

**Combined effects of
psychosocial factors,
working hours and physical
agents on accidents at work**

B.T. WELLENS & A.P. SMITH

**THE CENTRE FOR OCCUPATIONAL &
HEALTH PSYCHOLOGY,**

CARDIFF UNIVERSITY

WALES, UK

The Combined Effects Approach

- Factors usually studied in isolation
- Not representative of real-life situation
- Additive, interactive or independent effects ?

Combined effects of demographic and occupational factors – reports of stress

Divorced/separated/widowed

40-50 years old

Full-time

Educated to degree level

Socio-economic Group II

etc

Number of "risk factors"

	0	1	2	3	4	7
High Stress %	4.2	12.0	14.9	18.2	25.2	63.6

The Combined Effects of Fatigue Indicators on Health and Well-being in the Offshore Oil Industry

‘TOTAL FATIGUE INDICATORS’ SCORE:(1=low, 2=high)

Working Hours

No. of hours worked per week, rotating versus fixed shifts, shift work (i.e. ‘how often do you do shift work?’) night work, unsociable hours

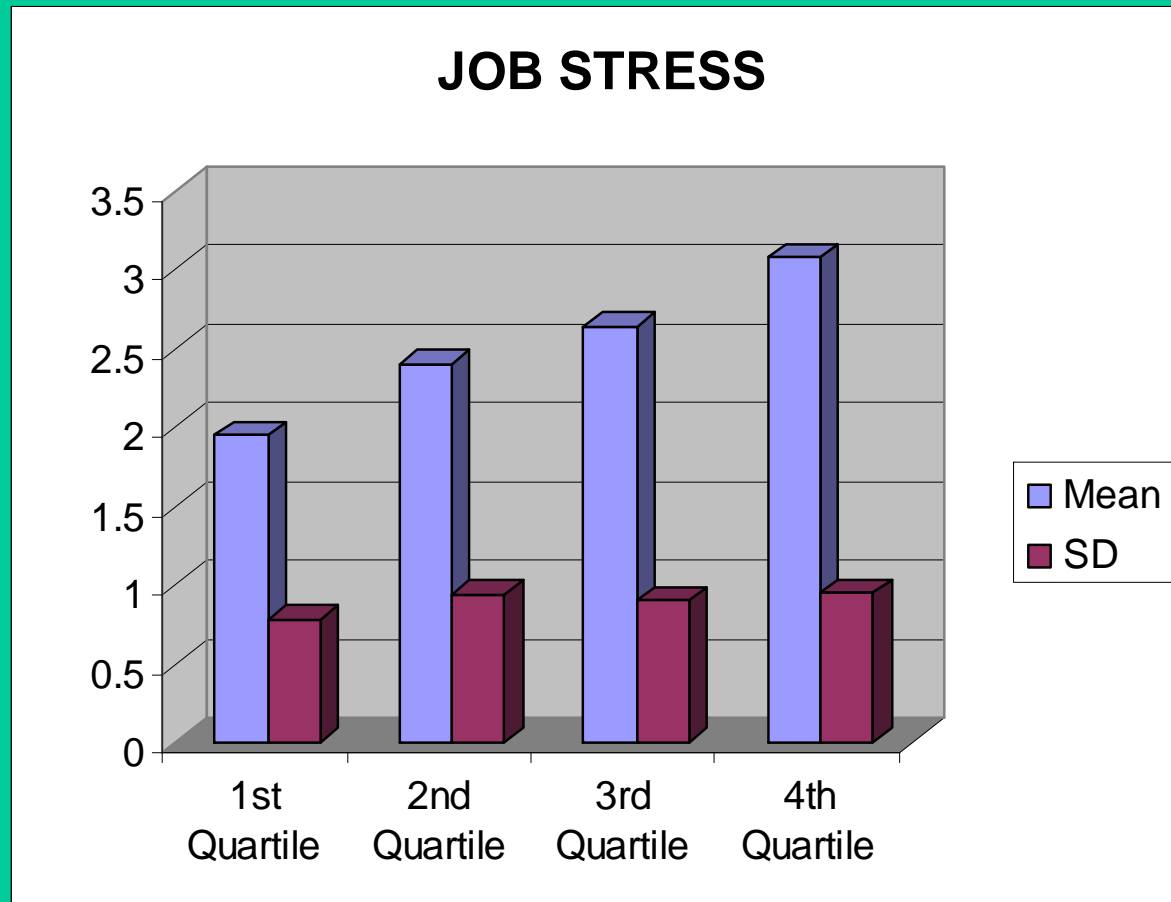
Physical Hazards

Breathing fumes/harmful substances, touching/handling harmful substances, ringing in the ears, background noise, vibration, motion sickness

Job Demand

‘I have constant time pressure due to a heavy workload’; ‘I have many interruptions & disturbances in my job’; ‘I have a lot of responsibility in my job’; ‘I am often under pressure to work overtime’; ‘I have experienced or expect to experience an undesirable change in my work’; ‘my job promotion prospects are poor’; ‘I am treated unfairly at work’

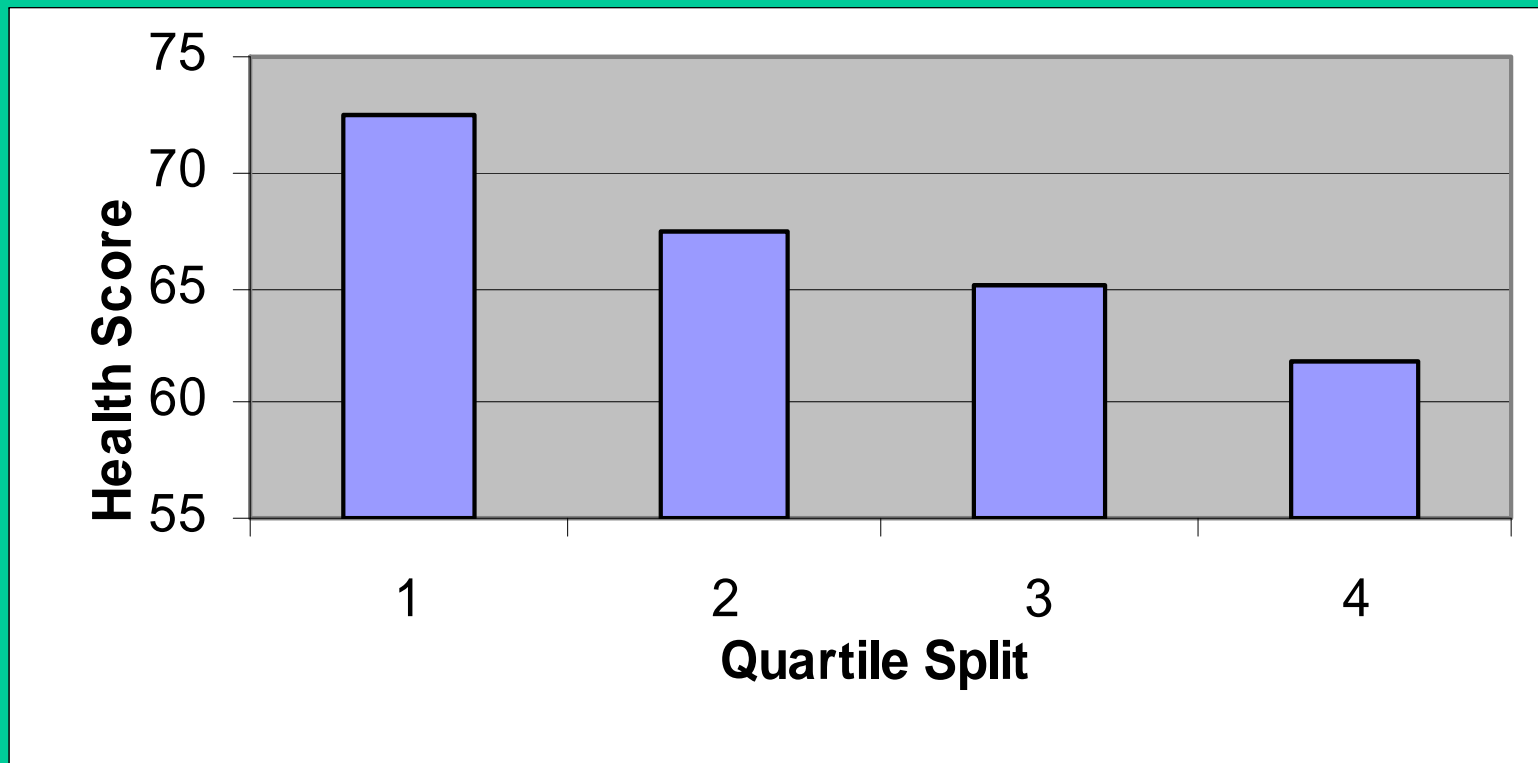
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$F [1, 732] = 53.38, p < .0001$

Combined Effects

Short-Form Health Questionnaire (SF-36) General health score



(A low score indicates poorer health)

THE BRISTOL STRESS AND HEALTH AT WORK STUDY

THE SAMPLE
N=8688

MALE

FEMALE

Full-time

Part-time

Full-time

Part-time

3645

327

2890

1826

(42%)

(3.8%)

(33.3%)

(21.0%)

NEGATIVE JOB CHARACTERISTICS AND OCCUPATIONAL STRESS

	OR	CI
1 st Quartile	1.00	
2 nd Quartile	1.60	1.32-1.93
3 rd Quartile	2.08	1.72-2.53
4 th Quartile	3.84	3.17-4.66

Present Research

- Apply combined effects approach to investigate accidents at work.
- Combined effects of psychosocial stressors, physical hazards and working hours
- Little previous research in this area

Ergonomic Stress Level

- Melamed et al., 1999
- Combined effects of body motion/posture, physical effort and environmental stressors
- A linear relationship between ESL scores and accident incidence

Samples

- Bristol sample – Time 2 – N=3,224
- Cardiff and Merthyr Tydfil Health, Work and Safety Study – N=7980
- Welsh A&E Units Study – N=2,520

Measures

- Job demands, control and support
- Effort-Reward Imbalance
- Exposure to physical agents (noise; fumes)
- Working hours (shift-work; overtime; on call)
- Calculation of NOF score from above

RESULTS

Total Negative Occupational Factors and Accidents

	OR	CI
1 st Quartile	1.00	
2 nd Quartile	3.59	1.16-11.14
3 rd Quartile	4.95	1.65-14.82
4 th Quartile	7.57	2.61-21.94

Psychosocial Factors and Accidents

No consistent effects.

Physical Agents, Working Hours and Accidents

Studies 1 and 2:

Trend for combined effects to be associated with greater risk of an accident. Lack of significance probably reflects the relatively small number of accidents.

Physical Agents, Working Hours and Accidents

A & E Study

	OR	CI
Low Hazards	1.00	
Temporal only	1.46	1.00-2.00
Physical only	2.58	1.80-3.74
Combined	3.60	2.60-5.00

Discussion

- Exposure to physical agents and temporal stressors are associated with the occurrence of accidents.
- The combination of these is greater than either by itself.
- Psychosocial factors have little effect. Where they do this reflects associations with physical hazards or working hours.
- Important to study samples where the outcome is common.
- The current approach can be applied to other outcomes (e.g. sickness absence) to define the “worst case” scenario and then identify the crucial influences.
- The NOF score can be used as a covariate in studies where the primary interest is not occupational factors.

CONCLUSIONS

Essential to examine combined effects

Total exposure, then specific combinations,
followed by dissection of individual components

Our initial research has implications for
methodology, modelling and guidance on
occupational health and safety

ACKNOWLEDGEMENTS

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