



The scale of occupational stress: A further analysis of the impact of demographic factors and type of job

Prepared by:
Centre for Occupational and Health Psychology
School of Psychology, Cardiff University
for the Health and Safety Executive

CONTRACT RESEARCH REPORT
311/2000



The scale of occupational stress: A further analysis of the impact of demographic factors and type of job

**Andrew Smith, Carolyn Brice, Alison Collins,
Victoria Matthews & Rachel McNamara**
Centre for Occupational and Health Psychology
School of Psychology, Cardiff University
PO Box 901, Cardiff CF10 3YG

A recent survey of a random population sample showed that about 20% of the workers reported very high or extremely high levels of stress at work. Preliminary analyses suggested that the scale of stress may vary considerably and the present report describes further analyses of the data reported in HSE Contract Research Report 265/2000. The aim of the analyses was to identify factors associated with perceptions of stress at work. The results do not allow conclusions about causal links between the factors and reported stress. Analyses of the demographic variables showed that gender had little overall effect although it did interact with other factors, such as full-time/part-time employment. The middle aged workers (30-50 year olds) had slightly higher proportions in the high reported stress category than those at the extremes of the age range. Educational attainment was found to be an important factor, with those educated to degree level (or equivalent) having a higher proportion in the high reported stress category. Marital status also influenced the reporting of stress, with those who were widowed/divorced or separated having a greater proportion in the high reported stress category. Ethnicity also influenced reporting of stress, with the non-white group having a greater proportion in the high reported stress category. The number of non-whites in the sample was small and it is essential to try to replicate the present findings with a much larger group. The occupational variables were also found to have a large impact on reporting of stress. Reported stress was greater in full-time employment than part-time employment, increased with salary, and there was a greater proportion in the high reported stress category in social group II. Reported stress was found to be highest in teachers, nurses and managers. Levels of reported stress increased as a direct function of the number of critical features present.

This report and the work it describes were funded by the Health and Safety Executive. Its contents, including any opinions and/or conclusions expressed, are those of the author(s) alone and do not necessarily reflect HSE policy.

This study reports a further analysis of some of the data reported in HSE Contract Research Report 265/2000. You may also wish to refer to this report, which is available from HSE Books as shown on the back cover.

© Crown copyright 2000

*Applications for reproduction should be made in writing to:
Copyright Unit, Her Majesty's Stationery Office,
St Clements House, 2-16 Colegate, Norwich NR3 1BQ*

First published 2000

ISBN 0 7176 1910 9

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means (electronic, mechanical, photocopying, recording or otherwise) without the prior written permission of the copyright owner.

CONTENTS

EXECUTIVE SUMMARY	v
1. BACKGROUND	1
2. METHODS	2
3. AGE, GENDER, AND MARITAL STATUS	3-4
3.1 Age	3
3.2 Gender	4
3.3 Marital status	4
4. FULL-TIME / PART-TIME EMPLOYMENT, EDUCATION, SOCIO-ECONOMIC STATUS AND SALARY	5-7
4.1 Full-time/part-time employment	5
4.2 Educational level	5
4.3 Socio-economic groups	6
4.4 Salary	6
5. OCCUPATION	8-10
6. ETHNICITY	11-15
6.1 Gender-non-whites only	11
6.2 Age-non-whites only	12
6.3 Education-non-whites only	12
6.4 Salary-non-whites only	13
6.5 Socio-economic groups-non-whites only	14
6.6 Full-time/part-time-non-whites only	14
6.7 Occupation-non-whites only	15
7. COMBINATIONS OF VARIABLES	16-51
7.1 Gender and other variables	16-22
7.2 Marital status and other variables	23-29
7.3 Age and other variables	30-35
7.4 Education and other variables	36-40
7.5 Socio-economic group and other variables	41-45
7.6 Salary and other variables	46-48
7.7 Full-time/part-time x occupation	49-50
7.8 Occupation	51

8. COMBINATIONS OF THE HIGH STRESS SUB-GROUPS	52-55
9. DISCUSSION	56-60
9.1 A summary of the results	56
9.2 Comments on present findings	58
9.3 How do the findings compare with previous research?	59
9.4 Implications for further research and management of occupational stress	60
10. REFERENCES	61

EXECUTIVE SUMMARY

Results from the Bristol Stress and Health at Work study (described in detail in HSE Contract Research Report 265/2000) showed that about 20 percent of the sample reported very high or extremely high levels of stress at work. The present report describes further analyses of the impact of demographic and occupational variables on reported stress at work. This analysis is based mainly on statistical significance testing. Consequently, the results do not establish with any certainty a causal link between any of the demographic and occupational factors measured and reported stress at work. The results may be suggestive of such a link but more in-depth research would be necessary to establish its validity.

In the majority of the analyses reported stress levels were similar in males and females. The exceptions were that there were higher proportions of males than females in the high reported stress category in those with no secondary school qualifications and the lowest salary group. In contrast, there were higher proportions of females than males in the high reported stress category in social class III.2, all the salary groups except the lowest and in the full-time employment group.

Marital status was related to the reporting of stress with those who were widowed/divorced or separated generally having a higher proportion in the high reported stress category. This was statistically significant for females, those in the 50 + age group, those educated to degree level, the highest salary group and those in full-time employment.

There were generally higher proportions in the high reported stress category in the middle age groups. This was significant for males, those who were single, those educated to degree level, social class II, those in full-time employment and those in the most stressful jobs.

There were also generally higher proportions in the high reported stress category in the group educated to degree level. This was significant in both sexes, those who were married, all but the youngest age group, the highest salary group, both full and part-time employment and the second occupational category.

The present sample was not a very good one for examining ethnicity, with there being very few non-white respondents. The non-white group reported greater stress at work than the sample as a whole. Slight differences were found as a function of ethnicity in the effects of the demographic and occupational variables although these should be treated with caution due to the small numbers in certain cells. Further research on occupational stress in non-white groups is now essential, especially as the evidence from the current small sample suggests that non-white groups may report higher levels of stress at work than their white counterparts. However, on the basis of the present analyses, it is unclear whether it is ethnicity per se that is important or correlated attributes present in the non-white sample.

The scale of occupational stress was clearly much greater for those in full-time employment than those with part-time jobs. The proportion in the high stress category also increased with salary.

Job category showed a strong relationship with reporting of stress at work. When socio-economic groups based on occupation were examined it was generally found that those in group II had a higher proportion in the high reported stress category. Analyses of occupations showed that teachers, nurses and managers had the highest proportion in the high reported stress category.

Sub-groups with the highest reported stress for each variable were identified. The proportions in the high reported stress category were then examined as a function of the number of these factors present. A clear dose response emerged, with reported stress increasing linearly as a function of the number of factors present. This was confirmed in regression equations where all the occupational variables remained as significant effects.

In conclusion, the present analyses show that the scale of occupational stress will vary as a function of demographic and occupational factors. Specifically, greater reported occupational stress is associated with being middle-aged, widowed/divorced or separated, educated to degree level, in full-time employment earning over £20,000, and having an occupation such as teaching, nursing or being a manager (or being in social group II). The magnitude of reported stress appears to be a direct function of the number of these features that are present, although it should be noted that stress at work is not an automatic consequence of having

these characteristics. The analyses also showed that non-whites report higher levels of stress and further research on this topic is clearly desirable.

1. BACKGROUND

Recent research (1) has investigated the scale and severity of occupational stress in a random population sample. This epidemiological survey of 17000 randomly selected people from the Bristol electoral register revealed that approximately 20% of the working sample (4,000+ workers) reported that they had very high or extremely high levels of stress at work. This effect was reliable over time, related to potentially stressful working conditions and associated with impaired physical and mental health. These effects of occupational stress could not be attributed to life stress or negative affectivity.

Preliminary analyses were conducted to determine whether perceptions of stress at work varied across gender, age and full-time/part-time work. The results showed little difference between males and females although this reflected the fact that more females did part-time work. Full-time work was associated with greater occupational stress and females in full-time work reported higher stress levels than males. These analyses show the importance of considering combinations of variables rather than examining each in isolation. When age was examined, it was found that those at either end of the age range (18-35, 55+) reported less stress than the 35-55 age group.

It is clearly important to have further information on the distribution of occupational stress by key demographic variables. Similarly, additional consideration of different types of job is required. The initial aim of the present research was to conduct further analyses of data reported in HSE Contract Research Report 265/2000 (which will be referred to as the main report). These new analyses examined associations between self-reported stress and age, gender, marital status, ethnicity, full-time/part-time status, occupation and socio-economic status (by income, occupational class I-V, and educational attainment). Initial cross-tabulations were produced to indicate the proportion of self-reported work stress in each sub-category of the variables (with stress being defined as those who reported being very or extremely stressed at work on a 5 point Likert scale). Following this, pairs of variables were examined to determine which combinations are associated with highest proportions of work stress. Finally, combinations of all the variables were examined to determine whether effects are additive or interact in complex ways.

2. METHODS

The approach adopted here combined statistical testing with an overview of consistent patterns and interpretable trends. The statistical testing was used to support interpretation based on observation of cross-tabulations of variables. Sophisticated statistical modelling was not intended and when focusing on the statistical outcomes one should always note the following points. First, there is considerable variation in the sample sizes in different analyses. This means that statistical significance will reflect the number of respondents being considered in any particular analysis. Secondly, given the number of tests conducted certain effects will occur by chance. Emphasis was, therefore, placed on consistent patterns of effects and when these are based on small numbers it is recommended that the effects are replicated in future work.

This analysis is based mainly on statistical significance testing. Consequently, the results do not establish with any certainty a causal link between any of the demographic and occupational factors measured and reported stress at work. The results may be suggestive of such a link but more in-depth research would be necessary to establish its validity.

In most analyses results from chi-square tests are reported. If the data are ordinal (e.g. age categories), then McNemar's chi square values were used to determine significance. In the case of very small cell sizes (expected < 5) results from Fisher's exact test were used.

The next section applies these methods to examine associations between levels of reported stress and demographic variables. Where the terms "high stress" or "low stress" are used these refer to "reported stress at work".

3. AGE, GENDER, AND MARITAL STATUS

3.1 AGE

Age was analysed by quartiles rather than the 10 years age bands used in the main report. This meant that each group had large enough numbers to permit combination with other variables. The cross tabulation with work stress is shown in Table 1. A chi-square test revealed a significant effect of age category (chi-square=9.19 d.f. 3, p<0.05) reflecting increased levels of stress in the two middle categories.

Table 1
Cross tabulation of work stress by age
(Percentage are shown with actual numbers in parentheses)

Work stress	Age groups			
	18-32	33-40	41-50	51+
High stress	16.3% (173)	19.8% (190)	20.8% (225)	17.3% (155)
Low stress	83.7% (887)	80.2% (768)	79.2% (855)	82.7% (742)

3.2 GENDER

Table 2 shows the high/low stress percentages for males and females. No significant difference was observed for the two groups.

Table 2
Work stress by gender cross-tabulation

Work stress	Gender	
	Male	Female
High stress	18.7% (367)	18.5% (384)
Low stress	81.3% (1600)	81.5% (1690)

3.3 MARITAL STATUS

Single and married workers reported very similar levels of stress but those who were divorced/separated or widowed reported significantly higher levels (chi square = 10.4 d.f.2 $p < 0.01$).

Table 3
Work stress by marital status cross-tabulation

Work stress	Marital status		
	Married/ Cohabiting	Single	Divorced/ Separated/widowed
High stress	18.2% (514)	17.3% (142)	24.7% (92)
Low stress	81.8% (2312)	82.7% (677)	75.3% (372)

4. FULL-TIME / PART-TIME EMPLOYMENT, EDUCATION, SOCIO-ECONOMIC STATUS AND SALARY

4.1 FULL-TIME/PART-TIME EMPLOYMENT

This analysis was presented in the main report and shows that full-time employment is associated with greater stress than part-time employment (chi-square = 81.7 d.f.1, $p < 0.001$).

Table 4
Work-stress by full-time/part-time cross tabulation

Work stress	Full-time v part-time	
	Full-time	Part-time
High stress	21.7% (661)	8.8% (87)
Low stress	78.3% (2383)	91.2% (898)

4.2 EDUCATIONAL LEVEL

Four categories were produced reflecting different levels of educational attainment. A highly significant difference was found between the groups with those educated to degree level (or equivalent) reporting greatest stress (chi-square = 41.5 d.f.3, $p < 0.001$).

Table 5
Work stress by education level cross-tabulation

Work stress	Education			
	No secondary school qualifications	Up to 'O' level	Up to 'A' level	Degree
High stress	13.6% (84)	15.1% (116)	15.8% (99)	22.7% (433)
Low stress	86.4% (535)	84.9% (654)	84.2% (529)	77.3% (1471)

4.3 SOCIO-ECONOMIC GROUPS

Table 6 shows work stress cross-tabulated against the standard socio-economic groups. A highly significant effect of socio-economic groups was found (chi-square = 144.3, d.f.5 $p < 0.001$), with group II having the highest proportion in the high stress category.

Table 6
Work stress by socio-economic groups cross-tabulation

Work stress	Socio-economic groups					
	Group I	Group II	Group III.1	Group III.2	Group IV	Group V
High stress	20.2% (73)	28.0% (388)	13.3% (126)	14.2% (95)	10.8% (60)	6.8% (11)
Low stress	79.8% (289)	72.0% (998)	86.7% (819)	85.8% (513)	89.2% (498)	93.2% (151)

4.4 SALARY

Salaries were grouped by quartiles and a highly significant difference in stress levels was found across the groups (chi square = 119.9 d.f.3 $p < 0.001$) with stress levels increasing with salary.

Table 7
Work stress by salary cross-tabulation

Work stress	Salary			
	£2,500-9,999	£10,000-15,999	£16,000-19,999	£20,000-50,000
High stress	9.2% (97)	18.0% (216)	22.4% (118)	27.3% (299)
Low stress	90.8% (956)	82.0% (985)	77.6% (409)	72.7% (797)

In summary, this section shows that (1) reported stress is greater in full-time jobs than part-time jobs, (2) reported stress increases with educational attainment and salary, and (3) reported stress increases up to socio-economic group II and then decreases slightly in group I. The largest differences are related to full-time/part-time employment, socio-economic groups and salary. These are all variables which may be related to the specific nature of the job. This is examined in the next section.

5. OCCUPATION

Occupation was initially categorised using the Computer Assisted Standard Occupational Coding (2). Categories were then combined in the same way as in the SWI report (3). These occupational groups are cross-tabulated against reported stress in Table 8.

The differences between the groups were highly significant (chi square = 216.2 d.f. 26 $p < 0.001$). Some of the groups had very small numbers and the results must be treated with caution. However, the profile obtained from the larger groups confirms that teachers, nurses and managers have the greatest proportions of high stress. In further analyses the above groups were collapsed to give four categories reflecting levels of reported stress (low stress occupations to high stress occupations). This new grouping is shown in Table 9.

Table 8
Work stress by occupation cross-tabulation

<i>Job</i>	Work stress	
	High stress	Low stress
Professional and support management	26.7% (111)	73.3% (305)
Teaching	41.5% (90)	58.5% (127)
Nursing	31.8% (47)	68.2% (101)
Other education and welfare	22.7% (53)	77.3% (180)
Literary, artistic and sports	16.8% (16)	83.2% (79)
Science and engineering	13.0% (34)	87.0% (228)
Managerial	27.8% (111)	72.3% (289)
Clerical	12.9% (66)	87.1% (447)
Secretarial	14.2% (30)	85.8% (181)
Selling	12.8% (28)	87.2% (191)
Security	19.0% (11)	81.0% (47)
Catering	6.8% (7)	93.2% (96)
Care workers	11.5% (25)	88.5% (193)
Hair & beauty	0% (0)	100% (26)
Cleaners	10.9% (14)	89.1% (115)
Other personal services	7.4% (2)	92.6% (25)
Farming, fishing, forestry	8.3% (2)	91.7% (22)
Metal processing	9.9% (14)	90.1% (128)
Electrical processing	11.5% (7)	88.5% (954)
Textile processing	6.7% (1)	93.3% (14)
Other processing	15.9% (24)	84.1% (127)
Repetitive assembly	8.3% (4)	91.7% (44)
Construction	16.5% (14)	83.5% (71)
Road transport	21.7% (25)	78.3% (96)
Other transport	16.7% (4)	83.3% (20)
Moving/storing	4.6% (3)	95.4% (62)
Miscellaneous	9.1% (1)	90.9% (10)

Table 9
New groupings of occupations

Category 1 (lowest reported stress)

Catering
Hair & beauty
Other personal services
Farming, fishing, forestry
Textile processing
Repetitive assembly
Moving/storing

Category 2

Clerical
Care workers
Cleaners
Metal processing
Electrical processing
Miscellaneous
Selling

Category 3

Literary, artistic, sports
Science & engineering
Secretarial
Other processing
Construction
Other transport

Category 4 (highest reported stress)

Professional, support. Management
Teaching
Nursing
Other education & welfare
Managerial
Security
Road transport

6. ETHNICITY

Less than 3% of the sample were non-white. This clearly means that one must be very cautious in applying the present finding to all ethnic groups. Indeed, it is obvious that further research on occupational stress in a range of ethnic groups is highly desirable.

The following section considers the non-white sub-group in detail. Again, the results should be treated with caution given the small numbers involved. The initial cross-tabulation shows reported work stress by ethnicity. This shows a greater proportion of very stressed workers in the non-white group (chi square = 8.6. d.f.1 p = 0.003).

Table 10
Work stress by ethnicity cross-tabulation

Work stress	Ethnicity	
	Non-white	White
High stress	29.1% (34)	18.3% (713)
Low stress	70.9% (83)	81.7% (3179)

6.1 GENDER – NON-WHITES ONLY

As in the analysis for the sample as a whole, there was no effect of gender on work stress.

Table 11
Work stress by gender cross-tabulation – non-whites only

Gender	Work stress	
	High stress	Low stress
Males	27.8% (15)	72.2% (39)
Females	30.6% (19)	69.4% (943)

6.2 AGE – NON-WHITES ONLY

In this sample, stress increased with age although the differences were not significant.

Table 12
Work stress by age cross-tabulation – non-whites only

Age	Work stress	
	High stress	Low stress
18-32	20.6% (7)	79.4% (27)
33-40	25.6% (11)	74.4% (32)
41-50	42.9% (69)	57.1% (12)
51+	43.8% (7)	56.3% (9)

6.3 EDUCATION – NON-WHITES ONLY

Again, reported stress was greatest in those educated to degree level. However, the differences between groups were not significant.

Table 13
Work stress by education cross-tabulation– non-whites only

Education	Work stress	
	High stress	Low stress
No secondary school qualifications	14.3% (1)	85.7% (6)
Up to 'O' levels	28.6% (6)	71.4% (15)
Up to 'A' level	12.5% (2)	87.5% (14)
Degree	33.3% (24)	66.7% (48)

6.4 SALARY - NON-WHITES ONLY

The results showed a different profile from the sample as a whole, with reported stress being greatest in the £16,000 – 19,999 group. However, these differences were not statistically significant.

Table 14
Work stress by salary cross-tabulation – non-whites only

Salary	Work stress	
	High stress	Low stress
£2,500-9,999	25.9% (7)	74.1% (20)
£10,000-15,999	18.2% (6)	81.8% (27)
£16,000-19,999	47.6% (10)	52.4% (11)
£20,000-50,000+	31.4% (11)	68.6% (24)

6.5 SOCIO-ECONOMIC GROUPS - NON-WHITES ONLY

Again, reported stress was significantly greater in group II ($p=0.002$).

Table 15
Work stress by socio-economic groups cross-tabulation – non-whites only

Socio-economic Groups	Work stress	
	High stress	Low stress
I	25.0% (1)	75.0% (3)
II	45.8% (27)	54.2% (32)
III.1	11.5% (3)	88.5% (23)
III.2	8.3% (1)	91.7% (11)
IV	12.5% (2)	87.5% (14)

6.6 FULL-TIME/PART-TIME - NON-WHITES ONLY

In this analysis, part-time work was associated with as high a level of reported stress as full-time work.

Table 16
Work stress by full-time/part-time cross-tabulation – non-whites only

Full-time/part-time employment	Work stress	
	High stress	Low stress
Full-time	29.2% (26)	70.8% (63)
Part-time	29.6% (8)	70.4% (19)

6.7 OCCUPATION – NON-WHITES ONLY

Nurses and managers again had the highest proportion of high stressed workers (there was only one teacher in this sample and that person was in the high reported stress category).

Table 17
Work stress by certain occupations cross-tabulation – non-whites only

Jobs	Work stress	
	High stress	Low stress
Management	66.7% (6)	33.3% (3)
Nursing	71.4% (10)	28.6% (4)
Managerial	68.8% (11)	31.3% (5)

In summary, the non-white group reported greater stress at work than the sample as a whole. Slight differences were found in the effects of the demographic and occupational variables although these should be treated with caution due to the small numbers in certain cells. Further research on occupational stress in non-white groups is now essential, especially as the evidence from the current small sample suggests that non-white groups may have higher levels of stress at work than their white counterparts. It is not clear whether the results reported here reflect ethnicity per se or correlated attributes found in the present non-white sample. Further research on this topic must address this issue in detail.

7. COMBINATIONS OF VARIABLES

7.1 GENDER AND OTHER VARIABLES

Separate analyses were carried out to determine whether there were significant differences between males and females in the various sub-groups of the other factors.

7.1.1 Marital status

There was no significant effect of gender in any of the marital status groups

Table 18
Work stress by gender by marital status cross tabulation

Marital status	Work stress	Gender	
		Male	Female
Married / cohabiting	Low stress	1139 80.8%	1172 82.8%
	High stress	270 19.2%	244 17.2%
Single	Low stress	344 83.5%	333 81.8%
	High stress	68 16.5%	74 18.2%
Widowed / divorced / separated	Low stress	105 79.5%	174 72.8%
	High stress	27 20.5%	65 27.2%

7.1.2 Age

Males and females showed a very similar pattern across all age groups, with both having the highest proportion in the high stress category in the two middle age groups.

Table 19
Work stress by gender by age cross tabulation

Age	Work stress	Gender	
		Male	Female
18 – 32	Low stress	389 82.9%	498 84.3%
	High stress	80 17.1%	93 15.7%
33 – 40	Low stress	350 78.5%	418 81.6%
	High stress	96 21.5%	94 18.4%
41 – 50	Low stress	401 79.2%	454 79.1%
	High stress	105 20.8%	120 20.9%
50+	Low stress	441 84.5%	301 80.3%
	High stress	81 15.5%	74 19.7%

7.1.3 Education

There were significantly more males than females in the high stress category for workers with no secondary school academic qualifications (chi square = 5.26 d.f.1 p<0.05). In the other educational groups there were no significant differences between males and females.

Table 20
Work stress by gender by education level cross tabulation

Education level	Work stress	Gender	
		Male	Female
No academic qualification	Low stress	272 83.4%	263 89.8%
	High stress	54 16.6%	30 10.2%
Up to 'O' level	Low stress	271 82.6%	383 86.7%
	High stress	57 17.4%	59 13.3%
Up to 'A' level	Low stress	339 84.5%	190 83.7%
	High stress	62 15.5%	37 16.3%
Degree	Low stress	669 78.4%	800 76.3%
	High stress	184 21.6%	249 23.7%

7.1.4 Socio-economic group

There were higher proportions of females than males in the high stress category for group I (chi square = 7.2 d.f.1 p<0.01) and this pattern was reversed for group III.2 (chi square = 4.8 d.f.1 p<0.01).

Table 21
Work stress by gender by socio-economic status cross tabulation

Socio-economic status	Work stress	Gender	
		Male	Female
I	Low stress	195 84.1%	94 72.3%
	High stress	37 15.9%	36 27.7%
II	Low stress	470 72.6%	527 71.4%
	High stress	177 27.4%	211 28.6%
III.1	Low stress	213 85.5%	605 87.1%
	High stress	36 14.5%	90 12.9%
III.2	Low stress	421 84.4%	91 92.9%
	High stress	78 15.6%	7 7.1%
IV	Low stress	223 87.8%	275 90.5%
	High stress	31 12.2%	29 9.5%
V	Low stress	66 93.0%	85 93.4%
	High stress	5 7.0%	6 6.6%

7.1.5 Salary

Two different patterns emerged in this data. First, there was a higher proportion of males than females in the high stress category for the lowest salary group (chi square = 3.84 d.f.1 $p < 0.05$). However, for all the other salary groups there were more females than males in the high stress category and this effect increased with salary (10,000 – 15,999: chi square = 3.80 d.f.1 $p < 0.05$; 16,000-19,999: chi square = 4.45 d.f.1 $p < 0.05$; 20,000+: chi square = 29.1 d.f.1 $p < 0.001$).

Table 22
Work stress by gender by salary cross tabulation

Salary	Work stress	Gender	
		Male	Female
£2,500 – 9,999	Low stress	206 87.7%	750 91.7%
	High stress	29 12.3%	68 8.3%
10,000 – 15,999	Low stress	464 84.4%	521 80.0%
	High stress	86 15.6%	130 20.0%
16,000 – 19,999	Low stress	255 80.7%	153 72.9%
	High stress	61 19.3%	57 27.1%
20,000 – 50,000	Low stress	612 77.2%	184 60.9%
	High stress	181 22.8%	118 39.1%

7.1.6 Full time / part time

There were more females in the high stress category for both full and part-time employment but only the full-time employment effect was significant (chi square = 11.7 d.f.1 p=0.001).

Table 23
Work stress by gender by full time / part time employment cross tabulation

Full-time/ part-time employment	Work stress	Gender	
		Male	Female
Full time	Low stress	1461 80.4%	919 75.1%
	High stress	357 19.6%	304 29.4%
Part time	Low stress	134 94.4%	764 90.6%
	High stress	8 5.6%	79 9.4%

7.1.7 Occupation

There were no significant differences between males and females for any of the job categories.

Table 24
Work stress by gender by occupation cross tabulation

Occupation	Work stress	Gender	
		Male	Female
1 (Low stress)	Low stress	107 93.0%	139 92.1%
	High stress	8 7.0%	12 7.9%
2	Low stress	472 87.7%	717 88.7%
	High stress	66 12.3%	91 11.3%
3	Low stress	493 82.9%	283 87.3%
	High stress	102 17.1%	41 12.7%
4 (High stress)	Low stress	509 73.0%	539 69.6%
	High stress	188 27.0%	235 30.4%

7.1.8 Summary

In summary, there were higher proportions of males than females in the high stress category in those with no secondary school qualifications and the lowest salary group. In contrast, there were higher proportions of females than males in the high stress category in social class III.2, all the salary groups except the lowest and in the full-time employment group.

7.2 MARITAL STATUS AND OTHER VARIABLES

Separate analyses were carried out to determine whether there were significant effects of marital status in the various sub-groups of the other factors.

7.2.1 Gender

These data have already been presented in table 18. Marital status had no significant effect in the males but did for the females (chi square = 13.48 d.f. 2 $p=0.001$), with the highest proportion in the high stress category being in those who were widowed/divorced or separated.

7.2.2 Age

Marital status had a significant effect in the two oldest categories. In the 41-50 year olds there was a higher proportion in the high stress category for those who were single (chi square = 6.70 d.f. 2 $p < 0.05$) whereas in those who were 50+ years old the highest proportion was in the widowed/divorced/separated group (chi square = 7.46 d.f. 2 $p < 0.05$).

Table 25
Work stress by marital status by age cross tabulation

Age	Work stress	Marital status		
		Married/ Cohabiting	Single	Widowed/ Divorced/separated
18 – 32	Low stress	420 81.4%	432 86.1%	27 79.4%
	High stress	96 18.6%	70 13.9%	7 20.6%
33 – 40	Low stress	596 81.2%	121 78.1%	50 74.6%
	High stress	138 18.8%	34 21.9%	17 25.4%
41 – 50	Low stress	676 80.7%	71 71.0%	101 74.8%
	High stress	162 19.3%	29 29.0%	34 25.2%
50+	Low stress	595 84.2%	42 84.0%	99 74.4%
	High stress	112 15.8%	8 16.0%	34 25.6%

7.2.3 Education

Marital status only had a significant effect in the group educated to degree level. In this group those who were widowed/divorced or separated had the highest proportion in the high stress category (chi square = 10.13 d.f. 2 $p < 0.05$).

Table 26
Work stress by marital status by education level cross tabulation

Education level	Work stress	Marital Status		
		Married/ cohabiting	Single	Widowed/ divorced/separated
No academic qualification	Low stress	436 87.0%	40 88.9%	56 80.0%
	High stress	65 13.0%	5 11.1%	14 20.0%
Up to 'O' level	Low stress	489 86.2%	106 82.2%	55 79.7%
	High stress	78 13.8%	23 17.8%	14 20.3%
Up to 'A' level	Low stress	344 84.1%	145 85.8%	34 77.3%
	High stress	65 15.9%	24 14.2%	10 22.7%
Degree	Low stress	970 76.9%	378 80.9%	116 69.0%
	High stress	292 23.1%	89 19.1%	52 31.0%

7.2.4 Salary

Marital status only had a significant effect in the group earning £20,000+ (chi square = 10.30 d.f. 2 p<0.01) with those who were widowed/divorced or separated having the highest proportion in the high stress category.

Table 27
Work stress by marital status by salary cross tabulation

Salary	Work stress	Marital status		
		Married/ Cohabiting	Single	Widowed/ divorced/separated
£2,500 – 9,999	Low stress	651 91.4%	216 90.8%	78 84.8%
	High stress	61 8.6%	22 9.2%	14 15.2%
10,000 – 15,999	Low stress	645 81.1%	230 85.5%	105 79.5%
	High stress	150 18.9%	39 14.5%	27 20.5%
16,000 – 19,000	Low stress	287 77.8%	93 79.5%	27 69.2%
	High stress	82 22.2%	24 20.5%	12 30.8%
20,000 – 50,000	Low stress	625 75.0%	112 67.5%	58 61.7%
	High stress	208 25.0%	54 32.5%	36 38.3%

7.7.5 Socio-economic group

Marital status did not have a significant effect in any of the socio-economic groups (which probably reflects the small numbers in each group).

Table 28
Work stress by marital status by socio-economic status cross tabulation

Socio-economic status	Work stress	Marital status		
		Married/ Cohabiting	Single	Widowed/ divorced/separated
I	Low stress	204 77.9%	64 87.7%	20 76.9%
	High stress	58 22.1%	9 12.3%	6 23.1%
II	Low stress	702 72.7%	206 73.3%	88 64.7%
	High stress	263 27.3%	75 26.7%	48 35.3%
III.1	Low stress	552 87.6%	181 85.8%	80 81.6%
	High stress	78 12.4%	30 14.2%	18 18.4%
III.2	Low stress	383 84.9%	89 89.0%	33 84.6%
	High stress	68 15.1%	11 11.0%	6 15.4%
IV	Low stress	345 91.0%	104 86.7%	44 81.5%
	High stress	34 9.0%	16 13.3%	10 18.5%
V	Low stress	110 94.0%	24 96.0%	15 88.2%
	High stress	7 6.0%	1 4.0%	2 11.8%

7.2.6 Full time / part time

Marital status had a significant effect in the group in full-time employment (chi square = 10.5 d.f.2 $p < 0.005$) but not those in part-time employment. Again, those who were widowed/divorced or separated had a higher proportion in the high stress category.

Table 29
Work stress by marital status by full time / part time employment cross tabulation

Full time/part-time employment	Work stress	Marital status		
		Married/ Cohabiting	Single	Widowed/ divorced/separated
Full time	Low stress	1589 78.0%	571 81.3%	206 72.0%
	High stress	447 22.0%	131 18.7%	80 28.0%
Part time	Low stress	714 91.8%	103 90.4%	74 86.0%
	High stress	64 8.2%	11 9.6%	12 14.0%

7.2.7 Occupation

Marital status had no significant effect in any of the job categories.

Table 30
Work stress by marital status by occupation cross tabulation

Occupation	Work stress	Marital status		
		Married/ Cohabiting	Single	Widowed/ divorced/separated
1 (low reported stress)	Low stress	159 90.9%	62 95.4%	21 95.5%
	High stress	16 9.1%	3 4.6%	1 4.5%
2	Low stress	825 89.4%	245 87.2%	108 83.1%
	High stress	98 10.6%	36 12.8%	22 16.9%
3	Low stress	559 85.2%	154 83.2%	59 79.7%
	High stress	97 14.8%	31 16.8%	15 20.3%
4 (High reported stress)	Low stress	748 71.6%	207 74.2%	91 63.6%
	High stress	297 28.4%	72 25.8%	52 36.4%

7.2.8 Summary

In summary, those who were widowed/divorced or separated generally had a higher proportion in the high stress category. This effect was significant for females, those in the 50 + age group, those educated to degree level, the highest salary group and those in full-time employment.

7.3 AGE AND OTHER VARIABLES

Separate analyses were carried out to examine whether there were significant effects of age in all the sub-groups of the other factors.

7.3.1 Gender

These data have already been presented in table 19. There was a significant effect of age in the males but not females (chi square = 8.07, d.f.3 $p < 0.05$) with the highest proportion in the high stress category being in the middle aged workers.

7.3.2 Marital status

These data have already been presented in Table 25. Age had a significant effect in the single workers (chi square = 15.77 $p < 0.005$) with the highest proportion in the high stress category occurring in the 41-50 year olds.

7.3.3 Education

Age only had a significant effect in those educated to degree level, with the middle aged groups having a higher proportion in the high stress category (chi square = 15.58 d.f. 3 $p < 0.005$). This is shown in Table 31.

Table 31
Work stress by age by education level cross tabulation

Education level	Work stress	Age			
		18-32	33-40	41-50	51+
No academic qualification	Low stress	21 91.3%	68 88.3%	188 85.5%	253 86.1%
	High stress	2 8.7%	9 11.7%	32 14.5%	41 13.9%
Up to 'O' level	Low stress	187 86.2%	198 85.0%	133 82.6%	127 84.7%
	High stress	30 13.8%	35 15.0%	28 17.4%	23 15.3%
Up to 'A' level	Low stress	190 83.3%	119 86.9%	134 82.2%	82 86.3%
	High stress	38 16.7%	18 13.1%	29 17.8%	13 13.7%
Degree	Low stress	481 82.8%	370 74.4%	365 73.9%	237 76.9%
	High stress	100 17.2%	127 25.6%	129 26.1%	71 23.1%

7.3.4 Socio-economic group

Age only had a significant effect in class II, with there being a higher proportion in the high stress category in the middle age groups (chi square = 12.2 d.f. 3 $p < 0.01$).

Table 32
Work stress by age by socio-economic status cross tabulation

Socio-economic status	Work stress	Age			
		18-32	33-40	41-50	51+
I	Low stress	77 83.7%	68 80.0%	78 78.0%	60 77.9%
	High stress	15 16.3%	17 20.0%	22 22.0%	17 22.1%
II	Low stress	254 77.2%	257 67.8%	278 68.8%	200 76.3%
	High stress	75 22.8%	122 32.2%	126 31.2%	62 23.7%
III.1	Low stress	270 86.3%	183 91.0%	183 83.2%	172 86.4%
	High stress	43 13.7%	18 9.0%	37 16.8%	27 13.6%
III.2	Low stress	124 87.9%	108 84.4%	141 85.5%	133 85.3%
	High stress	17 12.1%	20 18.2%	24 14.5%	23 14.7%
IV	Low stress	124 87.3%	122 92.4%	131 91.6%	117 86.0%
	High stress	18 12.7%	10 7.6%	12 8.4%	19 14.0%
V	Low stress	30 88.2%	26 100.0%	35 92.1%	56 93.3%
	High stress	4 11.8%	0 0.0%	3 7.9%	4 6.7%

7.3.5 Salary

Age had no significant effect in any of the salary groups.

Table 33
Work stress by age by salary cross tabulation

Salary	Work stress	Age			
		18-32	33-40	41-50	51+
£2,500 – 9,999	Low stress	284 90.4%	219 94.8%	220 88.0%	225 90.4%
	High stress	30 9.6%	12 5.2%	30 12.0%	24 9.6%
10,000 – 15,999	Low stress	315 83.8%	198 80.5%	246 81.5%	218 81.3%
	High stress	61 16.2%	48 19.5%	56 18.5%	50 18.7%
16,000 – 19,999	Low stress	120 80.0%	110 72.4%	106 77.4%	66 82.5%
	High stress	30 20.0%	42 27.6%	31 22.6%	14 17.5%
20,000 – 50,000	Low stress	144 74.6%	219 71.8%	248 70.5%	180 76.3%
	High stress	49 25.4%	86 28.2%	104 29.5%	56 23.7%

7.3.6 Full time / part time

Age had a significant effect for those in full-time employment, with the middle-aged groups having a higher proportion in the high stress category (chi square = 13.90 d.f. 3 p<0.005).

Table 34
Work stress by age by full time / part time employment cross tabulation

Full-time/part-time employment	Work stress	Age			
		18-32	33-40	41-50	51+
Full time	Low stress	710 82.2%	532 75.7%	623 75.7%	485 79.0%
	High stress	154 17.8%	171 24.3%	200 24.3%	129 21.0%
Part time	Low stress	176 90.7%	236 92.5%	228 90.1%	250 91.2%
	High stress	18 9.3%	19 7.5%	25 9.9%	24 8.8%

7.3.7 Occupation

Age only had a significant effect for those in the highest stress occupation. Again, the middle-aged groups had a higher proportion in the high stress category (chi square = 9.54 d.f. 3 $p < 0.05$).

Table 35
Work stress by age by occupation cross tabulation

Occupation	Work stress	Age			
		18-32	33-40	41-50	51+
1 (Low reported stress)	Low stress	71 92.2%	53 94.6%	64 92.8%	55 91.7%
	High stress	6 7.8%	3 5.4%	5 7.2%	5 8.3%
2	Low stress	359 87.1%	263 91.3%	277 87.1%	270 88.2%
	High stress	53 12.9%	25 8.7%	41 12.9%	36 11.8%
3	Low stress	212 84.8%	188 83.9%	190 84.1%	179 84.4%
	High stress	38 15.2%	36 16.1%	36 15.9%	33 15.6%
4 (High reported stress)	Low stress	238 76.0%	258 67.5%	313 68.8%	231 75.0%
	High stress	75 24.0%	124 32.5%	142 31.2%	77 25.0%

7.3.8 Summary

In summary, there were generally higher proportions in the high stress category in the middle age groups. This effect was significant for males, those who were single, those educated to degree level, social class II, those in full-time employment and those in the most stressful jobs.

7.4 EDUCATION

Separate analyses were carried out to assess the effect of educational attainment in all the sub-groups of the other variables.

7.4.1 Gender

These data have already been shown in Table 20. Educational level had a significant effect for both males (chi square = 8.74 d.f. 3 $p < 0.05$) and females (chi square = 40.57 d.f.3 $p < 0.001$). In both sexes the highest proportion in the high stress category was found in those educated to degree level.

7.4.2 Marital status

These data have already been shown in Table 26. There was only a significant effect of educational level in those who were married (chi square = 38.75 d.f. 3 $p < 0.001$). In this group the percentages in the high stress category increased with educational attainment.

7.4.3 Age

These data have already been shown in Table 31. Educational level had a significant effect in all age groups except for the 18-32 year olds. In all of the other age groups the highest proportion in the high stress category was found in those educated to degree level (33-40 year group: chi square = 20.5 d.f.3 $p < 0.001$; 41-50 year group: chi square = 15.59 d.f. 3 $p = 0.001$; 51 years +: chi square = 10.61 d.f. 3 $p < 0.05$).

7.4.4 Socio-economic groups

There were no significant effects of education in any of the socio-economic groups

Table 36
Work stress by education level by socio-economic status cross tabulation

Socio-economic status	Work stress	Educational level			
		No academic qualifications	Up to 'O' level	Up to 'A' level	Degree
I	Low stress	1 50.0%	17 81.0%	21 80.8%	250 79.9%
	High stress	1 50.0%	4 19.0%	5 19.2%	63 20.1%
II	Low stress	60 78.9%	125 71.4%	138 77.5%	662 70.4%
	High stress	16 21.1%	50 28.6%	40 22.5%	278 29.6%
III.1	Low stress	128 90.1%	264 87.7%	106 82.2%	303 86.6%
	High stress	14 9.9%	37 12.3%	23 17.8%	47 13.4%
III.2	Low stress	134 83.8%	99 86.8%	158 90.8%	99 82.5%
	High stress	26 16.3%	15 13.2%	16 9.2%	21 17.5%
IV	Low stress	133 85.8%	114 92.7%	87 87.0%	137 89.5%
	High stress	22 14.2%	9 7.3%	13 13.0%	16 10.5%
V	Low stress	72 94.7%	32 97.0%	15 93.8%	13 86.7%
	High stress	4 5.3%	1 3.0%	1 6.3%	2 13.3%

7.4.5 Salary

In the highest salary group those with degrees had a significantly greater proportion in the high stress category (chi square = 9.88 d.f 3 $p < 0.05$).

Table 37
Work stress by education level by salary cross tabulation

Salary	Work stress	Educational level			
		No academic qualification	Up to 'O' level	Up to 'A' level	Degree
£2,500 – 9,999	Low stress	208 91.6%	241 92.7%	148 91.9%	319 88.4%
	High stress	19 8.4%	19 7.3%	13 8.1%	42 11.6%
10,000 – 15,999	Low stress	186 86.1%	228 82.0%	166 82.2%	375 80.6%
	High stress	30 13.9%	50 18.0%	36 17.8%	90 19.4%
16,000 – 19,000	Low stress	48 85.7%	69 79.3%	75 78.9%	214 75.1%
	High stress	8 14.3%	18 20.7%	20 21.1%	71 24.9%
20,000 – 50,000	Low stress	54 74.0%	87 77.0%	121 81.8%	526 70.0%
	High stress	19 26.0%	26 23.0%	27 18.2%	225 30.0%

7.4.6 Full time / part time employment

For both the full time and part time groups, those educated to a degree level had a significantly greater proportion in the high stress category (full time: chi square = 27.96 d.f 3 $p < 0.001$; part time: chi square = 7.95 d.f 3 $p < 0.05$).

Table 38
Work stress by education level by full time / part time employment cross tabulation

Full time/ part-time employment	Work stress	Educational level			
		No academic qualifications	Up to 'O' level	Up to 'A' level	Degree
Full time	Low stress	350 83.3%	443 81.4%	423 82.1%	1103 74.3%
	High stress	70 16.7%	101 18.6%	92 17.9%	382 25.7%
Part time	Low stress	180 93.3%	209 93.3%	106 93.8%	364 88.1%
	High stress	13 6.7%	15 6.7%	7 6.2%	49 11.9%

7.4.7 Occupation

The only group to show a significant effect at education level was occupation category 2, where those educated to degree level had the highest proportion in the high stress category (chi square = 10.35 d.f 3 p<0.05).

Table 39
Work stress by education level by occupation cross tabulation

Occupation	Work stress	Educational level			
		No academic qualifications	Up to 'O' level	Up to 'A' level	Degree
1 (Low reported stress)	Low stress	77 93.9%	50 89.3%	61 93.8%	48 90.6%
	High stress	5 6.1%	6 10.7%	4 6.2%	5 9.4%
2	Low stress	255 91.7%	318 90.3%	222 88.1%	343 84.5%
	High stress	23 8.3%	34 9.7%	30 11.9%	63 15.5%
3	Low stress	127 77.9%	147 86.5%	132 85.7%	349 86.4%
	High stress	36 22.1%	23 13.5%	22 14.3%	55 13.6%
4 (High reported stress)	Low stress	64 78.0%	137 72.1%	108 71.5%	725 70.5%
	High stress	18 22.0%	53 27.9%	43 28.5%	304 29.5%

7.4.8 Summary

In summary, there were generally higher proportions in the high stress category in the group educated to degree level. This effect was significant in both sexes, those who were married, all but the youngest age group, the highest salary group, both full and part-time employment and the second occupational category.

7.5 SOCIO-ECONOMIC GROUP AND OTHER VARIABLES

Separate analyses were carried out to determine whether socio-economic status had a significant effect in all the sub-groups of the other variables.

7.5.1 Gender

Both males and females showed a significant effect of socio-economic group (males: chi square = 52.59 d.f.5 $p < 0.001$; females: chi square = 104.74 d.f.5 $p < 0.001$). In the males, Group II had the highest proportion in the high stress category and in the females the highest percentages were found in Groups I and II. These data have already been presented in Table 21.

7.5.2 Marital status

These data have already been presented in Table 28. Socio-economic status had a significant effect in all groups (married: chi square = 106.92 d.f.5 $p < 0.001$; single: chi square = 26.85 d.f.5 $p < 0.001$; divorced/widowed/separated = 14.94 d.f.5 $p < 0.05$) with the highest proportion in the high stress category being in Group II.

7.5.3 Age

Socio-economic group had a significant effect in all age groups (18-32 years: chi square = 15.37 d.f. 5, $p < 0.01$; 33-40 years: chi square = 72.14 d.f.5 $p < 0.001$; 41-50 years: chi square = 49.55 d.f.5 $p < 0.0001$; 51+ years: chi square = 17.24 d.f.5 $p < 0.005$). In all groups the highest proportion in the high stress group was found in Group II. These data have already been presented in Table 32.

7.5.4 Education

These data have already been presented in Table 36. There was a significant effect of socio-economic group in all educational groups (no secondary qualifications: chi square = 13.05 d.f.5 $p < 0.05$; up to 'O' level: chi square = 36.73 d.f. 5 $p < 0.001$; up to 'A' level: chi square = 14.03. d.f.5 $p < 0.05$; degree level: chi square = 59.52 d.f.5 $p < 0.001$). At all levels of

educational attainment the highest percentage of workers in the high stress category was found in social class II.

7.5.5 Salary

There was a significant effect of socio-economic group in all of the salary categories. This reflected a higher proportion of high stress workers in group II for all salary categories except 10,000 – 15,999 where group I had the highest percentage in the high stress category.

(£2,500 – 9,999: chi square = 39.6 d.f.5 p<0.0001

10,000 – 15,999: chi square = 11.4 d.f.5 p<0.05

16,000 – 19,999: chi square = 25.2 d.f.5 p<0.001

20,000+: chi square = 30.4 d.f.5 p<0.001).

Table 40
Work stress by socio-economic status by salary cross tabulation

Salary	Work stress	Socio-economic group					
		I	II	III.1	III.2	IV	V
£2,500 – 9,999	Low stress	17 89.5%	137 78.7%	352 94.4%	109 94.8%	242 23.1%	94 94.0%
	High stress	2 10.5%	37 21.3%	21 5.6%	6 5.2%	24 9.0%	6 6.0%
10,000 – 15,999	Low stress	37 71.2%	275 78.6%	297 83.0%	180 82.6%	154 86.5%	30 90.9%
	High stress	15 28.8%	75 21.4%	61 17.0%	38 17.4%	24 13.5%	3 9.1%
16,000 – 19,999	Low stress	40 87.0%	162 68.4%	61 80.3%	92 86.0%	45 91.8%	8 88.9%
	High stress	6 13.0%	75 31.6%	15 19.7%	15 14.0%	4 8.2%	1 11.1%
20,000 – 50,000	Low stress	190 79.5%	393 66.5%	80 77.7%	99 83.2%	25 86.2%	7 100.0%
	High stress	49 20.5%	198 33.5%	23 22.3%	20 16.8%	4 13.8%	0 0.0%

7.5.6 Full time / part time

There was a significant effect of socio-economic group in both full-time (chi square = 90.16 d.f. 5. $P < 0.001$) and part-time workers (chi square = 32.43 d.f. 5 $p < 0.001$). In the full-time workers there was a higher proportion in the high stress category in group II. In the part-time workers the higher proportions were in groups I and II.

Table 41
Work stress by socio-economic status by full time / part time employment cross tabulation

Full-time/ part-time employment	Work stress	Socio-economic group					
		I	II	III.1	III.2	IV	V
Full time	Low stress	245 79.5%	794 69.5%	500 82.8%	455 84.4%	309 86.6%	64 88.9%
	High stress	63 20.5%	348 30.5%	104 17.2%	84 15.6%	48 13.4%	8 11.1%
Part time	Low stress	44 81.5%	201 84.1%	318 93.5%	56 98.2%	189 94.0%	85 96.6%
	High stress	10 18.5%	38 15.9%	22 6.5%	1 1.8%	12 6.0%	3 3.4%

7.5.7 Occupation

A significant effect of socio-economic group was found in the most stressful jobs (chi square = 12.2 d.f.3 p<0.01). Again, group II had the highest proportion in the high stress category.

Table 42
Work stress by socio-economic status by occupation employment cross tabulation

Occupation	Work stress	Socio-economic group					
		I	II	III.1	III.2	IV	V
1 (Low reported stress)	Low stress	*	11 91.7%	9 100.0%	92 92.9%	118 91.5%	17 94.4%
	High stress	*	1 8.3%	0 0.0%	7 7.1%	11 8.5%	1 5.6%
2	Low stress	*	16 84.2%	569 86.7%	215 88.5%	276 90.2%	114 92.7%
	High stress	*	3 15.8%	87 13.3%	28 11.5%	30 9.8%	9 7.3%
3	Low stress	115 84.6%	169 85.8%	190 87.6%	205 80.4%	86 83.5%	11 100.0%
	High stress	21 15.4%	28 14.2%	27 12.4%	50 19.6%	17 16.5%	0 0.0%
4 (High reported stress)	Low stress	174 77.0%	802 69.3%	51 81.0%	*	18 90.0%	*
	High stress	52 23.0%	356 30.7%	12 19.0%	*	2 10.0%	*

Key: * No data

7.5.8 Summary

In summary, those in group II generally had a higher proportion in the high stress category. This was found for both sexes, all marital status groups, all age groups, all levels of educational attainment, all salary levels and both full and part-time work. However, only the most stressful job category showed a significant effect of social group, suggesting that it may

be the nature of the job, rather than social group per se that is important. Given that the socio-economic groupings used here are based on occupation this is not surprising.

7.6 SALARY AND OTHER VARIABLES

Separate analyses were carried out to determine whether salary had a significant effect on all sub-groups of the other factors.

7.6.1 Gender

These data have already been shown in Table 22. There were significant effects of salary for both males (chi square = 18.46 d.f3 $p < 0.001$) and females (chi square=150.22 d.f3 $p < 0.001$), with the proportion in the high stress category increasing with salary in both sexes.

7.6.2 Marital status

These data are shown in Table 27. Again, the proportion in the high stress category increased with salary for all groups (married: chi square = 73.20 d.f3 $p < 0.001$; single: chi square = 39.45 d.f3 $p < 0.001$; widowed/divorced or separated: chi square = 15.74 d.f3 $p < 0.001$).

7.6.3 Age

These data are shown in Table 33. Again, there were significant effects of salary in all age groups (18-32: chi square = 23.47 d.f3 $p < 0.001$; 33-40: chi square =49.77 d.f3 $p < 0.001$; 41-50: chi square = 28.76 d.f3 $p < 0.001$; 51+: chi square= 17.39 d.f3 $p < 0.001$).

7.6.4 Education

These data are shown in Table 37. The effect of salary was once again significant in all groups (no secondary qualifications: chi square = 15.16 d.f3 $p < 0.005$; 'O' level: chi square = 21.48 d.f3 $p < 0.001$; 'A' level: chi square = 10.46 d.f3 $p < 0.05$; Degree: chi square = 50.97 d.f3 $p < 0.001$).

7.6.5 Socio-economic group

These data are shown in Table 40. There were significant effects of salary in Groups II (chi square = 21.48 d.f3 $p < 0.001$), III.1 (chi square= 33.62 d.f3 $p < 0.001$) and III.2 (chi square =

10.19 df 3 $p < 0.001$). The absence of significant effects in the extreme groups reflects the small numbers in certain categories (i.e. very few low salary workers in Group I and very few highly paid workers in Groups IV and V).

7.6.6 Full time / part time

Salary had a significant effect for both full and part-time employment. In full-time workers the proportion in the high stress category increased with salary (chi square = 53.0 d.f. 3 $p < 0.001$). In part-time workers the salary group with the highest proportion in the high stress category was the 10,000-15,999 salary range (chi square = 11.19 d.f. 3 $p < 0.05$).

Table 43
Work stress by salary by full time / part time employment cross tabulation

Full time/ part time employment	Work stress	Salary			
		£2,500 – 9,999	10,000 – 15,999	16,000 – 19,000	20,000 – 50,000
Full time	Low stress	331 87.8%	849 81.6%	375 76.5%	744 71.8%
	High stress	46 12.2%	191 18.4%	115 23.5%	292 28.2%
Part time	Low stress	622 92.6%	132 84.1%	33 91.7%	51 91.1%
	High stress	50 7.4%	25 15.9%	3 8.3%	5 8.9%

7.6.7 Occupation

There was a significant effect of salary in all the job categories apart from the lowest stress category. In all job categories there was a higher proportion in the high stress category in the highest salary group than the lowest. Differences between the mid-salary groups and the others varied across job categories (occupation 1: chi square = 3.76 n.s; occupation 2: chi square = 28.85 d.f. 3 p<0.001; occupation 3: chi square = 8.98 d.f.3 p<0.05; occupation 4: chi square = 14.25 d.f. 3 p<0.005).

Table 44
Work stress by salary by occupation cross tabulation

Occupation	Work stress	Salary			
		£2,500 – 9,999	10,000 – 15,999	16,000 – 19,000	20,000 – 50,000
1 (Low reported stress)	Low stress	121 94.5%	70 89.7%	21 91.3%	14 82.4%
	High stress	7 5.5%	8 10.3%	2 8.7%	3 17.6%
2	Low stress	534 93.7%	375 84.7%	119 85.0%	102 81.6%
	High stress	36 6.3%	68 15.3%	21 15.0%	23 18.4%
3	Low stress	164 91.1%	250 82.2%	110 86.6%	223 82.0%
	High stress	16 8.9%	54 17.8%	17 13.4%	49 18.0%
4 (High reported stress)	Low stress	128 78.0%	276 76.2%	158 67.5%	456 67.5%
	High stress	36 22.0%	86 23.8%	76 32.5%	220 32.5%

7.6.8 Summary

In summary, the proportion in the high stress category increased with salary. This was significant for nearly every sub-group examined.

7.7 FULL TIME / PART TIME EMPLOYMENT AND OTHER VARIABLES

There were significantly higher proportions in the high stress category for those in full-time employment than those working part-time in analyses examining gender (see Table 22), marital status (see Table 29), age (see Table 34), education (see Table 38), socio-economic groups (see Table 41) and salary (see Table 43).

7.7.1 Occupation

There were significantly greater proportions of full-time workers in the high stress category for all occupation groups except for group I. (occupation 2: chi square = 30.05 d.f.1 p<0.001; occupation 3: chi square = 8.27 d.f. 1 p<0.005; occupation 4: chi square = 21.32 d.f.1 p<0.001).

Table 45
Work stress by full time / part time employment by occupation cross tabulation

Occupation	Work stress	Full-time/part-time employment	
		Full-time	Part-time
1 (Low reported stress)	Low stress	158 91.3%	89 94.7%
	High stress	15 8.7%	5 5.3%
2	Low stress	734 84.8%	454 94.8%
	High stress	132 15.2%	25 5.2%
3	Low stress	647 82.9%	126 92.6%
	High stress	133 17.1%	10 7.4%
4 (High reported stress)	Low stress	824 68.7%	222 82.8%
	High stress	375 31.3%	46 17.2%

7.7.2 Summary

In summary, all of the analyses clearly demonstrated that the scale of occupational stress is much greater in full-time employment than in part-time work.

7.8 OCCUPATION

7.8.1 Summary

Job category had a highly significant effect on the proportion in the high stress category. This effect was found in the analyses of gender (Table 23), marital status (Table 30), age (Table 35), education (Table 39), socio-economic groups (Table 42), salary (Table 44) and full-time/part-time employment (Table 45). In a few analyses the effect of job was not significant due to the small numbers in certain cells.

8. COMBINATIONS OF THE HIGH STRESS SUB-GROUPS

The previous section showed that gender differences in the scale of reported stress were variable, with some sub-groups showing a greater level of stress in males and others showing the reverse. Marital status had a more general influence with there being a higher proportion in the high stress category in those who were widowed/divorced or separated. Age had a small but significant effect in most analyses with the middle-aged having a higher proportion in the high stress category than the other age groups. Level of educational attainment was also a significant factor, with those educated to degree level reporting greater stress. The proportion in the high stress category also increased with salary. Similarly, high stress was greater in full-time work than part-time employment. Type of job also achieved significance in the majority of analyses. As socio-economic group was based on occupation it was not surprising that this showed a similar pattern.

The analyses reported below took the sub-groups with the highest reported stress levels from all of the variables and examined how stress varied as a function of the number of these variables present. The sub-groups considered as “highest reported stress” for the various factors were:

Marital status:	Divorced/separated/widowed
Age:	41-50 years old
Full-time/part-time	Full-time
Education:	To degree level
Socio-economic group:	Group II
Salary:	£20,000+
Occupation:	Category 4 (professional, teaching, nursing, other education and welfare, managerial, security and road transport)

Gender was not examined as this did not have a significant overall effect on the proportion in the high stress category.

Table 46 shows the proportion of workers in the high stress category as a function of the number of “highest reported stress” factors reported. This shows a clear “dose response” with a highly significant difference between groups (chi-square = 128.2 d.f 7 p<0.0001).

Table 46
Cross-tabulation of work stress by number of “highest”
stress sub-groups reported (those with no missing data, N=3680)

Work stress	Number of stress factors reported							
	0	1	2	3	4	5	6	7
Low stress	95.7% (290)	88.1% (683)	86.1% (686)	81.3% (499)	75.1% (467)	65.5% (258)	60.4% (99)	36.4% (4)
High stress	4.3% (13)	11.9% (92)	13.9% (111)	18.7% (115)	24.9% (155)	34.5% (136)	39.6% (65)	63.6% (7)

The above results show that the method of categorising the number of high stress factors present does not lead to many false positives at the zero stress end of the scale. In order to check that the above profile was not an artefact of excluding those with some missing data the analysis was repeated recoding missing data as low stress. These results are shown in Table 47.

Table 47
Cross-tabulation of work stress by number of “highest” stress sub-groups
Reported (missing data recoded as low stress)

Work stress	Number of high stress factors reported							
	0	1	2	3	4	5	6	7
Low stress	95.8% (339)	88.0% (801)	85.1% (754)	81.8% (545)	74.8% (488)	65.6% (263)	60.4% (99)	36.4% (4)
High stress	4.2% (15)	12.0% (109)	14.9% (132)	18.2% (121)	25.2% (164)	34.4% (138)	39.6% (65)	63.6% (7)

Again, there was a highly significant effect of number of factors (chi square = 218.2 d.f.7 $p < 0.0001$) and the profile was identical to the previous analysis.

The above results suggest that the different factors associated with the reporting of stress are independent and additive. This was confirmed by conducting a logistic regression. This revealed that type of job, full-time/part-time employment, socio-economic status, and marital status had a significant effects. Education and age no longer had significant effects when the other variables were also entered into the equation. The variables in the regression equation are shown in Table 48.

Table 48
Logistic regression entering the variables dichotomised into
sub-groups associated with high and low stress

Variable	Wald	Sig	R	Log odds ratio	95% CI log odds ratio	
					lower	upper
Job type	30.86	.0000	0.092	1.0068	1.0044	1.0092
Full-time	42.36	.0000	0.109	1.0088	1.0061	1.0114
Socio-economic	9.18	.0024	0.046	1.0036	1.0013	1.0060
Salary	4.98	.0026	0.030	1.0022	1.0003	1.0041
Marital status	8.98	0.003	0.045	1.0042	1.0015	1.0070

An identical profile emerged when stepwise multiple regression was used with the work stress rating (now on a 5 point scale rather than dichotomised) as the dependent variable. Additional regressions were carried out using the original categorisation of variables rather than the dichotomies. The logistic regression showed an identical outcome apart from the fact

that socio-economic group was no longer significant. Similarly, in the multiple regression the only difference was that educational level now had a significant effect.

Summary

Overall, these analyses have shown that the proportion in the high reported stress category increases as a function of the number of highest stress sub-groups reported. Regressions have shown that the associations between the occupational variables and reported work stress are robust whereas demographics such as age no longer have an impact when the other variables are entered into the regression equation. Full-time employment and type of job clearly have the strongest associations with reported work stress but the other factors can add to these variables. Marital status also appears to be important and cannot be accounted for by the other variables considered here.

9. DISCUSSION

9.1 A SUMMARY OF THE RESULTS

Results from the main study showed that about 20 percent of the sample reported very high or extremely high levels of stress at work. The present report describes further analyses of the impact of demographic and occupational variables on reported stress at work.

This analysis is based mainly on statistical significance testing. Consequently, the results do not establish with any certainty a causal link between any of the demographic and occupational factors measured and reported stress at work. The results may be suggestive of such a link but more in-depth research would be necessary to establish its validity.

In the majority of the analyses reported stress levels were similar in males and females. The exceptions were that there were higher proportions of males than females in the high reported stress category in those with no secondary school qualifications and the lowest salary group. In contrast, there were higher proportions of females than males in the high reported stress category in social class III.2, all the salary groups except the lowest and in the full-time employment group.

Marital status was related to the reporting of stress with those who were widowed/divorced or separated generally having a higher proportion in the high reported stress category. This was significant for females, those in the 50 + age group, those educated to degree level, the highest salary group and those in full-time employment.

There were generally higher proportions in the high reported stress category in the middle age groups. This was significant for males, those who were single, those educated to degree level, social class II, those in full-time employment and those in the most stressful jobs.

There were also generally higher proportions in the high reported stress category in the group educated to degree level. This was significant in both sexes, those who were married, all but

the youngest age group, the highest salary group, both full and part-time employment and the second occupational category.

The present sample was not a very good one for examining ethnicity, with there being very few non-white respondents. The non-white group reported greater stress at work than the sample as a whole. Slight differences were found as a function of ethnicity in the effects of the demographic and occupational variables although these should be treated with caution due to the small numbers in certain cells. Further research on occupational stress in non-white groups is now essential, especially as the evidence from the current small sample suggests that non-white groups may have higher levels of stress at work than their white counterparts. However, it is unclear whether the differences reflect ethnicity per se or the influence of other factors that are correlated with ethnicity in the present sample.

The scale of occupational stress was clearly much greater for those in full-time employment than those with part-time jobs. The proportion in the high stress category also increased with salary.

Job category showed a strong relationship with the reporting of stress. When socio-economic groups based on occupation were examined it was generally found that those in-group II had a higher proportion in the high reported stress category. Analyses of occupations showed that teachers, nurses and managers had the highest proportion in the high reported stress category.

Sub-groups with the highest reported stress for each variable were identified. The proportions in the high reported stress category were then examined as a function of the number of these factors present. A clear dose response emerged suggesting that the various factors are independent and additive. This was confirmed in regression equations where all the occupational variables remained as significant effects.

In conclusion, the present analyses show that the scale of occupational stress is associated with both demographic and occupational factors. Specifically, greater reported occupational stress is associated with being middle-aged, widowed/divorced or separated, educated to degree level, in full-time employment earning over £20,000, and having an occupation such as teaching, nursing or being a manager (or being in social group II). The magnitude of

reported stress appears to be a direct function of the number of these features that are present, although it should be noted that stress at work is not an automatic consequence of having these characteristics. The analyses also showed that non-whites report higher levels of stress and further research on this topic is clearly desirable.

9.2 COMMENTS ON PRESENT FINDINGS

The results have shown that there are clearly some groups of employees who report statistically significantly higher levels of work-related stress than average. These groups can be identified by standard demographic and occupational characteristics. The impact of the different factors clearly varies in magnitude. For example, if one considers the demographic variables one finds that the difference between the most stressed and least stressed sub-groups is in the region of 5-10% (Age: 4.5 %, 18-32 v 41-50 groups; Marital status: 7.5 %, single v widowed/divorced or separated; education: 9.1 %, no secondary qualifications versus degree; ethnicity: 10.8 %, whites v non-whites). The occupational variables lead to greater variation with differences between the least and most stressed sub-groups ranging from 12- 40% (part-time v full-time: 12.9%; salary: 18.1%, lowest v highest; socio-economic group: 21.2%, group V v group II; occupation: 41.5%, hair and beauty v teachers).

Analyses combining the variables showed that the effects are independent and additive. The presence of 4 or more of the factors was associated with stress levels well above average and 50% of the high reported stress sample fell into those categories. However, it should be noted that 27% of the low reported stress sample had 4 or more of the factors present which suggests that high reported levels of stress at work are not an automatic consequence of the presence of certain demographic and occupational characteristics. This suggests further research on why certain individuals perceive high levels of stress whereas others do not. Indeed, the present approach is very similar to early research on the effects of negative life events on health (4). While exposure to stressful events is clearly one important factor it has been shown that appraisal of the stress cannot be ignored, and that coping strategies must be considered. Nevertheless, if one looks at the group with 6 of the potentially stress-related characteristics, one finds that the proportion of high stress workers in this group is over twice the average. This would seem, therefore, to be a sub-group that require urgent investigation.

The present analyses cannot answer the question of whether it is the nature of the job that causes the stress or whether it is the characteristics of individuals who do certain jobs that is crucial. Further research investigating the impact of changes in the nature of the job will provide better information on this issue. However, the estimates of the scale of occupational stress have increased over the last decade and the nature of many jobs has also changed over this period. Indeed, there are anecdotal reports from professions such as teaching which suggest that teachers are now doing very different jobs from those they originally carried out. The extra administrative demands now associated with the jobs, and uncertainty due to the changing nature of work, may be related to the increases in perceived stress.

9.3 HOW DO THE PRESENT FINDINGS COMPARE WITH PREVIOUS RESEARCH?

Similar results have been obtained in some previous research. For example, SWI95 (5) identified teachers and nurses as being a group with high levels of stress at work and also found little in the way of gender differences. Very different results emerge from studies such as Whitehall II, where work-related ill-health often shows a social gradient. As perceived stress has not been measured in Whitehall II it is difficult to resolve any differences. However, it is clearly the case that stress is not unitary but can have a varied aetiology and also different outcomes. Indeed, the most recent report from Whitehall II (6) shows that an effort-reward imbalance has global effects on health whereas high job demands, low decision latitude and work social support and control influence specific health outcomes. Only small social gradients were found for self-report health measures, and in the case of the women there was a lack of a gradient or a tendency towards an inverse gradient.

The apparently discrepant findings can probably be best accounted for in the following way. Job characteristics can increase perceived stress but greater reporting of stress is not an inevitable consequence in every person. Similarly, both job characteristics and perceived stress are related to ill-health but again there will be individuals who do not show such associations. It may also be the case that different pathways are involved, with not all job-health effects being mediated by an increase in stress. This type of effect can be seen clearly in research on susceptibility to upper respiratory tract infections (7). Here, stressful events were associated with increased colds and so was perceived stress. However, the biological

pathways affected by the two variables were different, with the stressful events influencing the development of symptoms after infection and perceived stress increasing the initial susceptibility to infection.

All one has to assume is that the direct job characteristics to health pathway also involves a social gradient whereas the job –perceived stress-health pathway does not, or involves an inverse one.

9.4 WHAT ARE THE IMPLICATIONS OF THE PRESENT FINDINGS FOR FURTHER RESEARCH AND MANAGEMENT OF OCCUPATIONAL STRESS?

The present research has identified one area which clearly requires further study, namely investigation of occupational stress in different ethnic groups. It has categorized the most prevalent type of reported occupational stress and this can be labeled “social group II” stress. This is clearly very different from the social gradient health effects that have been widely studied and it requires further investigation.

With regard to the targeting of sub-groups, the present research confirms that occupational stress is perceived as a major problem by teachers, nurses and managers. However, perceived stress is not an automatic consequence of these occupations and it is not absent in other jobs. This suggests the necessity for both a global approach to the topic and a focused consideration of those occupations where it appears to be a particularly big problem at the moment. Further research on individual differences in perceived occupational stress is also vital and we may make as much progress in understanding perceived stress at work by studying those who do not experience it as those who do.

10. REFERENCES

1. **Smith A., Johal S., Wadsworth E., Davey Smith G. and Peters T** (2000). *The scale of occupational stress: The Bristol Stress and Health at work study*. Contract research report 265/2000. Health & Safety Executive. HSE Books: Sudbury.
2. **Elias P., Halstead K. and Prandy K** (1993). *Computer assisted standard occupational coding (CASOC)*. HMSO: London.
3. **Jones JR., Hodgson JT. and Osman J** (1997). *Self-reported working conditions in 1995: Results from a household survey*. Health & Safety Executive. HSE Books: Sudbury.
4. **Holmes TH. and Rahe RH** (1967). *The social readjustment rating scale*. Journal of Psychosomatic Research, 11, 213-218.
5. **Jones JR., Hodgson JT., Clegg TA and Elliott RC** (1998). *Self-reported work-related illness in 1995: Results from a household survey*. Health & Safety Executive. HSE Books: Sudbury.
6. **Stansfeld S., Head J. and Marmot M** (2000). *Work related factors and ill-health: The Whitehall II Study*. Contract research report 266 /2000. Health & Safety Executive. HSE Books: Sudbury.
7. **Cohen S., Tyrrell DAJ. and Smith AP** (1993). *Negative life events, perceived stress, negative affect and susceptibility to the common cold*. Journal of Personality and Social Psychology, 64, 131-140.



MAIL ORDER

HSE priced and free
publications are
available from:

HSE Books
PO Box 1999
Sudbury
Suffolk CO10 2WA
Tel: 01787 881165
Fax: 01787 313995
Website: www.hsebooks.co.uk

RETAIL

HSE priced publications
are available from
good booksellers

HEALTH AND SAFETY ENQUIRIES

HSE InfoLine
Tel: 08701 545500
or write to:
HSE Information Centre
Broad Lane
Sheffield S3 7HQ
Website: www.hse.gov.uk

CRR 311

£15.00

ISBN 0-7176-1910-9



9 780717 619108