Team 6 activities from 2008 to 2011

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INTRODUCTION

Team 6 discussed the activities from 2008 to 2011 at ICBEN Congress 2008. One collaborative theme and eight individual research projects were proposed: (1) the prevalence of guidelines for reporting core information from community noise reaction surveys, (2) combined effects of noise and vibration, (3) difference in response between standardized 5-point verbal and 11-point numeric scales, (4) how to estimate noise exposure and extract dose-response relationships, (5) establishment of data archive of socio-acoustic surveys, (6) linkage with soundscape research, (7) cross-cultural surveys particularly in developing countries, (8) noise change study and (9) cooperation with Team 9. The outcomes from these activities are summarized.

TEAM 6 ACTIVITIES FROM 2008 TO 2011

Guideline for reporting core information from community noise reaction surveys

In order to precisely compare the findings and results from community noise reaction surveys, Team 6 proposed the guideline for reporting core information from socio-acoustic surveys (Fields et al. 1997) and standardized noise annoyance scales in nine languages (Fields et al. 2001), respectively. These outcomes are included in ISO TS/15666. The latter is quite successful because the scales have been used in many surveys since the publication. The scales in the other languages have also been constructed (Preis et al. 2003; Yano & Ma 2004; Kvist & Pedersen 2006; Guenther et al. 2007). However, the former is not prevalent. Thus Team 6 asked J.M. Fields to make simplified tables for core information to be shown in journal articles and conference papers. Tables 1 and 2 are those for journal articles and conference papers, respectively. We sent two tables to international researchers who are engaged in community noise reaction surveys and asked them to use these guidelines in their own, their colleagues' and their students' papers. These tables are in the homepage of ICBEN: http:www.icben.org/.

Other eight themes

In total 37 abstracts were submitted to Team 6 session. From these submissions four papers were selected for the plenary session. Community response to noise research should be carried out cross-culturally and longitudinally since community response to noise may be a function of time and space. The two studies propose annoyance models and the other two discuss cross-cultural issue of railway bonus and effects of noise change on annoyance.

Table 1: Journal reporting guidelines

Topic area	Item	Topic	Information
Overall survey design	1	Survey date	Year and months when the social survey information was obtained from respondents
	2	Site location	The country & community(s) where the study sites were located and any important, unusual characteristics of the study period or study sites
	3	Site selection	The rationale and method for selecting study sites including all criteria that were explicitly used to select or exclude possible study sites
	4	Site size	The number of sites, areas, or locations where the social survey was conducted
	5	Study purpose	* The goals and purposes for conducting the study * The name of the organization that sponsored the survey
Social survey sample	6	Sample selection	The general method for selecting respondents (probability, judgmental, etc.), the detailed procedures that were followed and any criteria, that were followed to exclude some people in the study area (for example: age, gender, length of residence, etc.)
	7	Sample size (Issued)	A survey response rate and reference to the exact formula and operational definitions that were used to calculate the response rate. (Standard response rate formulas for most designs are defined in detail at http://www.aapor.org/standarddefinitions)
Social survey data collection	8	Survey methods	The method used to obtain respondents' answers (Face-to-face interviews, telephone interviews, mail surveys, etc.). If interviewers are used, the training and qualifications of the interviewers are provided
	9	Questionnaire wording	Exact wording of survey questions in the respondents' language and translated into language of the publication for annoyance questions and any other questions that were analyzed for the publication
	10	Precision of sample estimate	The number of respondents who provided answers that could be used in the analysis. The confidence intervals and results of significance tests for major results reported in the article
Nominal acoustical conditions (i.e., the common reference positions and conditions that the acoustical estimates represent)	11	Noise source	The primary noise source studied (aircraft, road traffic, etc.) and any types of noise, types of operations or noise levels from that noise source that are not included in the reported noise exposure values
	12	Noise metrics	The complete, standard label for any noise metrics appearing in the article. If these metrics are not $L_{Aeq24hr}$, DENL and DNL, then an appropriate conversion rule should be given for estimating $L_{Aeq24hr}$, DENL, and DNL from noise metrics used in the article
	13	Time period	The time period that the noise metric represents, in terms of hours of the day, and number of days or months that the reported noise exposure values are assumed to represent

	14	Estimation/ measurement procedure	If the respondent's noise exposure is estimated, describe or cite the noise prediction model version. If the exposure is measured, describe the sound sampling, measurement and estimation protocols
	15	Reference position	The reference position for which the noise exposure values are normalized relative to the noise source and reflecting surfaces and a conversion rule for estimating the exposure at the noisiest facade of the respondent's dwelling excluding sound reflected from the facade
	16	Precision of noise estimate	Provide the best information available about accuracy of noise exposure estimates for the periods they nominally represent. Describe any unusual factors that affected the accuracy or ability to estimate long-term noise exposure
Basic dose/response analysis (if a study goal)	17	Dose/response relationships	Present a tabulation of each degree of reaction for each category of noise exposure
Explanatory variable analysis (if part of study objectives)	18	Non-noise variables' impacts on reactions (e.g., demographic, personal or community variables)	Present the size of each non-noise variable's effect controlled for noise level and in units or graphs that permit comparisons to the size of effects from noise exposure. Conclusions should be reported for all variables, even if no statistically significant effect is found. - Compare the ability of noise level alone and of all explanatory variables together to explain response (e.g., correlation (r^2) and multiple correlation coefficient (R^2))

Table 2: Conference reporting guidelines

Topic area	Item	Topic	Information to include
Overall survey design	1	Survey date	Year and season when the social survey information was obtained from respondents
	2	Site location	The country & community(s) where the study sites were located
	3	Site selection	The rationale and method for selecting study sites
	4	Site size	Number of sites, areas, or locations where the social survey was conducted
	5	Study purpose	The name of the organization that sponsored the survey
Social survey sample	6	Sample selection	The method for selecting respondents (random/probability, judgmental, etc.)
	7	Sample size (Issued)	The number of sampled people or dwellings where an attempt was made to find a person who would answer the survey questionnaire
Social survey data collection	8	Survey methods	The method used to obtain respondents' answers (Face-to-face interviews, telephone interviews, mail surveys, etc.)
	9	Questionnaire wording	The exact wording of the primary questionnaire items (including answer alternatives)
	10	Precision of sample estimate	The number of respondents who provided answers that could be used in the analysis
Nominal acoustical conditions (i.e., the com-	11	Noise source	The primary noise source studied (aircraft, road traffic, etc.)
	12	Noise metrics	The complete, standard label for any noise metric appearing in the conference paper

Topic area	Item	Topic	Information to include
mon reference positions and conditions that the acoustical estimates represent)	13	Time period	The period (hours of the day) that the noise metric represents
	14	Estimation/ measurement procedure	The method used to derive the noise exposure levels for each respondent (modeling, measurement during sampled periods, etc.)
	15	Reference position	The reference position for which the noise exposure values are normalized relative to the noise source and reflecting surfaces (e.g., one meter from the noisiest facade, etc.)
	16	Precision of noise estimate	Any unusual factors that affected the accuracy or ability to estimate long-term noise exposure
Basic dose/response analysis (if part of study objectives)	17	Dose/response relationships	A measure of the extent of the response within each noise exposure grouping
Explanatory variable analysis (if part of study objectives)	18	Non-noise variables' impacts on reactions (e.g., demographic, personal or community variables)	The conclusions reached about the effect or lack of effect of each demographic, personal, or community variable examined (even if no effect is found)

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Community response to noise - A theory-based model for exposure-response relationships

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INTRODUCTION

Dose-response functions that relate transportation noise exposure to the average annoyance experienced by the residents in a community are important tools for city planners. Normally one would want to keep the negative impact from transportation noise as low as possible. However, a "zero target" is seldom feasible. A reliable dose-response function will tell which noise exposure level that is "low enough" to keep the annoyance at an acceptable level.

Since the initial effort by T. J. Schultz to establish a dose-response function for transportation noise (Schultz 1978) numerous attempts have been made to refine and improve such functions. Most of these dose-response functions have been derived by applying more or less sophisticated mathematical and statistical methods to a set of observation data coming from social surveys. Regression analysis is a statistical technique that can identify a function which minimizes the sum of the squares of the distances of a set of points to a line or a curve. A dose-response relationship derived by regression yields a function appropriate for characterizing annoyance prevalence rates of nominal communities located in the middle of a cloud of data points.

If the data points represent noise exposure (x-axis) and prevalence of annoyance (y-axis) the regression can either predict noise exposure from annoyance, or annoyance from noise exposure. Cause and effect are irrelevant in this analysis.

PREVIOUS STUDIES

Figure 1 shows a selection of "approved" dose-response functions for aircraft noise annoyance. The first serious attempt to establish a dose-response curve for transportation noise annoyance was published by in 1978 (Schultz 1978) Schultz's synthesis was based on a number of social surveys, mainly on road traffic noise. However, some studies on railroad noise and aircraft noise were also included. Schultz concluded that there was no difference between these sources. His dose-response function, the dark blue line in Figure 1, is based on 161 data points.

Later more surveys were added to the common data base, and in 1992 FICON (FICON 1992) established a "new and improved" dose-response curve for aircraft noise annoyance. This curve was based on about 400 data points. This function, the yellow line in Figure 1, shows only slight deviations from the original "Schultz curve".

The generally accepted international standard for assessing community noise annoyance, ISO 1996, Pt. 1, (ISO 2002) has yet another dose-response function. This is the same as the original Schultz curve from 1978, but the noise level has been given a source dependent correction. The standard recommends a "correction penalty of 3 to 6 dB". This means that road traffic at for instance 60 dBA is considered equally annoying as aircraft noise at a level between 54 dBA and 57 dBA. The red