

AIRCRAFT NOISE ANNOYANCE AROUND THE AIRPORT ZURICH-KLOTEN

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Introduction In the past few years the political and operational situation in the neighbourhood of the airport Zurich-Kloten has changed dramatically, and aircraft noise has become an important political issue and an everyday subject covered by the media. Zurich-Kloten is certainly not the only airport where people become the longer the more upset and fight for more quietness. With these agitated situations, it cannot be assumed that people react to aircraft noise the same way they did decades ago and that the dose-effect-relationships found in earlier studies are still valuable. The results obtained in the first part of the Swiss Noise Study 2000 seem to confirm this postulate: People do not react to aircraft noise as expected. Moderator variables influence their annoyance judgement. This counts mostly for people living in areas with high or very low aircraft noise levels.

Methods In August 2001, a survey in the surroundings of the airport Zurich-Kloten was conducted. 3500 persons living near the airport were randomly selected and received per mail a noise annoyance questionnaire. 52% of them filled it out and returned it. For each of the respondent's place of residence, a variety of physical noise measures was calculated by EMPA (Swiss Federal Laboratories for Materials Testing and Research).

Some results *Relationship between aircraft noise and annoyance* The correlation between L_{eq} 6am-10pm and different noise annoyance scales is rather small (maximal $r=.43$; $R\ square=.18$). Correlation is strongest between 50 and 58 dB(A) (figure 1). In areas with less than 50 and more than 58 dB(A), the relationship is evanescent. Two other interesting findings are:

Even in areas without any or just a small amount of aircraft noise, the mean ratings of annoyance are still unexpectedly high: 2-3 on a scale ranging from 1 to 7.

The general annoyance judgements were based on the assumption of the situation "in the house, open windows" or "outside the house". At the same noise level, the annoyance "inside the house, closed windows", is lower than for the other situations.

Regression With a linear regression, we tested the influence of the aircraft noise level and potential moderator variables on overall aircraft noise annoyance. Explained variance ($R\ square$) is .49. The most important variables included in the model ($p<.05$) are: L_{eq} 6am-10pm ($\beta=.32$), attitude towards air traffic (index built of 6 items like dangerous or interesting) ($\beta=-.21$), contentment with quietness at home (index built of 3 items like contentment with insulation) ($\beta=-.18$), owner or tenant of the house ($\beta=-.15$), politicians should pay attention to quietness / to the economical development ($\beta=.15$), and trust in the organizations concerned with air traffic (index built of 8 items like trust in the politicians or in the airlines) ($\beta=-.14$). Other studies found similar moderators (for a review see cf. [1]). Partial correlations indicate that the number of flights per year and self-reported expectance of noise insulation windows moderate noise annoyance as well. For the reason of too many missing cases, however, these variables could not be integrated in the regression model.

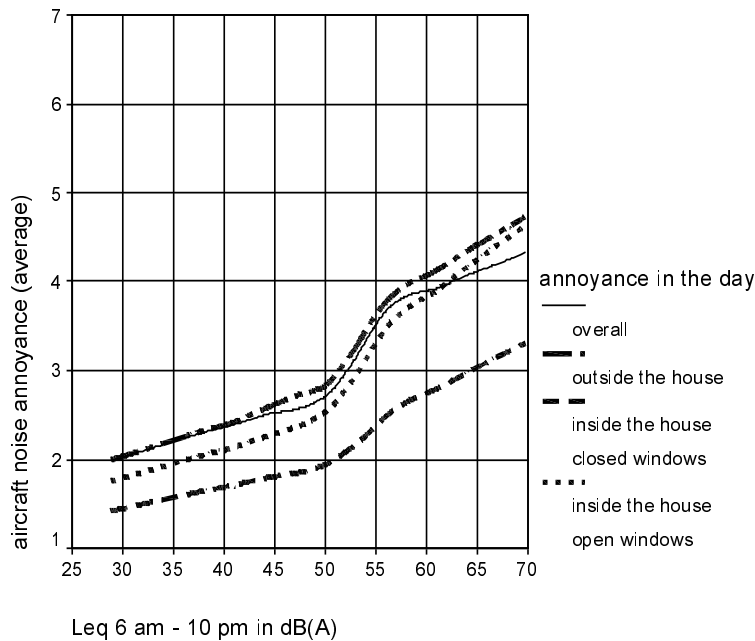


Figure 1: Relationship between aircraft noise (L_{eq} 6am-22pm) and annoyance (scale from 1 to 7) in different situations in the daytime.

Why are there highly annoyed persons in areas with no or only little aircraft noise, and why are there unannoyed persons in areas with high aircraft noise? To find out more about the characteristics of these subjects, all highly annoyed people with L_{eq} in the day below 50 dB(A) and L_{eq} at night below 45 dB(A) (called the sensitives in the remaining) and all little or not annoyed people with an L_{eq} above 60 dB(A) (called the unconcerned) were selected. For both groups, the scores for a variety of potential moderator variables were analysed. The most important differences between these two extreme groups and the entire sample are:

- 62% of the unconcerned persons have noise insulation windows
- 22% of the unconcerned are working in the air traffic sector (8% in the whole sample and 9% in the sensitive group)
- Concerning the future of the airport, 100% of the sensitive persons, but only 32% of the unconcerned and 66% of the whole sample want the politicians to pay attention to quietness and environment rather than to the economical development
- Asked about their noise sensitivity, the sensitives' scores average at 5.4 on a scale from 0-10 (unconcerned: 2.9, entire sample: 4.2)
- The average sensitive person travels by plane 1.9 times per year (average unconcerned person: 14 times, average sample person: 3.6 times per year)

Discussion The most surprising result of this study is the enhanced annoyance in areas with little or no aircraft noise. This result confirms on one hand studies showing that annoyance at stable noise levels changed in the last years (cf. [2]). On the other hand it supports Guski's [3] postulate that more research in the field of noise effects is needed to analyse chronological trends under stable conditions. Further research should try to explain the growing annoyance of persons who are - albeit living in the proximity of an airport - exposed to low aircraft noise. This study will be repeated in August 2003 employing both questionnaires and telephonic interviews, with the objectives of validating the survey method and of investigating the development of the noise annoyance by time.

Keywords: Aircraft noise annoyance, moderator variables, survey

References

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