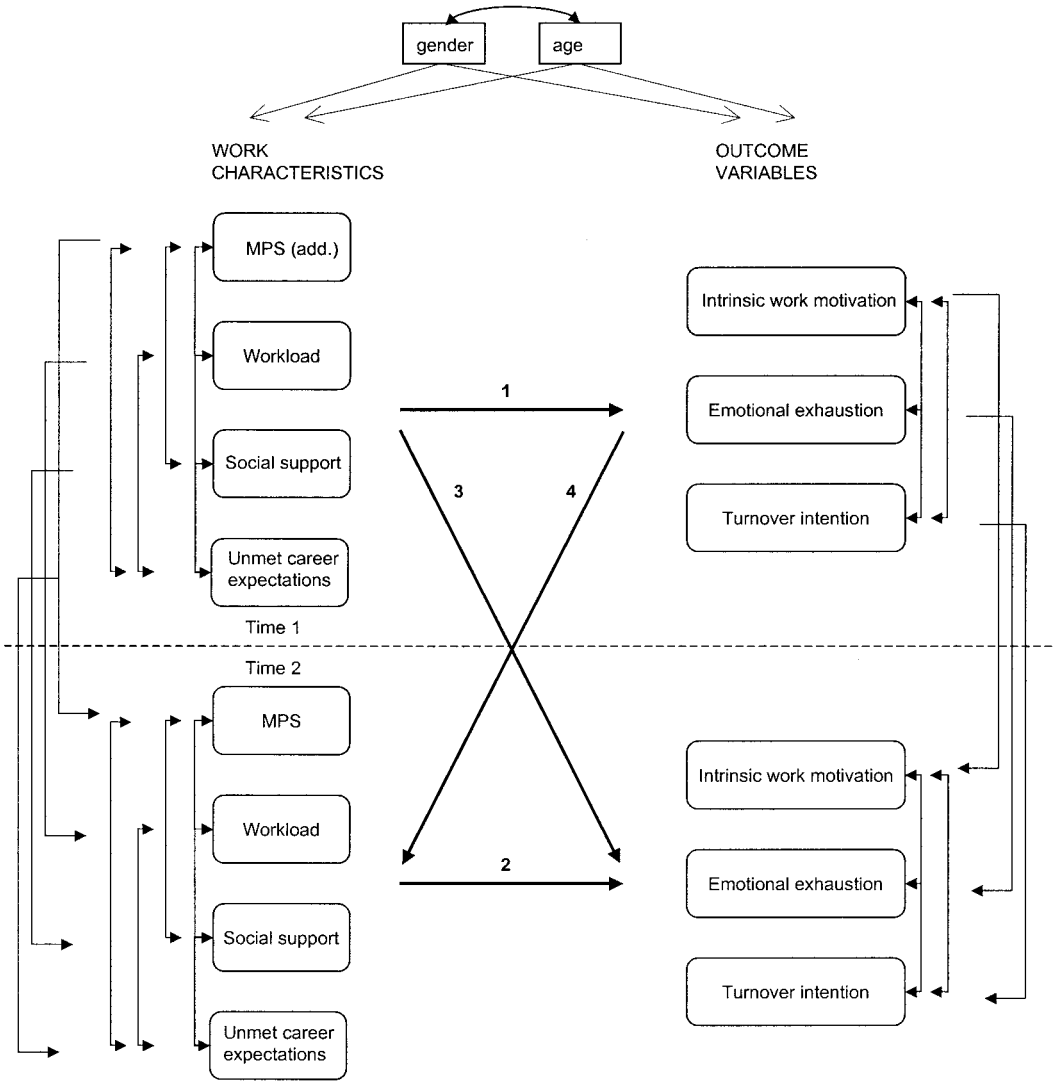

Figure 3. Cross-lagged panel model of work characteristics and psychological outcome variables used to test the moderating effects of personal characteristics. MPS (add.) = motivating potential score (additive index).

concern the relationship(s) the personal characteristic under study is hypothesized to moderate. In the case of NA, two additional models were tested (Md and Me), because NA is hypothesized to moderate two relationships. It appeared that for all personal characteristics, M2 was the best model in the first step of the multigroup analyses (i.e., Time 1 work characteristics seem to influence Time 2 outcome variables and not vice versa). This model was used as input model (Ma) in the second step.

Testing the moderating effect of GNS. The Step 2 results showed that the difference in chi-square between Ma and Mb was not significant, $\Delta\chi^2(2) = 0.37$, *ns*. In addition, the chi-square difference between Ma and Mc was not significant either, $\Delta\chi^2(3) = 1.50$, *ns*. Hence, Mc appears to be the best

model: The relationships between the additive MPS index and intrinsic work motivation appeared to be invariant over both groups: GNS does not moderate this relationship (i.e., Hypothesis 1b could not be confirmed). Table 5 shows the beta coefficients of the structural paths between the model variables for both the high and the low GNS group (Mc; common metric standardized solution). We can conclude that the relationship between the additive MPS index and intrinsic work motivation has the same strength and is positive for both the high and the low GNS group.

Testing the moderating effect of NA. With regard to the moderating influence of NA on the relationship between workload and emotional exhaustion, the Step 2 results showed that the difference in chi-square between Ma and Mb was significant, $\Delta\chi^2(2) = 7.93$, $p \leq .05$, just like the difference in chi-square between Ma and Mc, $\Delta\chi^2(3) = 10.02$, $p \leq .05$. These results indicate that NA moderates the relationship between workload and emotional exhaustion (i.e., Ma was the best model; Hypothesis 2b has been confirmed). With regard to the moderating influence of NA on the relationship between social support and emotional exhaustion, the results showed that the differences in chi-square between Ma and Md, $\Delta\chi^2(2) = 2.21$, *ns*, and between Ma and Me, $\Delta\chi^2(3) = 2.39$, *ns*, were not significant: NA does not moderate the relationship between social support and emotional exhaustion (Hypothesis 2c could not be confirmed). Table 5 shows that the synchronous as well as the cross-lagged relationships between workload and emotional exhaustion are stronger for people with high NA than for people with low NA. In both groups, however, the relationship between workload and emotional exhaustion is positive.

Testing the moderating effect of US. The Step 2 results showed that the chi-square difference between Ma and Mb was not significant, $\Delta\chi^2(2) = 2.47$, *ns*. The chi-square difference between Ma and Mc was not significant either, $\Delta\chi^2(3) = 2.47$, *ns*. We conclude that US does not moderate the relationship between unmet career expectations and turnover intention (i.e., Mc was the best model; Hypothesis 3b could not be confirmed). Table 5 shows that the relationship between unmet career expectations and turnover intention is positive for both the high and the low US group (Mc; common metric standardized solution). The power levels of the multigroup structural models tested above varies between .65 (i.e., modest) and .87 (i.e., acceptable) for tests of close fit as well as not close fit (see MacCallum et al., 1996; see Footnote 2).

Discussion

The findings that NA had longitudinal direct and additive relationships with emotional exhaustion and also moderates the relationship between workload and emotional exhaustion (longitudinal) can be considered the most salient result of this study. These findings imply that high NA people, who have a negative perspective on the world in general, are more likely to become emotionally exhausted than low NA people.

The finding of multiple effects of NA is in line with findings of Moyle (1995) and Spector et al. (2000). Spector and his colleagues, for instance, explained the interactive effect of NA by means of the hyperresponsivity mechanism, which states that high NA people have an exaggerated strain response (e.g., emotional exhaustion) to stressors (e.g., workload). It is not necessary that they perceive the stressors differently, rather it is their response to the stressors that differs. Examining the means of workload and emotional exhaustion among high and low NA people in our sample reveals that high NA people have somewhat higher scores on workload (mean difference is $0.7 \times SD$) but considerably higher scores on emotional exhaustion than low NA people (mean difference is $2.5 \times SD$).

As mentioned earlier, our results regarding multiple effects of NA are in line with the findings of Moyle (1995). However, Moyle performed only cross-sectional analyses, and we found *longitudinal* evidence for the multiple effects of NA. These results support the contention that NA is predictive of cross-situational stress (see also Costa & McCrae, 1980). In other words, we found support for the causal order of NA and emotional exhaustion (i.e., NA influences emotional exhaustion and not the other way around). However, in the cross-lagged panel model, we also found a turnaround of the sign of the cross-lagged relationships between workload and NA on the one hand and emotional exhaustion on the other, probably caused by the statistical artifact negative suppression (Maassen & Bakker, 2000). An alternative explanation for this result might be that this effect is caused by an adjustment (Frese & Zapf, 1988) or habituation (Gaillard, 1996) process. These processes imply that even although the stressor (e.g., workload) is still present, the dysfunctioning (e.g., emotional exhaustion) decreases. People get used to the presence of the stressor and learn to cope with it more effectively over time. We believe, however, that the first explanation (suppression) is more likely, be-

Table 5
Beta Coefficients of the Paths in the Best Structural Equation Models in Step 4 (Testing the Moderating Effects of the Personal Characteristics)

Structural path	Low GNS	High GNS	Low NA	High NA	Low US	High US
Time 1 MPS add. → Time 1 intrinsic work motivation	.08	.08	.16	.12	.19	.19
Time 1 workload → Time 1 emotional exhaustion	.28	.49	.12	.44	.42	.34
Time 1 social support → Time 1 emotional exhaustion	−.34	−.27	−.13	−.22	−.25	−.27
Time 1 unmet career expectations → Time 1 turnover intention	.05	.20	.11	.26	.21	.21
Time 2 MPS add. → Time 2 intrinsic work motivation	.11	.11	.11	.15	.09	.35
Time 2 workload → Time 2 emotional exhaustion	.45	.33	.31	.43	.25	.40
Time 2 social support → Time 2 emotional exhaustion	.04	−.19	−.20	−.05	.02	−.16
Time 2 unmet career expectations → Time 2 turnover intention	.11	.34	.20	.16	.21	.21
Time 1 MPS add. → Time 2 intrinsic work motivation	.08	.08	.18	.01	.02	−.06
Time 1 workload → Time 2 emotional exhaustion	−.43	−.15	−.27[a]	−.20[a]	−.26	−.21
Time 1 social support → Time 2 emotional exhaustion	−.12	.12	.10	.08	−.07	.07
Time 1 unmet career expectations → Time 2 turnover intention	.00	−.18	−.16	−.02	−.06	−.06

Note. GNS = growth need strength; NA = negative affectivity; US = upward striving; MPS add. = motivating potential score (additive index).
[a] The total effect of Time 1 workload on Time 2 emotional exhaustion was .06 in the low NA group and .27 in the high NA group.

cause of the positive bivariate correlations between Time 1 NA and Time 1 workload on the one hand and Time 2 emotional exhaustion on the other.

What are the practical implications of the findings regarding NA? First, organizations that are interested in the prevention of burnout should pay attention to work characteristics and to individual characteristics. A high level of NA in employees might, for instance, be diminished by means of personal training programs (see Zellars et al., 1999). Furthermore, Zellars et al. suggested that high NA individuals may respond very well to improving working conditions (e.g., a lower workload), even more so than low NA people. They based this on contentions of Fiske and Taylor (1991), who suggested that stimuli that are not expected by individuals are more salient to them than the expected stimuli. As high NA people generally expect negative stimuli, positive stimuli from their work environment may be more salient to them than to low NA people. This implies that high NA individuals respond more intensely than low NA individuals on positive and on negative stimuli in the work environment. Hence, interventions aimed at lowering the workload (a positive stimulus) may have positive effects for both high NA and low NA people, although high NA employees may benefit more. In line with Moyle (1995), we can conclude that the role of NA in the stress process is a complex one that cannot be explained by one mechanism or process. NA remains an important variable in stress research and may be a promising starting point for interventions at the workplace.

With regard to GNS, it appeared that this personal characteristic had a direct, synchronous, positive relationship with intrinsic work motivation. The higher employees score on GNS, the more they are intrinsically motivated to work well (in the short run). However, we could not demonstrate a longitudinal additive effect of GNS over and above the effects of task characteristics. Furthermore, in line with Tiegs et al. (1992), we could not demonstrate a moderating effect of GNS either. In line with Vogelaar and van der Vlist (1995), we may therefore conclude that for people scoring high on GNS, as well as for people scoring low on GNS, a stimulating work content may be motivating.

Our findings with regard to US are to a large extent similar to the findings regarding GNS. We found a direct synchronous relationship between US and turnover intention: People with high US are more inclined to leave the organization than people with low US. Longitudinally, we found neither an additive

nor a moderating effect of US. Furthermore, for both high and low US people, the relationship between unmet career expectations and turnover intention is positive. Thus, it is important for organizations to develop the career opportunities for all their employees. In this regard, paying attention to the work environment may be more worthwhile than a training program for individual employees.

In sum, GNS and US had synchronous effects on intrinsic work motivation and turnover intention, respectively, and NA had a longitudinal additive and moderating effect on emotional exhaustion over time. It might be that the true time lag of the first two relationships is shorter than the true time lag of the relationship between NA and emotional exhaustion. According to Zapf et al. (1996), in a study that uses a time lag of 1 year, a true 3 months time lag might be better represented by the synchronous effects than by the cross-lagged effects. Emotional exhaustion is, more than the other two outcome variables, a phenomenon that develops rather slowly (Schaufeli & Enzmann, 1998). In terms of Frese and Zapf (1988), this effect is called a *sleeper effect*. In addition, it is plausible that for people with high GNS, intrinsic work motivation develops rather quickly and not only after a year.

A methodological explanation for the finding that only one cross-lagged relationship between a personal characteristics and an outcome appeared to be significant might be found in the statistical technique we used. The true direct cross-lagged paths in a cross-lagged panel model might be underestimated as a result of the correction for stability effects (Dormann & Zapf, 1999). As can be concluded from Table 2, stability coefficients in the present study were rather high. Furthermore, the finding that only one out of the four expected moderating effects proved to be significant (even though we used two extreme groups to test the moderating effects) is also in accordance with contentions of Dormann and Zapf (1999), who stated that it is rather difficult to demonstrate moderating effects in longitudinal research in which prior states of mental health are controlled. According to them, this might be due to inappropriate time lags, nonspecific measures, insufficient variance in the model variables, and so forth. In the Results section, we have seen that the power level of the multigroup structural models (used to analyze the moderating effects) was, in some instances, somewhat lower than the desired level of .80 (see MacCallum et al., 1996). This might also be an explanation for the finding of only one moderating effect.

All in all, we believe our study method and results to be interesting, because we tested both synchronous and cross-lagged effects of several personal characteristics and work characteristics using a cross-lagged structural panel model that enables the test of causal predominance. Longitudinal studies in this specific area appear to be rather scarce (see Dormann & Zapf, 1999; Zapf et al., 1996). However, several limitations of the present study ought to be mentioned. First, there is the time lag problem, which was discussed earlier (see Kessler & Greenberg, 1981). This time lag problem is very difficult to solve and is intrinsic to longitudinal research. A second problem is attrition (i.e., panel loss). Our nonresponse analyses, however, showed that, generally, the panel group did not differ from the dropouts with regard to the variables under study. Third, in a nonexperimental study with two measurement points, it is difficult to demonstrate unambiguously the causality of relationships between variables (see also Zapf et al., 1996). The assessment of causality in a panel design rests on the logic of inquiry and the persuasiveness of the tests proposed to rule out alternative hypotheses. In this study, we followed the propositions Zapf et al. (1996) and de Jonge et al. (2001) made in this regard. Nevertheless, in the present study design, it is not possible to prove that personal characteristics influence outcome variables and not the other way around (Hypothesis 4). Fourth, in our structural models we controlled for the variables gender and age. In this regard, Spector et al. (2000) stated that when controlling for confounders, these variables should be related to the model variables but should not have substantial effects on the model variables. When controlling for potential confounders that have substantial effects on the model variables, one could be "throwing out the baby with the bathwater," that is, throwing away true variance between the model variables. Therefore, we checked the relationships between gender and age and the other model variables, and it appeared that the effects of gender and age on the other variables were, generally, not substantial (gamma varies between .03 and .15). Hence, we do not assume that we have partialed out true variance between the model variables. Other researchers (e.g., Schaufeli & Enzmann, 1998; Warr, 1987) have also shown that the variables gender and age are only slightly connected with the variables such as those in our research model. A final study limitation might be common method variance (leading to spurious relationships), because we used self-report questionnaires. We tried to limit this problem by selecting

self-report stressors that were as objective as possible, that were formulated in different terms from the outcome variables, and by using different scale ranges (see Spector et al., 2000).

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