

**inter.noise 2000**

*The 29th International Congress and Exhibition on Noise Control Engineering  
27-30 August 2000, Nice, FRANCE*

---

I-INCE Classification: 5.6

## PERCEPTIONS OF HEALTH EFFECTS OF NIGHT AIRCRAFT NOISE

I. Diamond\*, A. Smith\*\*, S. Hayward\*\*, S. Heatherley\*\*\*, Z. Sheppard\*\*

\* U. Southampton, Highfield, SO17 1BJ, Southampton, United Kingdom

\*\* U. Cardiff, The University, CF11 3YG, Cardiff, United Kingdom

\*\*\* U.Bristol, U. Bristol, BS2, Bristol, United Kingdom

Tel.: 44 1703 592518 / Fax: 44 1703 593846 / Email: idd@socsci.soton.ac.uk

### Keywords:

SLEEP DISTURBANCE, AIRCRAFT NOISE, PUBLIC PERCEPTIONS, SOCIAL SURVEY

### ABSTRACT

This paper describes a social scientific study into perceptions of aircraft noise at night around a number of UK airports. The study aimed to identify the nature and extent to which people perceive their lives are impacted by aircraft noise at night and to examine the association between health, noise sensitivity, noise disturbed sleep, personality and perceptions of aircraft noise at night. The study involved focus groups, an interview survey and a postal survey. The results show that, at some sites at some airports aircraft noise at night causes a moderate level of disturbance. A relatively low proportion felt their health to be very much affected but a larger proportion felt their health to be somewhat affected by aircraft noise at night.

### 1 - INTRODUCTION

As part of a larger study commissioned by the UK Department of Environment, Transport and Regions. The aims of this project are:

- To explore public perceptions of aircraft noise at night around UK airports. This was to include the identification of the nature and extent of the impacts, together with an investigation of the relationships between various indicators of disturbance and a number of modifying factors.
- To examine the relationship between health, noise sensitivity, noise – disturbed sleep, personality and perceptions of aircraft noise at night.

This paper describes data from two interlinked sources:

- A qualitative study involving focus group discussions with residents in areas around Heathrow and Manchester airports;
- An interview survey of respondents in areas around Heathrow, Manchester, Gatwick, East Midlands and Stansted airports; and

### 2 - QUALITATIVE STUDY

The qualitative study comprised two focus groups of residents close to each of Manchester and Heathrow airports. Focus groups are groups of people discussing a specific set of issues, problems or research questions. They ideally comprise between six and twelve people in a discussion of between 60 and 90 minutes led by an experienced researcher. The research follows a question route, an unstructured interview questionnaire which comprises a set of themes. The groups were taped and the data were analysed using standard qualitative methods.

The qualitative substudy highlighted the importance of studying the components of aircraft noise at night. While, at these two large airports, daytime noise is perceived to have more of an impact on

people's lives there are certain aspects of night noise which are clearly important. Most notable among these is the disturbance caused by the perception that the aircraft noise is waking people up in the early morning. It is also of note that the participants were fully able to discuss different aspects of the flying. Also of considerable importance is the disjuncture between people knowing what they can do to express their disquiet with aircraft operations and their perceptions of the potential worth of them doing so.

### 3 - INTERVIEW SURVEY

The survey took place at Heathrow, East Midlands, Gatwick and Manchester. At each of the airports, there were two sites, a high noise and a low noise site. The target was to sample 300 people with approximately equal samples sizes at each site. This would enable reasonable estimates of the level of disturbance and to be able to measure moderate differences between high and low areas. It should also be noted that the aims of this study are not to obtain representative samples of the entire population living around the airports nor to estimate a dose response relationship.

The sampling strategy was as follows. Within each site, data from the 1991 population census, updated using population estimates to account for population change, were obtained to identify the age-sex distribution of the target population. Within each site a number of enumeration districts were selected and address lists made for each enumeration district. Interviewers were instructed to obtain interviews from different addresses within the area. Interviewers were not permitted to gain more than one interview per household and were expected not to approach adjacent addresses. The fieldwork was conducted between November 1999 and January 2000, the great majority in November and December.

The main interview topics are listed in Table below.

|     |   |
|-----|---|
| 1.  | Opinion of levels of pollution from a number of sources in the local environment.   |
| 2.  | Disturbance due to aircraft noise both in the day and at night. At night, disturbance at different times of night.                          |
| 3.  | Attitudes and perceptions to aircraft and the aircraft industry.  |
| 4.  | Perceived changes in aircraft noise levels in past year or three years.   |
| 5.  | View of potential noise management strategies.  |
| 6.  | Self-reported health: (i) chronic illnesses diagnosed by doctor; (ii) health problems in past year; (iii) symptoms noticed in past 14 days. |
| 7.  | Perceived stress and control: (i) at work; and (ii) in general life.  |
| 8.  | Cigarette and alcohol use.  |
| 9.  | Self-reported sensitivity to noise.   |
| 10. | Mental Health: a subset of questions from Eysenck's Personality.  |

**Table 1:** Outline of interview topics.

The description of the results starts with two basic measure of disturbance. In common with very many studies of aircraft noise the respondents were asked whether they were disturbed by aircraft noise a) at night; and b) during the day. Figure 1 shows that, at night, in the noisier sites around 30% of respondents at Heathrow and at Manchester were disturbed often or all the time with the percentages closer to 15% at the other three airports. It should also be noted that the percentage disturbed at the noisier Coventry site was also around 30%. The percentages were markedly lower at the lower noise sites at Heathrow and Manchester but less so at Gatwick and Stansted. To investigate the possibility that these differences were the result of differences in the demographic and social characteristics of the areas a logistic regression was carried out. The results showed that relative to the lower noise area at Stansted, the only statistically significant differences were at the noisier sites at Heathrow and East Midlands where there was greater annoyance and at the lower noise sites at Heathrow and Manchester where annoyance was lower.

Turning to daytime noise annoyance it is very noticeable from Figure 2 that the percentages annoyed are similar to those at night at Heathrow, Gatwick and Manchester but rather lower at East Midlands and Stansted (with the exception of the lower noise area at Stansted). The percentages annoyed in the day at Coventry are also lower than those at night. It is instructive to compare these results with those from previous studies. The 1992 UK field study summarised the results to a general question on disturbance due to aircraft noise. These results agree with those. Of note first is the higher noise area at Manchester (Heald Green) where there are rather lower percentages annoyed than one might have expected given the estimated noise levels. This also occurred in the 1992 UK field study – the interpretation then (as a result of some additional ethnography) was that a combination of adaptation together with the alternative attractions of the area meant that, while not liking the noise, the respondents accepted it as part of the environment and hence were less likely to express high levels of disturbance. Second, a direct

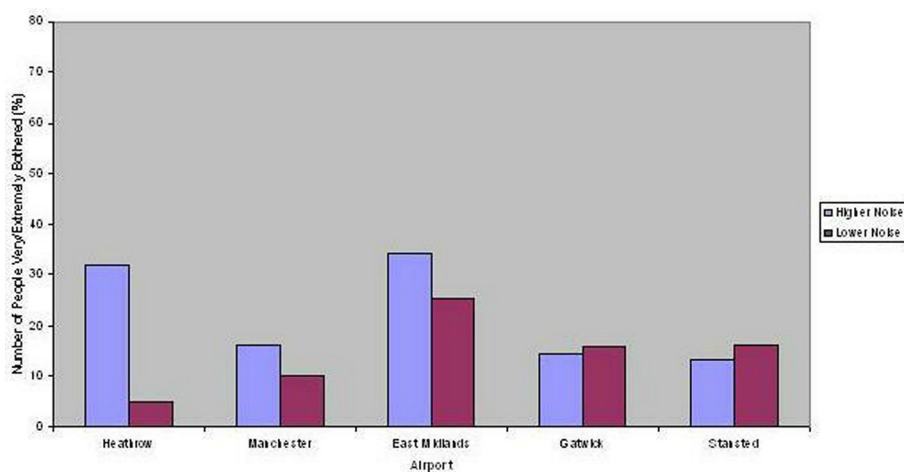


Figure 1.

comparison is possible at the lower noise area at Stansted. The percentage annoyed was very similar to that in the 1992 UK field study.

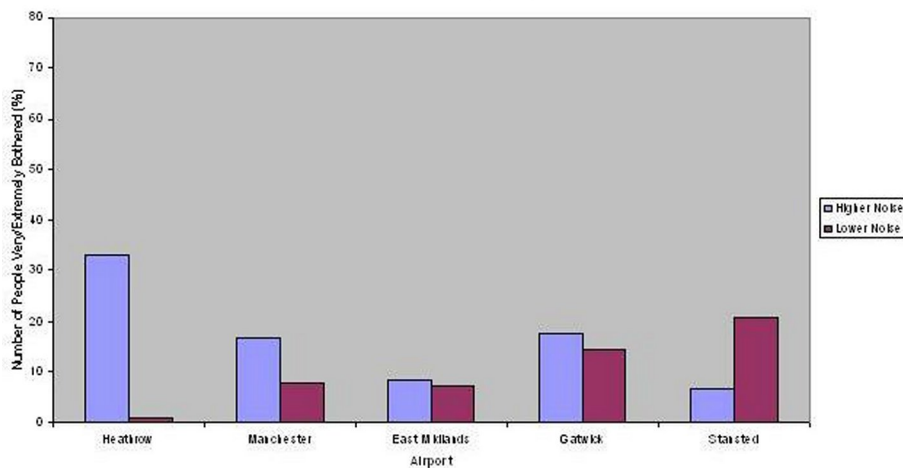


Figure 2.

The comparison between attitudes to daytime and night-time noise is particularly instructive. The higher disturbance at night at East Midlands and Coventry probably reflects the increased night flying at these airports in recent years – this was reported very clearly by the respondents – and by the fact that night flying may play a relatively higher part in the overall noise exposure at those airports. On the other hand flying at Heathrow, Manchester and Gatwick has not increased markedly at night in recent years. In summary there are a reasonable percentage of respondents who are relatively highly annoyed by aircraft noise at night.

One of the major reasons for continued work on the impact of aircraft noise at night is the possibility that there may be a measurable effect on health. This subsection describes the percentages of respondents who report a) that they believe their health to be effected; and c) that their quality of life is effected by aircraft noise at night. Figure 3 shows that, with the exception of the noisier Heathrow site, under one in ten respondents report that their health is effected very much or extremely by the aircraft noise at night. However it is worth noting that a much higher percentage report that their health is somewhat effected. At Heathrow, however, fully one person in six reports their health to be markedly effected. In multivariate analyses to control for demographic and social characteristics it was found that, relative to the low noise area at Stansted, there were increased perceived health effects only at the noisier areas at Heathrow and Gatwick.

To turn to actions that people have taken to alleviate the problem of noise or to complain about it, it should first be said that in the noisier areas a large percentage have insulated their house against it. For

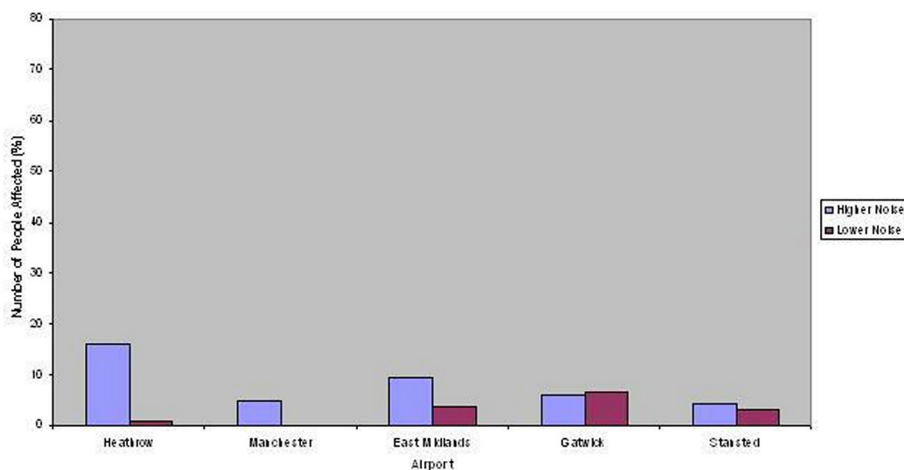


Figure 3.

example, at Heathrow in the noisier areas fully 60% had insulated against the noise with lower, but still notable, percentages in the noisier areas at Manchester (50%), Gatwick (45%) and East Midlands (30%) respectively.

It is clear from the survey that few people have taken action against the noise and that many people report that they adapt to the night noise. The lack of action is likely to reflect the fact that many people do not believe that the authorities would respond to complaints or action. On the other hand one should remember that reasonable percentages of people report high levels of annoyance and that relatively high percentages of people report their health or quality of life is at least somewhat affected by aircraft noise at night. As a result it is clear that very high percentages of people believe that the quality of life of people around airports would be improved if there were improved noise management strategies.

#### 4 - CONCLUSIONS

The major conclusions are:

- In the higher noise areas at each airport a reasonable percentage (30% at Heathrow and East Midlands; 20% at Gatwick, Coventry and Manchester) were highly disturbed by aircraft noise at night.
- At Heathrow, Manchester and Gatwick the percentages very much disturbed during the day were similar to that at night. However, at East Midlands and Coventry the percentages disturbed were higher at night than at day.
- Very few people reported that their health was extremely affected by aircraft noise at night. However between 30 and 60% respondents at each site perceived their health to be somewhat affected. While relatively few people believed their own health to be affected, a much higher percentage believed the health of the local population to adversely affected by aircraft noise at night.
- Respondents who reported any of the following: long term or recent physical or mental problems; stress in their job or in their life generally, were more likely to report that their health was affected by aircraft noise at night. This result held strongly after controlling for confounding variables in a multivariate analysis.
- High proportions of people at all airports are worried about various aspects of the flying. There was very strong support for nightly no-fly periods and for seasonal restrictions on flying at night.
- There was little feeling that the airline business was particularly concerned about the environment.