

PROPOSAL FOR A NESTED PROJECT (March, 2007)

Gender specific associations of reported traffic noise annoyance and Health related Quality of Life - Results from the SAPALDIA survey 2002.

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Co-PI and project director: PD Dr Elisabeth ZEMP, , Institut für Sozial und Präventivmedizin, Universität Basel.

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I. Project outlines:

1. Background and rationale:

Traffic noise, which is consistently increasing, is considered to be an important environmental health problem¹⁻³. Various negative health consequences are known to be associated with chronic noise exposure: hearing impairment⁴, sleep disorders¹, nervousness and concentration problems^{2 5-8} as well as hypertension and cardiovascular diseases^{2 7 8}. The health impact reported most consistently is annoyance and irritability^{1 9}. Health related quality of life (HRQoL) is an important tool in the assessment of the functional status of a population. It is a very sensitive measure of an early health impact. Additionally a reduction of HRQoL has been shown to predict cardiovascular disease and all-cause mortality¹⁰⁻¹³.

While the associations of traffic noise exposure and various diseases have been investigated by numerous researchers, studies on noise and quality of life are scarce¹⁴. HRQoL has been shown, however, to be affected by other environmental pollutants, such as passive smoking¹⁵. The neurological as well as the mental health consequences of traffic noise exposure let us hypothesize an association between HRQoL and traffic noise.

Gender: Prior studies have shown, that while correlation of noise perception and actual noise exposure correlate highly, the health impact does not necessarily correlate, implying other factors to influence the susceptibility to traffic noise¹⁶⁻¹⁹. Next to socio - psychological factors, such as perceived control of noise emission, fear of health effects and presence of coping strategies¹⁷⁻¹⁹, socio - demographic factors are also discussed, such as age and gender. Age is associated with the outcome and the degree of vulnerability²⁰⁻²³. For gender differences in the perception of noise have been described^{24 25}, as well as gender differences with regard to HRQoL.^{10 11} The analysis of SAPALDIA data by Bridevaux/Gerbase on ETS and HRQoL also showed a strong impact of gender on the association between the environmental exposure ETS and HRQoL¹⁵.

Switzerland: Noise annoyance and related health conditions are a public health issue in Switzerland. In 2002 33% of the Swiss population reported to be regularly disturbed by traffic noise²⁶. The Federal Office for Spatial Development ARE estimates the noise-related health cost to be 124 Mio. CHF per year (ARE). Women report an increase in neighbourhood noise annoyance, while in men the percentage of annoyed subjects is stagnating (Gender - Gesundheitsbericht Schweiz 2006). While questions on noise perception and annoyance are included in the Swiss Health

Survey, studies on the health impact are scarce and focus mostly on air traffic related health impact (Wirth 2004, Brink 2002).

SAPALDIA offers the opportunity to investigate the association of traffic noise annoyance and HRQoL. Next to various informations on traffic noise perception, the survey includes the **SF-36 questionnaire**. The main outcomes of interest for the proposed analyses are the total SF 36 score as well as the 8 domains of the SF-36 (Physical Functioning [PF], Role Physical [RP], Bodily Pain [BP], General Health [GH], Vitality [VT], Social Functioning [SF], Role Emotional [RE] and Mental Health [MH]). Each domain explores a different aspect of HRQoL. The main exposure variable is the reported level of noise annoyance by SAPALDIA participants (see details under concept of analyses).

Quality of life is an accepted tool to measure mental and physical functioning of subjects, but has so far only rarely been applied in the assessment of health impact of noise. The SAPALDIA cohort offers the opportunity to address this question on a population-level. The results of the ETS and HRQoL paper present significant gender differences¹⁵. This project follows up on the question of gender differences in the impact of environmental pollutants on quality of life.

2. Research question:

The following research questions will be addressed:

1. Is traffic noise annoyance associated with HRQoL?
2. Does gender influence the noise perception/the level of noise annoyance.
Are differences in susceptibility to noise and consequential reduction of quality of life partly explained by gender?

The study questions relate to the following **core questions** of SAPALDIA II:

- sex- and gender-related factors
- past health status and known personal risk factors

3. Concept for analysis:

We propose the following steps of analysis:

1. Descriptive analysis:

- Basic participant characteristics
- Traffic noise perception across sub-groups (gender, age-groups, language regions, study centers)

2. Multivariate analyses: association of traffic noise annoyance and HRQoL.

Main exposure variable: noise annoyance at home

(t_h012250 How interfering is the noise from traffic in your home when the windows are open?)

Outcome variables: separate domains of SF 36 and the SF36 as a whole

- adjusting for potential confounders (e.g. age, gender, marital status, building construction, health conditions, current employment status, pollutants at workplace, study area, education, BMI, smoking) and other environmental pollutants (ETS, PM10, NO2)
- stratified models for gender, age groups and language region

- Sensitivity analyses for disease status (chronic disease status/no history of chronic disease) and smoking (current/never smoker)

3. Correlation of reported noise annoyance with additional traffic frequency perception variables

Exposure variables in SAPALDIA: Traffic frequency (t_h01710 Which description best describes your living situation? (proximity to roads), t_h01720 How often do cars pass your house during the work days?; t_h01730 How often do heavy vehicles pass your house?)

4. Limitations to analyses:

Potential confounding is a limitation to this analysis and the interpretation of the results. While the data allow correction for certain confounders such as socio-economic status, ETS or air pollution, other confounders, however, such as work place environment, noise annoyance at work or the number of hours spent at home and being exposed, can not fully be adjusted for.

II. Timeline and publication potential before summer 2008

All data have been cleaned and are ready for analysis. The analyses are planned to start in September 2007 and will involve 30% working time of J. Dratva, supervised by Elisabeth Zemp and Christian Schindler. The estimated project time for analyses and submission is 5 months .

Analyses (2 months)	September/October 2007
First draft (1 months)	November 2007
Meeting with/input of team involved in manuscript (1 month)	December 2007
Finalizing manuscript and submission (1 month)	January 2008

The detailed planning of the project will start before September 2007 and will involve at least one meeting of the co-author team.

III. Leveraging and integration with the current statistical resources of SAPALDIA

The project team is part of the SAPALDIA statistics and data center:

The main applicant, Julia Dratva, is part of the women's and gender health department headed by Elisabeth Zemp at the ISPM in Basel. She has been working with SAPALDIA data since 2005, having conducted analysis on the association of menopausal hormone therapy and asthma related symptoms for E. Zemp. In 2006 she analyzed the data on reproductive characteristics (SAPALDIA women's questionnaire). The paper on "The variability of reproductive characteristics across the SAPALDIA study areas" is submitted in Annals of Human Biology. She is currently analyzing the joint SAPALDIA and ECRHS data on reproductive history focussing on determinants of menopause (paper in preparation).

E. Zemp is part of the SAPALDIA scientific team, leads the SAPALDIA gender group and is member of ECRHS gender working group. She is first author of the SAPALDIA 1 paper on the associations of air pollution and respiratory symptoms (Zemp et a.

1999) and co authored the paper by Nietsch on the sex-specific prevalence of renal impairment and its association with cardiovascular disease (Nietsch 2006). Christian Schindler is SAPALDIA grant co-investigator.

IV. Budget and required funding

We apply for a funding of the salary of J. Dratva (30% working time over 5 months, i.e 17680 CHF) and additional costs for travelling and presentation of the results (EUPHA approx. 350 EUR, flight and accommodation approx. 650 CHF). The overall amount totals to 18680 CHF .

Applicants

main applicant:	Julia Dratva
project director:	Elisabeth Zemp
SNF grant co-investigator	Christian Schindler
Further co-investigator	Margaret Gerbase

Literature:

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