

# The effect on ambulatory blood pressure of working under favourably and unfavourably perceived supervisors

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**Aims:** To investigate the role played by employees' perceptions of their supervisors' interactional styles as a possible source of workplace stress that may be associated with increased morbidity and mortality rates from cardiovascular disorders in workers in the lower strata of organisational hierarchies.

**Methods:** A controlled, quasi-experimental, field study of female healthcare assistants. Allocation to the experimental and control groups was based on participants' responses to a supervisor interactional style questionnaire. Experimental participants (n = 13) reported working under two divergently perceived supervisors at the same workplace, on different days. The control group (n = 15) worked either under one supervisor, or two similarly perceived supervisors. Ambulatory blood pressure was recorded every 30 minutes, over a 12 hour period for three days.

**Results:** The control group showed a 3 mm Hg difference in systolic blood pressure (SBP) and a non-significant difference in diastolic blood pressure (DBP; mean difference 1 mm Hg) between the two supervisor conditions. The experimental group showed significantly higher SBP (15 mm Hg) and DBP (7 mm Hg) when working under a less favoured compared to a favoured supervisor. The degree of divergence in perceptions of supervisors shows a significant positive relation with the difference in blood pressure between the two workdays. Divergence in perceptions of interpersonal fairness is the strongest predictor of difference in blood pressure.

**Conclusion:** An unfavourably perceived supervisor is a potent workplace stressor, which might have a clinically significant impact on supervisees' cardiovascular functioning.

Cardiovascular disease (CVD) is the primary cause of premature death in England and Wales, affecting 40% of men and 30% of women.<sup>1</sup> Approximately 50% of all CVD deaths are from coronary heart disease (CHD), for example, myocardial infarction. One of the most significant risk factors for CVD is hypertension (systolic blood pressure (SBP) >140 mm Hg and diastolic blood pressure (DBP) >90 mm Hg), which is proposed to contribute to 13% of the risk for CHD.

Evidence indicates that individuals occupying the lowest positions in organisational hierarchies show a three- to fourfold risk for developing CHD.<sup>2,3</sup> However, increased risk is not confined to those occupying the lowest hierarchical positions. In their 25 year follow up of the Whitehall I participants, Marmot and Shipley<sup>4</sup> found a strong negative correlation between position in the hierarchy and mortality risk.

One of the major competing explanations for this inverse relation between health status and occupational gradient is the "social causation hypothesis". This asserts that factors associated with occupational status play a causative role in undermining health status.<sup>5</sup> There are three potential pathways of causation: (1) the indirect effect on health related behaviours; (2) the "exposure and resource" paradigm,<sup>6</sup> which is synonymous with Townsend and Davidson's<sup>7</sup> "material deprivation" explanation; and (3) the direct effects of psychosocial factors.<sup>8</sup> The latter includes job control,<sup>9,10</sup> psychological demands,<sup>11–13</sup> and social support.<sup>14</sup>

More recently, there has been a synthesis of the exposure-resource and psychosocial paradigms. This fusion of conceptions equates with Weber's<sup>15</sup> social action theory, which posits that the unit of analysis should be the patterns of social interaction between individuals, patterns which are determined by both structural factors (economic and status) and individual factors (motivations, cognitions, and emotions). Inevitably, societies, and by extension, organisations, have, to a greater or

lesser extent, a hierarchical structure. Thereby, discrepancies arise between individuals' needs and aspirations, and the opportunities available to them.<sup>16</sup> Individuals occupying the lower strata of a hierarchy will tend to be those who are the most constrained.

Freund<sup>17</sup> contends that low status individuals are afflicted with a "structurally in-built handicap" in their ability to manage social and emotional information. This "handicap" refers to conventions of civility and deference, which translate into "display rules" for emotional expression. These tend to foster the suppression of negative emotions, which subsequently leads to the dissociation of outward bodily expression (and possibly conscious awareness) and inner physiological reactivity.<sup>18</sup>

Within the work stress literature, social relationships have typically been investigated in terms of providing a moderating resource between work stress and health related outcomes.<sup>19–21</sup> However, social relationships at work may also constitute a psychosocial stressor.<sup>22</sup> Evidence from studies of social interaction in the non-work environment suggest that aversive social contacts have greater potential to detract from wellbeing than favourable interactions have to enhance wellbeing.<sup>23</sup>

Elstad<sup>8</sup> contends that psychological stress is partly determined by the quality of interpersonal relationships, which are also influenced by existing structural social inequalities. In particular, Wilkinson<sup>24</sup> suggests that patterns of authoritarian

**Abbreviations:** CD, coefficient of determination; CHD, coronary heart disease; CI, confidence interval; CVD, cardiovascular disorders; DBP, diastolic blood pressure; SBP, systolic blood pressure; SD, standard deviation

leadership, often evident in highly delineated occupational hierarchies, are the most damaging to interpersonal relationships. Higher status individuals may show contempt for their subordinates, whilst subordinates respond with feelings of anger, hostility, fear, and insecurity. One of the physiological consequences of such recurrent negative affect is pronounced increases in blood pressure.

Gabriel's<sup>25</sup> findings from his study of insults in organisations offers an explanation as to how and why contempt manifests in exchanges with subordinates. He defines as insults interpersonal behaviours that are perceived by their recipient as slighting, humiliating, and offensive. These include behaviours such as ingratitude, scapegoating, excluding, ignoring, and the despoiling of personal beliefs and ideas. Gabriel argues that these behaviours are a regular feature of organisational life, and that they are routinely employed by some superiors as a means of subordinating employees and reaffirming power relations through their emphasis on subordinates' helplessness and vulnerability.

It appears that supervisor interactions need not be overtly insulting for them to erode subordinates' self-esteem and culminate in a plethora of anticipatory, consequential, and ruminative emotions. Subordinates' lower social status renders them structurally dependent on their supervisors for resources and rewards.<sup>26, 27</sup> Consequently, subordinates are more likely to monitor and ruminate over their interactions with superiors in order to make assessments of relational trust and their own status value.<sup>26</sup> Vonk<sup>28</sup> analysed the perceptions of moderately dislikeable interpersonal behaviours between actors of disparate relational social statuses. This showed that when such unhelpful behaviours are enacted towards a subordinate they are judged more negatively than those towards a superior. Additionally, low status participants are more likely to ruminate over minor breaches of courtesy by their supervisors than are supervisors when courtesy is breached by a subordinate.<sup>26</sup> Even innocuous exchanges with someone of higher social status have been shown to inflate blood pressure much more so than is evidenced when conversing with someone of equal status.<sup>29</sup>

We thus propose that the interactional style of higher status individuals can impact on the cardiovascular functioning of lower status group members through a number of different pathways: (1) by affecting perceptions of control and predictability; (2) by mediating the arousal of either pleasant or unpleasant emotions; and (3) by diminishing the repertoire of coping responses. The effect on resultant emotions is exacerbated by the constraints imposed by the social structure on emotional expression.<sup>30</sup> While high status members are relatively free to express negative emotions, low status members are inclined to suppress them.<sup>31</sup>

The detrimental impact on wellbeing of suppressing negative affect is twofold. Firstly, it inhibits the use of active, or problem focused, coping which can assist in resolving the problem. This permits the provoking events to continue unchallenged which may develop into persistent chronic stressors. For example, with regard to coping with perceived insults from a superior, resigned tolerance, as opposed to more assertive responses (for example, demanding an apology or seeking to retaliate), is a typical response from subordinates.<sup>25</sup> Leaving insults unchallenged confers permission to the agent to continue to engage in these interactional patterns.

Such passive responding is associated with significant increases in both systolic and diastolic blood pressure.<sup>32</sup> Additionally, continued exposure may result in generalised anxiety, which if unabated may deteriorate into a sense of powerlessness, hopelessness, and depression. Prospective studies show that relatively high levels of anxiety and depression often precede, and may be a predisposing factor for, the development of hypertension.<sup>33</sup>

Secondly, it is suggested that risk for, and severity of, heart disease is related to the tendency to withhold anger and irri-

tation with others. The suppression of anger is associated with prolonged<sup>34</sup> and exaggerated psychophysiological reactivity,<sup>35, 36</sup> and increased risk of developing coronary heart disease.<sup>37, 38</sup>

This study focuses on the link between employees' psychophysiological responsivity and perceptions of their supervisors. It is a development of the "synthesised" social causation hypothesis, which emphasises the relational social position of employees in the workplace. We have examined the impact of subordinates' perceptions of their first line supervisors' interactional styles as a mediating factor influencing their workday blood pressure. We define supervisor interactional style as: the manner in which information, meanings, and feelings are conveyed to the subordinate through the communication of both verbal and non-verbal messages. The instrument utilised addresses four factorial dimensions of interactional style: consideration, interpersonal fairness, social maturity, and empowerment. We argue that the emotional environment at work is not wholly event specific, but is also context dependent. That is, perceptions of the supervisor under whom the individual is working, whether or not they are actually engaging with the person, may influence their emotional state and associated physiological reactivity based on ruminations of their prior relational history.

It is hypothesised that employees' perceptions of their supervisors' interactional style will impact on cardiovascular functioning, as measured by variations in ambulatory blood pressure when working with favourably or less favourably appraised supervisors on different days. Since sustained increases in blood pressure are associated with, and are suggested as being a causative factor in the development of cardiovascular disorders, supervisors may have potential for influencing employees' health.

The validity of subordinates' perceptions as an indicator of actual supervisor interactional style is drawn from investigations of the congruence of their perceptions with those of different subordinates at different points in time, supervisors' peers,<sup>39</sup> and supervisors' superiors.<sup>40</sup> Proponents who uphold the view that subordinate appraisals of their supervisors are a valid reflection of reality argue that such judgements have been made from an informed perspective.<sup>41</sup> That is, since subordinates are dependent on their supervisors for aspects of their working conditions and prospects, they tend to invest considerable energy in monitoring their supervisors' behaviour.<sup>39, 42</sup>

## Hypotheses

- (1) Significant increases in ambulatory systolic and diastolic blood pressures will be evident in the experimental group when working under the less favourably perceived supervisor compared to working under the positively perceived supervisor.
- (2) The experimental group will show significantly greater differences in their mean systolic and diastolic blood pressures between the supervisor conditions compared to the control group.
- (3) Blood pressure will be significantly higher in the experimental group when working in the less favourable supervisor condition compared with blood pressure measured on a non-work day.
- (4) The degree of divergence between the participants' perceptions of their supervisors will be positively related to the difference in blood pressure evidenced between the supervisor conditions.

## Design

This investigation was a quasi-experimental field study, employing a within subjects design. Thus, the effect of individual differences was eliminated. A control group of participants was also included in order to calculate the

significance levels of the results. The design is believed to overcome some of the problems associated with cross sectional research in terms of determining causality.

This was a single blind investigation where neither the participants nor their supervisors were informed of the precise aim of the study. Participants were informed of the general aim of the study. However, the specific details of its objective were not made available either prior to, or at the conclusion of, their participation. The rationale for this is threefold. Firstly, this was done so as not to antagonise relations between participants and their supervisors, and secondly, out of respect for the supervisors, who remained anonymous to the researcher and thus whose consent was not sought. Finally, to have informed participants of the precise aim would have necessitated gaining the supervisors' informed consent which, even if possible, would have inevitably led to behavioural changes in both parties, potentially confounding the data. This practice is in accordance with the British Psychological Society's (1998) guidelines regarding economy of disclosure.

## METHODOLOGY

### Participants

Initially, 43 female healthcare assistants, aged between 18 and 45 years, were drawn from hospitals, nursing homes, and residential homes. Our decision to focus on healthcare assistants was because of their relatively low hierarchical status, high levels of reported work stress, and poor health.<sup>43</sup> In addition it was a necessity of our study design to find an occupational group who routinely worked under a number of different supervisors in the same workplace setting.

A 49% attrition rate was incurred. Comparative analyses were conducted in order to ascertain whether there were any significant differences between those who completed and those who did not with respect to their responses to the survey questions.

### Selection of participants

Participants were selected from the pool of suitable respondents from a larger survey. The samples were purposefully selected. The experimental group ( $n = 13$ ) was chosen on the basis of their indication that they worked under two different supervisors, of equal status, on different days, in the same work environment, and of whom they held divergent perceptions. The criteria for inclusion was set at a minimum of 27 score points difference between the two supervisor descriptions. This is the equivalent to a difference of one standard deviation of a validation study of the Supervisor Interactional Style Questionnaire.<sup>44</sup> Participants were allocated to the control group ( $n = 15$ ) if they indicated that they either worked under one supervisor or two very similar supervisors, in the same workplace on different days.

### Measures

#### Supervisor interactional style

This was assessed by means of the 47 item, self administered, five point Likert-scale (1 = strongly disagree, 5 = strongly agree) questionnaire.<sup>44</sup> The items included statements such as: "My supervisor encourages discussion before making a decision", and "I am treated fairly by my supervisor". Calculation of internal consistency produced a Cronbach's alpha of 0.9817, thus indicating highly satisfactory internal consistency. The perceptions of supervisor interactional style are positively related to the total score, with a possible range of scores between 47 and 235.

#### Ambulatory systolic and diastolic blood pressure

This was monitored at 30 minute intervals for up to 12 hours a day for a period of one day in each of the following conditions: working with the favourably perceived supervisor, working with the less favourably perceived supervisor, and a

non-work day. All participants began monitoring on a non-work day to gain familiarity with the equipment and to establish baseline readings. There was no systematic allocation to either of the two supervisor conditions, which were taken as they occurred. This resulted in a fairly even distribution between those who were first monitored in either the favourable or less favourable supervisor conditions. The apparatus employed was an A&D TM 2430 24-hour ambulatory monitor. Readings excluded from this analysis were those taken when travelling and before and after work.

Activities at time of blood pressure reading were recorded by means of a "quick response diary". Participants were also asked to record significant events (both in the work and non-work environments) and their mood states. Individual factors such as alcohol consumption and environmental variables (that is, abnormal occurrences during the day) were recorded and considered as exclusion criteria if anomalous.

### Need for social approval

The scale employed was the Revised Short-Form Martin-Larsen's<sup>45</sup> Approval Motivation Scale (MLAM). This is a self report measure of an individual's non-pathological dependency on the approval of others, which manifests as a marked sensitivity to interpersonal transactions and a strong gravitation toward affiliative behaviour.<sup>46, 47</sup> It consists of a five item, seven point Likert scale (1 = strongly disagree, 7 = strongly agree). Calculation of internal consistency in the present sample of healthcare workers ( $n = 202$ ) produced an alpha of 0.80. Thus internal reliability is considered satisfactory. The total score is positively related to the level of need for social approval, with a possible range of scores from 5 to 35.

## DATA ANALYSIS AND RESULTS

### Supervisor interactional style

The observed scores for the combined groups ranged from 63 to 234, resulting in a mean supervisor score of 172. The mean favoured supervisor scores for the experimental and control groups were almost equivalent; 200 and 193 respectively. The mean scores for the less favoured supervisors were significantly different from the experimental and control groups; 125 and 190 respectively. Computation of an unrelated  $t$  test between the experimental group's less favoured supervisors' score and the control group, revealed the observed difference to be significant to  $p < 0.017$ .

### Blood pressure recordings

The means and standard deviations of workplace blood pressure were calculated for each group of participants (see table 1). Similarly the mean and standard deviations were

**Table 1** Descriptive statistics

	Systolic BP		Diastolic BP	
	Control	Experimental	Control	Experimental
<b>Non-work day</b>				
Mean	116	114	81	78
SD	10.8	9.4	9.5	6.5
95% CI	109 to 122	108 to 120	75 to 87	74 to 82
Range	102-137	94-133	67-105	67-88
<b>Favoured supervisor</b>				
Mean	118	114	80	75
SD	11.6	10.7	8.2	6.5
95% CI	112 to 125	108 to 121	75 to 84	71 to 79
Range	97-136	98-128	66-101	64-88
<b>Less favoured supervisor</b>				
Mean	121	129	81	82
SD	12.5	16.9	8.8	6.6
95% CI	114 to 128	119 to 139	76 to 86	78 to 86
Range	98-143	104-165	64-99	75-97

**Table 2** Related *t* tests examining within group differences in blood pressure between the different days of monitoring

Comparison	Systolic BP (mm Hg)			Diastolic BP (mm Hg)		
	Mean difference	<i>t</i> value	<i>p</i> value	Mean difference	<i>t</i> value	<i>p</i> value
<b>Control</b>						
H - FS*	-4	-1.210	0.250	0	0.114	0.911
H - LFS	-7	-2.164	0.051	-1	-0.239	0.815
FS - LFS	-3	<b>-4.530</b>	<b>0.001</b>	-1	-1.012	0.330
<b>Experimental</b>						
H - FS	-2	-0.796	0.443	2	1.039	0.321
H - LFS	<b>-17</b>	<b>-4.655</b>	<b>0.001</b>	<b>-5</b>	<b>-2.565</b>	<b>0.026</b>
FS - LFS	<b>-15</b>	<b>-3.894</b>	<b>0.001</b>	<b>-7</b>	<b>-2.781</b>	<b>0.008</b>

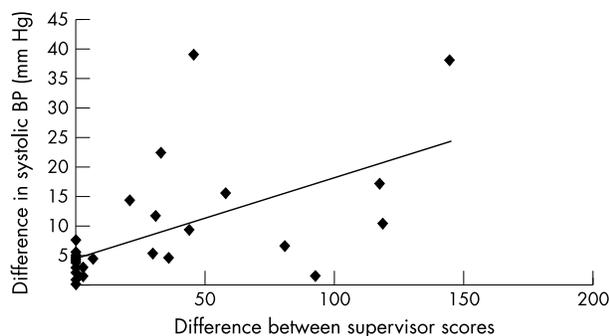
Bold indicates significance.

\*H, non-work day; FS, favoured supervisor condition; LFS, less favoured supervisor condition.

calculated for the difference in blood pressure between the supervisor conditions for each group. For the control group, the workday readings showing the highest average systolic pressure were used as the equivalent of the experimental group's less favourable supervisor condition.

Related *t* tests were computed for each of the two groups separately, in order to determine the significance levels of the observed differences in blood pressures in the two supervisor conditions (see table 2). The experimental group showed significantly higher systolic (mean difference = 15 mm Hg, SD = 11.9, 95% CI = 6.5 to 22.9,  $t = -3.894$ ,  $p = 0.001$ ) and diastolic (mean difference = 7 mm Hg, SD = 5.4, 95% CI = 1.5 to 12,  $t = -2.781$ ,  $p = 0.008$ ) blood pressure when working under a less favoured supervisor compared to a favoured supervisor. In contrast, no significant difference was observed in the control group's diastolic blood pressure (mean difference = 1 mm Hg, SD = 1.8, 95% CI = -1.1 to 3.1,  $t = 1.01$ ,  $p = 0.33$ , NS). However, their average systolic pressure was slightly higher on one of the workdays (mean difference = 3 mm Hg, SD = 3.2, 95% CI = 1.88 to 4.3,  $t = -4.53$ ,  $p = 0.001$ ).

Additionally, a one way, unrelated ANOVA was performed to ascertain whether the observed increases in blood pressures in the less favoured supervisor condition of the experimental group were significantly higher than those of the control group on their workday with the highest average blood pressure recordings. This indicated that the increases in the experimental group's systolic and diastolic blood pressures were significantly higher, by 12 mm Hg ( $F_{1,26} = 15.767$ ,  $p = 0.001$ ) and 6 mm Hg ( $F_{1,26} = 4.769$ ,  $p = 0.038$ ) respectively, compared with those of the control group. To determine the effect size of the observed differences in blood pressure between the two groups, the  $\eta^2$  statistic was computed using the harmonic mean sample size, since the sample sizes in the two groups differed slightly. This produced  $\eta^2 = 0.356$  for systolic blood pressure and  $\eta^2 = 0.158$  for diastolic blood pressure. Both values indicate a large effect size as their value exceeds 0.138.



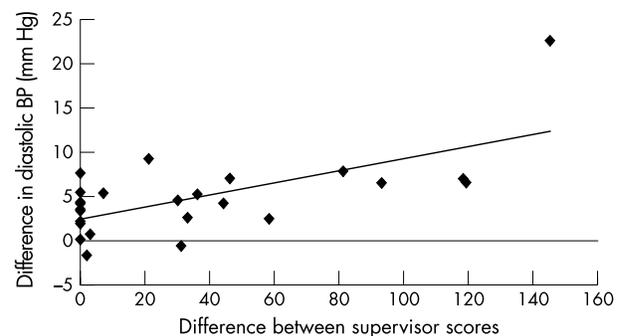
**Figure 1** Relation between the difference in supervisor scores and difference in systolic blood pressure.

Two simple linear regressions were conducted to determine the efficacy of the supervisor interactional style questionnaire in predicting workplace blood pressure (see figs 1 and 2). The difference between each participant's questionnaire scores of their two supervisors' interactional styles was entered as the independent variable and their difference in blood pressure between the two workdays as the dependent variable. This showed that the degree of difference in supervisor scores has a significant positive relation with the magnitude of difference in both systolic ( $\beta = 0.580$ ,  $SE = 8.35$ ;  $F = 13.212$ ;  $df = 1,17$ ;  $p = 0.001$ ) and diastolic blood pressure ( $\beta = 0.660$ ,  $SE = 3.43$ ;  $F = 20.120$ ;  $df = 1,17$ ;  $p = 0.0005$ ).

Finally, correlational analyses were conducted to ascertain which of the four dimensions of perceived supervisor behaviour provided the strongest predictor of the observed alterations in blood pressure. This showed that the strongest associations with both measures of blood pressure are with the items pertaining to interpersonal fairness (SBP:  $r = 0.724$ ,  $p = 0.0001$ ; DBP:  $r = 0.784$ ,  $p = 0.0001$ ).

The practical constraints, imposed by the single blind nature of the design, precluded random allocation of the participants to the two supervisor conditions. Although the participants were fairly evenly distributed between the two supervisor conditions on the first work day of blood pressure monitoring, it remains possible that the results obtained may have arisen because of order effects. For example, blood pressure might have been consistently higher on the first work day in comparison to the second work day because of self-consciousness. Thus, Wilcoxon signed rank tests were performed to ascertain whether this phenomenon is a possible confounding variable. For both systolic and diastolic blood pressure the results of these calculations were non-significant ( $Z = -0.33$ ,  $p = 0.741$ ;  $Z = -0.296$ ,  $p = 0.768$ , respectively). Thus, we can be fairly confident that the results have not been contaminated by this unavoidable limitation in the design.

One way unrelated ANOVAs were computed for supervisor scores, reported anxiety, depressive symptoms, and "need for



**Figure 2** Relation between the difference in supervisor scores and difference in diastolic blood pressure.

**Table 3** Comparison of participants who completed the blood pressure monitoring trial and those who withdrew from the study

	Lost participants' mean score (SD)	Completed participants' mean score (SD)	p value
Positive supervisor	197 (38.2)	185 (49.8)	0.760
Negative supervisor	135 (48.0)	127 (36.5)	0.372
Anxiety	7 (3.7)	7 (5.1)	0.479
Severe depression	3 (2.4)	3 (3.9)	0.330
Need for social approval	<b>19 (8.1)</b>	<b>13.0 (5.2)</b>	<b>0.009</b>

Significance levels based on the results of one way unrelated analyses of variance.  
Bold indicates significance.

social approval" to investigate whether the participants who withdrew from the study showed significant differences in these variables compared to those who completed the study (see table 3). Only one significant difference was found; participants who withdrew from the study reported significantly higher "need for social approval" (mean = 19, 95% CI = 14.6 to 22.4, SD = 7.85) than those who completed the study (mean = 13, 95% CI = 10.8 to 15.2, SD = 5.27) ( $F_{1,41} = 7.579$ ,  $p = 0.009$ ).

## DISCUSSION

Within group analyses for the experimental group indicated that working under a less favourably perceived supervisor was associated with significant increases in blood pressure, compared with working under a favourably perceived supervisor or measurements taken on a non-work day. Both favourably perceived and less favourably perceived supervisors worked in the same workplace on different days, were of the same sex and status, but were divergently perceived by the study participants.

The increments in the experimental group's blood pressure associated with working under a less favourably perceived supervisor were found to be 12 mm Hg (systolic) and 6 mm Hg (diastolic) over and above the slight increments shown by the control group. The implications of this finding are not merely of statistical significance but also of clinical importance, since an increase of 10 mm Hg systolic and 5 mm Hg diastolic blood pressure is associated with a 16% and 38% increased risk of CHD and stroke.<sup>48</sup>

Although the Supervisor Interactional Style Questionnaire was completed an average of three weeks before physiological monitoring, this "paper and pencil" instrument shows substantial efficacy in terms of predicting workplace blood pressure. The dimension revealing the greatest predictive power is "interpersonal fairness". This is defined as the giving of timely feedback (that is, particularly offering praise for a job well done), demonstration of trust and respect, consistency and non-partiality in the treatment of various staff members, and the adoption of a flexible approach according to each employee's individual needs. The two latter characteristics may appear somewhat contradictory but are compatible with the practice of equitable treatment, whereby each individual is treated according to their particular needs.

Moreover, the increases in blood pressure associated with the less favoured supervisor resulted in five of the 13 (38%) in the experimental group showing hypertension (isolated systolic ( $n = 3$ ), isolated diastolic ( $n = 1$ ), or a combination of both ( $n = 1$ )). Additionally, two of the control group participants consistently showed workplace hypertension across both workdays, despite having blood pressure readings within the normal range on their non-work days. These findings support recent suggestions that occult workplace hypertension is quite a prevalent phenomenon,<sup>49, 50</sup> the implications

of which necessitate consideration in the calculation and management of coronary risk factors.

In addition, experimental group participants, but not control participants, showed a non-significant decrease in diastolic blood pressure when working under a favoured supervisor, compared to that found in the home environment on a non-work day. Although not statistically significant, it might be tentatively interpreted as indicating that working under a favoured supervisor has a beneficial impact on employees' wellbeing. Increases in diastolic blood pressure have been found to be associated with subjective experiences of anxiety.<sup>51</sup> Consequently, this finding may suggest that when employees find themselves with a favoured supervisor they experience a reduction in anxiety, which serves to lower diastolic blood pressure.

It is possible that the observed increment in employees' blood pressure when working under a less favourably perceived supervisor is an underestimation of the true magnitude of the effect. Similarly, the observed decrement in the experimental participants' diastolic blood pressure when working under the favoured supervisors may also have been underrepresented. These putative underestimations may be attributed to three limitations with regard to representativeness of the samples utilised and to the nature of the questionnaire.

Firstly, in this sample the long term impact of perceived supervisor interactional style on blood pressure is moderated by the fact that the participants work under a number of different supervisors. The detrimental effect of the less positive supervisor is possibly ameliorated by the advantageous effect of working under a positive supervisor on alternate days. Individuals working constantly under a supervisor perceived as adopting an extreme authoritarian leadership style may experience a further exaggeration and prolongation in blood pressure increases because of alteration of the homeostatic set points of the physiological systems involved.<sup>52</sup>

Secondly, the beneficial effect of the positively perceived supervisors on participants' diastolic blood pressure may not have been fully captured because of the variation in the control group's supervisor scores. Although their average supervisor scores were equivalent to those of the experimental group's "positive" supervisor, their range of scores was much greater than those of the experimental group (that is, 63–234, compared to 191–234, respectively). Thus, the true effect of working under a positive supervisor may have been diluted in the analysis because some of the control group participants were actually working under fairly negatively perceived supervisors.

Lastly, the healthcare workers who completed the monitoring trial were a subgroup of the total sample since they showed significantly lower scores on the self reported measure of "need for social approval" compared with those who withdrew. We propose that this fact has precluded gaining data from the very group of individuals who are arguably the most sensitive to, and who consequently may have shown the greatest physiological reactivity to, the interpersonal style of their supervisors.

To clarify the above proposition a number of issues need to be addressed. Approval dependent individuals are characterised as showing an excessive concern with perceived criticism<sup>45</sup> and disapproval from significant others.<sup>53</sup> This predisposes these individuals to experience increased levels of "internally generated stress"<sup>54</sup> and exaggerated psychophysiological reactivity.

Kuiper and Olinger<sup>55</sup> propose that approval dependent individuals' assessments of self worth are dependent on their anticipated and interpreted evaluations by others of their "self". Thus they tend to be strongly motivated to project a favourable, conformist self image. In accordance with these tendencies, those who withdrew from the study reported relatively favourable interactions with their supervisors and low

levels of symptoms indicative of depression and anxiety. However, in spite of reporting favourable interactions, previous research has found that approval dependent individuals tend to be disliked by others.<sup>53</sup> This would suggest that their actual, as opposed to reported, interactions may be less favourable compared to individuals showing a lower need for social approval.

Additional characteristics of approval dependent persons thought to be of relevance to our findings are their lack of assertiveness and use of avoidant coping strategies.<sup>53</sup> This indicates that they are more likely to suppress negative emotions and to leave interpersonal insults unchallenged. Both characteristics are associated with increased vulnerability to aversive interactions with superiors.

Furthermore, an underestimation of the full magnitude of effect is also possible in light of the relatively subtle nature of the items on the questionnaire. The scale does not assess overt bullying behaviours. Items pertaining to this dimension were removed during the pilot/validation study<sup>44</sup> because of their lack of discriminatory power, and to facilitate acceptability to the host organisations. We believed it to be inappropriate and unrealistic to recruit participants to the study who were experiencing systematic bullying at work.

However, the prevalence of bullying, particularly within public service occupations, presents a substantial problem with associated health risks. For example, a survey conducted by UNISON on a random sample of its members in 1996 revealed that two thirds of respondents reported either experiencing or witnessing bullying.<sup>56</sup> Similarly, a survey of health-care personnel employed by a community NHS Trust in South East England, in 1996, found that 38% of the employees reported being bullied in the preceding 12 month period.<sup>57</sup> The most common form of bullying involves the abuse of power by superiors against subordinates.<sup>56-61</sup> In the UNISON survey 83% of the bullies were managers, and in Quine's<sup>57</sup> survey 54% of the agents were senior management or first line managers. Furthermore, Quine<sup>57</sup> reports that the most likely victims of bullying are unqualified residential care staff—that is, those with the lowest occupational status and the population from which the present sample was drawn.

The results here indicate a significant clinical risk associated with perceptions of relatively innocuous, and possibly inadvertent, interpersonal behaviours. However, it is plausible that the implications would be more deleterious if indices of actual bullying were to be taken into consideration.

The objective of the study was to investigate one putative causal factor for the inverse occupational gradient in risk for cardiovascular disorders. The finding that subordinates' mere perceptions of their supervisor are associated with significant changes in the subordinates' blood pressure may indicate that we have identified one psychosocial ingredient influencing occupational health.

## CONCLUSION

The Department of Health's "Healthy Workplace Initiative" (1999), identifies the workplace as a key player in their drive to improve public health. The role of work as a contributor to the status of the population's health is clearly acknowledged. However, there appears to be a disjuncture between this initiative and the recommendations inherent in the "National Service Framework for Coronary Heart Disease" (2000) regarding the identification of "at risk" populations. The latter focuses on physiological and lifestyle factors, to the exclusion of risks associated with the workplace.

While lifestyle factors contribute to this disparity, it seems unlikely that they are the sole determinants. In light of greater risk posed by low occupational status, in addition to that associated with low socioeconomic status, an alternative approach would be to tackle prominent workplace stressors, such as social relationships between subordinates and those of higher

status. Supervisors are in positions of relative power within the working environment. Inadvertently, their interactional style may have the potential to influence supervisees' wellbeing, either positively or negatively. Where their behaviour gives rise to supervisees perceiving them as acting unfairly or unreasonably, this is likely to result in a decrement in supervisees' general emotional and physiological wellbeing.

We conclude that the above findings provide substantive support to the proposition that supervisor interactional style is a potential workplace stressor and a possible contributory risk factor for the development of CHD. The findings imply that creating a social milieu in the workplace characterised by fairness, empowerment, and consideration is likely to provide one inexpensive strategy for reducing the risk of cardiovascular disorders, particularly for employees in the lower strata of the organisational hierarchy.

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(1) a; (2) c; (3) b; (4) e; (5) c