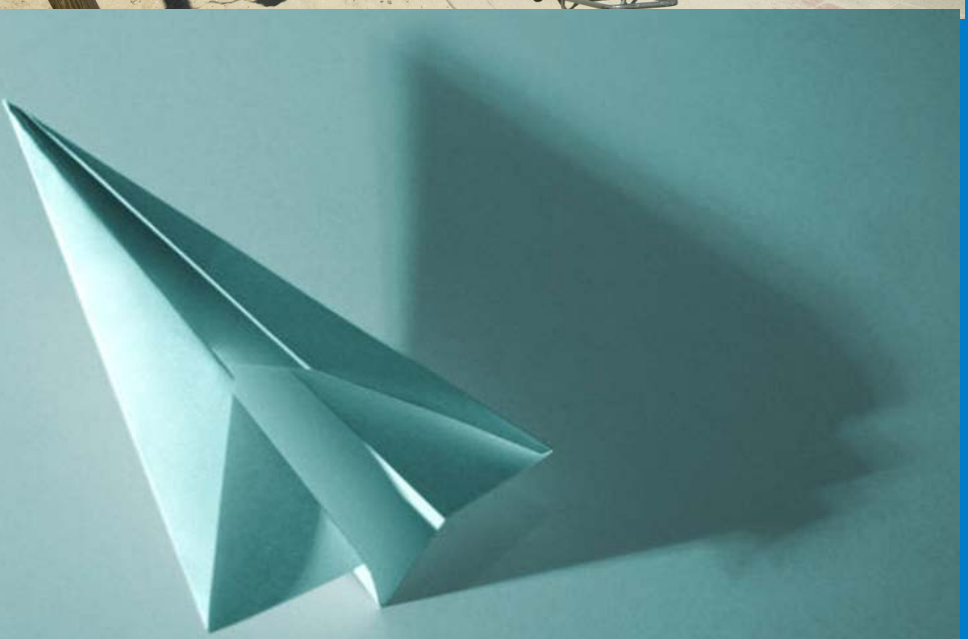
National Institute for Public Health
and the Environment
Ministry of Health, Welfare and Sport

Child development: NORAH child study

Irene van Kamp & Jürgen Hellbrück on behalf of the Scientific Advisory Board for quality assurance: NORAH child study



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Prologue to NORAH's Child Study

- Key question: Are children more vulnerable for the effects of noise >> and thus need more protection?
- Vulnerability mentioned in all base noise reviews (e.g. reviews Clark,Stansfeld, Berry, Davies, van Kamp, WHO, etc).
- Limited number of studies.
- Most studies are small scaled.
- Effects of air traffic noise on school children most extensively studied (LA, Munich, RANCH).

Prologue to NORAH's Child Study

- Children more vulnerable to noise especially with regards to cognitive development.
- Vulnerable period with regards to development and learning.
- (pre) schools are vulnerable places.
- Children more vulnerable because of less well developed coping skills.

Mechanisms:

- Disturbed Sleep
- Learned helplessness.
- Other mechanisms?

Summary of NORAH's Child Study

The research report describes in great detail the outcomes of a large study among 1243 schoolchildren, 1.185 parents and 85 teachers in the Rhine-Main region as part of the NORAH study and adding knowlegde to the NORAH database.

NORAH's KEY QUESTIONS

What is/are:

- the adverse effect of aircraft noise on children around Frankfurt Airport in terms of reading skills during a developmental phase where reading acquisition is salient, while adjusting for relevant cofounders (specific attention for socioeconomic aspects).
- the role of underlying linguistic and cognitive functions in these effects?
- the effects of aircraft noise on the health and well being of the children?
- the of bother/annoyance by the noise in the school and home environment?
- the overall effects of aircraft noise on everyday school life.

Main Finding

- Association between aircraft noise and decreased reading comprehension after adjustment for key confounders.
- at lower exposure levels than studied before.
- Results in line with those from i.e. the EU 5th framework study RANCH.
- The effect size is modest.

Remarkable Findings

- The effect is only significant in children without a migrant background,
  - Due to a lack of Power?
  - Masking of the association by other factors?
  - Unidentified factors in children who already have a language deficit?
- No direct association in technical reading skills.
- Changes in language-visual coordination are assumed.

Main findings on QOL and ANNOYANCE

- Moderate effect on health related Quality of life (as reported by the parents).
- Annoyance ratings of children and parents in line with earlier findings, with slight decline at the higher noise levels.
- Also comparable with previous fin

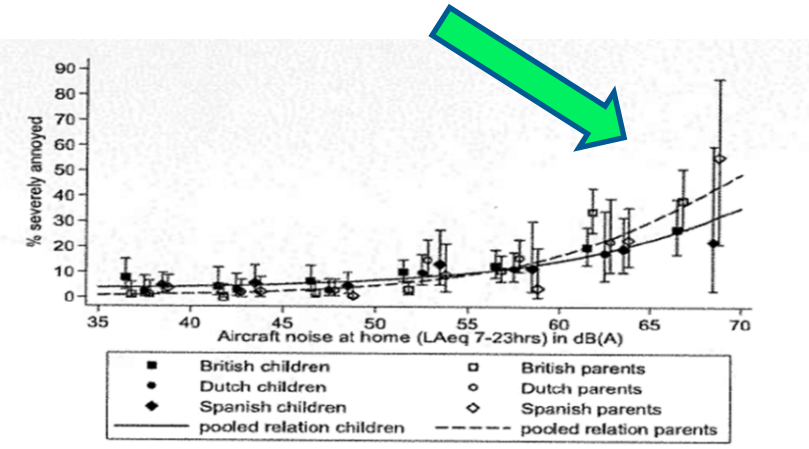

FIG. 4. Comparison between children and their parents: the country-specific percentage severely annoyed children and parents by 5 dB bands of aircraft noise ($L_{Aeq,7-23\ h}$) at home and the relationship between aircraft noise at home and the percentage of children and parents severely annoyed derived after pooling the data and adjustment for confounders. The vertical lines correspond to the 95% confidence interval.

Evaluation: Strength

- Well designed study, high scientific quality, replicating previous studies.
- Added value by extending and improving:
  - the cognitive instruments used
  - detailed information about migration, language skills
  - attention for social behaviour at school and at home,
  - adjusting for acute exposure.
- Research questions and hypotheses grounded in theory and empiry.
- Methodological rigidity: choice of statistics adjustment for confounders, power, sampling >>> improvement on previous studies.

Limitations

- The difference between home and school exposure hard to disentangle>>
  - due to high associations between home and school exposure (as was the case in RANCH);
  - worthwhile to study in future research in view of restoration: **a place for children to recuperate**.

- Related: The cumulative effect of road and air traffic noise not addressed: Schools with high levels of road traffic excluded.

- No comparison possible between effects of low and high levels of road traffic (night) noise again in view of restoration.

Strength >>> continued

- NORAH‘s child study accounts for the latest insights in the cognitive aspects of reading from a **developmental and pedagogical point of view**.

- Comes up with several interesting hypotheses regarding the mechanism and future directions for research.

Epilogue

- I would like to congratulate Maria Klatte and team for a well designed and balanced study.
- And thank you for great collaboration!

THANK YOU FOR YOUR ATTENTION!!