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Defensive Coping in Relation to Casual Blood Pressure and Self-Reported Daily Hassles and Life Events

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Our aim was to investigate the relationships between defensiveness and repression, on the one hand, and self-reported stressor exposure and resting blood pressure, on the other hand. In addition, different operationalizations of defensiveness and repression were compared. Participants were 310 male and 90 female employees representing a wide range of occupations. Before a medical examination, all subjects completed questionnaires measuring defensiveness, anxiety, repression, daily hassles, and life events. After controlling for potentially confounding variables, multiple regression analyses revealed an inverse association between defensiveness and self-reported number of daily hassles and a positive link between defensiveness and resting systolic blood pressure. In general, the interaction between defensiveness and anxiety (representing repression) did not add to the predictive power of defensiveness and anxiety alone. The results support the notion that defensive individuals tend to underreport problems, while exhibiting elevated resting blood pressures.

KEY WORDS: blood pressure; defensiveness; daily hassles; life events; repression.

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INTRODUCTION

It has been hypothesized that chronic or recurrent exposure to psychosocial stressors plays a substantial role in the etiology of essential hypertension (Henry, 1988). However, in research on the relation between hypertension and self-reported life stressor exposure, attempts to find support for this view has yielded inconsistent results (for an overview, see Nyklíček *et al.*, 1996). For instance, although in a number of studies it has been found that hypertensives report more negative life events than normotensive control groups (Lal *et al.*, 1982; Myers and Miles, 1981; Osti *et al.*, 1980), in several other investigations the reverse pattern has been obtained (Linden and Feuerstein, 1983; Svensson and Theorell, 1983; Theorell *et al.*, 1986).

These inconsistencies may be due largely to confounding factors influencing retrospective self-reports. Studies which have yielded a positive association between blood pressure and self-reported life stressors were based predominantly on samples of hypertensive patients, who are inclined to respond differently to self-report questionnaires than hypertensives who are not aware of their elevated blood pressure (Irvine *et al.*, 1989). For instance, in several studies, aware hypertensives reported significantly more physical symptoms and psychological problems than normotensives and unaware hypertensives, the latter group in turn showing even lower scores than normotensives (Davies, 1970; Irvine *et al.*, 1989; Kidson, 1973; Monk, 1980; Nyklíček *et al.*, 1997). Awareness of having the disorder may facilitate a search for meaning resulting in elevated self-reported distress and stressor exposure rates. Alternatively, selection bias of complaining individuals in the hypertensive patient groups or medication may be responsible for the obtained relationship. Whichever explanation will prove to be valid, the important conclusion is that the potential bias accompanying inclusion of patient groups in the sample should always be accounted for (Nyklíček *et al.*, 1996).

The inverse association found in some of the investigations based on unselected, largely unaware samples, may have a different explanation. It has been suggested that defensive coping—used here as a concept covering a wide range of closely related constructs like repression, denial, and defensiveness—may mediate these inverse associations (Winkleby *et al.*, 1988). Indeed, some support has been claimed for an association between some of these constructs (e.g., repression and defensiveness), on the one hand, and both underreporting problems (Santonastaso *et al.*, 1984; Tibblin and Lindström, 1972) and elevated blood pressure (Cottington *et al.*, 1985; King *et al.*, 1990; Warrenburg *et al.*, 1989), on the other hand. To date no studies testing this hypothesis more directly have been available. Moreover, the

reported links have been obtained in investigations using different conceptualizations and operationalizations of defensive coping. For instance, repression, operationalized in terms of a high score on the Marlowe–Crowne Social Desirability Scale (SDS; Crowne and Marlowe, 1964) and a low score on anxiety, has been found to be predictive of elevated resting blood pressure (e.g., King *et al.*, 1990) and blood pressure reactivity (Jamner and Schwartz, 1986). Mere scores on the SDS—a frequently used operationalization of defensiveness (Shapiro *et al.*, 1995)—proved to be a good or occasionally even a better predictor of resting blood pressure (Warrenburg *et al.*, 1989) and blood pressure reactivity (Shapiro *et al.*, 1995). In addition, Weinberger (1989) has designed another related measure: the 11-item Repressive Defensiveness subscale (RD) of the Weinberger Adjustment Inventory (WAI). Therefore, it seems desirable to compare these various measures of defensive coping in relation to blood pressure and self-reported stressor exposure.

In research on hypertension and stressor exposure, elevated blood pressure has been studied frequently in relation to major life-threatening changes (Nyklíček *et al.*, 1996). However, chronic or recurrent exposure to minor everyday hassles is potentially more relevant for the etiology of (cardiovascular) diseases than experiencing relatively rare major life changes (Lazarus, 1990; Vingerhoets and Van Tilburg, 1994). Therefore, in the present study a measure of daily hassles was included.

Thus, the purposes of this study were to examine whether subjects scoring high on repression or defensiveness (i) report a *lower* frequency and impact of life events and daily hassles and, at the same time, (ii) demonstrate a *higher* resting blood pressure than low-scorers on repression or defensiveness, when controlling for awareness of having elevated blood pressure and other possible confounders. Our approach further implies a comparison between the various operationalizations of defensive coping, focusing on their interrelationships and their associations with the dependent variables. For purposes of congruence, we apply the three widely used operationalizations, as discussed above, for defensiveness, repression, and repressive defensiveness.

METHOD

Participants

Participants were recruited from employees of a wide range of companies in the southern part of the Netherlands, who participated in a periodic medical screening program (once per three years). The screening

program, carried out by the local Municipal Health Services (GGD), focused mainly on employees who were older than 40 years of age. Together with the invitation for the periodic medical examination, two consecutive samples of 400 employees received the request to complete a set of self-report questionnaires prior to the medical examination.

A total of 417 (52.1%) subjects (310 men, 90 women, and 17 participants who did not indicate their gender) returned the questionnaires. The sample characteristics of the responders are shown in Table I. Based on the following exclusion criteria, namely, the presence of diabetes mellitus, any form of kidney disease, a history of myocardial infarction or other heart disease, and present pregnancy, 21 participants were excluded from all main analyses.

Table I. Descriptive Statistics

Variable	Women	Men	*F*	*p*
Age	46.88	46.76	.02	NS
	(5.57)	(7.10)		
BMI	25.75	25.87	.10	NS
	(3.78)	(2.87)		
Cholesterol	5.65	5.72	.34	NS
	(0.95)	(1.06)		
SBP	132.67	137.59	5.95	.0151
	(17.93)	(16.53)		
DBP	82.64	85.84	7.59	.0061
	(10.37)	(9.46)		
Smoking[a]	3.44	4.69	1.91	NS
	(6.78)	(7.76)		
Alcohol[b]	6.35	11.31	25.65	.0001
	(6.36)	(8.56)		
Coffee[c]	4.31	5.82	23.27	.0001
	(2.66)	(2.61)		
Exercise[d]	1.43	2.24	6.17	.0134
	(1.56)	(2.95)		
Education[e]	11.99	11.94	.01	NS
	(3.16)	(3.38)		
Relaxation techniques[f]	0.25	0.05	34.85	.0001
	(0.43)	(0.22)		
Antihypertension medication[g]	0.03	0.08	2.17	NS
	(0.18)	(0.27)		

[a]Cigarettes per day.
[b]Glasses per week.
[c]Cups per day.
[d]Hours per week.
[e]Years of education.
[f]Practicing relaxation techniques, such as yoga: 0 = no, 1 = yes.
[g]Current antihypertension medication: 0 = no, 1 = yes.

The outcomes of the biomedical assessments were also registered in a random sample of 176 (46.0%) of the persons who did not complete and return the questionnaires. In this way, responders and nonresponders could be compared with respect to the biomedical data.

Measures and Biomedical Procedure

The Everyday Problems Checklist (EPCL; Vingerhoets and Van Tilburg, 1994) is a Dutch checklist consisting originally of 114 daily hassles that the participants may have experienced in the past 2 months. The hassles range from events that can be more or less dependent on the person's behavior, such as "your children didn't listen to you," to events that are less controllable, such as "you were stuck in a traffic jam." In addition to checking the events they have experienced, for each marked item the participants have to indicate "how strongly this did upset" them, using a 4-point scale. In this way, the list assesses both frequency and impact of daily hassles (labeled DH-F and DH-I, respectively). In the present study, two shortened versions were used: a 49-item version in sample I and a 69-item version in sample II. For purposes of statistical comparison, we transformed the distributions of the frequency scores of both samples into deciles.

Defensiveness was measured by a Dutch translation of a shortened version of the Marlowe–Crowne Social Desirability Scale (SDS; Crowne and Marlowe, 1964), based on an item analysis by Hermans (1971). In general, items loading high on social desirability factors but low on factors reflecting performance motivation and test anxiety were included in the shortened SDS. Two items were excluded because of low applicability to the Dutch situation: the original items 1 and 12. This resulted in a 15-item version—containing the original items 2, 4, 6, 11, 13, 15, 16, 19, 20 21, 22, 24, 25, 31, and 33—with a Cronbach α of .65 in the total sample.

Repressive defensiveness and anxiety were assessed applying the Repressive Defensiveness (RD) and Anxiety (ANX) subscales of the shortened version of the Weinberger Adjustment Inventory (WAI; Weinberger, 1989). The original English version of the RD subscale consists of 11 items reflecting mild undesirable, but common, behaviors, such as "Once in a while, I say bad things about people that I would not say in front of them" and "Once in a while, I say things that are not completely true." The participants indicate on 5-point scales to what extent an item corresponds with their usual behavior. Based on the results of a pilot study, in which two items of the translated version had too low corrected item-total correlations ($< .25$), in this investigation we used a nine-item version. The

ANX subscale consists of three anxiety items. In the present sample, the Cronbach α's of the RD and ANX subscales were .83 and .80, respectively.

A separate questionnaire was employed for assessing various control variables, such as gender, age, smoking, coffee and alcohol consumption, level of education, and family history of hypertension.

Sample I additionally completed the Life Experiences Survey (Sarason *et al.*, 1978), assessing the number of major life events experienced in the past year, as well as the positive and negative impact of the events (Antoni and Goodkin, 1989). In the present study, we derived the total number (frequency) of negative life events (LE-F), and the average impact of negative life events (LE-I).

Blood pressure data and blood samples were collected at the local Municipal Health Service center (GGD) in the morning, while the participants were sitting. Blood pressure level was measured once using a standard mercury sphygmomanometer by a nurse certified in blood pressure assessment. Within 3 min after the capillary blood sample was taken, serum cholesterol level was determined by the enzymatic color method using Reflotron (Mannheim Boehrinher, Amsterdam). In addition, length and weight of the participants were measured.

Statistical Analyses

All analyses were performed using SPSS software. First, Pearson product–moment correlations between the RD, SDS, and ANX scales were computed in order to examine their interrelationships.

Pearson correlation coefficients were also computed to examine univariate associations between the defensiveness/repression constructs, on the one hand, and the self-reported stress indices and blood pressure, on the other hand. The main analyses were six stepwise multiple regression analyses, in which each of the dependent variables (DH-F, DH-I, LE-F, LE-I, SBP, and DBP) was predicted by the defensiveness/repression variables, after controlling for potential confounders. Multiple regression analyses were preferred over the frequently used median split procedures because it has been demonstrated that in research on personality/coping style effects and their interactions, the multiple regression format is the better option for two main reasons (Bissonnette *et al.*, 1990). First, multiple regression analyses avoid loss of statistical power as a consequence of dichotomizing continuous variables. Second, they minimize Type I errors that may result from range-restriction artifacts because of confounding between the predictors (Bissonnette *et al.*, 1990). In addition to defensiveness and repressive defensiveness, the frequently applied interaction between SDS

scores and anxiety scores to measure repression (Weinberger *et al.*, 1979) was used. Specifically, the latter variable consisted of the cross-product of the scores on the two scales, after reversal of the anxiety scores. Thus, the highest scores on this SDS × ANX cross-product would be reached by repressors (high SDS and low ANX). For each dependent variable, the multiple regression analysis procedure was as follows. On step I, the control variables were entered using the STEPWISE option. In the analyses on daily hassles and life events, these were gender, age, education, alcohol consumption , and awareness and medical treatment of hypertension. Because of their potential relevance, the following 17 potential confounders entered the analyses of the blood pressure data on step I: gender, age, body mass index [BMI: weight/(length^2)], total cholesterol, education, marital status, cigarette smoking, alcohol and coffee consumption, period since the participant had stopped smoking (if applicable), being on a low-fat or low-salt diet, physical exercise, presence of a hypertensive mother or hypertensive father, practicing relaxation techniques such as yoga, and awareness and medical treatment of hypertension. On step II, scores on RD, SDS, and ANX were entered, again using the STEPWISE option. The SDS × ANX interaction term was added on step III to examine whether this operationalization of repression could significantly augment the predictive power of the other defensive constructs and ANX. All predictor effects were tested using the *t* statistic.

RESULTS

Nonresponders appeared to be somewhat older than the individuals who did return the questionnaires: 49.0 (SD = 6.8) vs. 46.8 (SD = 6.2) [$t(574) = 3.75$, $p < .001$]. However, the nonresponders did not differ from responders regarding blood pressure, body mass index, gender, and total cholesterol (p's > .10).

SDS correlated moderately with RD (.48; $p < .0001$) and weakly with ANX (−.13; $p < .05$). RD and ANX correlated −.32 ($p < .0001$).

In the analyses on the number of life events, only approximately 50% of the participants were included, as a result of the fact that only one of the two samples completed the LES. Unfortunately, an apparently complicated response format regarding the *impact* of negative life events was responsible for missing data in the case of 39% of these responders, resulting in a further reduced sample size on this particular measure.

Pearson product–moment correlation coefficients between the self-reported stress variables and SBP and DBP, on the one hand, and the defensive constructs and anxiety, on the other hand, are presented in Table

II. DH-F correlated negatively with all defensiveness/repression variables (r's ranging from −.21 for SDS to −.32 for SDS × ANX; p's < .0001), as well as positively with ANX (r = .28, p < .0001). DH-I correlated significantly only with ANX (r = .16, p < .005). LE-F showed a significant negative association with SDS (r = −.18, p < .05) and SDS × ANX (r = −.23, p < .005) and a positive one with ANX (r = .20, p < .02). Also, the other measure of impact of stressors, LE-I, showed a significant correlation only with ANX (r = .23, p < .05). The results of the multiple regression analyses, discussed below in more detail, are summarized in Table III.

Self-Reported Stressor Exposure

In analyses on DH-F, awareness of having elevated blood pressure and the use of antihypertensive drugs significantly covaried in the model. Specifically, awareness of hypertension showed a positive association with self-reported DH-F (β = .23, p < .005), whereas antihypertensive medication was inversely related to DH-F after entrance of awareness (β = −.20, p < .02). When RD, SDS, and ANX were introduced on step II, SDS [β = −.19, t(329) = −3.75, p < .0005] and ANX [β = .25, t(329) = 4.81, p < .0001] still were significant predictors of DH-F. This was not true for RD [β = −.05, t(329) < 1.0, p > .10], despite its significant univariate negative

Table II. Pearson Correlation Coefficients Between the Predictor and the Outcome Variables as Used in the Regression Analyses

	RD	SDS	ANX	SDS × ANX
DH-F	−.22***	−.12***	.28***	−.32***
DH-I	−.05	.03	.16**	−.09
LE-F	.00	−.18*	.20*	−.23**
LE-I	.02	.04	.23*	−.19#
SBP	−.06	.12*	−.01	.10#
DBP	−.02	.11*	−.03	.11*

Note. RD, Repressive Defensiveness; SDS, Marlowe–Crowne Social Desirability Scale (measuring defensiveness); ANX, Anxiety; SDS × ANX, interaction of SDS and ANX (measuring repression); DH-F, frequency of daily hassles; DH-I, impact of daily hassles; LE-F, frequency of negative life events; LE-I, impact of negative life events; SBP, systolic blood pressure; DBP, diastolic blood pressure.

*p < .05.

**p < .01.

***p < .001, and #p = .06, two-tailed. $N \geq 349$ for DH-F, $N \geq 332$ for DH-I, $N \geq 157$ for LE-F, $N \geq 96$ for LE-F, $N \geq 351$ for SBP, and $N \geq 350$ for DBP.

Table III. Summary of the Significant Predictors in the Multiple Regression Analyses

	Step I	Step II	Step III (total r^2)
DH-F	Awareness (β = .23**)	SDS (β = −.19***)	
	Anti-HT[a] (β = −.20*)	ANX (β = .25***)	.15
DH-I	Gender[b] (β = .14**)	ANX (β = .15**)	
	Education (β = −.15**)		.07
LE-F	Education (β = .21*)	ANX (β = .22**)	.09
LE-I		ANX (β = .23*)	.05
SBP	Multiple[c]	SDS (β = .11*)	.19
DBP	Multiple[c]		SDS × ANX (β = .11*) .25

Note. For abbreviations, footnote to Table II.
[a]Antihypertensive medication.
[b]Women coded 1 and men coded 0.
[c]Multiple control variables were significant predictors: gender (β = −.11*), age (β = .20***), BMI (β = .17**), use of antihypertensive medication (β = .18**), and maternal hypertension (β = .12*) for SBP and gender (β = −.13**), age (β = .19***), BMI (β = .23***), use of antihypertensive medication (β = .18***), and being on a low-fat or low-salt diet (β = .11*) for DBP.

correlation with DH-F (see Table II). SDS × ANX did not improve prediction on step III [β = −.04, $t(329) < 1.0$, $p > .10$].

Gender and education significantly covaried in analyses on DH-I: being female (β = .14, $p < .01$; women coded 1 and men coded 0) and low education (β = −.15, $p < .01$) were associated with higher rates of DH-I. After entering ANX in the equation on step II [β = .15, $t(316) = 2.69$, $p < .01$], none of the defensive variables could predict DH-I significantly [β's < .02, t's(316) < 1.0, p's > .10].

Education was the only control variable showing a significant association with LE-F (β = .21, $p < .02$), indicating that more negative life events were reported by higher-educated participants. On step II, ANX entered the equation, showing a positive association with LE-F [β = .22, $t(146) = 2.77$, $p < .01$]. RD and SDS, however, failed to predict LE-F [β = −.13, $t(146) = -1.58$, $p > .10$, and β = −.09, $t(146) = -1.14$, $p > .10$, respectively]. On step III, SDS × ANX did not add to the predictive power of ANX [β = −.09, $t(146) = -1.07$, $p > .10$].

In the analyses on LE-I, none of the control variables showed a significant association with LE-I (p's > .10). Again, on step II, only ANX was a significant predictor [β = .23, $t(90) = 2.27$, $p < .05$]. RD and SDS did not enter the equation [β's < .09, t's(90) < 1.0, p's > .10]. Finally, also SDS × ANX failed to add to the predictive power of ANX [β = .01, $t(90) < 1.0$, $p > .10$].

Blood Pressure

In analyses with blood pressure as the dependent variable, gender, age, BMI, and the use of antihypertensive medication were significant predictors of both SBP and DBP. Men had higher SBP ($\beta = -.11$, $p < .05$; women coded as 1 and men as 0) and DBP ($\beta = -.13$, $p < .01$). Age was positively associated with SBP ($\beta = .20$, $p < .0005$) and DBP ($\beta = .19$, $p < .0005$), as were BMI ($\beta = .17$, $p < .005$, and $\beta = .23$, $p < .0001$, for SBP and DBP, respectively) and the use of antihypertensive medication ($\beta = .18$, $p < .005$ for SBP and $\beta = .18$, $p < .001$, for DBP). In addition, the presence of maternal hypertension was positively associated with SBP ($\beta = .12$, $p < .05$), and being on a low-fat or low-salt diet correlated positively with DBP ($\beta = .11$, $p < .05$). The positive associations between blood pressure and indices of medical treatment of hypertension probably result from effects of being hypertensive on the latter variables rather than visa versa. Therefore, we also performed analyses in which these two indices of medical treatment were omitted. The results with respect to the effects of defensiveness/repression reported below were essentially identical.

On step II, after control for the potential confounders, SBP was significantly predicted by SDS [$\beta = .11$, $t(302) = 2.06$, $p < .05$]. However, RD and ANX failed to predict SBP [β's $< .05$, t's$(302) < 1.0$, p's $> .10$]. SDS $\times$ ANX could not add to the predictive power of SDS [$\beta = .05$, $t(302) < 1.0$, $p > .10$] on step III.

In the analysis on DBP, none of the variables entered the equation on step II: RD [$\beta = .00$, $t(300) < 1.0$, $p > .10$], SDS [$\beta = .09$, $t(300) = 1.49$, $p > .10$], and ANX [$\beta = -.08$, $t(300) = -1.40$, $p > .10$]. However, on step III, SDS $\times$ ANX showed a significant positive association with DBP [$\beta = .11$, $t(299) = 1.98$, $p < .05$].

DISCUSSION

The major aim of the present study was to test whether repression or defensiveness would be associated with *low* self-reported frequency and impact of life events and daily hassles and, at the same time, a relatively *high* resting blood pressure. Our findings indicated that these hypotheses could be supported for some outcome variables, the results being dependent on the operationalization of the constructs.

With respect to the relationship of these constructs with self-reported *frequency* of negative life events, the predicted inverse correlations could be demonstrated for defensiveness (Marlowe–Crowne SDS) and repression (SDS $\times$ ANX): the higher the score on defensiveness or repression, the fewer

events were reported. However, in the regression analysis, after controlling for potential confounders and anxiety, none of the defensiveness/repression constructs predicted the frequency of negative life events significantly. Repressive defensiveness, as measured by the Weinberger RD scale, failed to show any association with this outcome variable. In fact, the only dependent variable to which this scale was substantially related was the number of self-reported daily hassles, a variable with which all defensive coping predictors correlated negatively, confirming the hypothesis. In the multiple regression analysis, only defensiveness remained a significant predictor, together with anxiety, which was positively associated with DH-F. Repression and repressive defensiveness did not add to the predictive power of defensiveness and anxiety. With respect to the two variables regarding self-reported *impact* of stressors (of both negative life events and daily hassles), neither of the defensive coping constructs showed significant effects. Only anxiety predicted significantly these outcome variables: again the associations were in the positive direction.

In conclusion, the first hypothesis has been partially supported. Both the Marlowe–Crowne SDS and the SDS $\times$ ANX showed significant inverse correlations with self-reported frequency of experienced life events and daily hassles, although for life events these associations disappeared in regression analyses after controlling for education and anxiety. In no case did repression add to the predictive power of the main effects of defensiveness and anxiety.

Contrary to expectations, no defensiveness or repression effects were obtained on perceived impact of stressors. It may be speculated that repressors and defensive persons would rather forget about the whole thing instead of just reducing cognitively the appraised aversiveness of a stressful event, an issue to be investigated in future studies. Interestingly, from an information processing perspective, evidence has been obtained that processes involved in both encoding and recall of affect-laden information can play a substantial role in defensive coping (Cutler *et al.*, 1996; Holtgraves and Hall, 1995). Research aiming at studying cognitive processes underlying the relationship between various defensive coping styles and self-reports regarding unpleasant information should be encouraged. Finally, the stronger effects regarding daily hassles compared with life events might be a result of the fact that major life stressors usually are more difficult to forget or repress than minor daily hassles. Nevertheless, the present outcomes are in agreement with the view that minor daily hassles may be at least as relevant to models of psychosomatic illness as major life events (Lazarus, 1990; Vingerhoets and Van Tilburg, 1994).

Awareness of having hypertension played only a minor role in the present study. Only with respect to the frequency of daily hassles was a sizable

effect obtained, as evidenced by a higher number of self-reported daily hassles for the aware hypertensives. This effect corroborates previous findings that aware hypertensives report more problems of various kinds, including psychological and physical symptoms, than both unaware hypertensives and normotensives (Davies, 1970; Irvine *et al.*, 1989; Kidson, 1973; Monk, 1980; Nyklíček *et al.*, 1997). However, awareness was not related to defensiveness. When we compared aware hypertensives with unaware hypertensives on the three defensive coping measures, no differences between the groups emerged. These results indicate that defensiveness is equally present in both hypertensive groups, independent of awareness of having the disorder.

The finding that anxiety correlated positively with all self-report measures of stressor exposure suggests a general negative affectivity effect in these measures. This effect seems to be largely independent from defensiveness, as indicated by the low correlation between SDS and the anxiety scale. In contrast, the negative affectivity effect does not show a relationship with blood pressure: anxiety was not associated with either blood pressure measure. The latter outcome is consistent with previous research conducted on predominantly unaware samples (Irvine *et al.*, 1989; Monk, 1980).

With respect to blood pressure levels, again, the three operationalizations of defensiveness/repression differed in their effects. The Weinberger RD scale failed to show any significant associations with blood pressure. In contrast, consistent with our predictions, defensiveness and repression correlated positively with both SBP and DBP, although the association between repression and SBP just failed to reach significance. In the regression analysis on SBP, again repression did not add to the predictive power of defensiveness. However, the results were slightly different with respect to DBP. After controlling for demographic and biomedical variables, defensiveness no longer predicted DBP significantly. In contrast, the effect of repression still reached significance. In summary, support has been found for the second hypothesis also. In previous research, repression has been found to be associated with higher resting SBP (King *et al.*, 1990), but in another study (Warrenburg *et al.*, 1989), defensiveness predicted resting SBP better than repression. Our outcomes are in line with the view that although both constructs are associated with blood pressure, the repression operationalization does usually not add to the predictive power of defensiveness alone. On the other hand, with respect to DBP, repression seems to be slightly better in preserving its association with DBP after controlling for demographic and biomedical variables.

Evidence is accumulating for the view that some defensive coping strategies are associated with elevated systolic blood pressure (Cottington *et al.*, 1985; Jorgensen *et al.*, 1996). However, this does not necessarily imply a causal relationship between the two variables. Prospective studies in

which young defensive/repressive individuals are followed up would enhance our knowledge in causal issues. In future research, emphasis should be on attempts to differentiate more clearly between various aspects of defensive coping that may be crucial in the association with elevated blood pressure. For instance, it has been demonstrated that the Marlowe–Crowne SDS contains both self-deception and impression management, two relatively independent aspects of defensiveness originally described by Sackheim and Gur (1978) and later modified and operationalized by Paulhus (1984). Self-deception refers to the tendency to give favorably biased but honestly held self-descriptions, whereas impression management comprises the tendency deliberately to describe oneself to others in a too favorable light (Paulhus and Reid, 1991). Paulhus' work resulted in a psychometrically sound questionnaire measuring both aspects of defensiveness (Kroner and Weekes, 1996; Paulhus, 1990). Later, factor analytical studies by Paulhus and Reid (1991) demonstrated that scales measuring self-deception contain a relatively independent subfactor, reflecting a person's tendency to exaggerate one's own positive cognitive attributes (termed self-deceptive enhancement). It has been demonstrated that this aspect is positively associated with psychological adjustment, as indexed by high self-esteem and low levels of anxiety and neuroticism (Paulhus and Reid, 1991). It would be of considerable importance to examine if these different defensive aspects also relate differentially to cardiovascular adjustment, in terms of both acute cardiovascular reactivity to stressors and tonic blood pressure levels (Warrenburg *et al.*, 1989). Recently, still other questionnaires have been designed to tap different aspects of defensiveness [e.g., self-concealment (Ritz and Dahme, 1996)], which may prove useful in investigations regarding the relationship between defensive coping and blood pressure. The final result of this approach may be the design of behavioral therapies to treat essential hypertension in some subgroups of patients or perhaps even for prevention purposes in at-risk subpopulations.

A limitation of the present study is the fact that blood pressure assessment was based on a single measurement at a municipal health service center, which may have resulted in exaggerated blood pressure levels in high-anxious or neurotic individuals (Lew, 1990). However, it has been demonstrated that hypertension, when not confounded with awareness of having the disorder, is not associated with elevated anxiety or neuroticism (Irvine *et al.*, 1989; Monk, 1980). This finding gives us confidence that these psychological factors did not result in any exaggerated casual blood pressure values in participants with a high resting blood pressure. Rather, blood pressure may have been assessed somewhat less reliably, which would reduce the probability of finding any significant effects. Hence, the reported effects may be too conservative. The same holds for the fact that our short-

ened version of the Marlowe–Crowne SDS had a rather modest coefficient of internal consistency (Cronbach α = .65). Partially, this would be expected if the SDS truly reflects the two relatively independent factors self-deception and impression management, but it may also indicate a lower reliability of the measured scores. The latter effect would, again, mean a lower probability of finding the significant effects, which were obtained in the present study. Nevertheless, the results should be interpreted with some caution.

The finding that defensive individuals both report less daily hassles and exhibit higher resting systolic blood pressures provides support for the view that the inverse associations found between blood pressure and self-reported problems (Linden and Feuerstein, 1983; Svensson and Theorell, 1983; Theorell *et al.*, 1986) may be a result of a mediating effect of defensive coping. However, it should be noted that nonsignificant results in research on the relationship between blood pressure and self-reported hassles might also be a result of a mediating effect of defensive coping. If one assumes that exposure to stressful events indeed contributes to tonic elevation of blood pressure, one would consequently expect this to be reflected by a positive statistical association between blood pressure and stressor exposure. However, if elevated blood pressure at the same time is linked to defensive coping, this may diminish any positive statistical relationship. In this context, it is interesting that, in contrast to findings from research based on objective measures of stressor exposure, which has obtained predominantly positive associations with tonic blood pressure (Baum, 1990; Cobb and Rose, 1973; D'Atri *et al.*, 1981; Harburg *et al.*, 1970; Rofé and Goldberg, 1983), studies using self-reports have yielded mixed results (Lal *et al.*, 1982; Linden and Feuerstein, 1983; Myers and Miles, 1981; Svensson and Theorell, 1983; Theorell *et al.*, 1986). These observations suggest that nonsignificant results in research on the relationship between self-reported stressor exposure and blood pressure do not necessarily imply a nonexisting association between (objective) stressor exposure and blood pressure. Therefore, in future research, emphasis should be on (i) including potential moderator and mediator variables (Baron and Kenny, 1986) in the relationships between hypertension and self-reported stressor exposure, such as awareness of hypertension and defensive coping, and (ii) assessing stressor exposure simultaneously both in an objective way and by means of the more subjective self-reports.

The differential predictive power of the different defensive coping operationalizations is not surprising, in view of the relatively modest correlation (.48) between the Marlowe–Crowne SDS and the Weinberger Repressive Defensiveness scale. In addition, if one would apply median split procedures on both scales, as many as 41.6% of the high-RD members

would be classified as low SDS, indicating that substantial proportions of the scales' variances are unique. The relatively small overlap may be due largely to the different response format and emphasis of the scales. While the RD uses 5-point scales on which the participants indicate to what extent they usually exhibit various *undesirable* behaviors, in the SDS one responds using a true-or-false format to items reflecting for a major part *desirable* behaviors. In comparing the success of the three ways of measuring defensive coping, it can be concluded that, in general, the SDS × ANX interaction and the classification based solely on scores on the Marlowe–Crowne SDS seem to be more suitable for investigating the effects of defensive coping on self-reported number of stressors and blood pressure than the Weinberger RD scale. Thus, these scales also seem most adequate for the examination of the role of defensive coping in the relatively low self-report rates of stressors in hypertensives. Finally, given the fact that, in general, the SDS × ANX interaction did not add to the predictive power of SDS, the use of the SDS scale alone may be preferred for the purpose of simplicity.

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