

care of prisoners for more than 20 a and were dissatisfied with their jobs. This result indicated that, in spite of the relatively low perceived health of the older employees, some of them were almost as healthy as the younger employees because of certain personality characteristics and a comparatively short work experience in prisons. This group was however small (N = 28).

The health status of the average groups was related to age, self-control, occupation, length of service, and job satisfaction.

Discussion. Age and duration of exposure to the effects of work in prisons reflected by length of service were by far the best predictors of perceived health status with respect to both the interactive combinations and the individual correlation ratios (table 10). This is an important finding in comparison to the predictors of perceived symptoms. It could be expected that health status as an indicator of more chronic and severe health disorders, as shown by the corresponding factor analysis, is related to one of the most definite risks of health, increasing age. A strong relation between age and physical health and a considerably weaker relation of age to perceived psychological symptoms has been reported also elsewhere (50). Duration of work experience implies chronicity and a long-term basis of the etiology of the illness indicator as a function of cumulating work stress combined with ageing. Occupation and size of prison can be considered also as corresponding global indicators of work stress. The overcrowding of prisons is, however, on the basis of its individual correlation ratio with health status, about as equally powerful as a predictor of health status.

The indicator of ego strength, self-control, can be interpreted as a coping resource against the impairment of health.

Relation of diastolic blood pressure to background factors

Introduction. A chronic elevation of blood pressure, essential hypertension, is a common public health problem in many industrialized countries. Among the adult Finnish population about 15 to 20 % has

a blood pressure above the limits of normal: diastolic blood pressure 95 mm Hg and/or systolic pressure 160 mm Hg (15). Hypertension has proved to be an important risk factor of, especially, cardiovascular diseases. It has sometimes been called a precursor of illness (128).

The mechanism and the etiology of hypertension have not been completely explained. It is known that blood pressure is a function of genetic factors, life experiences, living habits, and situational factors. Age and sex are well known determinants of blood pressure. There is also much evidence on the relation of overweight, salt intake, smoking, alcohol, and coffee to blood pressure level. The direct causal relation of all of the presented factors has not been confirmed.

Psychological and social factors are strongly suspected to play a role in the etiology of hypertension (20, 31, 96, 107). Evidence for their influence comes from five fields of research (244): retrospective studies of past experiences of hypertensives, acute elevation of blood pressure in man and animals, chronic hypertension following stressful experiences in man and animals, control of blood pressure by behavioral modification techniques, and personality characteristics of hypertensive persons.

A temporary rise in blood pressure in response to situations that are subjectively experienced as exciting, demanding or threatening is a well known phenomenon and a part of the general adaptation process. A situational elevation of blood pressure usually disappears rather quickly. A continuous exposure to situational factors that elevate blood pressure has been supposed to lead to a chronic state of hypertension.

In the study of occupational stress, repeated findings have been reported on the relations between certain work factors and blood pressure. In occupations with a demand for continuous alertness and a high responsibility, blood pressure has been found to be elevated, eg, among air traffic controllers (49) and car drivers (207). A high incidence of hypertension has also been found among telephone operators with a constantly heavy work load in a large exchange (161). In these studies some possibly interacting variables

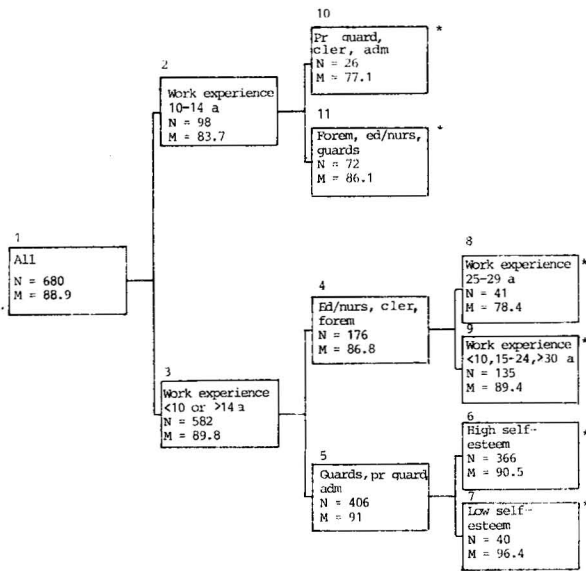


Fig 19. Diastolic blood pressure: Main predictors, their interactions and division of subjects into groups by the automatic interaction detector (AID) analysis. (adm = administrators, pr guard = principal guards, cler = clerical staff, forem = foremen, ed/nurs = educational and nursing staff)

like work experience have not always been controlled. In a study carried out 50 years ago prison guards were found to have higher blood pressure than the prisoners in Mexican prisons (6). The importance of this finding is, however, lessened by the fact that the guards studied were applying for new posts at the time of the blood pressure measurements. They may have been situationally more anxious than usual with a concomitant rise in blood pressure.

Hypertension was a common problem in the prison study sample (fig 12). For this reason it seemed important to determine whether the studied work conditions and individual factors were related to a variation in diastolic blood pressure. The aim of this study was not a systematic survey of all types of possible or probable risk factors of high blood pressure.

The whole study sample was included in the analysis. The separation of the males and the females was not considered necessary in this preliminary analysis because the proportion of women in the study sample was rather small (14%). In addition, the differences in diastolic blood pressure become reduced in older age groups.

Results. The results of the AID analysis on the diastolic blood pressure are presented in fig 19. The following independent variables in the analysis formed in-

teractions in predicting the diastolic blood pressure: length of service, occupation, and self-esteem.

The total study sample was first divided into two subgroups by work experience. The low blood pressure group included those who had worked in prisons 10-14 a (group 2). The others belonged to the higher blood pressure group (group 3). Those who had worked in prisons for more than 14 a formed the largest part of this group. It also included the employees with less than 10 a of work experience, but their proportion was relatively small.

The high blood pressure group was further divided by occupation (groups 4 & 5). To the group of higher blood pressure (group 5) belonged the administrators, principal guards and guards, ie, the occupations responsible for the maintenance of order and the enforcement of punishment. The mean blood pressure in this group exceeded the upper limit of normal. The educational, nursing, and clerical staff and the foremen belonged to the group with lower blood pressure (group 4).

Group 5, with relatively high blood pressure and including occupations responsible for the maintenance of order and punishment, was further subdivided into two groups by self-esteem. Those with low self-esteem (group 7) had a higher diastolic blood pressure (96.4 mm Hg) compared to those (group 6) with high self-esteem (90.5 mm Hg). Group 4, comprised

of occupations not directly involved in the maintenance of order and punishment, was again divided into two subgroups by length of service. Blood pressure was relatively low among those who had worked in prisons for 25 to 29 a. Those who had worked for either a very short time or for over 30 a in prisons had a higher diastolic blood pressure (group 9).

The relatively low blood pressure group of those with a short work experience in prisons, formed as a result of the first subdivision of the total study sample, was further divided into two subgroups (groups 10 & 11) by occupation. In addition to the clerical staff and the administrators two principal guards belonged to the lowest blood pressure group (group 10). Most of the principal guards had been included already in the higher blood pressure group and further to the group with occupations involving the maintenance of order and punishment (group 5).

Discussion. The proportion of the variation in diastolic blood pressure that could be explained by the predictors in the analysis was relatively low (8 %). This result is understandable on the basis of the scope of the predictors in relation to the diverse etiology of hypertension. The differences between the extreme end groups in this AID analysis were, however, rather great. Worth noting is, in particular, that length of service in the care of prisoners seems to be more related to blood pressure than age. The relation of work experience to blood pressure was configural; an elevated blood pressure seemed to be more common among the staff members with a very short or a long experience in prison work than among those with an intermediate length of work experience. Of the occupational groups, especially the guarding staff seemed to be a risk group. On the basis of stress theories and some empirical findings concerning the psychological etiology of hypertension it seems possible that the suppression of aggressive feelings, especially in guarding work, could be related to the higher blood pressure in these occupations (96, 174, 275). From the individual characteristics the level of self-esteem had an inverse relation to blood pressure.

The correlation ratios of the single variables showed that prison size had as

equally strong a relation to blood pressure as any of the other variables. It did not, however, form explanatory interactions with the other predictors (table 10). This correlation may be explained on the basis of the general finding that the staff in big institutions, especially in client work, is more apt to stress than those in smaller institutions (227). The more specific stress factors related to big prison size remain out of the scope of this study.

Relation of social activeness to background factors

Introduction. In the study of positive aspects of health, attention has been drawn to two main approaches. The biological approach has emphasized the physical fitness of body structure and functions. A good physical fitness has been interpreted to reflect a good level of health. Psychological and social approaches, on the other hand, have not yet produced generally approved criteria of well-being (170, 269). Certain of the proposed components (19), ie, social participation, energy for hobbies and emotional reaction to contacts, were studied in the present investigation. The dependent variable in the analysis was a sum scale formed of several items (appendix I).

Results. The variation of social activeness, measured by items primarily indicating perceived resources for social and other leisure-time activities, was best explained in the AID analysis by combinations of the work-related variables job satisfaction and vocational education, as well as by the individual variables optimism/pessimism, extroversion/introversion, dominance/submissiveness, self-esteem, self-control, and authoritarianism (fig 20). The interactive combination of these variables explained 31 % of the total variation of social activeness. The correlation ratios of all the independent variables included in the analysis with the activeness score are given in table 10.

The whole study sample was first divided in two subgroups by the variable pessimism/optimism, which indicates that this predictor was the best explanatory variable of the variation of social activeness among all prison employees. The group of optimists (group 2) included a large ma-

together on the basis of the activeness score in the following way:

Activeness score	Group
8.40	23 passive
9.59	22
10.29	14
10.44	11 relatively
10.74	13 passive
11.29	17
11.29	21
12.06	20
12.19	16 relatively
12.20	19 active
12.52	6
12.54	25
13.67	24 highly active

The group with the highest social activeness score was formed as a result of the interaction of the following variables: optimistic attitude, extroversion, high self-esteem, and high job satisfaction. The group with the lowest activeness score was separated from the others by an interaction of pessimistic attitude, submissiveness, and unauthoritarianism. The differences between the extreme end groups were great. The end groups were however small in size. This result indicates that fairly large subgroups remained between the two extreme groups.

Discussion. The explanatory combinations, formed by the independent variables, are congruous with a part of the reported positive indicators of health. It could be expected that the activeness scale formed of social activity, participation, and initiativeness is partly determined by optimistic attitude towards coming events, extroversion, high self-esteem, and satisfaction with work. The predictors of a lower level of activeness, ie, submissiveness and unauthoritarian attitude, also fit the social psychological theory on social activity and participation.

The interpretation of the function of vocational education is more difficult. This result may be due to the specific aspects of vocational education in various occupations in prison service. It is possible that the result also refers to a lack of possibilities for social participation and hobbies in the best educated groups, particularly in rural areas.

The work variables did not have much effect in the explanatory analysis of social

activeness. It is surprising that living on the prison grounds or outside them was not significantly related to this health indicator.

The predictors which formed the best explanatory interactions were not all the same as those that had the highest individual correlation ratios with the dependent variable, as can be seen in table 10. Social appreciation of work, role conflicts in work, length of service in prison, and the overcrowding of prisons were all variables with higher correlation ratios with social activeness than certain of the variables in the interactive explanatory combinations. In spite of their relatively strong individual predictive power these variables did not form predictive interactions with other variables.

On the whole the results of the interactive functions of this analysis could best be regarded as descriptive of the phenomenon of concern and as less explanatory. Other variables with relatively high single correlation ratios to social activity were more explanatory. Role conflicts and the overcrowding of prisons are stress factors which may decrease the perceived resources for active leisure functions. A lack of social appreciation, in turn, is apt to diminish participation in social settings.

Conclusions based on the automatic interaction detector analyses

The results of the AID analyses indicated that job satisfaction, length of service, and occupation were the work-related factors with the best predictive power for stress and health indicators. In addition most of the other work variables studied either had some individual explanatory power or formed interactive predictive combinations with the other predictors. Only the variables indicating living on or outside the prison grounds and the security level of the prison did not show any predictive relation to the indicators under study. The same variables were the best predictors of both health disturbances and the positive aspects of health.

Several relatively strong predictors were found among the individual characteristics. Self-control, pessimism/optimism, and self-esteem were important determinants of most of the stress and health indicators. Introversion/extroversion and dominance

were especially related to social active-ness. Sex and education were not important predictors; in addition age had a noteworthy relation only to the indicator of chronic illness, ie, perceived health status.

The results of the AID analyses clarified the relation of the demographic factors and global factors of the work environment to stress reactions and health status. Further analyses with emphasis on the work stressors was carried out with other predictors selected on the basis of the AID analyses.

Final analyses with the general linear model

The aim of the GLM analyses was to study the relations of specific stressors in work and work conditions to the stress reactions and health indicators in order to widen the view on work stressors, which were only preliminarily studied in the AID analyses. On the other hand, the intervening effect of the best predictive dimensions of self concept, on the basis of the AID analyses, and of social support was to be studied.

Dependent variables

As the purpose of the analyses with the GLM was to increase the information available on the relation of work characteristics to stress and health indicators, mainly the same dependent variables were studied as in the preliminary analyses.

The symptom sum scale was slightly modified, the variables with the lowest correlations to the other items being

omitted so as to increase the internal consistency of the scale (appendix I). Two additional dependent variables were also analyzed. One of them was the measure of serum cholesterol, which was one of the possible single physiological stress indicators without significant correlations with other stress reactions or health indicators. It also remained outside the factor structure of the stress and health indicators. Cholesterol is, however, considered as one stress reaction, sometimes called a precursor of disease (161).

Job satisfaction was also analyzed with the GLM. The aim was not primarily to determine its predictors as such, but to test the relevance of its inclusion in the previously described AID analyses as a state partly mediating the effect of work conditions on stress reactions and health outcomes. The psychometric quality of the job satisfaction indicator was also made better by the formation of a sum scale of single variables of satisfaction.

Predictors

The selection of the predictors was based partly on the results of the AID analyses, and the theory on work stressors was applied. The aim of the selection of predictors was to include, in the analyses, mainly work characteristics left almost completely out of the AID analyses. The demographic variables included in the AID analyses were not selected as their relation to the dependent variables was already known. Of the individual characteristics, also those were left out which did not have any remarkable effect on the dependent variables in the AID analy-

Table 11. Results of the stepwise analysis with the general linear model of symptoms. (N = 546)

Predictor	Partial eta	Partial eta ²	Semipartial eta ²	eta
Pessimism	0.31	0.10 ***	0.07	0.41 ***
Self-control	0.26	0.07 ***	0.05	0.34 ***
Motive conflict	0.19	0.04 ***	0.02	0.25 ***
Work challenge	0.18	0.03 ***	0.02	0.23 ***
Social support	0.15	0.02 ***	0.02	0.20 ***
Organization climate	0.17	0.03 **	0.02	0.21 ***
Work load	0.17	0.03 **	0.02	0.20 ***
Role conflict	0.17	0.03 **	0.02	0.20 ***
Multiple R = 0.61, Multiple R ² = 0.37, F (29, 516) = 10.57 ***.				

** p < 0.01, *** p < 0.001.