

# **Noise, stress and mental health: surveys across different occupations**

**Professor Andy Smith  
School of Psychology  
Cardiff University**

**[smithap@cardiff.ac.uk](mailto:smithap@cardiff.ac.uk)**

**Tel: 02920874757**

# Noise at Work

- Hearing loss
- Accidents
- Mental health

# Confounding factors

- Noisy jobs are associated with other factors (e.g. dangerous machinery) that may be the cause of accidents.
- Interventions to change noise levels may reflect motivational changes rather than direct effects of noise.

# How do we explain noise effects on accidents?

- Auditory effects – masking.
- Distraction.
- Due to increased stress.
- Fatigue.

# How do we explain effects of noise on health ?

- Explanation: Noise increases stress. Stress influences health.
- But: Three major features of stress-health process don't seem to apply to noise.
- Mental Health; Stress hormones; Immune suppression

# Aims of the Present Study

- Examine associations between perceived noise exposure at work and (1) the occurrence of accidents, injuries and cognitive failures, (2) mental health.
- Control for demographic, occupational and psychosocial factors.
- Control for exposure to other physical hazards

# Sample

6512 workers from Bristol Stress and Health at Work Study and Cardiff Health and Safety at Work Study

# Perceived noise exposure

- Do you work in an environment where the level of background noise disturbs your concentration?

Never

Seldom

Sometimes

Often

# Job characteristics

- Job Demand- Control-Support (Karasek)
- Effort-Reward Imbalance (Siegrist)

# Measures of mental health and stress at work

Perceived stress at work

(5-point scale – Smith et al., 2000)

Hospital Anxiety and Depression Scale

(Zigmond & Snaith, 1987)

Accidents requiring medical attention in last 12 months.

Frequency of minor injuries (e.g. cuts and bruises)

- Not at all to Very frequently

Frequency of cognitive failures

- Not at all to Very frequently

# RESULTS

# Noise, Accidents, Injuries and Cognitive Failures

**Table 1:** Noise, accidents, injuries and cognitive failures

	Low noise	High noise
% having accident	7.4%	16.5%
% frequent injuries	9.1%	26.2%
% frequent cognitive failures	11.2%	17.3%

# Noise and mental health

- Initial analyses showed that noise was associated with greater stress and mental health problems.
- The association between noise and mental health outcomes was entirely due to other psychosocial aspects of the job (job demands, effort-reward imbalance, low social support).

# CONCLUSIONS

- Perceptions of noise exposure were related to reports of accidents, injuries and cognitive failures
- Dose response observed
- Not due to demographic, occupational or psychosocial factors.
- Effects of noise on stress and mental health reflect other job characteristics.
- Explaining effects of noise in terms of stress may be inappropriate.

# Nurses Survey

- A survey of 858 nurses using the same measures as in the previous study.
- Anxiety, depression and work stress increased with increasing noise exposure.

	Often noise	Some times	Seldom	Never
Anxiety	10.0	8.5	7.7	7.3
Depress ion	6.2	5.5	4.8	4.3
Stress at work	2.5	2.4	2.1	1.9

These effects were no longer significant when adjusted for job characteristics.

# Problems with cross-sectional studies

- Reverse causality – mental health problems influence perception of noise rather than noise influencing mental health.
- Interventions would be ideal.
- Longitudinal studies looking at naturally occurring changes are a good initial step.

# Longitudinal follow up of a sub-sample from study 1

- N = 1627; followed up 12 months later.
- 24.9% reported greater noise exposure; 59.9% no change; 15.2% reduced noise exposure.
- Those who showed an increase in noise exposure reported a greater increase in anxiety, depression and stress than those who reported lower noise exposure. This was still significant when other job characteristics were controlled for. However, the magnitude of the noise effects were small.

	Increase in noise	Same	Decrease
	N = 427	N=1023	N=262
<b>Depression</b>	+10.0%	+8.6%	+5.5%
<b>Anxiety</b>	+12.0%	+9.2%	+0.1%
<b>Stress at work</b>	+8.4%	+4.6%	-1.2%

# SUGGESTION

- Field studies of effects of noise at work have always been criticised because of the lack of control of confounding factors. This led to laboratory studies where noise could be controlled.
- The best way to examine the effects of noise at work is to conduct intervention studies, which unfortunately are very difficult to do and can often be interpreted in terms of effects which do not reflect the direct effects of noise (e.g changes in state).