TECHNICAL SPECIFICATION

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Acoustics — Assessment of noise annoyance by means of social and socio-acoustic surveys

Acoustique — Évaluation de la gêne causée par le bruit au moyen d'enquêtes sociales et d'enquêtes socio-acoustiques

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Foreword

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Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO/TS 15666 was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 1, *Noise*.

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Introduction

This Technical Specification is proposed for provisional application so that information and experience of its use in practice may be gathered. Comments on the content of this document should be sent to the ISO Central Secretariat.

Many countries have already developed regulations concerning the acceptability of environmental noise exposure, while others are likely to do so in the future. Such regulations often take into account relationships between noise exposure and noise-induced annoyance.

Measurement of environmental noise has been standardized. For example, ISO 1996 contains detailed specifications about basic quantities and procedures, about acquisition of (noise) data, and about the application of these data to set noise limits. ISO 3891 specifies measurements of aircraft noise heard on the ground. No International Standard yet recommends practices for measuring the prevalence of noise-induced annoyance, however.

The intent of this Technical Specification is to provide specifications for the assessment of noise annoyance by social and socio-acoustic surveys. When these specifications are met, the statistically relevant possibilities of comparing and pooling survey results will be increased, thus offering more and better quality information for use by environmental policy makers.

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Acoustics — Assessment of noise annoyance by means of social and socio-acoustic surveys

1 Scope

This Technical Specification provides specifications for socio-acoustic surveys and social surveys which include questions on noise effects (briefly referred to hereafter as “social surveys”). Its scope includes questions to be asked, response scales, key aspects of conducting the survey, and reporting the results. This Technical Specification does not prescribe methods for the analysis of data obtained from these questions.

It is recognized that specific requirements and protocols of some social and socio-acoustic studies may not permit the use of some or all of the present specifications. This Technical Specification in no way lessens the merit, value or validity of such research studies.

The scope of this Technical Specification is restricted to surveys conducted to obtain information about noise annoyance “at home”. Surveys conducted to obtain information about noise annoyance in other situations, such as recreational areas, work environments and inside vehicles, are not included.

This Technical Specification concerns only the questions on noise annoyance used in a social survey and the most important additional specifications needed to accomplish a high level of comparability with other studies. Other elements which are required to provide high-quality social surveys, but which are not specific for social surveys on noise (such as sampling methods), can be found in textbooks (e.g. see references [1] and [2]).

Compliance with the recommendations of this Technical Specification does not guarantee the collection of accurate, precise or reliable information about the prevalence of noise-induced annoyance and its relationship to noise exposure. Other aspects of study design, as well as uncertainties of estimation and measurement of noise exposure, can influence the interpretability of survey findings to a great extent.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1996-1, *Acoustics — Description and measurement of environmental noise — Part 1: Basic quantities and procedures*

ISO 1996-2, *Acoustics — Description and measurement of environmental noise — Part 2: Acquisition of data pertinent to land use*

ISO 1996-3, *Acoustics — Description and measurement of environmental noise — Part 3: Application to noise limits*

ISO 3891, *Acoustics — Procedure for describing aircraft noise heard on the ground*

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3 Terms and definitions

For the purpose of this document, the following terms and definitions apply.

3.1
noise-induced annoyance
one person's individual adverse reaction to noise

NOTE 1 The reaction may be referred to in various ways including, for example, dissatisfaction, bother, annoyance and disturbance due to noise (see reference [3]).

NOTE 2 Community noise annoyance is the prevalence rate of this individual reaction in a community, as measured by the responses to questions specified in Clause 5, and expressed in appropriate statistical terms.

3.2
socio-acoustic survey
social survey in which noise-induced annoyance is assessed and values of measured or calculated noise metrics are attributed to the subjects' residential environment

NOTE Many general social surveys of environmental factors including noise are not considered to be "socio-acoustic" surveys because they do not have associated noise data.

4 Specifications for wording and scaling of questions on annoyance

Two questions have been formulated: one question with a verbal rating scale; one with a numerical rating scale.

a) Question with verbal rating scale

Thinking about the last (12 months or so), when you are here at home, how much does noise from (noise source) bother, disturb or annoy you?

— *Not at all?*

— *Slightly?*

— *Moderately?*

— *Very?*

— *Extremely?*

b) Question with numerical rating scale, with introduction

Introduction:

This uses a 0-to-10 opinion scale for how much (source) noise bothers, disturbs or annoys you when you are here at home. If you are not at all annoyed choose 0; if you are extremely annoyed choose 10; if you are somewhere in between, choose a number between 0 and 10.

Question:

Thinking about the last (12 months or so), what number from 0 to 10 best shows how much you are bothered, disturbed or annoyed by (source) noise?

The rationale for the specification and wording is presented in Annex A. The most accurate translations into several other languages are presented in Annex B.

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5 Additional specifications for conducting social and socio-acoustic surveys when asking about noise annoyance

General specifications for conducting social surveys of any kind are found in numerous articles, papers and textbooks (e.g references [1] and [2]). This clause does not give a comprehensive overview of these general specifications. The focus in this clause is on additional specifications with respect to the design of the questionnaire when asking about noise annoyance. More information is given in Annex A.

a) Each respondent shall be asked both questions specified in Clause 4. Respondents shall not be eliminated on the basis of some previous question about whether they "hear" the noise, nor on the basis of length of residence. If it is necessary to determine whether some respondents do not hear the noise source, a question about the audibility of the noise may be asked separately later in the interview.

b) Respondents shall not first be asked if they are annoyed or not and then, if they are annoyed, about their degree of annoyance.

c) The questions shall be placed early in the questionnaire, unless this conflicts with other survey objectives, and before other, more detailed, questions about noise have been asked. If other questions on noise annoyance are more important for the survey's purposes, the specified questions may be asked later.

d) When asking a question about annoyance, do not imply that the noise should be present in the respondent's situation at home. Ask, for instance, about "noise from aircraft" instead of "noise from the aircraft".

e) If pre-tests indicate that the questions are perceived as repetitious, include appropriate instructions. An example is presented in Annex A.

f) If show cards are used, the answer categories of the five-point verbal scale shall be presented without numbers, as follows:

CARD QV
NOT AT ALL
SLIGHTLY
MODERATELY
VERY
EXTREMELY

The show card for the numerical scale shall be as follows:

CARD QN										
NOT AT ALL										EXTREMELY
0	1	2	3	4	5	6	7	8	9	10

The chosen answer shall be marked clearly within one box.

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g) Prepare written instructions for interviewers. For telephone or personal interviews, the interviewers shall be provided with written instructions that

- instruct interviewers to ask questions exactly as written,
- train interviewers to respond to “I don't understand” with methods that do not require paraphrasing the question,
- urge respondents to choose between the offered answers,
- encourage all residents to answer these questions (new residents can be instructed to answer about only their recent period of residence), and
- if repetition is expected to be a problem, provide interviewers with instructions for respondents who find the questions to be repetitious.

6 Specifications for assessing the degree of annoyance

Results of the questions shall be given as the frequency or cumulative distributions of the individual annoyance scores, if available for each category of noise exposure. Other (summarizing) statistics such as the mean or median annoyance score, or percentages of respondents who are annoyed to a certain degree, may be given.

No specification is given for defining the percentage of respondents who should be regarded to have at least a certain degree of annoyance, such as for example “highly” annoyed. This depends on the cut-off scores used in individual countries or preferred by individual researchers. On the basis of the specified frequency distributions, any cut-off score may be chosen.

7 Specifications for reporting core information from social and socio-acoustic surveys

In Table 1, minimum specifications are presented for reporting core information from social and socio-acoustic surveys in scientific reports. This information is essential to judge whether comparisons with other surveys can be made. More detailed information can be found in reference [4].

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Table 1 — Minimum specifications for reporting core information from social and socio-acoustical surveys in scientific reports

Topic area	Item	Topic	Required information
Overall design	1	Survey date	Year and months of social survey
	2	Site location	Country and city of study sites
	3	Site selection	Any important, unusual characteristic of the study period or sites Map or description of study site locations relative to the noise source
	4	Site size	Rationale for site selection Site selection and exclusion criteria
	5	Study purpose	Number of study sites Number of respondents by site State original study goals
Social survey sample	6	Sample selection	Respondent sample selection method (probability, judgmental, etc.) Respondent exclusion criteria (age, gender, length of residence, etc.)
	7	Sample size and quality	Response rate Reasons for non-response
Social survey data collection	8	Survey methods	Method (face-to-face, telephone, etc.)
	9	Questionnaire wording	Exact wording by primary questionnaire items (including answer alternatives)
	10	Precision of sample estimate	Number of responses for main analyses
Acoustical conditions	11	Noise source	Type of primary noise source (aircraft, road traffic, etc.) Types of noise source operations that are included or excluded Protocols to define the noise source (e.g. minimum level, operations, days of week)
	12	Noise metrics	Give the complete description of any noise metric reported, according to ISO 1996-1, ISO 1996-2, ISO 1996-3 or ISO 3891 (if applicable): — Provide $L_{Aeq,24h}$, L_{dn} and L_{den} (or L_{Aeq} by time-period) for all locations or — provide conversion rule(s) to estimate $L_{Aeq,24h}$, L_{dn} and L_{den} under the specific study conditions from the study's preferred metric — Discuss the adequacy of the conversion rule(s) — Provide impulse and/or tone corrections
	13	Time period	Hours of day represented by noise metric Period (months, years) represented by noise metric
	14	Estimation/ measurement procedure	Estimation approach (modelling, measurement during sampled periods, etc.)
	15	Reference position	Nominal position relative to noise source and reflecting surfaces Present exposure (or give conversion rule) for noisiest façade, specifying whether reflections from the façade are taken into account or not
	16	Precision of noise estimate	Best information available on precision of noise exposure estimates
Basic dose/ response analysis	17	Dose/response relationships	Tabulation of frequency of annoyance ratings for each category of noise exposure

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Annex A
(informative)

Rationale for wording and scaling of questions on annoyance

A.1 Introduction

In this annex the rationale for the specifications for wording and scaling of the specified questions about annoyance is presented. A more comprehensive and detailed clarification can be found in reference [7].

A.2 Types of question

Direct rating questions

— name the noise source,

— ask for respondents' attitude towards the noise, and

— present respondents with choices between a limited number of answers.

Such direct rating questions have been almost universally accepted as the primary measure of the relationship between noise and residents' reactions. Answers to such direct questions are more explicit and more readily interpreted than indirect questions or comparison questions (the two other types of questions that are sometimes used for special purposes in noise surveys).

Indirect questions attempt to ascertain the underlying impact of noise on people with

— open questions in which the noise source is not identified,

— questions in which respondents report complaint actions rather than an attitude, or

— questions in which respondents report behavioural reactions rather than an attitude.

Although useful for specific purposes, these have not supplanted the direct questions as the primary indicator of noise impact because they can only be used to infer indirectly how people feel about noise impact. In addition, such indirect questions are less highly related to noise exposure (see reference [7]). Indirect, open questions that allow respondents to volunteer their own answers are expensive to analyse and result in answers that cannot be directly compared.

The other type of question, a comparison question, provides an anchor for a rating by asking respondents to compare their attitude towards the specified noise to their attitude towards some other object. The overwhelming problem with comparison questions is the absence of a common, shared anchor that could provide a uniform point of comparison across surveys or even across neighbourhoods in the same survey. The most obvious anchors, other neighbourhood nuisances, vary so greatly from site to site that they cannot be used for comparing noise responses at different sites. Magnitude estimation techniques could, in theory, use other shared reference points to resolve this problem, but previous research has found that such techniques are not sufficiently refined for a question to be recommended for wide usage in noise-reaction surveys (see reference [8]).

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A.3 Noise, not sound

In many languages it is linguistically odd to use the word “sound” in relation to unwanted sound. In connection with unwanted sound usually the word “noise” is used.

A.4 Unipolar scales (neutral-negative)

From many previous surveys, it has been found that reactions to transportation noise are overwhelmingly either negative or neutral. Therefore the questions should use unipolar scales that extend from a negative pole (extremely annoyed) to a neutral position (not at all annoyed), but not to a positive pole (extremely enjoyable).

A.5 Two questions

This Technical Specification recommends the use of two questions on annoyance and two annoyance scales in each questionnaire. Using more than one scale is consistent with the most basic principles of increasing the reliability of psychometric measurements.

A.6 A verbal and a numerical scale

Each of the scales has a different strength. The verbal scale is needed for the clearest, most transparent communication. The simple task of choosing a word is most likely to be easily performed by respondents of any degree of sophistication in any culture. The resulting selected word is, when presented in a report, simply passed on to readers as the respondent’s choice. The protocol used to choose the answer scale words attempts to ensure that the commonly understood meaning of the word is consistent with its position on the scale.

The numerical scale is needed to provide a check on the consistency of the respondent’s answer on an important issue. Furthermore, the numerical scale is useful as a second question that may not be as subject to the choice of words as a verbal scale is, which is an advantage in a multiracial society and in international work.

A.7 General, non-specific reaction questions

The recommended questions seek to obtain general, consistent reactions that allow respondents to integrate their experiences over different times and locations in and around their home (e.g. on a balcony, in a garden). They do not specify one particular combination of conditions because an overall response measure necessarily involves an integrated response over a range of different types of experiences. The questions do not explicitly list the range of conditions over which the experiences should be integrated for the following five reasons.

a) A complete list would involve too many conditions (e.g. room in a home, location on property, season of year, day of week, hour of day, window-opening conditions, activity during exposure, number of noise events, and peak levels of noise events).

b) A long list may lead respondents toward objective assessments of noise exposure levels and away from subjective feelings about exposures.

c) A long, complex question may confuse some respondents who will resolve the complex task by just answering for one condition, perhaps the first or last condition mentioned, while ignoring their most important, but seemingly insufficiently sophisticated, feelings about their general subjective response.

d) A long list of conditions is more difficult to adapt to different cultures and languages.

e) A long question is less likely to be included in many surveys.

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A.8 Wording of the questions

The details involved in the final decisions on wording of the English, five-point verbal scale are as follows.

a) *Thinking about the last (12 months or so), when...*

The indefinite “thinking” and “12 months or so” encourages a general response to the noise, rather than an exclusive comparison of the last 12 months with any other period.

b) ..*you*..

The respondent’s own reaction, not that of family members, is requested. In the instructions for interviewers, it should be made clear from the beginning of the interview that the respondent’s own reaction is required. Therefore in the question itself the word “you” should be sufficient; “you personally” might complicate the understanding of the question by the respondent, especially in other cultures.

c) ..*are*..

The habitual, present tense of the verb “are” encourages the habitual, general response as explained in a). Therefore the present tense should be used instead of the (grammatically more correct) past tense.

d) ..*here at home*..

This phrase is intended to measure the general evaluation for the respondent’s dwelling environment while excluding the broader neighbourhood shopping and recreation areas (as might be suggested by “around here”) but not strictly restricting answers to inside the building (as would be implied by “in your house”). In the instructions for interviewers, the following preamble to the question should be included: “at home means inside your home or outdoors at home, for example in the garden or on the balcony”.

e) ..*how much.*.

This phrase prepares the respondent for choosing an answer of degree of response.

f) ..*does*..

Present tense; see c).

g) ..*noise*..

The single word “noise” rather than the phrase “the noise” is used to avoid the implication that the present noise should be considered. “Noise” is used rather than a neutral word for the reasons given earlier.

h) ..*from (noise source)*..

The name of the noise source is specified, not left unclear.

i) ..*bother, disturb or annoy*..

These three words were judged to be necessary to convey the general impression of a negative reaction in English. In other languages, the general impression of a negative reaction could require less (or more) words.

j) ..*you*..

Own reaction reinforced; see b).

k) ..*not at all*..

This phrase was found to have the lowest annoyance intensity rating in several studies (see reference [8]).

l) *slightly, moderately, very, extremely*

These four words were selected by the protocols contained in the empirical study described in reference [5]

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A.9 Choice of response descriptors in other languages than English

The translation of each question in each language should be performed by translation and back-translation. For languages other than English, the labels for the categories on the 5-point verbal scale and the endpoints for the 0-to-10 numerical scale should be chosen on the basis of empirical studies conducted using a standard technique in each language and not be simply translated from English. The studies should be conducted following the protocol presented in reference [5]. These types of study were actually carried out in the following nine languages: Dutch, English, French, German, Hungarian, Japanese, Norwegian, Spanish and Turkish. The questions and answer categories in these languages are presented in Annex B.

NOTE If an ISO Member Body doubts the correctness of the translations presented in Annex B, it should initiate a replicate study to improve the translations as they stand now. Just changing the wording based on personal preference instead of based on empirical studies does not seem a fruitful approach.

A.10 11-point numerical scale

The 0-to-10 scale was selected because it is assumed that a 0-to-10 scale would be more readily understood and manipulated than a shorter 7-point, 9-point or 10-point scale. Most people are familiar with base-10 numeric systems through currency and other familiar counted materials. Logically, 0 will always stand for “not at all”, and 10 for “extremely”. The scale should not be reversed.

As with all questions in a questionnaire, there needs to be a provision for coding missing data responses such as “don't know”, “refusal” or “skipped in error”. It is recommended that the survey organizations include a code for such answers.

CAUTION — These possible answers should not, however, be shown or read to respondents. They would not, therefore, appear in a mail questionnaire. One of the primary findings from question-wording experiments is that the number of don't knows is very much increased if the respondent sees or is offered this option.

Interviewers should use such a code only after having encouraged the respondent to choose one of the offered responses with a phrase, such as *“Which of the answers comes closest to your view?”*

A.11 5-point scale for verbal questions

For the purpose of comparisons between surveys, the same number of points are needed on all verbal answer scales. The discussion about the use of dichotomous answer scales clearly indicates that the number of scale points do have an effect on answers that cannot be accounted for by the labels that are used. In considering the evidence, it was decided that a 5-point scale is preferable. The available evidence suggests that a 5-point scale is either preferable or no different than the 4-point scale. See also reference [5].

Also, the 5-point verbal scale must be completed with “don’t know” as an answer alternative. See also A.10.

A.12 Appropriate time period

The phrase “12 months or so” appears in parentheses in the questions because the length of the time period may need to be different for different surveys. The period that is asked about in the questionnaire should be a period for which the noise exposure can be estimated sufficiently accurately. In general, a period of approximately one year is recommended to encourage respondents to give their general reactions to the acoustical environment. However, if there have been recent changes in the noise environment, or if the focus of the study is on a particular time, or if is it not possible to make sufficiently accurate estimates for a long time period, then some shorter period may need to be specified.

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A.13 Abstraction level of noise source

If one of the purposes of a survey is to make comparisons (e.g. to compare noise annoyance in different areas, or noise annoyance over the years, or noise annoyance caused by different sources), the noise sources should be described on the same abstraction level.

NOTE Different abstraction levels are for instance “road traffic” and “lorries”.

A.14 Written instructions for interviewers

A.14.1 General instructions for opinion questions

All opinion questions should be read exactly as written. They should not be paraphrased or explained by the interviewers. A great deal of care went into choosing each word in each question and each respondent should hear exactly these same words and not some additional words that an interviewer may add. It was found that in almost all cases when a respondent says he or she does not understand a question, the problem can be solved by repeating the question. This gives the respondent a second chance to listen and provides a period for the respondent to think more about the answer. In the rare case where the respondent still asks what the question means, the interviewer should respond: “*Whatever it means to you*”.

Occasionally a respondent may decline to choose one of the answer categories, or may reply with a long qualified statement that does not fit within one of the pre-coded categories. In either case, the interviewer should just repeat the question and, if necessary, add the phrase “*And so, which of these answers comes closest to your own*?” If the respondent still finds it impossible to answer or choose, then a "Not Answered" response should be filled in.

A.14.2 Instructions specific to a matrix question

NOTE The question QX, presented later, is just an example.

Question QX uses the same answer scale for all nine noise sources mentioned. Be sure to read the full question, including the answers, about the first noise source, road traffic, and then, after road traffic is rated, about aircraft. For most respondents it will not be necessary to read the entire question again. Instead the phrase “*And how about noise from (trains)*?” can be repeated each time and will be sufficient. If there is a digression or any discussion between items, be sure to reread the complete question and all five alternatives again. If the respondent hesitates or appears to be confused at any point, read all five alternatives again.

Circle the respondent’s answer. Only circle NA (Not Answered) if the respondent replies “*do not know*”, or refuses, or the question is skipped in error.

QX *Thinking about the last 12 months or so, when you are here at home, how much does noise from (road traffic) bother, disturb, or annoy you: not at all, slightly, moderately, very or extremely?*

	NOT AT ALL	SLIGHTLY	MODERATELY	VERY	EXTREMELY	NA
Road traffic	NOT	SLIGHT	MOD	VERY	EXT	NA
Aircraft	NOT	SLIGHT	MOD	VERY	EXT	NA
Trains	NOT	SLIGHT	MOD	VERY	EXT	NA
Factories or machinery	NOT	SLIGHT	MOD	VERY	EXT	NA
Construction work	NOT	SLIGHT	MOD	VERY	EXT	NA
Animals outside	NOT	SLIGHT	MOD	VERY	EXT	NA
Children outside	NOT	SLIGHT	MOD	VERY	EXT	NA
Other people outside	NOT	SLIGHT	MOD	VERY	EXT	NA
Any other noises (specify)	NOT	SLIGHT	MOD	VERY	EXT	NA

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A.14.3 If pretests indicate that the questions are perceived as repetitious

If the questions are not placed early in the questionnaire, potential interviewer or respondent discomfort with apparently repetitious questions can be solved with introductions to the questions similar to the following.

a) *Now we return to the noise from (source) and take everything we have discussed into account. Thinking about the last*... {insert recommended questions}.

b) *People in other surveys have answered this next question to tell us how they feel about noise. Now you can use it for the noise here. Thinking about the last*... {insert recommended questions}.

c) *Even though all of the questions are slightly different, I know a few of them can seem similar for people in special circumstances like yourself. If any seem repetitious for you, just give me a quick answer and I will move right along to other questions.*

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Annex B
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Wording in nine languages of questions on annoyance

B.1 Introduction

The use of a verbal and a numerical scale is necessary with the questions as formulated in Clause 4. The questions, and especially the verbal scale, will be used in as many languages as possible. It is not enough to merely translate the questions and labels of the verbal scale from English into any other language, because a literal translation can lead to slightly other meanings (connotations) of words.

The International Commission on Biological Effects of Noise has recognized this problem and initiated an international study designed to accomplish translations that would have the same meaning in each country. The results are presented in this annex. More details of the study can be found in reference [5]. A difference between the ICBEN study and this Technical Specification is that here the order of the answer categories of the verbal scale has been reversed.

NOTE Questions in languages other than the three official ISO languages (English, French and Russian) are published under the responsibility of the member bodies of the countries concerned.

B.2 English

QV *Thinking about the last (12 months or so), when you are here at home, how much does noise from (noise source) bother, disturb or annoy you: not at all, slightly, moderately, very, or extremely?*

QN Next is a 0-to-10 opinion scale for how much (source) noise bothers, disturbs or annoys you when you are here at home. If you are not at all annoyed choose 0; if you are extremely annoyed choose 10; if you are somewhere in between choose a number between 0 and 10.

Thinking about the last (12 months or so), what number from 0 to 10 best shows how much you are bothered, disturbed or annoyed by (source) noise?

B.3 **Dutch** (including Flemish)

QV *Als u denkt aan de afgelopen (12 maanden of zo), in welke mate ergert, stoort of hindert geluid van (geluidbron) u als u hier thuis bent?: helemaal niet, een beetje, tamelijk, erg of extreem?*

QN Hier is een schaal van nul tot tien waarop u kunt aangeven in welke mate geluid u hindert, stoort of ergert als u hier thuis bent. Als u helemaal niet gehinderd wordt kiest u de nul, als u extreem gehinderd wordt kiest u de tien. Als u daar ergens tussenin zit, kiest u een getal tussen nul en tien.

Als u denkt aan de afgelopen (12 maanden of zo), welk getal van nul tot tien geeft het beste aan in welke mate u geërgerd, gestoord of gehinderd wordt door geluid van (geluidbron) als u hier thuis bent?

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B.4 French

QV *Si vous pensez aux douze derniers mois, quand vous êtes ici, chez vous, le bruit de (citez la source) vous gêne-t-il: pas du tout, légèrement, moyennement, beaucoup ou extrèmement?*

QN Voici une échelle d'opinion graduée de zéro à dix. Vous devez noter sur cette échelle la façon dont le bruit de (citez la source) vous gêne lorsque vous êtes ici, chez vous: notez zéro si le bruit ne vous gêne pas du tout et notez dix si le bruit vous gêne extrèmement. Si vous êtes entre ces deux situations, choisissez une note intermédiaire entre zéro et dix.

Maintenant, si vous pensez aux douze derniers mois, quand vous êtes ici, chez vous, quelle note comprise entre zéro et dix exprime le mieux la façon dont le bruit de (citez la source) vous gêne?

B.5 German

QV *Wenn Sie einmal an die letzten (12 Monate) hier bei Ihnen denken, wie stark haben Sie sich durch Lärm von (Quelle) insgesamt gestört oder belästigt gefühlt?: überhaupt nicht, etwas, mittelmäßig, stark, oder äußerst?*

QN Jetzt kommt eine Messlatte von Null bis Zehn, auf der Sie angeben können, wie sehr Sie der Lärm von (Quelle) insgesamt gestört oder belästigt hat. Wenn Sie sich äußerst gestört oder belästigt fühlten, wählen Sie die Zehn, wenn Sie sich überhaupt nicht gestört oder belästigt fühlten, geben Sie bitte die Null an, und wenn Sie irgendwo dazwischen liegen, wählen Sie bitte eine Zahl zwischen Null und Zehn.

Wenn Sie nun an die letzten 12 Monate hier bei Ihnen denken, welche Zahl zwischen Null und Zehn gibt am besten an, wie stark Sie sich durch den Lärm von (Quelle) insgesamt gestört oder belästigt fühlten?

B.6 Hungarian

QV *Tekintve az utóbbi (időszakot, 1 évet) mennyire zavarja Önt a (zajforrás) zaja, amikor otthon tartózkodik: egyáltalán nem, kissé, közepesen, nagyon, vagy rettenetesen?*

QN Képzeljen el egy 0-tól 10-ig terjedő skálát arról, hogy mennyire zavarja Önt a (zajforrás) zaja, amikor otthon tartózkodik. Ha egyáltalán nem zavarja, válassza a 0-t, ha rettenetesen zavarja, válassza a 10-et, ha pedig a kettő közötti mértékben zavarja, válasszon egy megfelelő számot 0 és 10 között.

Tekintve az utóbbi (időszakot, 1 évet) milyen 0-10 közötti számmal jellemezné a (zajforrás) zavaró hatását?

B.7 Japanese

Signs not available.

B.8 Norwegian

QV *Tenk etter på de siste (12 månedene) når du er hjemme. Hvor mye er du plaget av støy fra (støykilde)? Er du ikke plaget i det hele tatt, litt plaget, middels plaget, mye plaget eller voldsomt plaget?*

QN Angi på en skala fra null til ti hvor plaget du er av støy fra (støykilde) når du er hjemme. Hvis du ikke er plaget i det hele tatt, velger du null. Hvis du er voldsomt plaget, velger du ti. Hvis du vurderer støyplagen mellom disse grensene, velger du et tall mellom null og ti.

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Tenk etter på de siste (12 månedene). Hvilket tall mellom null og ti angir hvor plaget du er av støy fra (støykilde) når du er hjemme?

B.9 Spanish

QV *Tomando en consideración los ultimos (12 meses), indique Vd. en qué cuantía le molesta o perturba el ruido producido por (indicar la fuente de ruido), cuando se encuentra en su casa: absolutamente nada, ligeramente, medianamente, mucho o extremadamente*

QN A continuación se da una escala de opinión de cero a diez para que Vd. pueda expresar en qué cuantía le molesta o perturba el ruido producido por (indicar la fuente de ruido) cuando se encuentra en su casa. Por ejemplo, si Vd. está nada molesto por el ruido debería escoger el cero, y si Vd. está extremadamente molesto debería escoger el diez.

Tomando en consideración los últimos (12 meses), indique qué numero, cero al diez, expresa mejor la cuantía en que Vd. está molesto o perturbado por el ruido producido por (indicar la fuente de ruido)

B.10 Turkish

(TÜM DENEKLERE SORULACAKTIR)

QV *Yaklaşık son on iki ayı düşündüğünüzde, (gürültü kaynağından) gelen gürültü, burada evinizdeyken sizi ne kadar rahatsız etmektedir? değil, hafifçe, orta derecede, çok, hiç feci şekilde?*

QN Şimdi, evinizdeyken (....) gürültüsünün sizi ne kadar rahatsız ettiğini “sıfır” ile “on” arasında sayılarla gösteren bir ölçek verilmektedir. Eğer hiç rahatsız değil seniz “sıfır”ı seçiniz, eğer feci şekilde rahatsız iseniz “on” u seçiniz, bunların arasında iseniz “sıfır” ile “on” arasında bir sayı seçiniz.

Yaklaşık son 12 ayı düşünerek (.....) gürültüsünden olan rahatsızlığınızı “sıfır”dan “on”a kadar hangi sayı en iyi gösterir?

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Bibliography

[1] SMITH R.B. *Handbook of social science methods*. Praeger, New York, 1985 (ISBN 0884109097)

[2] ROSSI P.H., WRIGHT J.D. and ANDERSON A.B. *Handbook of survey research*. Academic Press, New York, 1983 (ISBN 0125982267)

[3] GUSKI R., SCHUEMER R. and FELSCHER-SUHR U. The concept of noise annoyance: How international experts see it. *J. Sound. Vibr.*, **223**, 1999, pp. 513-527

[4] FIELDS J.M., JONG R.G. de, BROWN A.L., FLINDELL I.H., GJESTLAND T., JOB R.F.S., KURRA S., LERCHER P., SCHUEMER-KOHRS A., VALLET M. and YANO T. Guidelines for reporting core information from community noise reaction surveys. *J. Sound Vibr.*, **206** (5), 1997, pp. 685-695

[5] FIELDS J.M., JONG R.G. de, GJESTLAND T., FLINDELL I.H., JOB R.F.S., KURRA S., LERCHER P., VALLET M., YANO T., GUSKI R., FLESCHER-SUHR U. and SCHUEMER R. Standardized general-purpose noise reaction questions for community noise surveys: research and a recommendation. *J. Sound Vibr.*, **242**, 2001, pp. 641-679

[6] FIELDS J.M. and WALKER J.G. The response to railway noise in residential areas in Great Britain. *J. Sound Vibr.*, **85**, 1982, pp. 177-255

[7] FIELDS J.M. Progress towards the use of shared noise reaction questions. *Inter-noise 96*, pp. 2389-2391

[8] LEVINE N. The development of an annoyance scale for community noise assessment. *J. Sound Vibr.*, **74**, 1981, pp. 301-305

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