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Aircraft Noise Affects Cognitive Performance in Children

European researchers have investigated the effects of exposure to aircraft and road traffic noise on cognitive performance and health in children. The results suggest that exposure to high levels of aircraft noise could impair the development of reading capacity and memory in children. Thus, schools exposed to high levels of aircraft noise are not healthy educational environments.

While the effects of air pollution are well known, less attention has been paid to the effects of environmental noise on health. Noise is a public health issue because it can produce annoyance, reduces environmental quality, and may affect health and cognition. In particular, very little is known about the effects of environmental noise in child health. Children are especially vulnerable because noise could interfere with learning at a critical stage of their development.

Under the EU-funded research project RANCH [1], a team of European researchers has assessed the effects of road traffic and aircraft noise on children's cognitive development and health. Over 2800 children, aged 9-10 years, from 89 primary schools located near three major airports in Europe (Schiphol in the Netherlands, Barajas in Spain, and Heathrow in the UK) participated in the study. The authors evaluated aircraft and road traffic noise levels around the schools using external noise measurements, and compared these levels to the results of cognitive tests and health questionnaires administered in the classroom. They also used a questionnaire to obtain information from parents about their socioeconomic status, education, and the ethnic group.

The results of the study showed that:

- Exposure to aircraft noise impaired reading comprehension and recognition memory. Reading age in children exposed to high levels of aircraft noise was delayed to 2 months in the UK and to 1 month in the Netherlands for a 5 decibel change in noise exposure.
- Neither exposure to road traffic noise nor aircraft noise were found to affect sustained attention, self-reported health, or mental health.
- Long-term exposure to both aircraft and road traffic noise was associated with increased annoyance, which may imply a reduced well-being and quality of life in children.

The authors recommend that further research should be performed on the effects of exposure to noise at home and schools, the interaction with the classroom acoustics, the potential protective effects of classroom insulation against noise, and the measures that can be taken to help teachers and children to overcome noise-related effects.

This study demonstrates that schools exposed to high levels of aircraft noise are not healthy educational environments. The obtained results are relevant for the design and placement of schools in relation to airports, to the formulation of policy on noise and child health, and to a wider consideration of the effect of environmental stressors on children's cognitive development.

Source: Stansfeld S.A. et al.(2005) “Aircraft and road traffic noise and children's cognition and health: a cross-national study”, The Lancet, 365(9475): 1942-1949

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Theme(s): Noise, Environment and Health

Additional Information: A recent project by the City of Graz (LIFE00 ENV/A/000240) co-funded by the EU LIFE programme developed and implemented an innovative action plan linking health, noise, mobility and the environment. For more information see the project web site, project summary and layman's report. Another recent LIFE project (LIFE02 ENV/F/000295) is developing a GIS based tool to help municipal authorities take into account all aspects of environmental noise in their town planning. For more information see the project web site and project summary.

[1] The RANCH project (Road Traffic & Aircraft Noise & Children's Cognition & Health) is funded by the European Community (QLRT-2000-00197) in the 5th research framework programme under the specific programme 'Quality of life and management of living resources' For more information see *http://ec.europa.eu/comm/environment/noise/*