Kumamoto University Repository System

Title	The Equivalence of Standardized Noise Annoyance Scales and Questions in English and Japanese
Author(s)	Masden, Kirk
Citation	
Issue date	2005-03-28
Type	Thesis or Dissertation
URL	http://hdl.handle.net/2298/11064
Right	

Kumamoto University

Doctoral Dissertation

The Equivalence of Standardized Noise Annoyance Scales and Questions in English and Japanese

Kirk Masden

TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION

1.1 OBJECTIVE AND SUBJECTIVE MEASURES OF NOISE

Environmental noise can have serious negative effects on human health and quality of life. Exposure to high levels of noise, for example, can cause hearing loss, tinnitus and other hearing problems. However, the negative effects of environmental noise are by no means limited to hearing. Environmental noise interferes with basic human activities such as sleep, communication, and thought and thus has serious negative effects on health, interpersonal relationships, work, and learning. The stress and discomfort that an individual experiences as an immediate result of noise exposure is compounded by the additional stress that results from lack of sleep, miscommunication, impaired mental functioning and the myriad social and economic consequences of such reductions in the individual's ability to function properly. It should not be surprising, therefore, that the stress caused by prolonged exposure to environmental noise can lead to heart disease and other stress-related maladies [1].

In order to reduce noise and improve the health and quality of life in the community, policy makers must implement regulations that are predicated on an answer to the following question: How much noise is too much? Researchers have endeavored to assist in the formulation of intelligent answers to this question by developing methods for measuring noise levels and community responses to noise; objective measurements of noise levels facilitate the scientific discussion of the "how much" part of the question while subjective measurements of community response inform the discussion of what might constitute "too much" impact on the community.

Both kinds of measurement involve the simplification of a complex phenomenon into a numeric level or rating. The objective, physical measurement of noise is complicated because the human ear does not respond to all noise frequencies uniformly and because noise is a temporal phenomenon. In other words, high-pitched noises and low-pitched noises of equal energy are not necessarily perceived by human beings to be equally loud and most noises that occur in the real world are not constant but begin and end or wax and wane. The first measurement problem is solved by weighting; that is, physical measurements are adjusted so that measures of the same level sound equally loud to the human ear despite differences in pitch. In the study of environmental noise, A-weighting is the norm. A-weighting approximates the loudness of tones relative to a

40 dB reference tone of 1000 Hz. There are several approaches to the second problem, that of measuring the level of noises that change over time. One is to identify the peak noise level (L_{Amax}). Another method is to measure the percentage of time that noise measurements are above a given level (L_{AN} or $L_{AN, T}$). A third method is to measure the average A-weighted sound pressure level over a given period of time. This third method, called L_{Aeq}, is the standard method of measuring noise in studies of environmental noise.

Measuring the subjective community response to noise is even more complex than objectively measuring noise itself because human beings respond to noise in many different ways and the responses are affected by various factors. The extent of this complexity is demonstrated by Guski et al in their discussion of the concept of "noise annoyance" [2]. Guski et al divided definitions of "noise annoyance" into five types: 1) noise annoyance as emotion; 2) noise annoyance as a result of disturbance; 3) noise annoyance as attitude; 4) noise annoyance as knowledge; and 5) noise annoyance as a result of rational decisions. The first type, emotion, refers to the immediate perception that a noise is inherently unpleasant and to the emotions, such as fear, associated with the noise source. Disturbance refers to the interference of noise in a wide range of activities such as sleep, communication, relaxation, work and study. The extent and type of disturbances depend in part on lifestyle and culture. Attitude is also important because reactions to noise may be influenced by the attitude of the subject to the noise source. If a noise source such as a highway, for example, is generally perceived positively, the noise may be tolerated more easily. Knowledge is a component of noise annoyance in that memories of noise situations and other knowledge about the negative effects of noise may increase sensitivity. Finally, rational decisions made by individuals may affect noise annoyance. If, for example, an individual chose to live in a noisy environment because he or she judged the advantages of the environment to outweigh the disadvantages associated with the noise, he or she might be more tolerant of the noise.

Research on these and other dimensions of adverse reactions to noise must be conducted in order to develop a more complete understanding of noise problems. However, ultimately, policy makers require an overall measurement of negative impact in order to determine whether a given level of noise is or is not "too much." The concept of "noise annoyance" has special importance in noise research because of its potential to provide such an overall measurement. As Guski et al have made clear, "noise annoyance" encompasses an extremely wide range of negative effects and perceptions.

In order to use the concept of "noise annoyance" to measure to the general negative reaction of a community to noise, a method for producing a quantitative summary of the strength of that reaction must be decided upon. In a seminal article published in 1978, Schultz proposed a method of measuring the "percent highly annoyed" for this purpose [3]. Schultz suggested that individuals who responded to a survey question about noise annoyance by choosing either of the two highest categories of a seven-point scale (the upper 29% of the scale) or one of the top three categories of an eleven-point scale (the upper 27% of the scale) should be counted as "highly annoyed". Measured in this way, the percent of survey respondents whose answers to a question about overall annoyance fell in the "highly annoyed" range may be interpreted as an indication of the general level of negative community response to environmental noise. Since Schultz published his article, various researchers have suggested changes or adjustments in the method of determining the "percent highly annoyed" but the importance of the basic concept has gained wide acceptance. Thus, "percent highly annoyed" as a measure of negative community reaction is analogous to L_{Aeq} as a measure of the physical noise level; whereas L_{Aeq} is the standard measurement of how much noise is present, "percent highly annoyed" is gaining acceptance as the standard measurement of the extent of the negative impact of the noise on the community.

A major obstacle to the establishment of "percent highly annoyed" as a standard measurement of the impact of noise on a community is the lack of standardization in noise annoyance questions. When there are differences in the wording of the question stems or the labels used to identify different degrees on rating scales, one cannot know whether the results reflect differences in the degree of the community response or differences in the construction of the questions. A classic example how the wording of a question can affect the responses it generates is sometimes referred to as the "forbid-allow asymmetry." In one study, when subjects were asked if speeches against democracy should be "allowed" the number who expressed opposition to the speeches was 25% higher than among subjects who were asked if such speeches should be "forbidden." According to Fields et al, similarly striking effects of wording differences in questions about noise annoyance have not yet been identified but the possibility that wording differences may cause significant differences in the responses to noise annoyance questions cannot be ruled out [4]. In regard to the relationship between the degrees of an answer scale and the labels attached to them, Fields cites a study of time spent on television viewing in which subjects' responses were significantly affected by the range of choices presented; when the scale degrees were

labeled with higher numbers of viewing hours subjects tended to choose the higher numbers more readily than when the range of choices was narrower. Thus, it is conceivable that responses to noise annoyance questions may be affected significantly by the wording of the question, the manner in which the scales are labeled, or the relationship between the label meaning and scale position.

1.2 THE STANDARDIZATION OF ANNOYANCE SCALES AND QUESTIONS

Several proposals have been made to address this problem by standardizing the wording and scale composition used in English and Japanese noise annoyance surveys. In regard to English-language surveys, Fidell et al [5], Levine [6], and Fields [7], have presented arguments favoring the use of 5-, 7-, and 4-point scales respectively. Similarly, Furihata *et al* [8] and the Committee of Social Surveys on Noise Problems of the Acoustical Society of Japan [9] have recommended 7- and 3-point scales respectively for use in the Japanese language. However, these proposals for standardization were limited to either English or Japanese and did not address the question of the comparability of scales between languages.

The first systematic effort to address the problem of comparability between languages began in 1993, when the Community Response to Noise Team (Team 6) of the International Commission on the Biological Effects of Noise (ICBEN) initiated a project to develop standards for the construction of noise annoyance scales and questions in multiple languages. The project resulted in the proposal of an two English-language annoyance questions that may serve as models for questions in other languages and the development of a procedure for constructing comparable scales, which was implemented in parallel in nine languages [4].

The international comparison that the ICBEN initiative facilitates is important for several reasons. Firstly, administering social surveys to large numbers of subjects is extremely time-consuming and expensive. The facilitation of the comparative study of community responses to noise vastly increases the data available to scientists for research at little or no extra cost and thus improves research efficiency.

Secondly, international comparative research allows scientists to better determine what aspects of a community response to noise are more-or-less universal and what aspects seem to be unique to specific situations or cultures. For example, European researchers have noted that noise caused by railways general elicits lower annoyance responses that road traffic noise of the same L_{Aeq} [10] [11] [12]. However, a similar

4

"railway bonus" is generally not observed in Japan [13] [14] [15]. Without the advantage of international comparative research, European researchers might mistakenly conclude that the "railway bonus" is a universal phenomenon. Contradictory evidence from Japan and other nations is leading to more research on the specific mechanisms involved in the "railway bonus" that would not have been possible without international comparison. This, in turn, promises to lead to a more complete and accurate understanding of the European phenomenon. Over a century ago, Durkheim wrote that "comparative sociology is not a special branch of sociology; it is sociology itself" [16]. The same may be said of research on community responses to noise; comparative research is essential to progress in the study of fundamental questions.

Thirdly, as travelers cross national borders in ever greater numbers, it has become increasingly difficult to regulate the noise associated with such travel as a purely domestic matter. The international nature of the noise phenomena demands that researchers be able to study community responses to specific noise sources as they cross national and linguistic borders. This research, in turn, should inform efforts to regulate noise across national borders.

As discussed above, the concept of "noise annoyance" is of particular importance to the regulation of community noise because it has the potential to serve as the basis of the primary general measure of the negative impact of noise. It is the recognition of the importance of this general concept that led the members of ICBEN Team 6 to make a broad conception of the concept of "annoyance" the foundation of their standardized questions. It should also be noted, however, that use of the ICBEN Team 6 questions in international research tends to further solidify the importance of this basic concept. Most social surveys on noise are designed to investigate specific aspects of noise problems (vibration, attitude toward noise source, interference with specific activities, etc.) as well as the general level of annoyance caused by a particular noise source. Standardization for the purpose of international comparison of the innumerable specific questions that might be asked about various aspects of a community noise problem would be extremely difficult if not impossible. Thus, the concept of "annoyance" may be expected to take on additional importance in both research and regulation because it is the basis of the only questionnaire items that can reasonably be expected to be included on all or most social surveys on community responses to noise.

In sum, the standardization of social survey questions on noise annoyance in accord with the ICBEN Team 6 recommendations holds great promise for the facilitation of

basic research and the more confident and precise interpretations of the "percent highly annoyed" data produced by social surveys on community responses to noise.

1.3 RESEARCH OBJECTIVES

The first objective of this study is to test a premise of the ICBEN scale label determination method. In the method, the scales for each language are determined using data obtained from a survey of subjects in the target language. The subjects are required to select modifiers for 5- and 4-point scales from a pool of 21 candidate modifiers and to evaluate the intensity of each modifier. A key premise of this method is that cultural and linguistic differences will not have a significant effect on how subjects interpret these tasks. Specifically, it is assumed that the upper extreme of the range of possible annoyance imagined by subjects does not differ widely between cultures and languages. Significant differences in the upper extreme imagined by subjects might influence modifier preferences and would distort the intensity scores that the subjects assign. Thus, the first objective of this study is to ascertain whether or not Japanese and English subjects imagine similar upper extremes of annoyance when following the ICBEN procedure. Confirmation that Japanese and English subjects imagine similar upper extremes would support the equivalence of the Japanese and English scales produced in accordance with the ICBEN method.

The second objective is to determine whether wording in annoyance questions that focuses on the character or quality of the noise to be evaluated produces responses that differ significantly from wording that focuses on the psychological impact of the noise. In Japan, many social surveys on noise annoyance have employed questions that ask about the "urusasa" or "noisiness" of the noise. By contrast, most social surveys on noise annoyance that have been written in English use questions about "annoyance." Thus, there is some question about whether social survey questions based on the concept of "urusasa" are equivalent to questions about "annoyance." The ICBEN question stem is made up of three base descriptors each, thus reducing the likelihood that any one descriptor might have a serious detrimental effect on the equivalence of the question. However, if it could be determined that questions that focus exclusively on the quality of the noise and questions that focus on the psychological impact of the noise are functionally equivalent, this result would provide indirect support for the functional equivalence of the Japanese and English versions of the ICBEN questions.

1.4 THESIS STRUCTURE

Chapter 1: Introduction

This chapter addresses the following: 1) the importance of the concept of annoyance in international research on community responses to noise; 2) the importance of standardized question wording and scales; 3) the main objectives of the research discussed in this thesis; and 4) thesis structure.

Chapter 2: Equivalence of noise annoyance scales in Japanese and English: An experiment using bilingual subjects

In this chapter, the first research objective of this study is addressed. Seventy-three bilingual subjects were used to test the hypothesis that the upper extremes of annoyance imagined by English and Japanese speakers do not differ substantially and thereby to evaluate the equivalence of the English and Japanese scales produced by ICBEN's Team 6. The results clearly indicate that English- and Japanese-speaking subjects do not differ significantly in their interpretations of the "highest degree" of annoyance. Thus, the key premise of the equivalence of the ICBEN scales was confirmed for English and Japanese. Moreover, it was found that bilingual and monolingual subjects differ in their evaluations of the intensity of certain words even when the "first" or native language of the groups is the same. This second result does not have direct bearing on the equivalence of annoyance questions but may be of interest to linguists and designers of bilingual surveys.

Chapter 3: Equivalence of noise annoyance question stems in English and Japanese: An experiment using Japanese, Australian and American subjects

This chapter addresses the second research objective of the dissertation in a laboratory setting. An experiment was conducted to assess the effect of wording differences on the equivalence of English and Japanese noise annoyance question stems. English- and Japanese-speaking subjects were asked to do the following three tasks: 1) to evaluate noises in a laboratory experiment; 2) to respond to hypothetical questions about noise annoyance; and 3) to respond to hypothetical questions about noise annoyance and non-noise annoyance. In the first two tasks, the subjects were

7

presented with noise annoyance question stems in one of three formats. The first was the question format recommended by ICBEN Team 6. It focused on the degree to which a noise would "bother, disturb, or annoy" the subject. The second asked subjects to evaluate the "bothersome, annoying, or disturbing" quality of the noise. The third asked how much the noise would "worry, irritate, or concern" the subject. Though some statistically significant effects were observed in the responses to the hypothetical questions, no significant difference was found in responses to the three formats when subjects evaluated noise in laboratory conditions.

Chapter 4: The relationship between question stem wording and community response to railway noise: Results of a social survey conducted in Kyushu, Japan

This chapter addresses the second objective of this dissertation through a Japanese-language social survey. Data from a survey on railway noise annoyance that was conducted in Kyushu, Japan in 2002 is analyzed. The key questions included in the survey concerned annoyance, activity disturbance and related effects caused by railway noise. Four types of questionnaires were prepared. In each type, one of four types of noise annoyance questions was used. Responses to the four types are compared in this chapter. No statistically significant effect of question type on response was found when only question type and L_{Aeq} were used as independent variables in the statistical analysis. However, a significant interaction between gender and question type was found for one definition of percent highly annoyed.

Chapter 5: Conclusion

In this chapter the results of the three studies reported in Chapters 2, 3 and 4 are summarized in relation to each other. Though some statistically significant effects of wording differences are noted, on the whole the three studies support the equivalence of questions and scales constructed in accordance with the ICBEN method. Finally, issues requiring further research are summarized.

NOTES

[1] B. Berglund, T. Lindvall and D. H. Schewela (eds.), *Guidelines for Community Noise* (Geneva: Word Health Organization, Guideline Document, 1999), Chapter 3: "Adverse Health Effects of Noise," 39-54.

[2] R. Guski, U. Felscher-Suhr, "The concept of noise annoyance: How the international experts see it," *J. Sound Vib.*, 223, (1999) 513-527.

[3] T. J. Schultz, "Synthesis of social surveys on noise annoyance," *Journal of Acoustical Society of America* 64(2)(1978) 377-405.

[4] J. M. Fields, R. G. d Jong, T. Gjestland, I.H. Flindell, R. F. S. Job, S. Kurra, P. Lercher, M. Vallet, R. Guski, U. Felscher-Suhr and R. Schumer, "Standardized general-purpose noise reaction questions for community noise surveys: Research and a recommendation," *J. Sound Vib.*, 242, 641 (2001).

[5] S. Fidell and S. R. Teffeteller, "Scaling annoyance for social surveys of community reaction to noise exposure," Bolt Beranek and Newman Inc. Report, No. 4211 (1980).

[6] N. Levine, "The development of an annoyance scale for community response assessment," *J. Sound Vib.*, 74, 265-279 (1981).

[7] J. M. Fields, "Effect of personal and situational variables on noise annoyance in residential areas," *J. Acoust. Soc. Am.*, 93, 2753-2763 (1993).

[8] K. Furihata and T. Yanagisawa, "Reconstruction of vehicle noise-rating scale based on judgment of residents in and around Nagano city and its effectiveness," *J. Acoust. Soc. Jpn.*, 44, 108-115 (1988).

[9] Committee of Social Surveys on Noise Problems of Acoustical Society of Japan, "Report of the Committee of Social Survey on Noise Problems," *J. Acoust. Soc. Jpn.*, 48, 119-125 (1992).

[10] H. M. E. Miedema and H. Vos, "Exposure-response relationships for transportation noise," *J. Acoust. Soc. Am.* 104(6), pp. 3432-3445(1998).

[11] J. M. Fields and J. G. Walker, "Comparing the relationships between noise level and annoyance in different surveys: a railway noise vs. aircraft and road traffic comparison", *Journal of Sound and Vibration* 81(1) (1982) 51-80.

[12] U. Moehler, "Community response to railway noise: a review of social surveys," *Journal of Sound and Vibration* 120 (1988) 321-332.

[13] H. Fastl, S. Kuwano and S. Namba, "Assessing the railway bonus in laboratory studies", *The Journal of the Acoustical Society of Japan* (E) 17, 3 (1996) 139-147.

[14] J. Kaku and I. Yamada, "The possibility of a bonus for evaluating railway noise in Japan", *Journal of Sound and Vibration* 193 (1996) 445-450.

[15] T. Yano, T. Sato, K. Kawai and K. Kurosawa, "Comparison of community response to road traffic and railway noises", *The Journal of the Acoustical Society of Japan* 54 (1998) 489-496.

[16] E. Durkheim (S. Lukes, ed; W. D. Halls, tr), *The rules of sociological method and selected texts on sociology and its method* (New York: Free Press, 1982), 108.

CHAPTER 2: EQUIVALENCE OF NOISE ANNOYANCE SCALES IN JAPANESE AND ENGLISH: AN EXPERIMENT USING BILINGUAL SUBJECTS

2.1 INTRODUCTION

Over the past several decades a large number of social surveys on community response to noise have been conducted in developed and, to a lesser extent, developing countries. Studies that compare data from multiple surveys have been conducted [1], but differences in languages, wording, and scale composition have made such comparison difficult.

As explained in Chapter 1, the first systematic effort to address the problem of comparability between languages began in 1993, when the Community Response to Noise Team (Team 6) of the International Commission on the Biological Effects of Noise (ICBEN) initiated a project to develop standards for the construction of noise annoyance scales and questions in multiple languages. The project resulted in the development of a procedure for constructing comparable scales, which was implemented in parallel in nine languages [2].

In the ICBEN method, the scales for each language are determined using data obtained from a survey of subjects in the target language. The subjects are required to select modifiers for 5- and 4-point scales from a pool of 21 candidate modifiers and to evaluate the intensity of each modifier. A key premise of this method is that cultural and linguistic differences will not have a significant effect on how subjects interpret these tasks. Specifically, it is assumed that the upper extreme of the range of possible annoyance imagined by subjects does not differ widely between cultures and languages. Significant differences in the upper extreme imagined by subjects might influence modifier preferences and would distort the intensity scores that the subjects assign.

In this study, 73 bilingual subjects were used to test the hypothesis that the upper extremes of annoyance imagined by English and Japanese speakers do not differ substantially and thereby to evaluate the equivalence of the English and Japanese scales produced by ICBEN's Team 6.

11

2.2 EXPERIMENT

The procedure was essentially the same as the ICBEN study [2] except that all subjects chose modifiers for use in both English and Japanese scales and evaluated the intensities of both English and Japanese modifiers. Moreover, a paired comparison test of 12 English and Japanese modifiers was appended, though paired comparison was not part of the original ICBEN procedure.

2.2.1 Subjects

Seventy-three subjects between the ages of 20 and 71 who were fluent in Japanese and English participated in the study. They were bilingual in the sense that they were fluent in both Japanese and English. However, they were not bilingual in the sense of having used languages with equal facility and frequency since childhood; in all cases, one of the two languages was acquired first, as the native or primary language, and the other learned later. In this paper, we borrow the terms "L1" (first language) and "L2" (second language) from the field of linguistics when we refer to the first language of subjects or the relationship between the subjects and the language they are evaluating. Thus, we use the phrase "English L1 subjects," for example, to refer to subjects for whom English is the first or primary language. Similarly, when the phrase "L1 subjects" is not prefaced by "Japanese" or "English," it refers to bilingual subjects as evaluators of words in their first language; those same subjects would be "L2 subjects" when evaluating words in their second language.

English was the first language (L1) of 19 males (mean age: 38) and 17 females (mean age: 37) while Japanese was the first language of 17 males (mean age: 45) and 20 females (mean age: 40). The nationalities of the subjects who spoke English as their first language were as follows: U.S.A., 21; Australia, 4; United Kingdom, 3; Ireland, 2; France, 1; New Zealand, 1; Japan, 1. The Japanese subjects had lived in English-speaking areas for an average of five years while those for whom English was L1 had lived in Japan for an average of 11 years.

We initially recruited subjects from among acquaintances in the Kumamoto area and other parts of Japan. Subsequently, subjects were also recruited on the Internet. The Honyaku mailing list [3] was a particularly good source of highly qualified subjects. The list serves over 1,000 professional Japanese/English translators ("honyaku" means "translation" in Japanese). The recruitment message explained the purpose of the study and our interest in recruiting subjects who are "fluent in both aural and written

12

communication in Japanese and English." Unless there was a specific reason to question the qualifications of a potential subject, we assumed that persons who claimed to be fluent in both languages were indeed qualified and did not administer a systematic test of fluency. Our recruitment methods led to the participation of many professional translators, interpreters, and language teachers as subjects.

2.2.2 Questionnaires

There were two types of questionnaire: "Annoyed" was used as the base descriptor throughout in one while "urusai" was used in the other. Both types were bilingual. In the questionnaires in which "annoyed" was used as the base descriptor, English text appeared in a column on the left side of each page and the corresponding Japanese appeared in a column on the right. This arrangement was reversed in the questionnaires in which "urusai" was the base descriptor. These questionnaires were distributed evenly to each of the following four groups of the subjects: 1) female, L1 is Japanese; 2) male, L1 is Japanese; 3) female, L1 is English; 4) male, L1 is English. Each questionnaire contained the following tasks:

1) Construction of 5- and 4-point scales in English: Subjects constructed 5- and 4-point equidistant annoyance scales in English from the minimum to the maximum by selecting suitable modifiers from the 21 English modifiers (Table 1).

2) Construction of 5- and 4-point scales in Japanese: Subjects constructed 5- and 4-point equidistant annoyance scales in Japanese from the minimum to the maximum by selecting suitable modifiers from the 21 Japanese modifiers (Table 2).

3) Line-marking exercise for 42 modifiers in English and Japanese: Subjects evaluated the intensity of the 42 English and Japanese modifiers by placing a mark on a 10 cm line as shown in Figure 1. The modifiers were presented sequentially in a random order.

4) Paired comparison test: Six English and six Japanese modifiers of intensities equal to or lower than that of the modifier selected for the highest scale point and equal to or higher than that of the modifier selected for the second highest scale point in each language were selected on the basis of the results of the ICBEN study [2] for evaluation in a paired comparison test. As paired comparison tests are only appropriate for the evaluation of slight differences in intensity or preference, the 12 modifiers were divided into three groups of similar intensity (higher, middle, and lower) and all possible pairs within each group were compared (Table 3). The higher intensity group consisted of the three modifiers of highest intensity in each

13

language (a total of six) while the lower intensity group consisted of the remaining six modifiers. The middle intensity group consisted of the middle two modifiers in each language (a total of four) or, in other words, the lowest modifiers from the higher intensity group and the highest modifiers from the lower intensity group. Of the six possible pairs in the middle group, two were ignored because they duplicated pairs already obtained in the lower and higher groups. Thus, a total of 34 pairs were composed (15 in the higher intensity group, 4 in the middle group, and 15 in the lower intensity group) and then presented to the subjects in randomized order. It took about an hour to complete the questionnaire.

Table 1   21 English modifiers

---

extremely, tremendously, severely, strongly, highly, very, significantly, substantially, considerably, importantly, rather, moderately, fairly, somewhat, partially, slightly, a little, hardly, barely, insignificantly, not at all

---

Table 2   21 Japanese modifiers

---

hijôni, kiwamete, hidoku, sugoku, taihen, sôtô, totemo, kanari, daibu, warini, hikakuteki, tashô, yaya, ikuraka, sukoshi, wazukani, sorehodo...nai, taishite...nai, amari...nai, hotondo...nai, mattaku...nai

---

somewhat
-SW-

No / lowest degree
of urusasa

うるさくない状態／
最少のうるさき

Highest degree
of urusasa

最大のうるさき
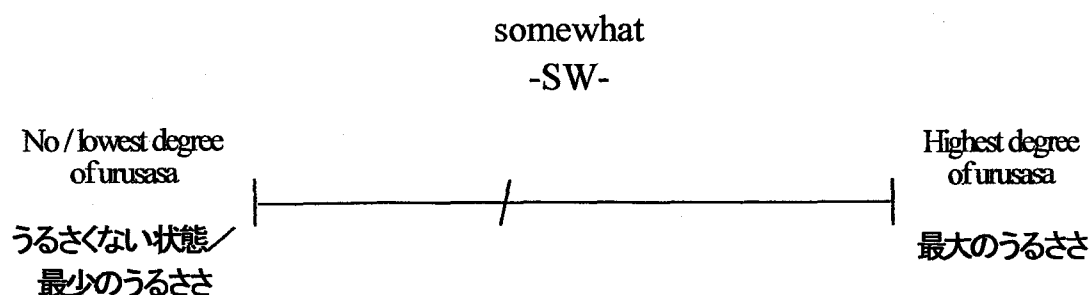
Fig. 1 Line-marking exercise

Table 3 12 modifiers used in the paired comparison test

Higher intensity		Lower intensity	
	Middle intensity		
extremely, tremendously, hijôni, sugoku,	severely, taihen,	strongly, sôtô,	highly, very, kanari, daibu

2.3 RESULTS

2.3.1 Scale Construction

In accordance with the method devised by ICBEN Team 6 [2], the following criteria were used to determine the scale-point labels:

1) Intensity difference score (I-C Delta): the difference between the modifier's mean and the scale point's ideal intensity score (0, 25, 50, 75 or 100).

2) Net preference score (P%): the net number of selections of the modifier for a particular scale point (the number of selections for the scale point minus the number of selections for other scale points) divided by the total number of subjects.

3) Standard deviation of intensity scores (StD): the standard deviation of the intensity scores for each modifier.

Table 4 shows the 5-point scales constructed using the data produced by all subjects of the present study (bilingual) and the 5-point scales produced by the ICBEN study. The English scale is the same as ICBEN's English scale except that "a little" was

15

selected as the second lowest category. However, the Japanese scale is completely different from that of the ICBEN study as "mattaku...nai" was fixed as the lowest category.

Table 4 Modifiers for 5-point scales in English and Japanese

English, bilingual:	"extremely," "very," "moderately," "a little" and "not at all"
English, ICBEN:	"extremely," "very," "moderately," "slightly" and "not at all"
Japanese, bilingual:	"kiwamete," "totemo," "hikakuteki," "sukoshi" and "mattaku...nai"
Japanese, ICBEN:	"hijôni," "daibu," "tashô," "sorehodo...nai" and "mattaku...nai"

This result stems in part from differences between Japanese and English. In each of the five intensity ranges English seems to have one clearly dominant modifier whereas in Japanese two or more modifiers of similar quality are available in each intensity range [4]. Moreover, in Japanese, impressions about various modifiers are more affected by differences between subject groups than is the case in English. For example, when regression analysis was applied to the data from the ICBEN study (the intensity score was a dependent variable and the age of the subjects was an independent one) the age effect on the intensity was more dominant in Japanese than English [5]. The regression coefficients were significant at the 1% level for eight of 21 modifiers and at the 5% level for three modifiers in Japanese, whereas they were significant at 1% for three modifiers and at 5% for three modifiers in English.

2.3.2 Classification of the modifiers

Table 5 shows the mean intensity scores of the 21 English and the 21 Japanese modifiers on a scale of 100 for this bilingual study and the ICBEN study. Cluster analysis was applied to the intensity scores of the 42 modifiers. When the modifiers were classified into five clusters, "kiwamete" and "hijôni" both were in the same cluster as "extremely" (Table 6). When Tukey's Multiple Comparison Procedure was applied to the pairs of the modifiers in the highest cluster, there were significant differences at the 5% level between "extremely" and "kiwamete" and at the 1% level between "extremely" and "hijôni" and no significant difference between "kiwamete" and "hijôni." "Extremely" seems to be a little more intense than "kiwamete" and "hijôni."

16

Table 5 Intensity scores of 42 modifiers

English	Bilingual	ICBEN	Japanese	Bilingual	ICBEN
extremely	96.9	94.9	kiwamete	93.3	91.8
tremendously	95.6	92.3	hijôni	92.2	93.8
severely	91.8	90.7	hidoku	90.6	91.0
strongly	80.3	79.7	sugoku	86.5	89.5
highly	80.1	78.7	taihen	84.1	86.3
very	78.4	75.6	totemo	79.9	83.9
significantly	73.9	67.2	kanari	73.6	83.9
considerably	71.3	62.2	sôtô	72.2	84.9
importantly	71.3	65.1	daibu	71.2	75.2
substantially	70.7	64.5	hikakuteki	50.9	55.9
rather	56.0	47.9	warini	49.2	57.4
fairly	55.2	40.5	ikuraka	36.4	39.2
moderately	48.1	43.7	tashô	35.6	44.5
somewhat	35.3	35.7	yaya	34.2	43.5
partially	31.9	29.6	sukoshi	20.3	34.8
a little	17.2	13.2	sorehodo...nai	17.6	21.0
slightly	16.3	15.4	wazukani	15.0	26.0
insignificantly	12.7	7.6	taishite...nai	14.5	19.6
hardly	9.0	10.3	amari...nai	10.8	18.6
barely	7.5	8.1	hotondo... nai	6.0	6.9
not at all	0.6	0.8	mattaku... nai	0.8	1.0

17

Table 6   Results of cluster analysis

Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5
extremely	sugoku	rather	ikuraka	sukosi
tremendously	taihen	fairly	tashô	sorehodo...nai
kiwamete	strongly	hikakuteki	somewhat	a little
hijôni	highly	warini	yaya	slightly
severely	totemo	moderately	partially	wazukani
hidoku	very			taishite...nai
	significantly			insignificantly
	kanari			amari...nai
	sôtô			hardly
	importantly			barely
	considerably			hotonndo...nai
	daibu			mattaku...nai
	substantially			not at all

2.3.3 Effects of subjects' first language (L1) and bilingualism on intensity scores

2.3.3.1 Analysis of Variance in intensity scores

In order to analyze variation in intensity scores more precisely, a two-factor analysis of variance was conducted in which the factors were the L1 of the subject and the base descriptor ("annoyed" or "urusai") that appeared on the questionnaire. The L1 of the subject was found to be statistically significant at the 5% level in four English modifiers ("rather," "significantly," "very," "tremendously") and at the 1% level in another four ("insignificantly," "fairly," "strongly," and "extremely"). In Japanese, L1 was a significant factor at the 5% level in three modifiers ("wazukani," "kanari," and "kiwamete") and at the 1% level in two ("hotondo" and "sôtô"). The base descriptor was only found to be a significant factor in one Japanese modifier ("kiwamete"); it was not a significant factor in any of the English modifiers.

2.3.3.2 Comparison of L1, L2, and ICBEN scores

Figure 2 compares the average English intensity scores for all subjects in this study with the ICBEN results. Similarly, Figure 3 compares the Japanese intensity scores produced by the two studies. In both cases, results at the highest intensity levels are quite consistent. However, the middle-range intensity scores in this study are generally higher in English and lower in Japanese. Figures 4 and 5 compare the results for the English L1 subjects with the English ICBEN results and the results for the Japanese L1 subjects with the Japanese ICBEN results. Though in all cases subjects were evaluating modifiers in their native or first language, the results exhibit the same tendencies observed in Figures 2 and 3. Finally, Figures 6 and 7 compare the results of the English L1 and Japanese L1 subjects in each language. Significant differences in intensity can be observed in certain individual modifiers (e.g. "fairly" in English and "sôtô" in Japanese) but a general pattern of difference such as observed above is not apparent.
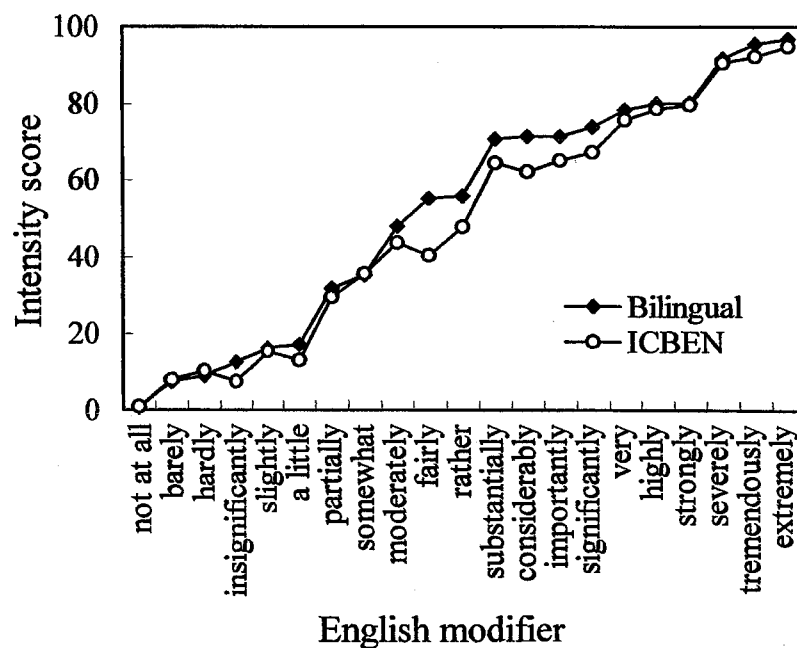
Fig. 2   Comparison of English intensity scores for all bilingual subjects with ICBEN scores

19
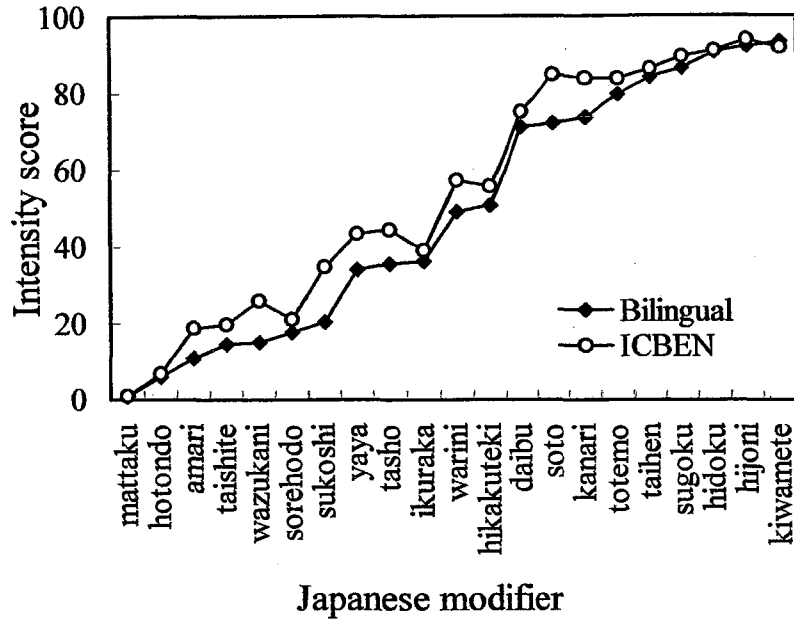
Fig. 3 Comparison of Japanese intensity scores for all bilingual subjects with ICBEN scores
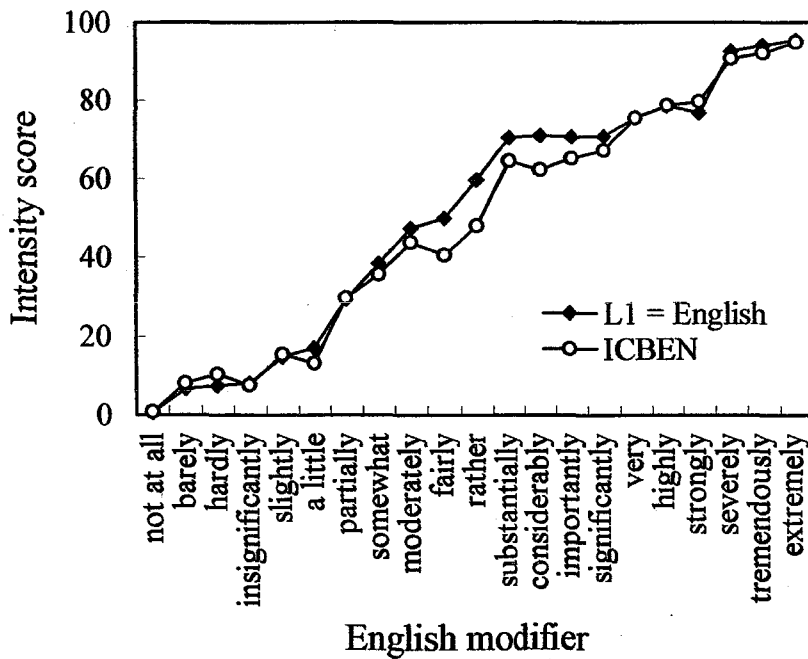
Fig. 4 Comparison of English intensity scores for English L1 subjects with ICBEN scores
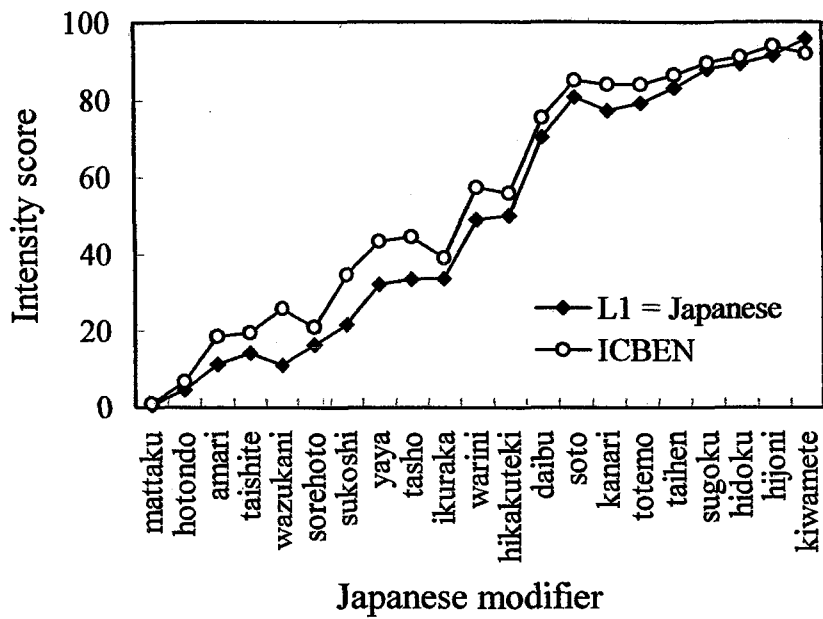
Fig. 5 Comparison of Japanese intensity scores for Japanese L1 subjects with ICBEN scores
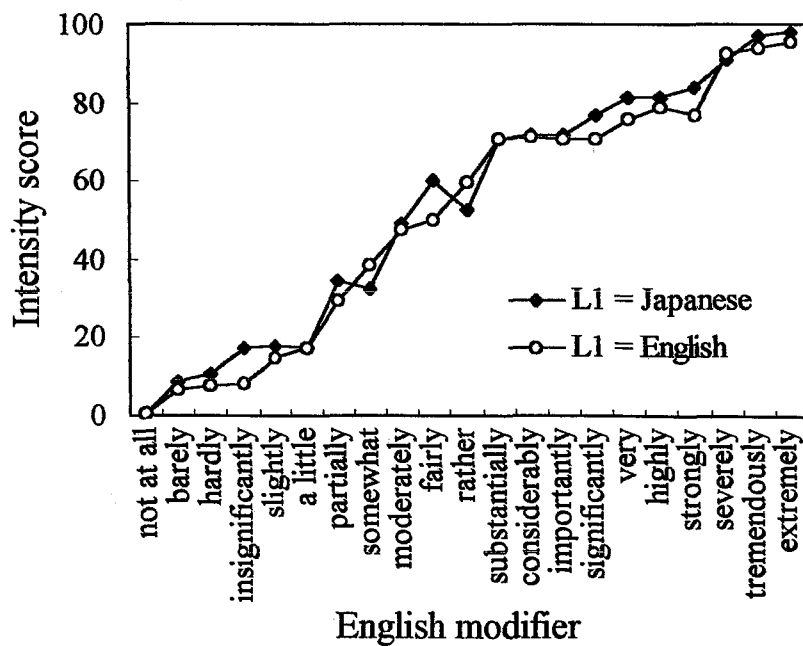
Fig. 6 Comparison of English intensity scores for English L1 and Japanese L1 subjects

21
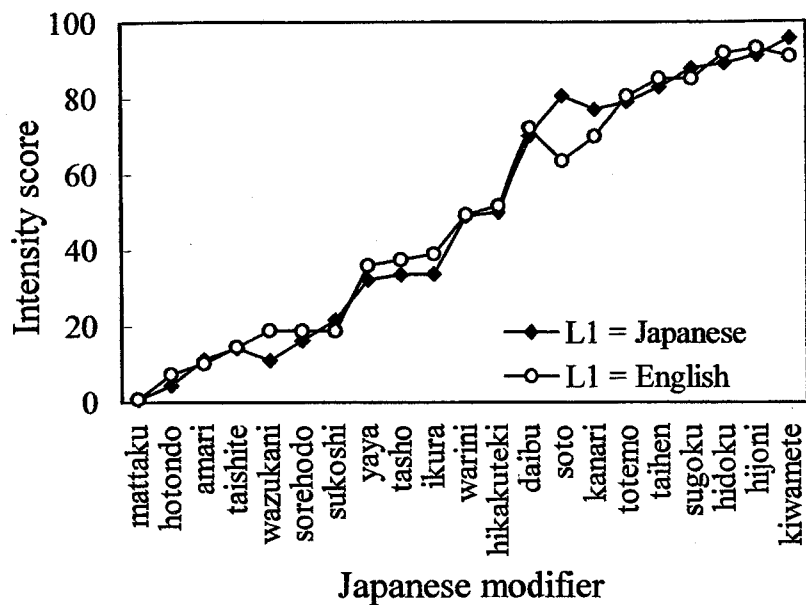
Fig. 7 Comparison of Japanese intensity scores for English L1 and Japanese L1 subjects

2.3.3.3 Standard deviation in intensity scores

Figures 8 and 9 compare the standard deviation in intensity scores between English L1 and Japanese L1 subjects. Predictably, the standard deviation tends to be greater when subjects are evaluating modifiers in their second language (L2). The discrepancy is particularly great for a few modifiers such as "insignificantly" and "hardly" in English and "wazukani" and "sôtô" in Japanese.
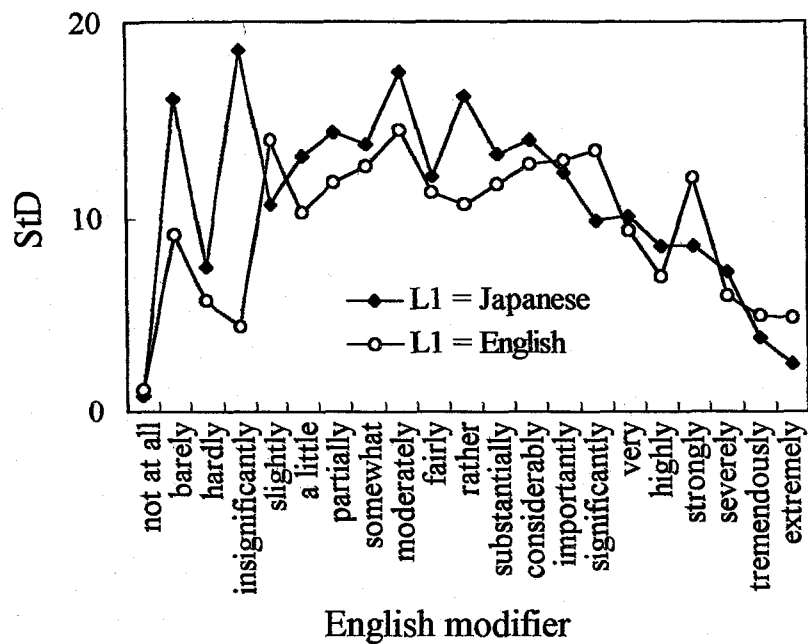
Fig. 8 Comparison of standard deviation of English intensity scores by native language
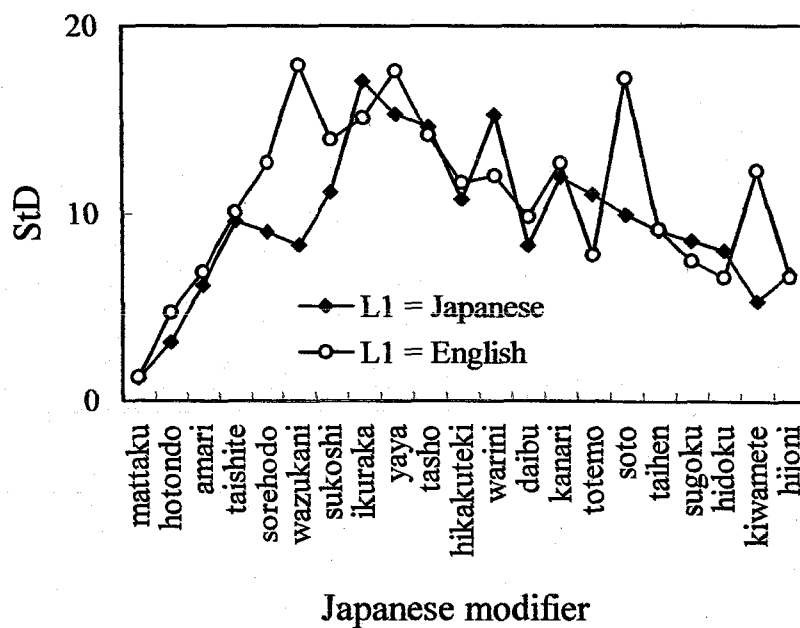
Fig. 9 Comparison of standard deviation of Japanese intensity scores by native language

23

2.3.4 Paired comparison test

Tables 7 and 8 show the results of the paired comparison test for the higher and lower intensity groups. The order of modifier intensity produced by the paired comparison test was "extremely," "tremendously," "hijôni," "severely," "sugoku" and "taihen" for the higher intensity modifiers. That for the lower intensity modifiers was "strongly," "highly," "very," "sôtô," "kanari" and "daibu." Comparing the orders with the intensity scores in Table 5, they were consistent with the scores except that the positions of "sôtô" and "kanari" were reversed between the line-marking exercise and the paired comparison test.

Table 7 Results of paired comparison test for the higher intensity modifiers

p	extremely	tremendously	hijôni	severely	sugoku	taihen
extremely		0.31	0.29	0.23	0.07	0.03
tremendously	0.69		0.36	0.38	0.17	0.17
hijôni	0.71	0.64		0.49	0.23	0.09
severely	0.77	0.61	0.51		0.33	0.13
sugoku	0.93	0.83	0.77	0.67		0.39
taihen	0.97	0.83	0.91	0.87	0.61	
Σp	4.07	3.23	2.84	2.65	1.41	0.80
Distance	1.80	1.29	1.14	1.03	0.39	0

Table 8 Results of paired comparison test for the lower intensity modifiers

p	strongly	highly	very	sôtô	kanari	daibu
strongly		0.43	0.26	0.39	0.41	0.21
highly	0.57		0.37	0.44	0.44	0.20
very	0.74	0.63		0.43	0.37	0.21
sôtô	0.61	0.56	0.57		0.49	0.29
kanari	0.59	0.56	0.63	0.51		0.29
daibu	0.79	0.80	0.79	0.71	0.71	
Σp	3.29	2.97	2.62	2.49	1.41	1.20
Distance	0.94	0.81	0.65	0.60	0.56	0

2.4 DISCUSSION

2.4.1 Interpretation of "highest degree"

Under the ICBEN protocol, before subjects begin to evaluate the intensity of individual modifiers in the line-marking exercise, they are instructed that the "highest degree" point on the line-marking exercise is the "highest degree of annoyance imaginable." This imaginary "highest degree" then becomes the standard against which the intensity of each modifier is measured. The cross-cultural comparability of the resulting intensity scores is predicated on the hypothesis that subjects of differing linguistic and cultural backgrounds interpret this "highest degree" level similarly. Testing this hypothesis is difficult, however, because there is no obvious standard against which subjects can be asked to measure their interpretations directly. The use of bilingual subjects in this study, however, allows us look for indirect indications of different interpretations.

In this study, each of the English L1 and Japanese L1 subjects evaluated all of the English and Japanese modifiers using the line-marking exercise. On each questionnaire, the base descriptor and the bilingual format of the exercise were consistent throughout; that is, the format of the line-marking exercise was the same for both English and Japanese modifiers. If there were a significant difference in the "highest degree" imagined by English L1 subjects and Japanese L1 subjects, that difference should lead to a significant numerical difference in intensity scores between the two groups. Moreover, the difference should be most apparent in the modifiers of high intensity because they are closest to the "highest degree" standard.

Accordingly, the average intensity scores for all six modifiers in Cluster 1 were calculated for English L1 subjects and Japanese L1 subjects as shown in Table 9. "Japanese Average" indicates the averages of the three Japanese modifiers ("hidoku," "kiwamete," and "hijôni") while "English average" denotes the averages for the English modifiers ("serverely," "tremendously," and "extremely"). Although Japanese L1 and English L1 subjects differed by as much as nearly 5 points in their interpretations of individual modifiers, the average difference in their intensity scores in this cluster is only slightly more than 1 point for the English modifiers and less than 1 point for Japanese modifiers and the combination of Japanese and English modifiers. Moreover, ANOVA tests for each of these three averages showed none of them to be statistically significant (Tables 10, 11, and 12). This indicates that the English L1 and Japanese L1 subjects did not interpret the "highest degree" standard in significantly different ways.

25

Table 9 Average intensity scores for all six modifiers in Cluster 1

Subjects	hid-oku	kiwa-mete	hij-ôni	sev-erely	tremen-dously	extre-mely	Japanese Average	English Average	Average
English L1	92.0	90.8	93.1	92.7	94.2	95.5	92.0	94.1	93.1
Japanese L1	89.2	95.7	91.3	91.1	96.9	98.2	92.1	95.4	93.7
English ICBEN				90.7	92.3	94.9		92.6	
Japanese ICBEN	91.0	91.8	93.8				92.2		

Table 10 ANOVA summary table for the effect of L1 on "Japanese Average"

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
L1	1	0.447	0.4468	0.0068	0.9343
Error	217	14249.261	65.6648		
C. Total	218	14249.708			

Table 11 ANOVA summary table for the effect of L1 on "English Average"

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
L1	1	87.8754	87.8754	2.8505	0.0928
Error	217	6689.778	30.8285		
C. Total	218	6777.653			

Table 12 ANOVA summary table for the effect of L1 on "Average"

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
L1	1	50.427	50.4268	1.009	0.3157
Error	436	21790.653	49.9786		
C. Total	437	21841.08			

For half of the subjects the base descriptor on the line-marking exercise was the English "annoyance" while the remaining subjects received questionnaires in which the Japanese "urusasa" was used. It is also conceivable that these English and Japanese base descriptors might elicit different responses from the subjects based on differing cultural and linguistic norms, but such a difference was found for only one modifier in the two-factor analysis of variance test. Thus, the analysis of variance test did not produce strong evidence of a cultural difference that might affect the interpretation of "highest degree" on the line-marking exercise.

Finally, the agreement between the intensity scores and the order determined by the paired comparison test is further evidence that a difference in the interpretations of "highest degree" did not corrupt the intensity data.

2.4.2 Relationship of "hijôni" to English modifiers

Igarashi [6] argued that differences he observed in the dose-response relationships derived from various social surveys resulted in part from differences in the number of steps corresponding to "highly annoyed" and the verbal labeling of the scales. In his review, most Japanese curves shifted to the left compared with the foreign studies. He speculated that this was partly because the labels of the upper two steps were usually "extremely" and "very" in foreign studies whereas they were "hijôni" (translated as "very") and "urusai" (Japanese for "annoyed") without a modifier in the Japanese studies. While it is true that "annoyed" alone without any modifier is much less intense than "very annoyed" [3], Tables 5 and 6 refute the possibility that "kiwamete" and "hijôni" are closer to "very" than to "extremely." The second highest modifiers in Japanese, "daibu" in the ICBEN study and "totemo" in the present study, are in the same category as "very" in Table 6.

2.4.3 Characteristics of bilingual subjects

Three general observations can be made regarding bilingual subjects on the basis of these results. First, L1 subjects and L2 subjects differ markedly in their average evaluations of the intensity of certain modifiers. Second, L2 subjects are less consistent in their intensity evaluations, particularly in regard to certain modifiers. Third, and perhaps most interesting, in some instances L2 knowledge seems to have a significant impact on the interpretation of the intensity of L1 modifiers.

27

The first and second phenomena may be due in part to the use of English-Japanese and Japanese-English dictionaries in the process of L2 acquisition. Table 13 shows the Japanese modifiers that are presented in several standard English-Japanese dictionaries as equivalents of some of the English modifiers used in this study. Similarly, Table 14 presents the results of a survey of Japanese-English dictionaries. The numerals in the "English" and "Japanese translation" columns of Table 13 and the numerals in the analogous columns of Table 14 indicate the ICBEN intensity scores for these modifiers.

Table 13 Equivalents of English modifiers listed in English-Japanese dictionaries shown with ICBEN intensity scores and compared with scores of bilingual subjects

English		Japanese translation						Ave.	L1	L2
extremely	94.9	kiwamete	91.8	hijôni	93.8	totemo	83.9	89.8	95.2	98.2
tremendously	92.3	sugoku	89.5	hidoku	91.0	totemo	83.9	88.1	94.2	96.9
very	75.6	kiwamete	91.8	hijôni	93.8	taihen	86.3	90.6	75.5	81.1
rather	47.9	kanari	83.9	tashô	44.5	yaya	43.5	57.3	59.6	52.4
fairly	40.5	kanari	83.9	sôtô	84.9			84.4	49.9	60.3
slightly	15.4	sukoshi	34.8	wazukani	26.0			30.4	14.7	17.8
a little	13.2	sukoshi	34.8	tashô	44.5	ikuraka	39.2	39.5	17.0	17.4
hardly	10.3	hotondo	6.9	mattaku	1.0	hidoku	91.0	33.0	7.4	10.6

The "Ave." column shows the average of the intensity scores of the equivalents presented in the dictionaries. Columns "L1" and "L2" show the average intensity scores of subjects for whom the language of the column on the far left is L1 and L2. The discrepancies that can be observed between the intensity scores of the modifiers in the far left column and the modifiers presented as their equivalents in dictionaries may help to explain some of the phenomena observed in this study. For example, while the L1 intensity score for "fairly" was 49.9, the L2 intensity score was 60.3, a result that is consistent with the association of "fairly" with modifiers of high intensity in English-Japanese dictionaries. In Japanese, a similar point can be made about the word "sôtô." Moreover, discrepancies between the impressions about these words gained through use of the language and the intensities of equivalents offered in

dictionaries may also be causing confusion about the intensities and thereby contributing to higher standard deviation scores in L2 users.

Table 14 Equivalents of Japanese modifiers listed in Japanese-English dictionaries shown with ICBEN intensity scores and compared with scores of bilingual subjects

Japanese		English translation							Ave.	L1	L2
hijôni	93.8	extremely	94.9	highly	78.7	very	75.6	considerably	71.3	80.1	91.3	93.1
hidoku	91.0	extremely	94.9	hardly	10.3					52.6	89.2	92.0
sôtô	84.9	moderately	43.7	fairly	40.5			considerably	71.3	51.8	80.7	63.5
kanari	83.9	moderately	43.7	fairly	40.5			considerably	71.3	51.8	77.1	70.1
totemo	83.9	extremely	94.9	tremendously	92.3	very	75.6	rather	47.9	77.7	79.1	80.7
warini	57.4	rather	47.9							47.9	49.0	49.4
sukoshi	34.8	a little	13.2	slightly	15.4			somewhat	35.7	21.4	21.7	18.8
wazukani	26.0	barely	7.5	slightly	15.4					11.5	11.1	18.9

A striking example of the third phenomenon is the discrepancy between the ICBEN intensity score for "sukoshi" (34.8) and the L1 score obtained in this study (21.7). This later score is much closer to typical scores for "a little," which is a common translation. Thus, it appears that intimate knowledge of English may have lead Japanese subjects to adjust their assessment of the intensity of "sukoshi." The general similarity of the contours of Figures 6 and 7, which compare the intensity scores of L1 and L2 subjects, and the pattern of difference observed in Figures 4 and 5, which compare the intensity scores of monolingual ICBEN subjects and the bilingual L1 subjects in this study, may also indicate influence of L2 on L1. This possibility is of particular interest because L2 influence on L1 has only recently become the subject of research in the field of linguistics and is not yet well understood [7].

While the results of this study indicate that monolingual and bilingual subjects may differ significantly in their evaluations of middle-range modifiers, similar differences in the evaluations of modifiers in the highest intensity range were not found. Therefore, differences between monolingual and bilingual subjects discussed here should not cast significant doubt on the validity of the results discussed in relation to the interpretation of the "highest degree" in the line marking exercise.

2.5 CONCLUSIONS

An experiment in which bilingual subjects constructed annoyance scales in English and Japanese according to the ICBEN protocol was conducted. The results clearly indicate that English- and Japanese-speaking subjects do not differ significantly in their interpretations of the "highest degree" of annoyance. Thus, a key premise of the equivalence of the ICBEN scales was confirmed for English and Japanese.

In addition, though the Japanese modifier "hijôni" has frequently been translated as "very," the results of this study show that "extremely" is a more appropriate translation.

Finally, the results of this study indicate that bilingual subjects may differ significantly from monolingual subjects in their interpretations of certain words.

NOTES

[1] H. M. E. Miedema and H. Vos, "Exposure-response relationships for transportation noise," J. Acoust. Soc. Am., 104, 3432 (2002).

[2] J. M. Fields, R. G. d Jong, T. Gjestland, I.H. Flindell, R. F. S. Job, S. Kurra, P. Lercher, M. Vallet, R. Guski, U. Felscher-Suhr and R. Schumer, "Standardized general-purpose noise reaction questions for community noise surveys: Research and a recommendation," J. Sound Vib., 242, 641 (2001).

[3] http://www.crossroads.net/honyaku/

[4] T. Yano, J. Igarashi, J. Kaku, K. Kanda, T. Kaneko, S. Kuwano, Y. Nii, T. Sato, M. So, I. Yamada and Y. Yoshino, "International joint study on the measurement of community response to noise: The validity of noise annoyance modifiers and question wording in Japanese," J. Acoust. Soc. Jpn., 58, 165 (2002).

[5] K. Kanda, J. Igarashi, J. Kaku, T. Kaneko, S. Kuwano, Y. Nii, M. So, T. Sato, I. Yamada, T. Yano, Y. Yoshino, "International joint study on the measurement of community response to noise: Comparison of Japanese noise annoyance modifiers between age brackets and areas," J. Acoust. Soc. Jpn., 58, 93 (2002).

[6] J. Igarashi, "Comparison of community response to transportation noise: Japanese results and annoyance scale," J. Acoust. Soc. Jpn. (E), 13, 301 (1992).

[7] V. J. Cook (ed.), Portraits of the L2 User (Multilingual Matters, Clevedon, 2000).

CHAPTER 3: EQUIVALENCE OF NOISE ANNOYANCE QUESTION STEMS IN ENGLISH AND JAPANESE: AN EXPERIMENT USING JAPANESE, AUSTRALIAN AND AMERICAN SUBJECTS

3.1 INTRODUCTION

Insuring the equivalence of noise annoyance question stems and rating scales is a key issue in the cross-cultural study of community response to noise. The Community Response to Noise Team (Team 6) of the International Commission on the Biological Effects of Noise (ICBEN) [1] has addressed the problem by constructing standardized verbal scales in nine languages using a common method and by proposing two standard English question stems (one to be used with a verbal scale and the other to be used with an 11-point numeric scale) that were translated and then back-translated to create equivalent question stems in the nine languages. However, the equivalence of these scales and question stems is based on several premises. Firstly, as discussed in Chapter 2, since the ICBEN method of scale construction requires subjects to evaluate the intensities of potential scale labels relative to the "highest degree" of intensity imaginable, the equivalence of the resulting scales depends on the premise that subjects interpret this "highest degree" similarly across languages and cultures. Secondly, the scale construction method also assumes that any differences between the groups of subjects selected for each language may be ignored. Thirdly, the equivalence of the question stems is based on the premise that they all convey the same fundamental concept, despite differences in wording and/or the nuances of individual vocabulary in the various languages.

In order to test the equivalence of the ICBEN scales Masden et al [2] conducted the experiment discussed in Chapter 2. In the experiment, subjects fluent in both English and Japanese followed the ICBEN procedure to construct scales in both languages. The results of this experiment confirmed the equivalence of the ICBEN scales in English and Japanese. The objective of the experiment discussed in this chapter was to investigate the possibility that differences in wording and/or vocabulary nuance in noise annoyance question stems may have a significant effect on subject reactions. English- and Japanese-speaking subjects were asked to evaluate noise in laboratory conditions and hypothetical noise situations using one of three question formats in each language. The three question formats were formulated to test for the effect of wording differences

associated with the concepts most commonly used in English and Japanese questions about noise annoyance: "annoyance" and "urusasa."

Over the past three decades, several studies related to the equivalence of "annoyance" and "urusasa" have been published. In 1980, stimulated by Western debates, a panel discussion was held in Japan on the distinctions between "loudness," "noisiness" and "annoyance" as attributes of noise and how these attributes should be labeled in Japanese [3]. The discussion revealed disagreement among experts regarding whether "urusasa" or "fukaikan" is closest in meaning to "annoyance." In 1986, Namba et al [4] published a study of Japanese, English, and German noise terminology employing the semantic differential method and found that the semantic profiles of "urusasa" and "annoyance" were very similar. However, a subsequent study by Namba et al [5] that employed the method of selected description found that, while "noisy" and "annoying" are differentiated in English, "yakamashii" and "urusai," the terms usually proffered as their Japanese equivalents, are used without clear differentiation. This lack of distinction between "yakamashisa" and "urusasa" was also noted in an earlier study by Hiramatsu et al [6]. Based on a historical review of usage, Osada [7] argued that a distinction analogous to that between "noisiness" and "annoyance" once existed between "yakamashisa" and "urusasa" but that the contemporary usage of "urusasa" is closer to "noisiness" or "yakamashisa." Accordingly, Osada concludes that "urusasa" is not an appropriate translation for "annoyance." Finally, in a study using the method of similarity rating with noise research experts as subjects, Guski et al [8] also found significant differences between the contemporary concepts of "annoyance" and "urusasa."

Yet, despite the problems associated with the translation of "annoyance" as "urusasa," the frequency with which "urusasa" is used in Japan to describe noise annoyance makes it impossible to ignore the issue of the equivalence of the two terms. In a study done by Yano et al [9], for example, when bilingual subjects were asked to choose the expression or phrase that they would be most likely to use in describing a noise problem, "urusai" was chosen far more often than any other Japanese term while "noisy," "bother" and "annoying" were chosen with similar frequency in English.

The noise reaction question stems recommended by ICBEN Team 6 use a phrase composed of three base descriptors ("bother, disturb or annoy") and Team 6 recommends that noise reaction question stems in other languages also employ multiple base descriptors in order to avoid bias caused by the different nuances of individual words. This method of reducing bias is known as the decentering approach [10].

Since the corresponding Japanese phrase ("nayamasarere, aruiwa, jamasareru, urusai to kanjiru") employs multiple base descriptors, the danger that differences in the concepts of "annoyance" and "urusasa" will have a significant impact on the equivalence of the English and Japanese question stems has been greatly reduced.

In this study, the authors employ another approach, known as the convergence approach [10], in order to assess the equivalence of noise reaction question stems employing wording associated with the concepts of "annoyance" and "urusasa." Whereas the wording of questions about "annoyance" generally focuses on the effect of a noise on the psychological state of the subject (e.g. "How much does the noise annoy you?"), "urusasa" is general presented as an attribute of the noise itself (e.g. "How *urusai* is the noise?"). Two of the question formats used in this study employ wording associated with the concept of "annoyance" while the remaining question format focuses attention of the quality of the noise, as do questions about "urusasa." Following the convergence approach, analysis in this paper is based on the hypothesis that similar reactions to the different formats within each language would constitute strong evidence of the functional equivalence of the two concepts. This, in turn, would constitute additional, albeit indirect, support for the equivalence of the English and Japanese ICBEN question stems.

3.2 EXPERIMENT

3.2.1 Outline of Experiment

English- and Japanese-speaking subjects were asked to do the following three tasks: 1) to evaluate noises in a laboratory experiment; 2) to respond to hypothetical questions about noise annoyance; and 3) to respond to hypothetical questions about noise annoyance and annoyance not caused by noise. Three different question formats were used in the first two tasks to test for the effects of wording differences. The third task was designed to test for cultural differences in sensitivity to noise among the English- and Japanese-speaking subjects.

3.2.2 Questionnaires

The questionnaire for the study was divided into three independent parts. In Part I, the subjects were asked to evaluate 16 recorded road traffic noises. Each time a noise was presented, subjects were instructed to imagine that they lived in a home where the

road traffic noise is heard and then asked to evaluate the noise using one of the following question formats:

Format A: How much would this much noise from road traffic bother, disturb, or annoy you? (Anata wa, kono dôro kôtsu sôon o dore kurai urusaku, matawa fukai ni kanjiru deshô ka?)

Format B: How bothersome, annoying or disturbing should this much noise from road traffic be rated as? (Kono dôro kôtsu sôon wa dore kurai urusai, matawa kininaru deshô ka?)

Format C: How much would this much noise from road traffic worry, irritate, or concern you? (Anata wa, kono dôro kôtsu sôon ni yotte dore kurai nayamasaremasu ka?)

In Part II, subjects were asked to imagine living in the 10 hypothetical community noise situations shown in Table 1 and to evaluate each one using the same question format as

<div align="center">

Table 1   Hypothetical community noise situations of Part II

</div>

1	Hearing big trucks (when you are in your home) every time the traffic signal changes at a nearby intersection
2	Hearing a dog that barks in the middle of the night about once a week outside a nearby building
3	Having to always raise your voice at the entrance to your home because of the noise from a high traffic street
4	Hearing the entrance door of your home squeak every time it is opened
5	Hearing a distant aircraft about once a week
6	Hearing about ten airplanes a day that make your television hard to hear when they fly by
7	Hearing the background music from a nearby business when your windows or doors are open
8	Being woken up by motorcycles about once a week
9	Hearing your neighbor's radio, television or stereo when your doors or windows are open
10	Hearing the backup warning signals beeping on trucks about once a hour during the daytime at your home

in Part I. In Part III, subjects were asked to evaluate the 22 hypothetical problems shown in Table 2. Three types of annoyance problems were included: 1)

Table 2 Hypothetical problems of Part III

1	Smelling a bad odor from an industry when you are in your home
2	Hearing noise from the faucets and water pipes in your home
3	Having unhealthy air pollution in the area where you live
4	Having to raise your voice outside your home due to noise from airplanes landing at a nearby airport
5	Living in a home where you are bothered by mosquitoes when you are tying to sleep
6	Hearing a distant expressway when you listen outside your home
7	Having a nearby streetlamp burn out and not be replaced for about a month
8	Having neighbors who leave trash in front of their home
9	Being woken up by airplanes about two nights a week
10	Not being able to remember the names of people you just met for the first time
11	Not being able to see well out of one eye
12	Having a car that will not start once or twice a year
13	Having a refrigerator in the kitchen that you can clearly hear from your bedroom
14	Having cockroaches in your home
15	Having a neighbor's outside light shine into your bedroom at night
16	Living on a street where cars go so fast that it is dangerous for children
17	Hearing your neighbors shouting at their children in the evening
18	Living next to a factory that makes things outside your home dirty
19	Hearing about ten big trucks a day that make your television hard to hear when they go by
20	Having such bad hearing that a doctor would recommend a hearing aid
21	Having a door inside your house that is sometimes hard to open
22	Being able to see a business with piles of scrapped cars from your home

environmental, transportation noise problems at home (situations 4, 6, 9 and 19); 2) household noise problems (situations 2, 13 and 17); and 3) non-noise problems (remaining situations). Unlike Parts I and II, in Part III only the following question format was used: "If you had this problem, how annoying or unpleasant would this problem be for you?" (Tsugi no jôkyô de seikatsu suru koto wa anata ni totte dore kurai fukai na koto deshô ka?)

Of the three question formats used in Parts I and II, Format A is closest to the standard ICBEN question stem: "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?" It should be noted, however, that the wording of the Japanese Format A question differs somewhat from that of the Japanese ICBEN question stem because the experiment was conducted before the wording of the Japanese ICBEN question stem had been agreed upon. As Format A focuses the subject's attention on the extent to which "you" would be annoyed by a given noise, it is referred to as the "you" question. The wording of Format B is intended to simulate typical Japanese questions about noise annoyance which ask subjects to rate the degree to which a noise source is "urusai" ("annoying") rather than the extent to which they personally are "annoyed." This is called the "rate" question because of the question's reference to rating. Format C is similar to Format A but uses base descriptors that indicate deeper psychological disturbance. This is called the "worry" question because of the use of this stronger verb. Of the three, it was hypothesized that Format B ("Rate") would be most likely to elicit a strong response because its focus on the quality of the noise source does not require the subject to admit to any personal loss of psychological equilibrium. Similarly, it was hypothesized that Format A ("You") would be somewhat less likely to elicit a strong response because subjects must admit that they would be annoyed or disturbed by the noise source. By the same logic, it was hypothesized that Format C ("Worry") would elicit the weakest response because it requires subjects to admit to more profound levels of personal disturbance. The Japanese versions of the three formats are not exact translations of the English; rather, care was taken to approximate the different nuances of the three English formats. While restricting the Japanese base descriptors to words that are commonly used in Japanese studies of noise annoyance, the questions were constructed such that the order of the anticipated strengths of response (Format B, strongest; Format C, weakest) under the authors' hypothesis was the same as the English questions. As far as possible, the ICBEN recommendation to use multiple base descriptors was followed in both English and Japanese. Thus, the experiment was

designed to test for the effect of overall wording differences among question stems constructed in accord with ICBEN recommendations.

In Parts I and II, subjects were asked to use one of two types of scales when responding to each question stem: a 5-point verbal scale or an 11-point numeric scale. The labels used on the 5-point verbal scales were "extremely," "very," "moderately," "slightly" and "not at all" in English and "hijôni," "kanari," "tashô," "amari...nai," and "mattaku...nai" in Japanese. The second and fourth scale points of the Japanese scale differ from the Japanese scale constructed by ICBEN ("hijôni," "daibu," "tashô," "sorehodo...nai," and "mattaku...nai") because the data set was incomplete when this experiment was conducted. The 11-point scale extended from 0 (labeled "not at all" or "mattaku...nai") to 10 (labeled "extremely" or "hijôni") as shown in Figure 1. In Part III, all subjects responded using the 11-point numeric scale.

The following two versions of the questionnaire were prepared for each of the three question formats: 1) a version in which the verbal scale of Parts I and II appeared first and the numeric scale followed in each of the two parts; and 2) a version with the opposite order of verbal and numeric scales in each part. In Part III, the order of presentation was reversed for those who received the numeric scales first in Parts I and II. Thus, a total of six versions (two ordering schemes for each of three question formats) were prepared in both English and Japanese.

3.2.3 Subjects

The Japanese subjects consisted of 157 male and 41 female students tested at Kumamoto University, Japan. The English-speaking subjects consisted of 13 male and 23 female students tested at the University of Sydney, Australia, 47 male and 16 female students tested at the University of Melbourne, Australia, and 6 male and 24 female employees tested at the NASA Langley Research Center in Hampton, Virginia, USA. The age ranges and the mean ages at the four sites were as follows: Kumamoto, 19 to 30, mean 21.0; Sydney, 19 to 36, mean 21.1; Melbourne, 18 to 27, mean 19.6; NASA, 26 to 62, mean 45.6

3.2.4 Procedure

The 16 traffic noises rated in Part I of the questionnaire were 30-second recordings of road traffic noise exposures from a single location near an expressway. They were prepared on a CD for playback at about 56, 64, 72 and 80 dB (L_{Aeq}) after being calibrated using a pink noise test sound. At Kumamoto University, subjects were tested

in groups of about 70 students in standard classrooms with a single loudspeaker. At the University of Sydney, subjects were tested in eight groups of four or five students each in a small classroom. Subjects were also tested in a small classroom at the University of Melbourne. At the NASA Langley Research Center, the experiment was conducted in an acoustically treated, psychoacoustic test room; noises were presented via eight uniformly distributed, high fidelity loudspeakers mounted in the ceiling. Levels were measured at from 9 to 23 subjects' positions in each room and used to estimate the levels at each subject's position for each of the 16 noise test exposures. The noise levels were very similar for the same test sound at all seats in the NASA test facility (within 2.5 dB at different seats) but varied by as much as 8 decibels between different positions in the classrooms at the university sites. Each subject completed one of the six versions of the questionnaire. The six questionnaire versions were distributed around each room so as not to correlate question format with noise exposure. After the first four noises were presented so that the subjects could practice the marking procedure, the 16 noises to be rated were presented at the four noise levels in a Latin squares design. After completing Part I, the subjects then completed Parts II and III in silence in the same venue. The tests were conducted from October of 1999 to March of 2000.

3.3 RESULTS

3.3.1 Comparison of annoyance reactions to laboratory noise exposure as measured by different question formats

Multiple regression analysis of the English and Japanese data from Part I did not reveal a statistically significant effect of question format on subject responses. In the analysis of the Japanese data, the decibel level of the stimulus, the format (A, B, or C) of the question stem, and the type of scale used (verbal or numeric) constituted the independent variables while the response score constituted the dependent variable. Responses on the 5-point verbal scale were scored 0, 2.5, 5 7.5, and 10 to facilitate comparison of the data from the verbal and numeric scales. The English-language data was analyzed in the same manner as the Japanese data with the addition of the test site (Sydney, Melbourne or NASA) as a fourth independent variable. Figures 2 and 3 show the relationships between noise level and annoyance reaction for the English-speaking subjects and Japanese-speaking subjects respectively. In both figures, the abscissa is the L_{Aeq} of the stimuli and the ordinate is the average reaction for
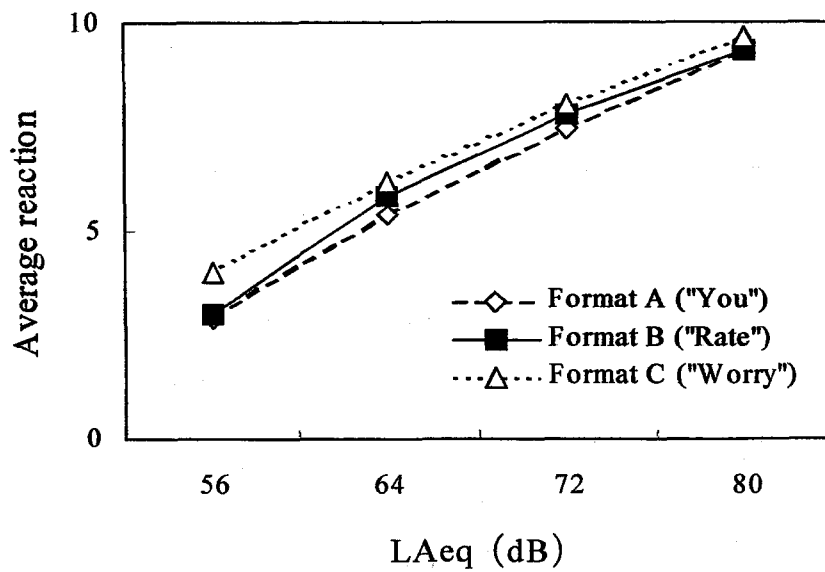
Fig. 2 Average reactions of English-language subjects by noise level and question format in Part I
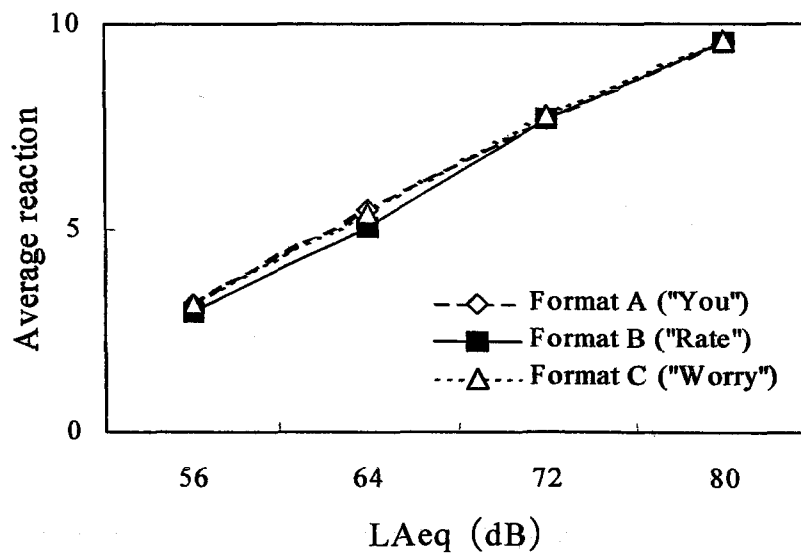
Fig. 3 Average reactions of Japanese-language subjects by noise level and question format in Part I

each of the three question formats. Figure 4 shows the average reactions to each question format for all noise levels at the four test sites.   The figures show that there is
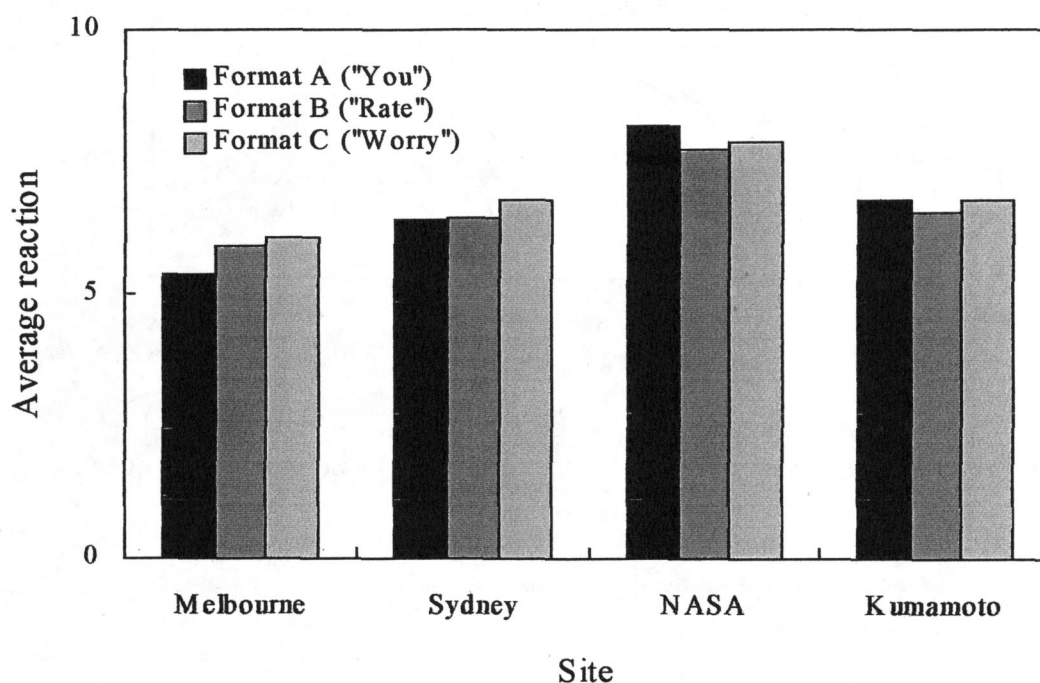
Fig. 4   Average reactions of subjects by test site and question format in Part I

not a systematic tendency for any one format to elicit more negative responses. Although the multiple regression analysis of the data from the three English-language sites did not reveal a significant effect of the different formats, "test site" was found to be statistically significant at the 1% level, as shown in Table 3.   This may be due to the lower levels of background noise at the NASA facility.   Figure 5, which shows the average reactions recorded at the three English-language test sites for all format types at the four noise levels, supports this hypothesis.   Although reactions at the NASA test site are higher at all noise levels, the differences between the test sites are greatest at the lowest noise levels as would be expected with different levels of background noise. The results of the multiple regression analysis of the Japanese data are shown in Table 4.

42
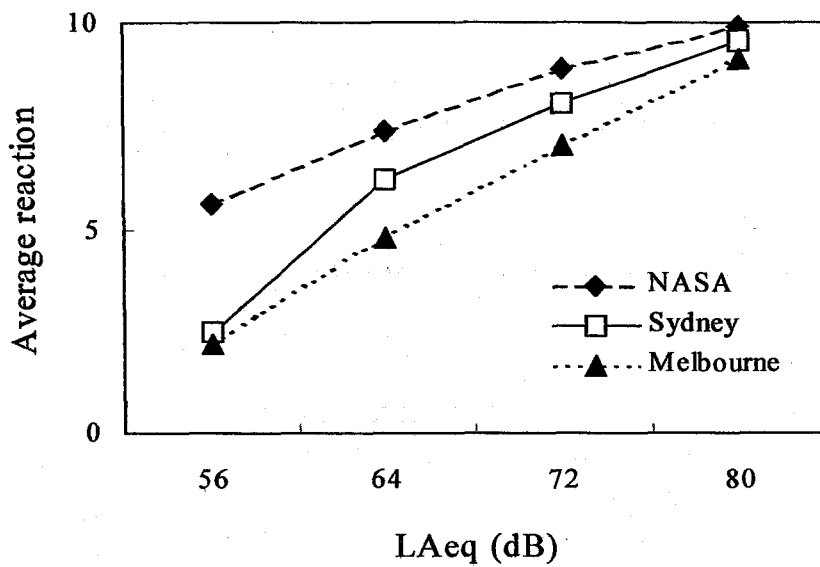
Fig. 5 Average reactions of English-speaking subjects by test site and noise level in
Part I

Table 3 Multiple regression analysis of English Section I data

Factor	Parameters	DF	Mean Square	F Value	Prob>F
Site	2	2	1182.386	63.1693	<.0001
Format	2	2	39.9003	2.1317	0.1189
Scale type	1	1	4.9914	0.5333	0.4653
Noise level	1	1	666.425	71.2079	<.0001

Table 4 Multiple regression analysis of Japanese Section I data

Factor	Parameters	DF	Mean Square	F Value	Prob>F
Format	2	2	14.18	1.9589	0.1412
Scale type	1	1	30.894	8.5361	0.0035
Noise level	1	1	14740.77	4072.892	0

3.3.2 Comparison of annoyance reactions to hypothetical noise situations as measured by different question formats

In Part II, subjects were presented with ten different noise situations and asked to imagine what it would be like to live in a home with each noise. The results for each situation and question format are shown in Figures 6 and 7. Figure 8 shows the average reactions to all ten situations by test site and question format. An analysis of variance in which response was the dependent variable and format, situation, site, and scale type were independent variables showed the effect of question format on subject responses to be significant at the 5% level in the English-language data, as shown in Table 5. Similar analysis of the data from the single Japanese site found the effect of question format on subject responses to be significant at the 1% level, as shown in Table 6. The mean English responses for all situations in Part II by question format were as follows: Format A, 5.7; Format B, 6.1; Format C, 6.0. The corresponding means for the Japanese-language data were as follows: Format A, 6.1; Format B, 5.8; Format C, 5.4. These values are not consistent with the hypothesis that Format B should elicit the highest response and Format C should elicit the lowest.

Table 5 Analysis of Variance of English Section II data

Factor	Parameters	DF	Mean Square	F Value	Prob>F
Site	2	2	188.3693	16.5551	<.0001
Format	2	2	36.3578	3.1953	0.0413
Scale type	1	1	49.0507	8.6218	0.0034
Situation	9	9	6052.994	118.2165	<.0001

Table 6 Analysis of Variance of Japanese Section II data

| Factor	Parameters	DF	Mean Square	F Value	Prob>F
Format	2	2	84.928	7.2564	0.0007
Scale type	1	1	37.336	6.3801	0.0116
Situation	9	9	6325.851	120.1086	<.0001
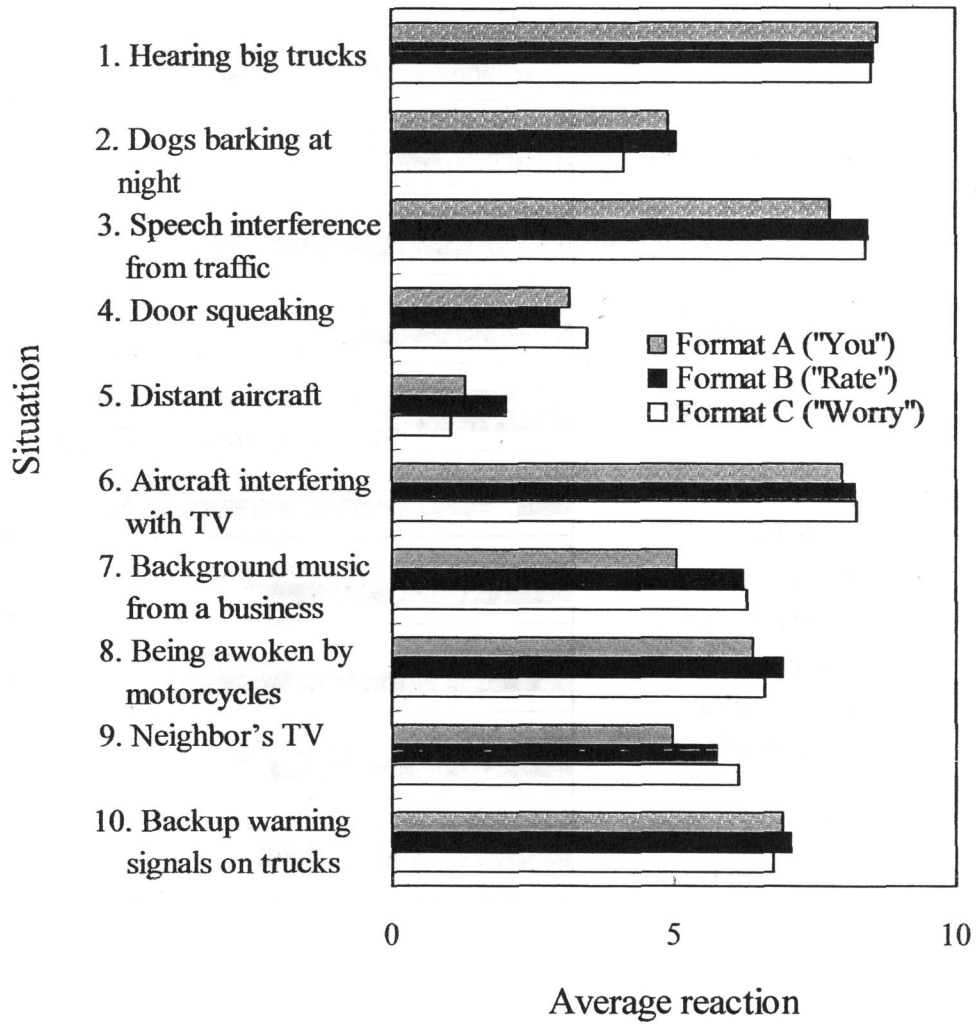
Fig. 6 Average reactions of English-speaking subjects by situation and question format in Part II
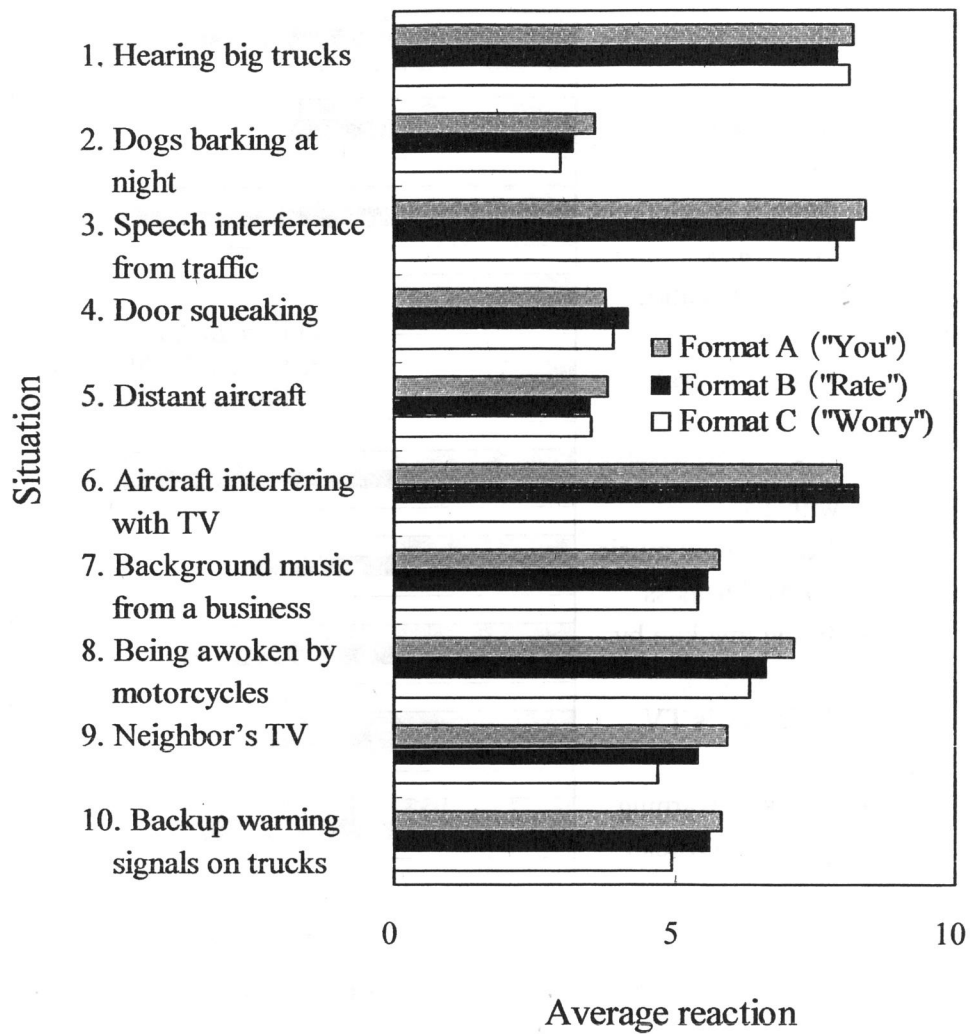
Fig. 7 Average reactions of Japanese-language subjects by situation and question format in Part II

46
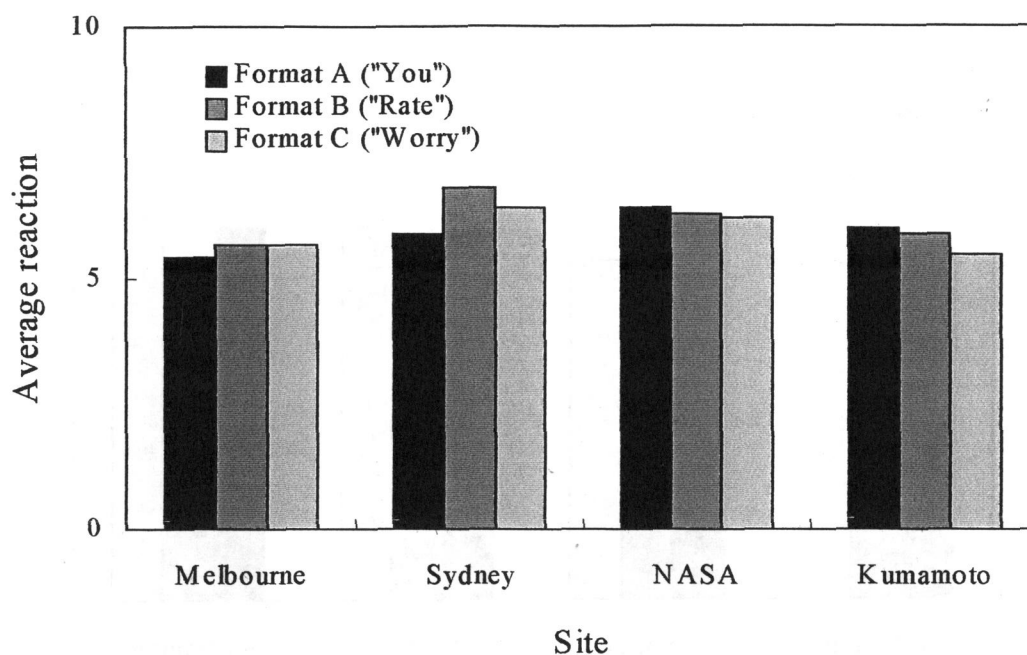
Fig. 8 Average reactions by test site and question format in Part II

3.3.3 Comparison of annoyance reactions to hypothetical noise and non-noise situations

Figure 9 shows the results for the three types of annoyance problems at the four test sites. An analysis of variance in which response was the dependent variable and the language of the respondent (English or Japanese) and the type of problem suggested (environmental noise, household noise, or non-noise) were independent variables indicated an effect of language on the response to the three types of problems that was significant at the 1% level, as shown in Table 7. When environmental noise and household noise were combined into one category, the same analysis showed the effect of language on response to the noise vs. non-noise problems to be significant at the 5% level, as shown in Table 8. The mean responses for English speakers were 6.8 (noise) and 6.9 (non-noise) whereas the mean responses for Japanese speakers were 6.7 and 7.2 respectively. Though Part III produced results that were determined to be statistically significant, they should not be interpreted as evidence that Japanese speakers are less sensitive to noise than English speakers because the differences between the mean responses of the two are very small.

47
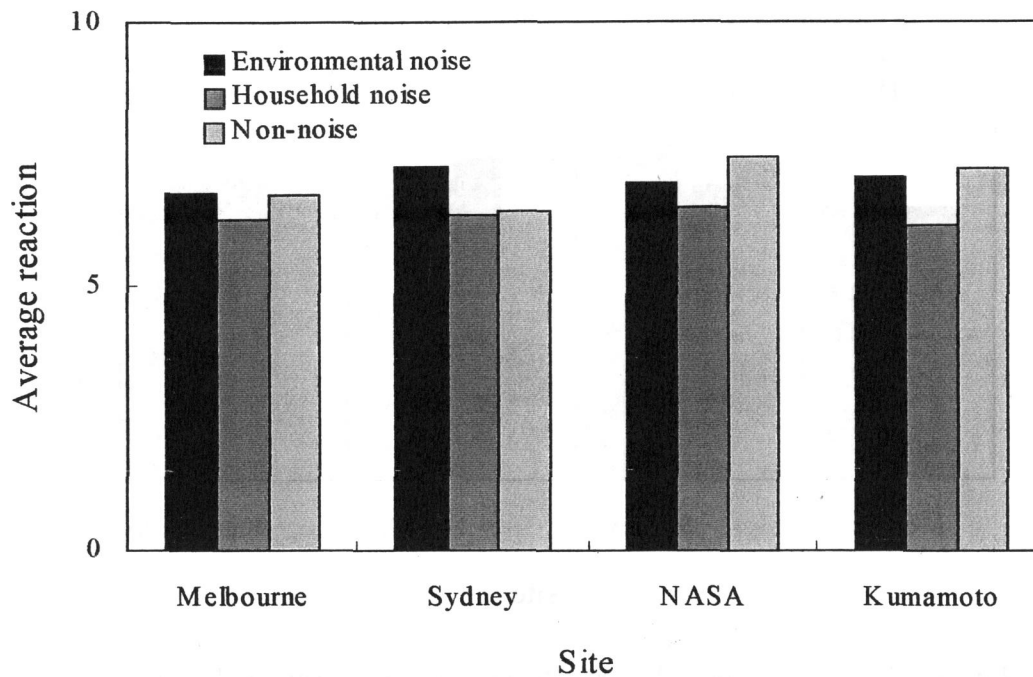
Fig. 9 Average reactions by test site and type of annoyance in Part III

Table 7 Analysis of Variance of three types of annoyance problems in Section III

Factor	Parameters	DF	Mean Square	F Value	Prob>F
Language	1	1	22.52481	2.1346	0.1441
Type	2	2	935.5211	44.3271	<.0001
Language*Type	2	2	100.7994	4.7761	0.0085

Table 8 Analysis of Variance of two types of annoyance problems in Section III

Factor	Parameters	DF	Mean Square	F Value	Prob>F
Language	1	1	33.33067	3.1276	0.077
Type	1	1	162.1718	15.2172	<.0001
Language*Type	1	1	66.87709	6.2753	0.0123

48

3.4 DISCUSSION

The results of Part I, in which subjects reacted to noises in a laboratory, indicate that differences in the degree to which these question stems focus on the character of the noise or, conversely, the subjective experience of the respondent do not have a significant effect on reactions in laboratory situations. In Part II, in which subjects evaluated hypothetical noise problems, significant effects were found in both the English- and Japanese-language data but the effects did not confirm the authors' hypothesis regarding the relative strength of the responses that the three formats should elicit. While the authors hypothesized that Format B should elicit the strongest response and C the weakest, the response to C was stronger than the response to A in the English data; in the Japanese data, the response to A was stronger than that to B.

Though the exact reasons for the observed responses are unclear, the hypothetical nature of Part II may have led subjects to focus more carefully on the wording of the question stems. Table 9 shows the actual and/or hypothetical conditions upon which subjects are to base their reactions in field studies and Parts I and II of this study. In

Table 9   Actual and hypothetical dimensions of noise annoyance studies

Noise evaluated	Context	
	Actual	Hypothetical
Actual	Field study	Part I
Hypothetical	-	Part II

field studies, subjects are asked about actual noises that they have already experienced in their living environment. Since subjects answer entirely on the basis of their experience, nothing about the questions is hypothetical. Part II is at the opposite extreme in that subjects were required to imagine both the noise and the living situation in which they would be exposed to that noise. Subjects may have focused more carefully on the wording of the question stems in Part II because its hypothetical nature forced them to construct mental images of the noise problems based solely on verbal cues. In other words, it may be that questions about noise problems that are posed in

field and laboratory conditions are less susceptible to wording variations than hypothetical questions because in field and laboratory conditions the subjects rely less on question wording to construct mental images of the noises or noise problems.

The experiment reported in this study is not a direct test of the equivalence of the English and Japanese question stems proposed by ICBEN Team 6 but the results provide indirect support for the equivalence of the two. Firstly, whereas the three formats used in this experiment were constructed so as to exaggerate differences in wording, back translation was employed when constructing the ICBEN question stems in order to minimize such differences. Moreover, although the concepts of "annoyance" and "urusasa" have been included in the ICBEN question stems, the decentering approach has been employed to reduce the influence of unique connotations associated with the words. Therefore, the lack of a statistically significant effect of either the English or Japanese wording differences in Part I indicates that it is very unlikely that subtle differences between the English and Japanese ICBEN noise annoyance question stems would have a significant impact on their equivalence. Secondly, although statistically significant differences in the reactions to the three formats were observed in Part II, this result should not led to concern about the equivalence of the ICBEN question stems for two reasons: 1) while the ICBEN questions are designed to be administered in field studies of actual noise problems, the questions administered in Part II were entirely hypothetical; 2) the effects observed in Part II did not conform to the authors' hypothesis and therefore may not be the result of the types of wording differences the authors intended to study.

In sum, neither the psychoacoustic experiment conducted in this study nor a separate social survey study indicated that shifting the focus of question stem wording between the quality of the noise and the impact of the noise of the psychological state of the subject had a significant effect on subject response. Question stem wording was found to be significant in responses to hypothetical questions but in differing patterns in the two languages, neither of which was in accord with the researchers' hypothesis. On the whole, therefore, we may conclude that the types of question stem wording examined here did not produce systematic differences in subject responses.

5. CONCLUSIONS

English-speaking subjects and Japanese-speaking subjects were asked to evaluate noise presented in a laboratory situation and hypothetical noise problems through a question stem worded in one of three ways. No significant effect of the differences in the wording was found in the laboratory situation. Significant effects were observed when subjects were asked about hypothetical noise problems but the effects did not conform to the researchers' hypothesis. Thus, the results of the laboratory experiment (Part I) provide support for the equivalence of question stems constructed according to the ICBEN method, while the results of the hypothetical experiment (Part II) are inconclusive in that a systematic difference between the question formats was not found

NOTES

[1] J. M. Fields, R. G. d Jong, T. Gjestland, I. H. Flindell, R. F. S. Job, S. Kurra, P. Lercher, M. Vallet, R. Guski, U. Felscher-Suhr and R. Schumer, "Standardized general-purpose noise reaction questions for community noise surveys: Research and a recommendation," *J. Sound Vib.*, 242, 641-679 (2001).

[2] K. Masden, T. Yano, "Equivalence of noise annoyance scales in Japanese and English: An experiment using bilingual subjects," *Acoust. Sci. & Tech.*, 25, 144-152 (2004).

[3] Kansai Branch of the Acoustical Society of Japan, ed., "Panel Discussion on loudness, noisiness, annoyance," Technical Report of the Joint Meeting of the Technical Committee of Noise and the Technical Committee of Psychological and Physiological Acoustics, 25 January 1980.

[4] S. Namba, S. Kuwano, A. Schick, "A cross-cultural study on noise problems," *J. Acoust. Soc. Jpn.*, (E) 7, 279-289 (1986).

[5] S. Namba, S. Kuwano, T. Hashimoto, B. Berglund, Z. Da Rui, A. Schick, H. Hoege, M. Florentine, "Verbal expression of emotional impression of sound: A cross-cultural study," *J. Acoust. Soc. Jpn.*, (E) 12, 19-29 (1991).

[6] K. Hiramatsu, K. Takagi, T. Yamamoto, "A rating scale experiment on loudness, noisiness and annoyance of environmental sounds," *J. Sound Vib.*, 127, 467-473 (1988).

[7] Y. Osada, "Urusasa (annoyance) of noise," *J. of the INCE of Japan*, 13, 185-188 (1989).

[8] R. Guski, U. Felscher-Suhr, "The concept of noise annoyance: How the international experts see it," *J. Sound Vib.*, 223, 513-527 (1999).

[9] T. Yano, K. Masden, K. Kawai, "A survey on the Japanese and English descriptors of noise annoyance by bilingual persons," Technical Report of the Technical Committee of Noise and Vibration of the Acoustical Society of Japan, N-98-14, 27 February 1998.

[10] F. van de Vijver, K. Leung, *Methods and Data Analysis for Cross-Cultural Research* (Sage Publications, Thousand Oaks, 1997), Chapter 1.

CHAPTER 4: THE RELATIONSHIP BETWEEN QUESTION STEM WORDING AND COMMUNITY RESPONSE TO RAILWAY NOISE: RESULTS OF A SOCIAL SURVEY CONDUCTED IN KYUSHU, JAPAN

4.1 INTRODUCTION

In Chapter 3, the results of an international experiment on the effect of differences in the wording of noise annoyance questions were discussed. Under laboratory conditions in which subjects were exposed to a noise stimulus, no significant difference was found, in either English or Japanese, between questions that focus subject attention on the character of the noise and those that focus on the psychological impact of the noise. A statistically significant effect of the question type on subject response was found when subjects were asked to evaluate hypothetical noise situations, but the effect was not compatible with the author's hypothesis.

This chapter examines the possibility that similar differences in wording may have a significant effect on responses to social survey questions about noise annoyance. Data from a survey on railway noise annoyance which was conducted in Kyushu, Japan in 2002 is analyzed. The key questions included in the survey concerned annoyance, activity disturbance and related effects caused by railway noise. Four types of questionnaires were prepared, each containing noise annoyance questions with one of four base descriptors. Responses to the four types of noise annoyance questions are compared in this chapter. Question type alone did not have as statistically significant effect on responses, though statistically significant interaction between gender and question type was found. Also, age was found to have a statistically significant effect on response.

4.2 SURVEY

4.2.1 Outline of survey

A social survey on community response to railway noise was conducted in Kyushu, Japan in May and June of 2002. The distribute-collect method was used in residential areas along four railway lines. The railway lines and residential areas surveyed are shown in Table 1. All of the houses surveyed were detached and faced the railways. The questionnaire consisted of about 40 questions related to environmental, housing and

personal factors. The key questions concerned annoyance, activity disturbance and related effects caused by railway noise. Four kinds of questionnaires were prepared. Each questionnaire type employed a different phrase to describe the nature of the noise problem in questions about noise annoyance. The four phrases are shown in Table 2.

Table 1 Railway lines, residential areas surveyed, and trains per day

Line		Nippô Honsen	Hita-Hikosan Sen	Kagoshima Honsen	Chikuhi Sen
Residential area(s) surveyed		Kita-ku Minami-ku Karita-machi Yukuhashi-shi Shiida-machi Buzen-shi	Minami-ku	Koga-shi Fukuma-machi Munakata-shi Okagaki-machi	Nishi-ku Maebaru-shi Nijô-machi
Trains per day	Local and rapid	78-135	52	209-226	83-137
	Express	76	--	89	--
	Freight	14-19	--	66-69	--

Table 2 Four questionnaire types and phrases used in noise annoyance questions

Questionnaire name	Phrase used in noise annoyance question
Urusai	[noise] o urusai to kanjiru
Fukai	[noise] o fukai ni kanjiru
Nayamasareru	[noise] de nayamasareru
Standard	[noise] de nayamasareru, aruiwa jamasareru, urusai to kanjiru

The respondents, from 20 to 75 years of age, were randomly selected from voter lists on a one-person-per-family basis. The four kinds of questionnaires were distributed randomly to the homes. The numbers of respondents for each of the four types of questionnaires were between 397 and 408, and the response rates were between 62.6% and 64.8% as summarized in Table 3. Tables 4 and 5 show the numbers of male and

female respondents and the age distribution for each questionnaire type. Figure 1 shows the distribution of noise exposure levels for each question type. There were no systematic differences among four questionnaires in the survey; the populations selected for the different base descriptors were uniform.

Table 3 Distribution of the four questionnaire types and response rates by railway line

		Fukai	Urusai	Standard	Nayama-sareru	Total
Nippô Honsen	Sample size	171	176	167	173	687
	Response rate	66.0%	67.7%	64.5%	65.8%	66.0%
Hita-Hikosan Sen	Sample size	56	51	45	56	208
	Response rate	62.9%	58.6%	53.6%	64.4%	59.9%
Kagoshima Honsen	Sample size	109	100	115	98	422
	Response rate	67.7%	62.5%	70.6%	61.6%	65.6%
Chikuhi Sen	Sample size	72	76	70	77	295
	Response rate	59.5%	62.3%	54.7%	61.6%	59.5%
Total	Sample size	408	403	397	404	1612
	Response rate	64.8%	64.1%	62.6%	63.7%	63.8%

Table 4 Distribution of the four questionnaire types by gender

Gender	Fukai	Urusai	Standard	Nayamasareru	Total
Male	164	169	168	168	669
Female	238	226	225	230	919
Total	402	395	393	398	1588

Table 5 Distribution of the four questionnaire types by age

Age	Fukai	Urusai	Standard	Nayamasareru	Total
20s	32	46	28	19	125
30s	31	36	25	41	133
40s	63	61	61	66	251
50s	93	114	115	117	439
60s	104	86	114	96	400
70s	79	54	49	62	244
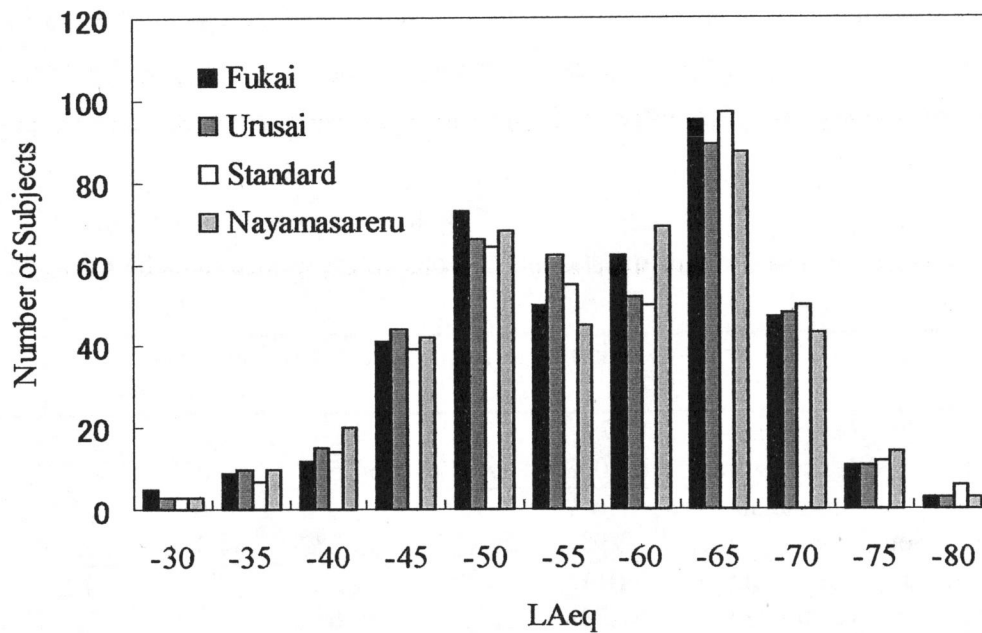
Fig. 1 Distribution of noise exposure levels among the four questionnaire types

After the questionnaires were completed, noise measurements were made at several points. At reference points close to the railway, noise levels from various types of trains were recorded with an integrating sound level meter from morning to evening, and the L_{AE} value was calculated. The numbers of trains that passed per day on each of the four lines are shown in Table 1. Distance reductions at points 5, 10, 20 and 40 m from the reference points were measured simultaneously, and equations for estimating the distance reductions of L_{AE} were formulated. Noise exposure to each house was calculated in $L_{Aeq(24)}$ using data on the number and type of trains that pass each day, their L_{AE} values at the references points, the distance of the house from the tracks, and the distance reduction equations.

4.2.2 Question wording design

The first three questionnaires are named for the base descriptor used in the noise annoyance question. All three of these base descriptors have been used in many noise annoyance studies conducted in Japan [1]. The word "urusai" is usually used to refer to the annoying character of a noise (its "noisiness"), while "fukai" can be used to refer to anything that is "unpleasant." When these words are used in reference to noise, they

both identify the "noisiness" or "unpleasantness" as properties of the noise. Thus, the noise annoyance questions used in the "Urusai" and "Fukai" questionnaires are similar to Format B ("Rate") in the experiment discussed in Chapter 3. Conversely, "nayamasareru" literally means to "be made to worry" and thus corresponds to Format C in the laboratory experiment. While the "Urusai" and "Fukai" questions refer to negative properties or characteristics of the noise, the "Nayamasareru" question refers to the negative impact of the noise exposure on the psychological state of the subject.

The fourth type is called "Standard" because it was the phrase at the heart of the Japanese version of standard noise annoyance question being considered for adoption by ICBEN Team 6 at the time that the survey was conducted. It asks subjects if they are either "worried" ("nayamasareru") by the noise, "disturbed" by it ("jama sareru"), or find it to be "noisy" ("urusai"). Thus, it combines wording that focuses on the effect on the noise on the subject with wording that refers to the character of the noise itself.

The three question formats used in the experiment discussed in Chapter 3 were intended to replicate the different nuances of the typical Japanese and English noise annoyance questions in both languages. In order to do that, it was necessary to sacrifice the naturalness of the wording to some extent. Conversely, in constructing the questions to be used in this social survey, priority was placed on the naturalness and practical utility of the questions. Although the wording of the questions is not identical, this survey includes two questions ("Urusai" and "Fukai") that focus on the negative properties of the noise and one ("Nayamasareru") that focuses on the psychological impact of the noise on the subject. Thus, the data from this survey can be used to test the same fundamental question that was posed in Chapter 3: Do questions that focus on the psychological impact of the noise on the subject elicit substantially different responses from questions that focus on the nature of the noise itself? Moreover, this survey design allows the evaluation of the equivalence of questions written in the style proposed by ICBEN Team 6 and the three more traditional question types.

In most of the questions about noise annoyance and activity disturbance posed in this survey, the Japanese version of the five-point verbal scale endorsed by ICBEN Team 6 was used. In addition, a 0 to 10 point numeric scale was used in one question about annoyance caused by railway noise. The Japanese modifiers for five-point verbal scales are shown in Table 6 and the numeric scale is shown in Figure 2. The English modifiers that were determined through the ICBEN joint study conducted in England, Australia and U.S.A. are also shown in Table 6 for comparison.

0	1	2	3	4	5	6	7	8	9	10
mattaku...nai										hijoni
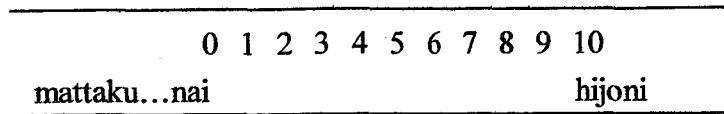
Fig. 2 Numeric scale

Table 6 Annoyance modifiers for each category determined in the joint study by the ICBEN Team 6

Category	Japanese	English
5	hijoni	extremely
4	daibu	very
3	tasho	moderately
2	sorehodo...nai	slightly
1	mattaku...nai	not at all

4.3 RESULTS

Results of surveys such as this one are frequently summarized and compared in terms of the percentage of subjects who are "highly annoyed." Accordingly, logistic analysis in which annoyance response was the dependent variable and the question type and L_{Aeq} were independent variables was conducted to determine whether different base descriptors had a statistically significant effect on the % highly annoyed. According to Shultz [2] and Miedema [3], subjects responding to point 9 or higher on an 11-point numeric scale should be considered to be "highly annoyed." In regard to 5-point verbal scales there has been some difference of opinion as to whether the highest point on the scale only or the highest two points should constitute the "highly annoyed" level [4]. Accordingly, in this study all three possibilities are considered.

Table 7 shows the results of logistic regression analysis for each of the three definitions of "highly annoyed" (HA). When only L_{Aeq} and question type are used as dependent variables, no significant effect of question type on responses is observed. However, when the interaction of gender and age are also considered, some statistically significant effects can be observed.

Table 7   Logistic regression analysis for each of the three definitions of % "highly annoyed" (HA)

Def of %HA	Factor	Parameters	DF	Wald ChiSq	Prob>ChiSq
Numeric	Question	3	3	4.102679	0.2506
	LAeq	1	1	185.6198	0
Verbal Top 1	Question	3	3	5.406809	0.1443
	LAeq	1	1	173.9046	0
Verbal Top 2	Question	3	3	7.280098	0.0635
	LAeq	1	1	239.9614	0

4.3.1 Results of analysis when top three points of the 11-point numeric scale constitute "highly annoyed"

Figure 3 compares the community responses to general noise annoyance among the four base descriptors for this range.

Fig. 3   Logistic regression model of the relationship between % highly annoyed on 11-point numeric scale and L_{Aeq}

No consistent difference between the responses to the four question types can be observed in these results

The results of logistic regression analysis in which % highly annoyed in the 11-point numeric scale is the dependent variable and question type, age and gender and there

interactions are the independent variables are shown in Tables 8 and 9. A statistically significant effect of question type is not found but age is found to be significant at the 1% level.

Table 8 Initial results for logistic regression analysis of 11-point numeric scale

Factor	Parameters	DF	Wald ChiSq	Prob>ChiSq
Question	3	3	6.47929	0.0905
Age	1	1	3.00878	0.0828
Question*Age	3	3	1.029168	0.7942
Sex	1	1	1.937353	0.164
Question*Sex	3	3	7.548218	0.0563
Age*Sex	1	1	0.227305	0.6335
LAeq	1	1	86.6405	0
Question*LAeq	3	3	0.183956	0.9801
Age*LAeq	1	1	0.368087	0.544
Sex*LAeq	1	1	1.917078	0.1662

Table 9 Final results for logistic regression analysis of 11-point numeric scale

Factor	Parameters	DF	Wald ChiSq	Prob>ChiSq
Question	3	3	7.064489	0.0699
Age	1	1	14.75611	0.0001
Sex	1	1	0.755521	0.3847
Question*Sex	3	3	7.554285	0.0562
LAeq	1	1	194.1687	0

Miedema [5] has written that age is indeed a significant factor and that subjects in their 30s and 40s tend to be more sensitive to noise annoyance while both younger and older subjects are less sensitive. Figure 4 shows that the results of this study tend to support Miedema's findings.
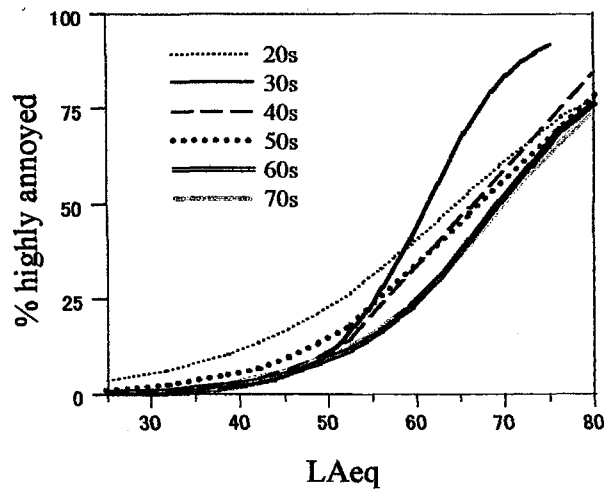
Fig. 4   Logistic regression model of the relationship between % highly annoyed on 11-point numeric scale and L_{Aeq} by age group

4.3.2 Results of analysis when top point of the 5-point verbal scale constitutes "highly annoyed"

Figure 5 compares the community responses to general noise annoyance among the four base descriptors for this range.
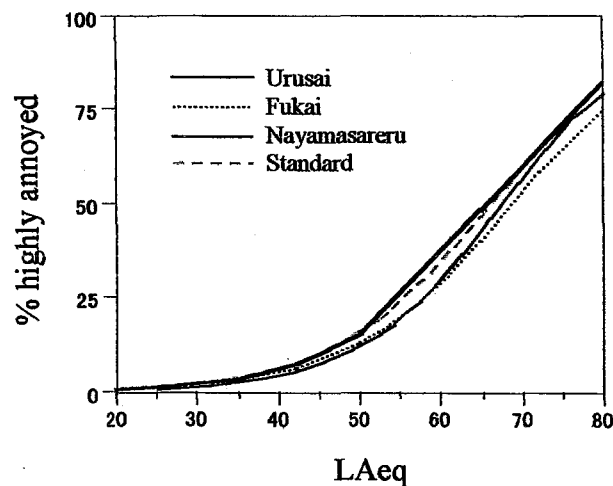

Fig. 5   Logistic regression model of the relationship between % highly annoyed on 5-point verbal scale and L_{Aeq} when top scale point is %HA

The results of logistic regression analysis in which % highly annoyed (the top point on the 5-point scale) is the dependent variable and question type, age and gender and there interactions are the independent variables are shown in Tables 10 and 11. A statistically significant effect of question type is not found but age is found to be significant at the 1% level.

Table 10 Initial results for logistic regression analysis of 5-point verbal scale when top category is %HA

Factor	Parameters	DF	Wald ChiSq	Prob>ChiSq
Question	3	3	3.053844	0.3834
Age	1	1	0.411839	0.521
Question*Age	3	3	1.912236	0.5908
Sex	1	1	1.056031	0.3041
Question*Sex	3	3	10.87143	0.0124
Age*Sex	1	1	0.759524	0.3835
LAeq	1	1	78.87471	0
Question*LAeq	3	3	1.10957	0.7748
Age*LAeq	1	1	0.108872	0.7414
Sex*LAeq	1	1	1.747087	0.1862

Table 11 Final results for logistic regression analysis of 5-point verbal scale when top category is %HA

Factor	Parameters	DF	Wald ChiSq	Prob>ChiSq
Question	3	3	2.485411	0.4779
Age	1	1	5.760172	0.0164
Sex	1	1	0.123504	0.7253
Question*Sex	3	3	11.18793	0.0108
LAeq	1	1	176.5199	0

Here, too, age is a statistically significant factor (at the 5% level, as seen in Table 8). Unexpectedly, however, the interaction of question type and gender is also statistically significant at the 5% level. Figures 6 and 7 illustrate the nature of the relationship between gender and question type that was found.
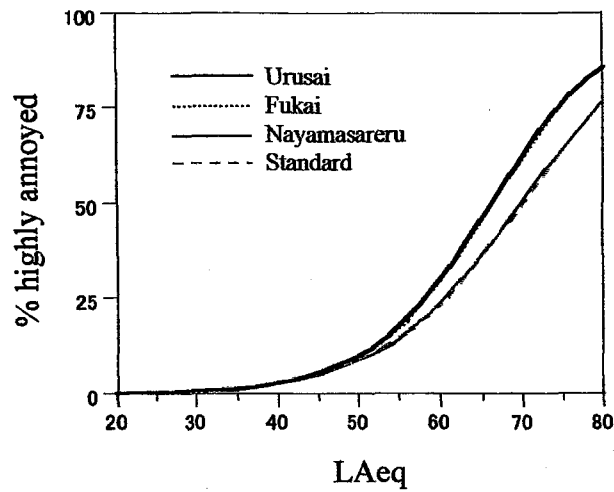
Fig. 6 Logistic regression model of the relationship between % highly annoyed and L_{Aeq} by question type among males on 5-point verbal scale when top scale point is %HA
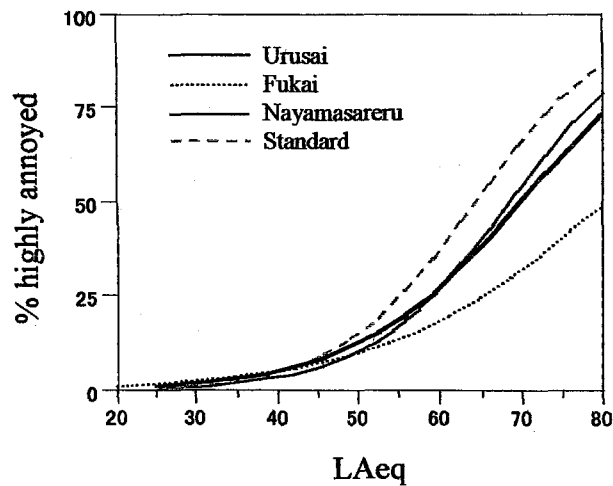
Fig. 7 Logistic regression model of the relationship between % highly annoyed and L_{Aeq} by question type among females on 5-point verbal scale when top scale point is %HA

Logistic analysis of the effect of gender within each question type for the same definition of %HA was also conducted. The results of that analysis are shown in Table 12.

Table 12 Logistic analysis of the effect of gender within each question type when top point of 5-point scale is %HA

Question	Factor	Parameters	DF	Wald ChiSq	Prob>ChiSq
Fukai	Sex	1	1	4.109115	0.0427
	LAeq	1	1	31.71159	0
Standard	Sex	1	1	5.650293	0.0175
	LAeq	1	1	51.04098	0
Nayamasareru	Sex	1	1	0.394271	0.5301
	LAeq	1	1	44.55423	0
Urusai	Sex	1	1	0.187194	0.6653
	LAeq	1	1	45.71706	0

Gender is statistically significant at the 5% level in the Fukai and Standard question types. As can be observed from Figures 8 and 9, the gender division is reversed in the two types.
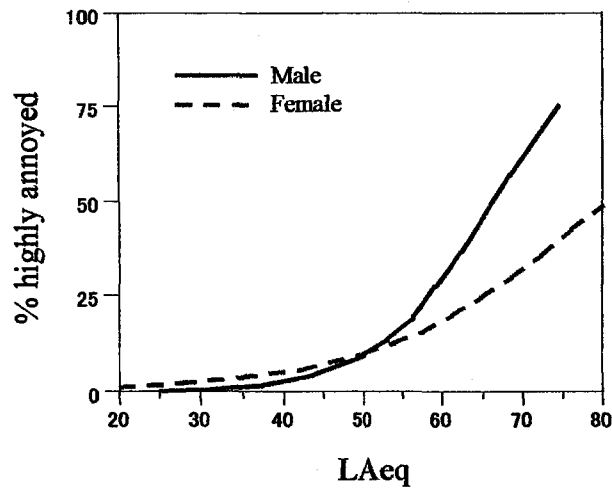
Fig. 8 Logistic regression model of the relationship between % highly annoyed and L_{Aeq} by gender in Fukai question data when top scale point is %HA
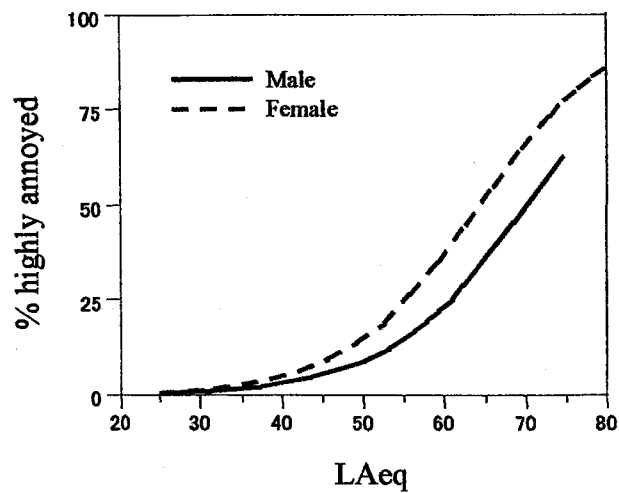
Fig. 9 Logistic regression model of the relationship between % highly annoyed and L_{Aeq} by gender in Standard question data when top scale point is %HA

4.3.3 Results of analysis when top two points of the 5-point verbal scale constitute "highly annoyed"

Figure 10 compares the community responses to general noise annoyance among the four base descriptors for this definition of % highly annoyed.
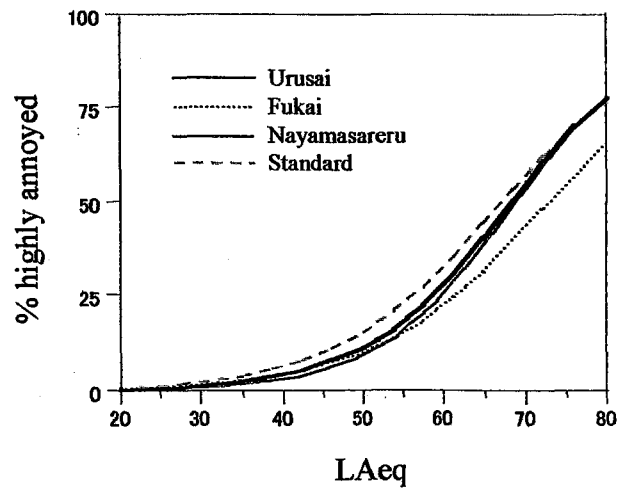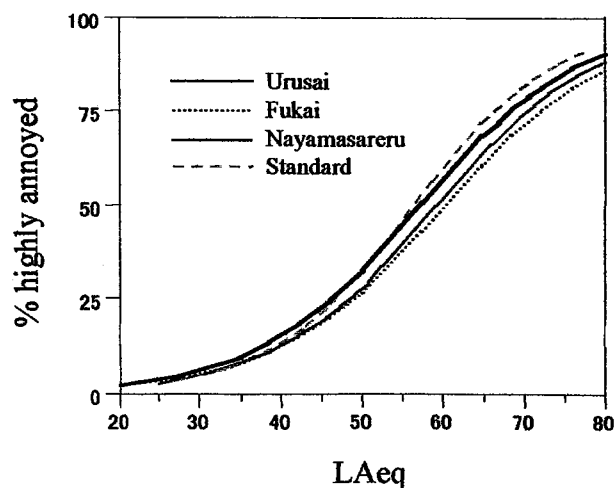

Fig. 10 Logistic regression model of the relationship between % highly annoyed on 5-point verbal scale and L_{Aeq} when top two scale points are %HA

The results of logistic regression analysis in which % highly annoyed as the top two points on the 5-point scale is the dependent variable and question type, age and gender and there interactions are the independent variables are shown in Tables 13 and 14. A statistically significant effect of question type is not found but age is found to be significant at the 1% level.

Table 13 Initial results for logistic regression analysis of 5-point verbal scale when top two categories are %HA

Factor	Parameters	DF	Wald ChiSq	Prob>ChiSq
Question	3	3	2.046309	0.5629
Age	1	1	3.188271	0.0742
Question*Age	3	3	1.085693	0.7805
Sex	1	1	2.498732	0.1139
Question*Sex	3	3	2.070048	0.558
Age*Sex	1	1	0.533641	0.4651
LAeq	1	1	95.82812	0
Question*LAeq	3	3	1.196037	0.754
Age*LAeq	1	1	1.127839	0.2882
Sex*LAeq	1	1	0.182955	0.6688

Table 14 Final results for logistic regression analysis of 5-point verbal scale when top two categories are %HA

Factor	Parameters	DF	Wald ChiSq	Prob>ChiSq
Question	3	3	7.588179	0.0553
Age	1	1	3.809358	0.051
Sex	1	1	2.284238	0.1307
LAeq	1	1	243.5627	0

None of the factors other than L_{Aeq} are statistically significant.

4.3 DISCUSSION

The experiment discussed in Chapter 3 was designed to test the hypothesis that questions that ask subjects to admit to a negative change in their psychological state as a result of exposure to noise may elicit weaker responses than questions that merely ask subjects to evaluate the quality of a noise. Though the wording of the question types employed in this survey was not identical to the three formats used in the experiment discussed in Chapter 3, they were designed to test the same hypothesis. Logistic regression analysis for each of the three definitions of "highly annoyed" (Table 7) did not reveal a statistically significant difference when only question type and L_{Aeq} were used as independent variables. This result indicates that the difference in question wording does not have the effect hypothesized and the various wordings are functionally equivalent. However, a significant interaction between gender and question type was found in the analysis of the responses to the 5-point verbal scale when % highly annoyed was defined as the highest point on the scale. More research on this possible gender difference should be conducted to determine whether it occurs frequently, particularly in the use of the ICBEN Team 6 questions.

The results of the logistic regression analysis that does not test for interactions with gender and age indicate that the Japanese version of the ICBEN Team 6 question used in this survey is equivalent to question types that have been used traditionally in Japanese surveys on community response to noise. Thus, the results of this experiment tend to support the utility of the Japanese versions of the ICBEN Team 6 question stem for both international comparative studies and longitudinal studies within Japan, though more study of possible gender differences should be done.

4. 5 CONCLUSION

A social survey on railway noise was performed in Kyushu, Japan in order to compare community responses obtained with different base descriptors. No systematic differences were found among the four base descriptors when only question type and L_{Aeq} were used as independent variables in the statistical analysis. However, a significant interaction between gender and question type was found for one definition of percent highly annoyed. Also, the age of the subjects was found to be a statistically significant factor.

NOTES

[1] T. Yano and A. Kobayashi, "Kankyo hyoka ni tsukawareru shakudo ni kansuru chosa: Sono 2 category shakudo ni wariaterareru hyoukago no shukei" Nihon Kenchiku Gakkai Chugoku Kyushu Shibu kenkyu hokoku no. 10, March 1996.

[2] T. J. Schultz, "Synthesis of social surveys on noise annoyance," *Journal of Acoustical Society of America* 64(2)(1978) 377-405.

[3] H. M. E. Miedema and H. Vos, "Exposure-response relationships for transportation noise," *Journal of Acoustical Society of America* 104, pp. 3432-3445, (1998).

[4] T. Yano, T. Sato, T. Morihara and Y. Hashimoto, "On the percent highly annoyed in community responses to noise as measured by the ICBEN 5-point scale in Japanese," inter-noise 2004.

[5] H. M. E. Miedema and H. Vos, "Demographic and attitudinal factors that modify annoyance from transportation noise," *Journal of Acoustical Society of America* 105 (6), June 1999, pp. 3336-3344.

CHAPTER 5: CONCLUSIONS

5.1 EQUIVALENCE OF JAPANESE AND ENGLISH SCALE LABELS

In Chapter 2, the results of an experiment in which bilingual subjects constructed annoyance scales in English and Japanese according to the ICBEN protocol were reported. The results clearly indicate that English- and Japanese-speaking subjects do not differ significantly in their interpretations of the "highest degree" of annoyance. Thus, a key premise of the equivalence of the ICBEN scales was confirmed for English and Japanese. In addition, though the Japanese modifier "hijôni" has frequently been translated as "very," the results of this study show that "extremely" is a more appropriate translation.

5.2 EQUIVALENCE OF QUESTION STEMS WITH DIFFERENT BASE DESCRIPTORS

The equivalence of question stems with different base descriptors was tested through a laboratory experiment conducted in parallel in Japan, Australia and the United States and through a social survey conducted in Japan. In the laboratory experiment, discussed in Chapter 3, English-speaking subjects and Japanese-speaking subjects were asked to evaluate noise presented in a laboratory situation and hypothetical noise problems through a question stem worded in one of three ways. No significant effect of the differences in the wording was found in the laboratory situation. Significant effects were observed when subjects were asked about hypothetical noise problems but the effects did not conform to the researchers' hypothesis. Thus, the results of the laboratory experiment (Part I) provide support for the equivalence of question stems constructed according to the ICBEN method, while the results of the hypothetical experiment (Part II) are inconclusive in that a systematic difference between the question formats was not found.

In the social survey on railway noise in Kyushu, Japan, which was discussed in Chapter 4, no systematic differences were found among the four base descriptors when only question type and L_{Aeq} were used as independent variables in the statistical analysis. However, a significant interaction between gender and question type was found for one definition of percent highly annoyed.

These results tend to support the hypothesis that data from surveys on noise annoyance that were conducted with different base descriptors are comparable despite the differences in question wording. The results of these tests of the equivalence of questions with different wording provide indirect support for the equivalence of questions constructed in accord with ICBEN Team 6 recommendations.

5.3 ISSUES REQUIRING FURTHER STUDY

5.3.1 The effect of second language acquisition on first language

In Chapter 2, it was noted that bilingual Japanese subjects differ from monolingual Japanese subjects in their interpretations of the intensities of certain Japanese words and that those interpretations seemed to be influenced by mental association with certain English words. Further research should be conducted to confirm this effect among Japanese speakers of English and to determine if indeed those Japanese speakers are associating those Japanese words with English ones.

5.3.2 Increased sensitivity to question wording in hypothetical contexts

In Chapter 3, statistically significant effects of wording differences were observed in response to hypothetical questions but not in response to noise stimuli. This may be a result of the increased focus on question wording that imagination of a hypothetical question requires. Yet, research on this phenomenon could not be found. "Hypothetical bias" is often referred to in literature on questionnaire wording but the term refers to differences in estimates of what a person would be willing to do in a particular situation and what they actually do in such situations. Research on the relationship between question wording and the hypothetical nature of a question or questionnaire should be conducted in order to clarify this aspect of questionnaire construction.

5.3.3 Gender differences in interpretation of noise annoyance questions

More research should be conducted to clarify the interaction between question wording and gender noted in Chapter 4. It is possible that the phenomenon is the result of random error but there may be a difference of which noise researchers should be aware. Studying this phenomenon is particularly important because a statistically significant gender difference was observed within the data for the Japanese version of the ICBEN Team 6 question. Since this noise annoyance question will be used

extensively in future research, it is particularly important to determine whether there is a consistent pattern of gender difference in its interpretation and, if so, what can be done to minimize the effects of this difference.

PREVIOUS PUBLICATIONS BY THE AUTHOR PERTAINING TO THIS DISSERTATION

CHAPTER 2

1) K. Masden, T. Yano, "Equivalence of noise annoyance scales in Japanese and English: An experiment using bilingual subjects," *Acoustical Science and Technology*, Vol. 25, No. 2, pp. 144-152, March 2004.
2) K. Masden, T. Yano, "Equivalence of English and Japanese Annoyance Scales," *Proceedings of the 8th International Congress on Noise as a Public Health Problem* (Rotterdam, Netherlands), pp. 270-271, June 2003.
3) K. Masden, T. Yano, "Direct comparison of English and Japanese noise annoyance modifiers used in the ICBEN Team 6 study," *Proceedings of the 2002 International Congress on Noise Control Engineering* (Dearborn, Michigan), CD-ROM, August 2002.
4) T. Yano, K. Masden, "Equivalence of noise annoyance modifiers in Japanese and English for standardized scales constructed according to the ICBEN method," *Proceedings of the 2002 International Congress on Noise Control Engineering* (Dearborn, Michigan), CD-ROM, August 2002.
5) カーク・マスデン、矢野隆、「日本語と英語のうるささ尺度の等価性について―バイリンガルを対象としたICBENの程度表現語の等価性」、『日本音響学会2002年春季発表会講演論文集』, pp. 763-764, 平成14年3月。
6) カーク・マスデン、矢野隆、「日本語と英語のうるささ尺度の等価性に関する検討―日本語と英語に精通した人々を対象としたICBENの程度表現語の評価実験」、日本音響学会騒音振動研究会資料, N-2002-09、平成14年2月。

CHAPTER 3

7) K. Masden, T. Yano, "Evaluating the equivalence of verbal scales and question stems to be used in English and Japanese noise annoyance questions, *Journal of Sound and Vibration*, Vol. 277, No. 3, pp. 589-601, October 2004.
8) カーク・マスデン、矢野隆、「日本語と英語の基礎評価語のうるささ反応への影響」、『日本音響学会2001年秋季発表会講演論文集』、 pp. 765-766 平成13年10月。

9) カーク・マスデン、矢野隆、「騒音に対する反応への日本語と英語の基礎評価語の影響」、日本音響学会騒音振動研究会資料, N-2001-12、平成13年2月。

10) K. Masden, J.M. Fields, T. Yano, J. Hatfield, R.F.S. Job, "Effect of social survey question wording on measured noise reactions and hypothetical reactions to environmental factors: A comparison of Japanese and English speakers," *Proceedings of WESTPRAC VII* (Kumamoto, Japan), Vol. 2, pp. 951-954, October 2000.

11) J.M. Fields, T. Yano, K. Masden, J. Hatfield, R.F.S. Job, "A test of the effect of question wording on measured noise reactions: A comparison of Japanese and English questions," *Proceedings of the 2000 International Congress on Noise Control Engineering* (Nice, France), pp. 3214-3218, August 2000.

CHAPTER 4

12) T. Sato, T. Yano, T. Morihara, K. Masden, "Relationships between rating scales, question stem wording, and community responses to railway noise," *Journal of Sound and Vibration*, Vol 277, No. 3, pp. 609-616, October 2004.

13) 佐藤哲身、矢野隆、カーク・マスデン、「九州での鉄道騒音に対する社会反応と基礎評価語の関係」、『日本音響学会2003年春季発表会講演論文集』、pp. 971-972、平成15年3月。

14) 佐藤哲身、森原崇、矢野隆、カーク・マスデン、「北海道での鉄道騒音に対する社会反応と評価尺度の関係」、『日本音響学会2002年春季発表会講演論文集』、 pp. 765-766、平成14年3月。

ACKNOWLEGEMENTS

APPENDICES: QUESTIONNAIRES

APPENDIX 1:

**EXAMPLE OF BILINGUAL QUESTIONNAIRE USED IN
EXPERIMENT DISCUSSED IN CHAPTER 2**

AN INTERNATIONAL JOINT STUDY OF THE WORDING USED IN SOCIAL SURVEYS
アンケート調査で用いる言葉の表現に関する国際共同研究

Please fill in this page before turning to the instructions on the next page.
このページの項目を記入し終えてから、次のページへお進み下さい。

Sex   (circle):   female / male
性別   （丸印をつけて下さい）：   女性   /   男性

Age: |___|___| years
年齢 ：   歳

Number of education years (including college)： |___|___| years
就学期間   ：   年

Native language:
母語：   _____

Address (community):
現住所（市町村）：   _____

Place of birth (community):
出身地（市町村）：   _____

Community in your native country in which you have lived for the longest period of time:
最も長く住んだ市町村：   _____

Total length of residence   Japan 日本語圏   _____
in the following countries: English-speaking countries 英語圏   _____
暮らした年月の合計：   Other その他   _____

Nationality:
国籍 ：   _____

Date (year/month/day): |___|___| / |___|___| / |___|___|
日付（年／月／日）：

INTRODUCTION

This is a study to choose verbal expressions. It is a study about the words that people use to describe the intensity of their feelings about being bothered or annoyed by environmental noise. We want you to help us select Japanese and English words for use in opinion surveys with all types of people who live in all types of quiet and noisy environments.

There will be no right or wrong answers. We just need the views from people like you to help us choose words that will work well in questionnaires.

Please notice that we will NOT be asking you about your own amount of annoyance with noise. We will just be asking about the types of words that people like you use to describe their own degrees of annoyance.

This survey is composed of the following four parts:

Part 1 : Selecting English words
Part 2 : Selecting Japanese words
Part 3 : Rating word intensity on a line
Part 4 : Comparison of paired words

Finally, throughout this questionaire English explanations will be accompanied by Japanese. Before responding to a particular question, please read both.

まえがき

この調査は、環境騒音の影響を受けたときに感じる、annoyanceの程度を表す言葉を選ぶために行うものです。静かな場所ややかましい場所などに住むさまざまな人々を対象にアンケート調査をするときに使用する日本語と英語の言葉をそれぞれ選ぶことが目的です。

この調査には正解も誤りもありません。アンケートで使う言葉を適切なものにするため、あなた方の意見をお伺いしたいだけです。

あなたにお伺いしたいのは、あなたが日常の騒音でどれくらいannoyanceを感じるかではなく、アンケートの対象となる人々が感じるannoyanceの程度を回答する際の言葉の選択肢として、どのような表現が適切であると考えるかということです。

この調査票は以下の4つのパートで構成されています。

第1部：英語の言葉の選択
第2部：日本語の言葉の選択
第3部：言葉の強さの線分による評価
第4部：一対の言葉の比較

なお、日本語での説明文の横に英語での説明文を載せています。この実験の意図を十分理解して頂くために、両方読んで頂くようよろしくお願いします。

PART 1
第 1 部

SELECTING ENGLISH WORDS
英語の言葉の選択

GETTING ACQUAINTED WITH THE ENGLISH WORDS

We have selected 21 verbal expressions for the intensity of noise annoyance for you to look at. Some of these words are very similar to each other, but others differ greatly from one another. The words have been printed on the cards that are in your envelope marked "English."

Please take all the cards from the envelope and spread them out in front of you. Look at each word and read each carefully before turning to the next page, Page 5, of these instructions.

最初に用意した英語の言葉を示しますのでよく見てください

騒音のannoyanceの程度を表す２１種類の言葉を用意しました。言葉は「英語」と書かれた封筒の中に入っているカードに印刷してあります。それらの言葉のなかには互いによく似たものや大きく異なるものがあります。

封筒から全部のカードを取り出し、机の上に広げてください。そして、それらのカードに書かれた一つ一つの言葉をよく眺め、注意深く読み、その上で次のページ（５ページ）に進んでください。

84

SORTING THE EXPRESSIONS INTO CATEGORIES

Your first task is to sort the cards into categories that show how much annoyance is expressed by the English words. Remember that this is about the meaning of the words generally. We do NOT want to know anything about how much you might be personally annoyed at the present time.

Begin by sorting the cards into ordered categories from low to high annoyance. For Category 1 choose one or several expressions that express no annoyance or the lowest annoyance you can imagine. For Category 9 choose one or several expressions that express the most annoyance you can imagine.

Arrange the rest of the cards into a maximum of 9 groups where the amount of annoyance increases steadily in stair-step fashion from one group to the next. When several expressions show equal annoyance, then put them together in a group. It is not necessary to have every category filled; it is only necessary that the amount of annoyance increases steadily from group to group. After sorting the cards into the groups, you can turn to Page 6 of this booklet.

Page 6 contains an answer sheet with boxes for categories numbered from 1 to 9 that correspond to the categories you created for your cards. Please copy the appropriate modifier and 2-letter abbreviation from each card into the appropriate box on Page 6. Double check to be sure that all of the words and two-letter abbreviations were copied exactly right.

Don't move the cards themselves yet. You will need them later.

言葉の分類

あなたにしていただく最初の作業は、カードに書いた英語の言葉がどの程度のannoyanceを表すかを考え、その程度に基づいて言葉をいくつかのカテゴリに分類することです。この作業が一般的な言葉の意味に関するものであることを忘れないで下さい。現在あなたがどれくらいannoyedであると感じているかを聞いているのではありません。

まず、これらのカードをannoyanceの程度が低い方から高い方へと順序付けたいくつかのカテゴリに分類してください。カテゴリ１は「annoyedでない」または「最小のannoyance」の状態を表すものとします。カードの言葉を見たときに思い浮かぶ「annoyanceの程度」がこの状態に該当するものを少なくとも１個選んでください。カテゴリ９は「最大のannoyance」の状態を表すものとします。それに該当すると思う言葉を少なくとも１個選んでください。

これらを両端とする最大９つのカテゴリに残りのカードを全て分類してください。ただし、各カテゴリはannoyanceの程度が段階的に増加するようにします。同じ程度のannoyanceを示す表現は１つのカテゴリにまとめてください。用意したカテゴリの全てに必ず表現を割り振る必要はありません。カテゴリからカテゴリへannoyanceの程度が段階的に増えていくこと、それだけが必要な条件です。全てのカードをカテゴリに分けてから、６ページの作業に進んでください。

６ページにはあなたが分類したカテゴリの各々に相当する１から９までの番号をつけた欄があります。その各々の欄に対応するカードの言葉と２文字の略語を記載し、間違いのないことを十分に確かめてください。

カードは動かさないようにしてください。のちほどそのカードが必要になります。

SORTING THE ENGLISH INTO CATEGORIES
英語の分類

Highest degree of bother/annoyance
「最大のbother/annoyance」の状態

9

8

7

6

5

4

3

2

1

No / lowest degree of bother/annoyance
「bothered or annoyedでない」または「最小のbother/annoyance」の状態
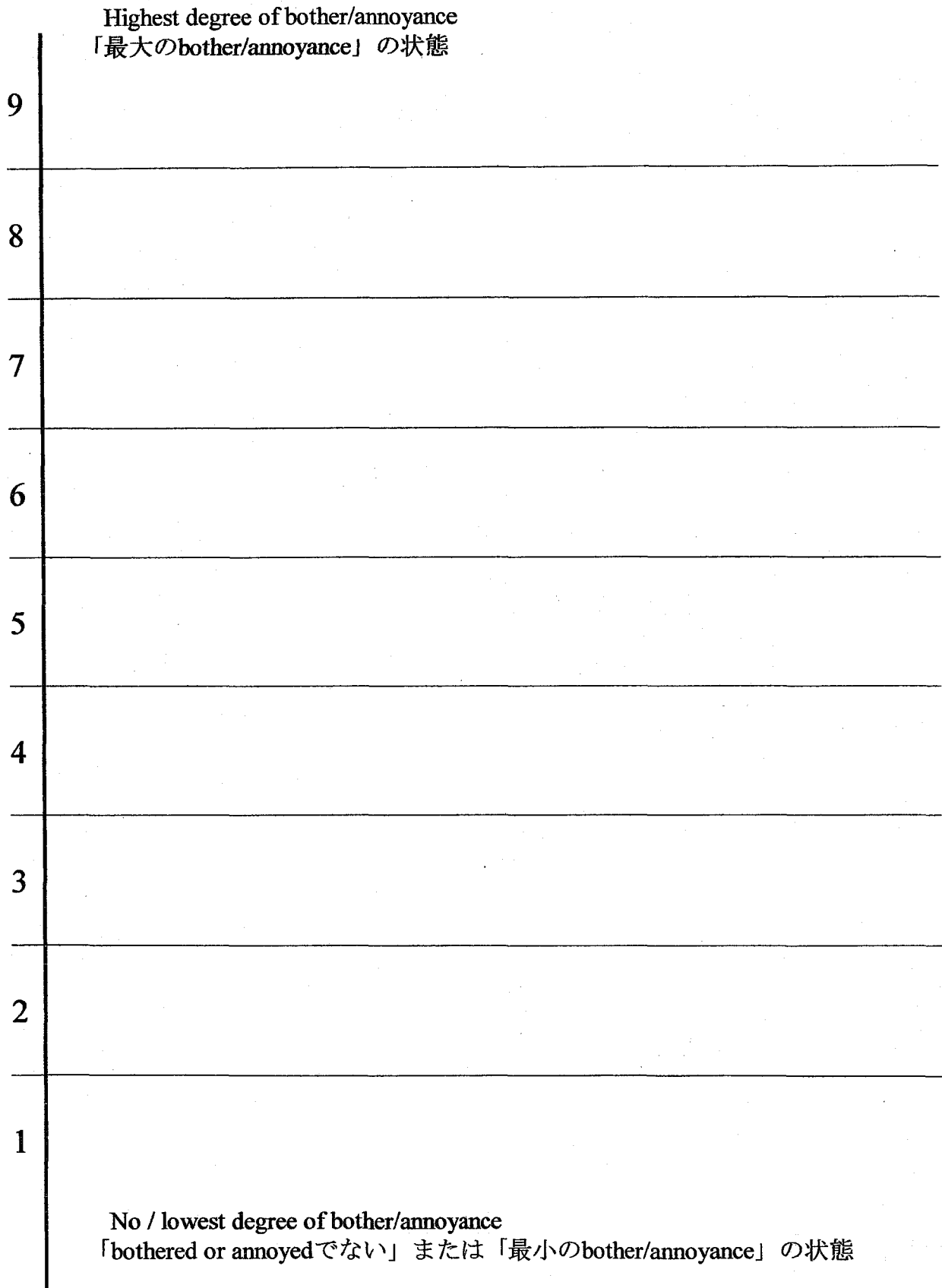
CHOOSING AN EXPRESSION FOR THE TOP

Your next task is to choose the best expression for the top of the scale on Page 8.

Please look at your sorted cards again. From the highest category, now choose the expression that you would be most likely to use if you had to tell someone about the greatest amount of bother or annoyance you could feel. Please think about whether the word would sound right for telling someone about being bothered or annoyed by the most noise anyone might hear.

This time you can select only one card. Take your time in choosing this card since you will be using it several more times.

When you have made your selection turn to Page 8. Please write your chosen expression and the 2-letter code on the answer sheet inside the top box, the box marked "5."

Please note that the phrase "not at all" appears in space number 1. Its use there has been decided on the basis of international discussion.

最大のANNOYANCEを表す言葉の選択

あなたにしていただく次の作業は8ページに示した尺度の最上位の表現として最適な言葉を選ぶことです。

先ほどあなたが分類したカードをもう一度よく見てください。その最上位のカテゴリに分類した言葉の中から、あなたが最大のannoyanceを誰かに話すときに使う表現として最も頻繁に使用すると思われる言葉を選んでください。その際、その言葉が自然に聞こえるかどうかを考えてください。

ここでは一枚しかカードを選べません。それをこの後何回か使いますから、よく考えて選んでください。

選び終えたら、8ページの回答用紙に進んでください。そして、「5」と印を付けた一番上の欄に選んだ表現語と2文字の略語を書いて下さい。

なお、欄1にはすでに "not at all"、という言葉が書かれていますが、この調査に先だって国際間で検討し、この表現を当てることに決めたためです。

CHOOSING ENGLISH EXPRESSIONS
ANNOYANCEを表す英語の選択

5	5
4	4
3	3
2	2
1	**not at all** bothered or annoyed -NA-	1

FILLING IN THE REMAINING BOXES ON PAGE 8

Next you need to choose words to fill in the remaining three empty boxes on Page 8 so that the words are evenly spaced in equal steps between the two expressions you already have in boxes #1 and #5.

A schematic representation of the scale looks like this diagram:

```
        XXXX      (Your top expression)
    5      annoyed
    |
    |
    4
    |
    |
    3
    |
    |
    2
    |
    |
    1      not at all
           annoyed
```

To fill in the remaining three boxes, first choose an expression that lies exactly half way between the two extremes you already have on the scale. Look at all of the cards carefully to make a choice. Be sure to again choose a modifier that people would normally use when talking to one another. If you find more than one modifier is half way, you should still select just one. Please write the expression and its two-letter code in box #3.

8ページの残りの欄への記入（5段階尺度に用いる言葉の選択）

次に、8ページの残り3つの空欄を埋める言葉を選び、先ほど選んだ欄1と欄5の2つの表現のあいだに等間隔に並べていただくことになります。

その結果を図示すると以下のような尺度になるでしょう。
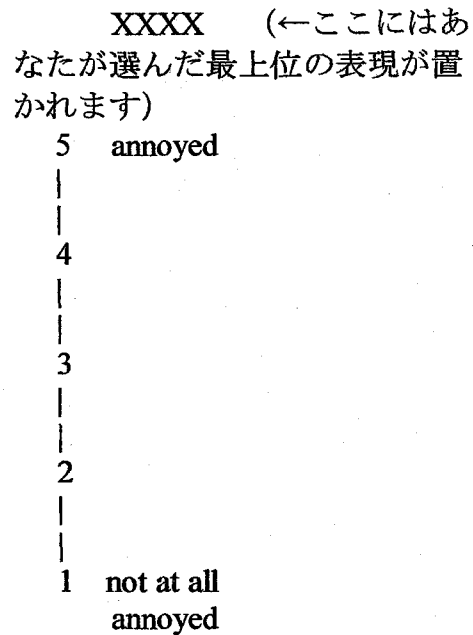
```
        XXXX      （←ここにはあ
    なたが選んだ最上位の表現が置
    かれます）
    5      annoyed
    |
    |
    4
    |
    |
    3
    |
    |
    2
    |
    |
    1      not at all
           annoyed
```

残りの3つの欄を埋めるにあたり、まず、すでに尺度上に置いた最上位（欄5）と最下位（欄1）の言葉のちょうど真ん中に位置する表現を選んでください。全てのカードを注意深く見たうえで選んでください。人々がお互いに話をする際に普通に使う言葉を選ぶようにしてください。たとえ2つ以上の言葉がこの真ん中の位置に該当すると思っても、必ず一つだけ選ぶようにして下さい。選んだ言葉とそれに対応する2文字の略語を欄3に書いてください。

From the rest of the cards, now select the expression that falls half way between "not at all bothered or annoyed," and the expression that you just selected for the middle. Write the expression and its two-letter code into box #2.

From the rest of the cards, select a final card that falls half way between the top expression in box #5 and the one you choose in box #3. Write that expression and the two-letter code in box #4.

Please return any cards you moved to the appropriate category among the sorted cards.

次に、残りのカードから"not at all bothered or annoyed"と今あなたが欄３の真ん中の位置に選んだ言葉の中間に該当すると思う言葉を選び、その言葉と２文字の略語を欄２に書いてください。

最後に、残りのカードから、欄５の最上位と欄３に選んだ言葉の中間に該当すると思う言葉を選び、その言葉と２文字の略語を欄４に書いてください。

以上の作業が終わったら、全てのカードを元のカテゴリに戻して下さい。

SELECTING EXPRESSIONS FOR A 4-POINT SCALE

Now you repeat the procedures you used before, but this time there are four points rather than five and you have already selected the top point.

Start by copying the word and 2-letter abbreviation from the top box (#5) on Page **8** into the top box (#4) on the next page (Page 12).

Next, choose two cards to complete the 4-point scale such that the intensity is equally divided between the four words. In other words, the difference or distance between points 1 and 2, 2 and 3, and 3 and 4 should be the same.

Take your time and try a few different cards. Then write down the expressions and their two-letter codes.

```
        XXXX    (Your top expression)
4    annoyed
|
|
3
|
|
2
|
|
1    not at all
     annoyed
```

When you finish this task you can put your cards back into the envelope marked "English."

4段階尺度に用いる言葉の選択

先ほどと同じ手順を繰り返しますが、今回は５段階尺度ではなく４段階の尺度であり、しかもすでに最上位の言葉は選んであります。

まず最初に、８ページの最上位の欄（欄５）の言葉と２文字の略語を１２ページの最上位欄（欄４）に転記して下さい。

次に、annoyanceの尺度全体が等間隔に分割されるように２つの言葉のカードを選んでください。つまり、１２ページの1と2、2と3、3と4の間隔が等しくなるようにしてください。

2と3の言葉を選ぶ際は、すぐに決めず、いくつかの異なるカードを試してみて、じっくりと選んでください。そして、２つの適切な表現を決定し、その言葉と２文字の略語を書いてください。

```
        XXXX    （←ここにはあ
  なたが選んだ最上位の表現が置
  かれます）
  4    annoyed
  |
  |
  3
  |
  |
  2
  |
  |
  1    not at all
       annoyed
```

以上の作業が終わったら、カードを「英語」と書かれた封筒にしまってください。

CHOOSING ENGLISH EXPRESSIONS
ANNOYANCEを表す英語の選択

4	4
3	3
2	2
1	**not at all** botherd or annoyed -NA-	1

PART 2
第２部

SELECTING JAPANESE WORDS
日本語の言葉の選択

GETTING ACQUAINTED WITH THE JAPANESE WORDS

Now we would like for you to follow the same procedure as in Part I to select English words to express noise annoyance. Of course the word annoyance is not normally used in Japanese conversation but, for the purposes of this study, please imagine that you are talking about annoyance in Japanese.

We have selected 21 verbal expressions for the intensity of noise annoyance for you to look at. Some of these words are very similar to each other, but others differ greatly from one another. The words have been printed on the cards that are in the envelope marked "Japanese."

Please take all the cards from the envelope and spread them out in front of you. Look at each word and read each carefully before turning to the next page, Page 15, of these instructions.

最初に用意した日本語の言葉を示しますのでよく見てください

今度は第一部と同じ手続きでannoyanceの程度を表現するための日本語の言葉を選んでいただきたいと思います。もちろん、日本語でのannoyanceという言葉は通常英語の中では使われませんが、ここでは日本語でannoyanceについて話していると仮定してお答えください。

騒音のannoyanceの程度を表す２１種類の言葉を用意しました。それらの言葉は「日本語」と書かれた封筒の中に入っているカードに印刷してあります。それらの言葉のなかには互いによく似たものや大きく異なるものがあります。

封筒から全部のカードを取り出し、机の上に広げてください。そして、それらのカードに書かれた一つ一つの言葉をよく眺め、注意深く読み、その上で次のページ（１５ページ）に進んでください。

94

SORTING THE EXPRESSIONS INTO CATEGORIES

Don't move the cards themselves yet. You will need them later.

言葉の分類

Your first task is to sort the cards into categories that show how much annoyance is expressed by the Japanese words. Remember that this is about the meaning of the words generally. We do NOT want to know anything about how much you might be personally annoyed at the present time.

Begin by sorting the cards into ordered categories from low to high annoyance. For Category 1 choose one or several expressions that express no annoyance or the lowest annoyance you can imagine. For Category 9 choose one or several expressions that express the most annoyance you can imagine.

Arrange the rest of the cards into a maximum of 9 groups where the amount of annoyance increases steadily in stair-step fashion from one group to the next. When several expressions show equal annoyance, then put them together in a group. It is not necessary to have every category filled; it is only necessary that the amount of annoyance increases steadily from group to group. After sorting the cards into the groups, you can turn to Page 16 of this booklet.

Page 16 contains an answer sheet with boxes for categories numbered from 1 to 9 that correspond to the categories you created for your cards. Please copy the appropriate modifier and 2-letter abbreviation from each card into the appropriate box on Page 16. Double check to be sure that all of the words and two-letter abbreviations were copied exactly right.

あなたにしていただく最初の作業は、カードに書いた日本語の言葉がどの程度のannoyanceを表すかを考え、その程度に基づいて言葉をいくつかのカテゴリに分類することです。この作業が一般的な言葉の意味に関するものであることを忘れないで下さい。現在あなたがどれくらいannoyedであると感じているかを聞いているのではありません。

まず、これらのカードをannoyanceの程度が低い方から高い方へと順序付けたいくつかのカテゴリに分類してください。カテゴリ1は「annoyedでない」または「最小のannoyance」の状態を表すものとします。カードの言葉を見たときに思い浮かぶ「annoyanceの程度」がこの状態に該当するものを少なくとも1個選んでください。カテゴリ9は「最大のannoyance」の状態を表すものとします。それに該当すると思う言葉を少なくとも1個選んでください。

これらを両端とする最大9つのカテゴリに残りのカードを全て分類してください。ただし、各カテゴリはannoyanceの程度が段階的に増加するようにします。同じ程度のannoyanceを示す表現は1つのカテゴリにまとめてください。用意したカテゴリの全てに必ず表現を割り振る必要はありません。カテゴリからカテゴリへannoyanceの程度が段階的に増えていくこと、それだけが必要な条件です。全てのカードをカテゴリに分けてから、16ページの作業に進んでください。

16ページにはあなたが分類したカテゴリの各々に相当する1から9までの番号をつけた欄があります。その各々の欄に対応するカードの言葉と2文字の略語を記載し、間違いのないことを十分に確かめてください。

カードは動かさないようにしてくださ
い。のちほどそのカードが必要になり
ます。

SORTING THE JAPANESE INTO CATEGORIES
日本語の分類

Highest degree of bother/annoyance
「最大のbother/annoyance」の状態

9

8

7

6

5

4

3

2

1

No / lowest degree of bother/annoyance
「bothered/annoyedでない」または「最小のbother/annoyance」の状態

CHOOSING AN EXPRESSION FOR THE TOP

最大のANNOYANCEを表す言葉の選択

Your next task is to choose the best expression for the top of the scale on Page 18.

次の作業は１８ページに示した尺度の最上位の表現として最適な言葉を選ぶことです。

Please look at your sorted cards again. From the highest category, now choose the expression that you would be most likely to use if you had to tell someone about the greatest amount of bother or annoyance you could feel. Please think about whether the word would sound right for telling someone about being bothered or annoyed by the most noise anyone might hear.

先ほどあなたが分類したカードをもう一度よく見てください。その最上位のカテゴリに分類した言葉の中から、あなたが最大のannoyanceを誰かに話すときに使う表現として最も頻繁に使用すると思われる言葉を選んでください。その際、その言葉が自然に聞こえるかどうかを考えてください。

This time you can select only one card. Take your time in choosing this card since you will be using it several more times.

ここでは一枚しかカードを選べません。それをこの後何回か使いますから、よく考えて選んでください。

When you have made your selection turn to Page 18. Please write your chosen expression and the 2-letter code on the answer sheet inside the top box, the box marked "5."

選び終えたら、１８ページの回答用紙に進んでください。そして、「５」と印を付けた一番上の欄に選んだ表現語と２文字の略語を書いて下さい。

Please note that the phrase "mattaku... nai" appears in space number 1. Its use there has been decided on the basis of international discussion.

なお、欄１にはすでに「まったく…ない」、という言葉が書かれていますが、この調査に先だって国際間で検討し、この表現を当てることに決めたためです。

CHOOSING JAPANESE EXPRESSIONS
ANNOYANCEを表す日本語の選択

5	5
4	4
3	3
2	2
1	**まったく…ない** bothered or annoyed -MT-	1

FILLING IN THE REMAINING BOXES ON PAGE 18

Next you need to choose words to fill in the remaining three empty boxes on Page 18 so that the words are evenly spaced in equal steps between the two expressions you already have in boxes #1 and #5.

A schematic representation of the scale looks like this diagram:

```
         XXXX    (Your top expression)
5     annoyed
|
|
4
|
|
3
|
|
2
|
|
1     mattaku···nai
      annoyed
```

To fill in the remaining three boxes, first choose an expression that lies exactly half way between the two extremes you already have on the scale. Look at all of the cards carefully to make a choice. Be sure to again choose a modifier that people would normally use when talking to one another. If you find more than one modifier is half way, you should still select just one. Please write the expression and its two-letter code in box #3.

18ページの残りの欄への記入（5段階尺度に用いる言葉の選択）

次に、１８ページの残り３つの空欄を埋める言葉を選び、先ほど選んだ欄１と欄５の２つの表現のあいだに等間隔で並べていただくことになります。

その結果を図示すると以下のような尺度になるでしょう。
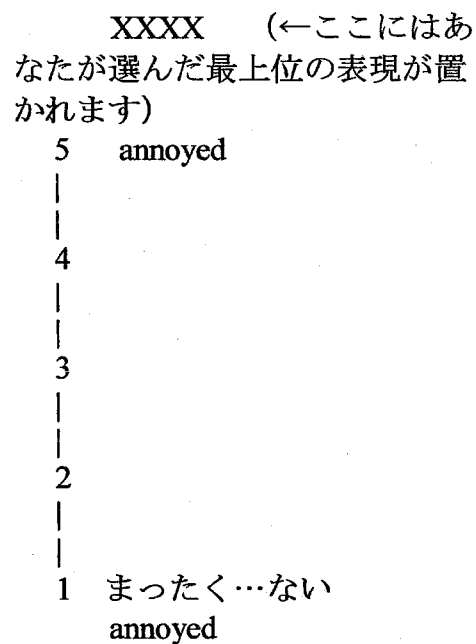
```
         XXXX    （←ここにはあ
なたが選んだ最上位の表現が置
かれます）
5     annoyed
|
|
4
|
|
3
|
|
2
|
|
1     まったく…ない
      annoyed
```

残りの３つの欄を埋めるにあたり、まず、すでに尺度上に置いた最上位（欄５）と最下位（欄１）の言葉のちょうど真ん中に位置する表現を選んでください。全てのカードを注意深く見たうえで選んでください。人々がお互いに話をする際に普通に使う言葉を選ぶようにしてください。たとえ２つ以上の言葉がこの真ん中の位置に該当すると思っても、必ず一つだけ選ぶようにして下さい。選んだ言葉とそれに対応する２文字の略語を欄３に書いてください。

From the rest of the cards, now select the expression that falls half way between "mattaku...nai," and the expression that you just selected for the middle. Write the expression and its two-letter code into box #2.

From the rest of the cards, select a final card that falls half way between the top expression in box #5 and the one you choose in box #3. Write that expression and the two-letter code in box #4.

Please return any cards you moved to the appropriate category among the sorted cards.

次に、残りのカードから「まったく…ない」と今あなたが欄３の真ん中の位置に選んだ言葉の中間に該当すると思う言葉を選び、その言葉と２文字の略語を欄２に書いてください。

最後に、残りのカードから、欄５の最上位と欄３に選んだ言葉の中間に該当すると思う言葉を選び、その言葉と２文字の略語を欄４に書いてください。

以上の作業が終わったら、全てのカードを元のカテゴリに戻して下さい。

SELECTING EXPRESSIONS FOR A 4-POINT SCALE

Now you repeat the procedures you used before, but this time there are four points rather than five and you have already selected the top point.

Start by copying the word and 2-letter abbreviation from the top box (#5) on Page 18 into the top box (#4) on the next page (Page 22).

Next, choose two cards to complete the 4-point scale such that the intensity is equally divided between the four words. In other words, the difference or distance between points 1 and 2, 2 and 3, and 3 and 4 should be the same.

Take your time and try a few different cards. Then write down the expressions and their two-letter codes.

```
          XXXX     (Your top expression)
4      annoyed
|
|
3
|
|
2
|
|
1    mattaku…nai
       annoyed
```

When you finish this task you can put your cards back into the envelope marked "Japanese".

4段階尺度に用いる言葉の選択

先ほどと同じ手順を繰り返しますが、今回は５段階尺度ではなく４段階の尺度であり、しかもすでに最上位の言葉は選んであります。

まず最初に、１８ページの最上位の欄（欄５）から言葉と２文字の略語を２２ページの最上位欄（欄４）に転記して下さい。

次に、annoyanceの尺度全体が等間隔に分割されるように２つの言葉のカードを選んでください。つまり、２２ページの1と2、2と3、3と4の間隔が等しくなるようにしてください。

2と3の言葉を選ぶ際は、すぐに決めず、いくつかの異なるカードを試してみて、じっくりと選んでください。そして、２つの適切な表現を決定し、その言葉と２文字の略語を書いてください。

```
          XXXX     （←ここにはあ
   なたが選んだ最上位の表現が置
   かれます）
4      annoyed
|
|
3
|
|
2
|
|
1   まったく…ない
       annoyed
```

以上の作業が終わったら、カードを「日本語」と書かれた封筒にしまってください。

CHOOSING JAPANESE EXPRESSIONS
ANNOYANCEを表す日本語の選択

4	4
3	3
2	2
1	**まったく…ない** bothered or annoyed -MT- 1

PART 3
第３部

RATING WORD INTENSITY ON A LINE
言葉の強さの線分による評価

Note: In this part of the questionnaire, subjects are presented with 42 modifiers, in random order, for evaluation. However, to save space only two are shown here, one Japanese modifier and one English modifier.

MARKING INTENSITY ON A LINE FOR EACH MODIFIER

This next task is to rate the intensity of the annoyance for each modifier on a separate sheet of paper. The task is quite easy.

Each of the remaining pages in this part of the questionnaire has a single one of the modifiers printed at the top. Beneath it is a horizontal line, extending from "No / lowest degree of annoyance" to "highest degree of annoyance."

Please indicate the degree of intensity for the expression on a particular page by making a vertical mark anywhere on the horizontal printed line.

➔ If you feel that an expression indicates a very low intensity, you should put your mark somewhere near "the lowest degree" end (left bar) of the line.

➔ If you feel that an expression indicates a very high intensity, put a mark somewhere near the "highest degree" end (right bar) of the line.

➔ If you feel that an expression indicates an intermediate intensity, put your mark somewhere in the center.

The distance between the lowest bar and your mark will be used as an indication of the annoyance intensity expressed by the word combination above.

Please, do NOT use a cross or check on the line, just draw your short vertical line across the printed horizontal line.

言葉が表すANNOYANCEの程度を線分に記入する

次の作業は、一つ一つの言葉が表すannoyanceの程度を用紙の上で評価することです。作業はたいへん簡単なものです。

第3部の残りのページには、それぞれ1つの言葉が印刷されており、その下に「bothered or annoyedでない状態／最小のannoyance」から「最大のannoyance」まで引いた1本の水平線が示してあります。

この水平線上のどこかに垂直な線でマークを付けて言葉のannoyanceの程度を示して下さい。

➔ もしある言葉が非常に低いannoyanceの程度を表すと思う場合には、水平線の左端「最小のannoyance」の近くにマークを付けて下さい。

➔ 反対に、その言葉が非常に高いannoyanceの程度を表すと思う場合には、水平線の右端「最大のannoyance」の近くにマークを付けて下さい。

➔ もし、その言葉が中程度のannoyanceを表すと思う場合には、中央付近にマークを付けて下さい。

水平線左端の「最小のannoyance」の位置からあなたが付けたマークまでの距離がその言葉によって表されるannoyanceの程度を表すものとして使われます。

なお、マークを付ける際は必ず水平線と直角の短い線分を引いて下さい。
位置が不明瞭になりますから、決して×印やチェックは使わないで下さい。

あまり…ない

-AM-

No / lowest degree
of annoyance

highest degree
of annoyance

├──────────────────────────────────────┤

bothered or annoyedでない状態／
最小のannoyance

最大のannoyance

very

-VY-

No / lowest degree
of annoyance

highest degree
of annoyance

|———————————————————————————————|

bothered or annoyedでない状態／
最小のannoyance

最大のannoyance

PART 4
第4部

COMPARISON OF PAIRED WORDS
一対の言葉の比較

THE FINAL TASK: CHOOSING THE STRONGER WORD

34 pairs of words are shown on Page 69.

The final task is to choose the stronger description of noise annoyance in each pair.

Please indicate your choice by circling the stronger word.

Example:　(非常に)　　a little
　　　　　　bothered or annoyed

Even if there does not seem to be a difference in intensity, circle one of the words in the pair.

When you have circled one word from every pair, you will have completed the questionnaire.

Thanks very much for your help.

最後の作業：強いほうの言葉を選択する

６９のページには３４組の言葉の対があります。

最後の作業は、騒音のannoyanceに関して２つの言葉のうち強いほうを選択することです。

それぞれの対のうち強いほうの言葉を選択し、強いほうの言葉に〇印をつけてください。

例：　　(非常に)　　a little
　　　　　bothered or annoyed

たとえ、それらの言葉に違いがないと思っても、必ずどちらかに〇印を付けてください。

全ての対についてこの作業を終えたら終了です。

ご協力ありがとうございました。

付録

日本語と英語の言葉
(JAPANESE AND ENGLISH WORDS)

[Note: This page and next are to be printed on cardboard and cut into the 42 individual cards that are placed in an envelope for each subject. Each of Japanese and English words are 21 individual cards.]

Japanese words (21 individual cards)

あまり…ない -AM-	いくらか -IR-	かなり -KN-
きわめて -KW-	すごく -SG-	すこし -SK-
そうとう -ST-	それほど…ない -SR-	たいして…ない -TI-
たいへん -TH-	だいぶ -DB-	たしょう 多少 -TS-
とても -TT-	ひかくてき 比較的 -HK-	ひじょう 非常に -HJ-
ひどく -HD-	ほとんど…ない -HT-	まったく…ない -MT-
やや -YY-	わずかに -WK-	わりに -WR-

112

English words (21 individual cards)

not at all -NA-	somewhat -SW-	very -VY-
barely -BA-	fairly -FY-	highly -HY-
insignificantly -IF-	moderately -MO-	strongly -SY-
hardly -HA-	significantly -SI-	importantly -IM-
a little -AL-	rather -RA-	severely -SE-
slightly -SL-	considerably -CN-	extremely -EX-
partially -PA-	substantially -SU-	tremendously -TR-

APPENDIX 2:

**EXAMPLE OF ENGLISH QUESTIONNAIRE USED IN
EXPERIMENT DISCUSSED IN CHAPTER 3**

NOISE OPINION QUESTIONNAIRE

This questionnaire consists of three sections. Sections II and III are each closed with a seal now. Please do not open them until you are told to do so. Please complete the information on this first page before the experiment starts.

Today's date *(year/month/day)*:   ____ / ____ / ____

Gender *(circle)*:   1   Female   2   Male

Date of birth *(year/month/day)*:   ____ / ____ / ____

Number of years of education completed (including college before this year)   _____

SECTION I: LISTENING TO SAMPLE NOISE ENVIRONMENTS

In a few minutes 20 recordings of road traffic noise environments will be played over the speaker. You will be asked to give your opinion about each of the road traffic noise environments. For each recording you will be asked to imagine what it would be like to have this much road traffic noise in a home. Each noise will be played for 30 seconds. You will then have seven seconds to answer the question before the instructor announces the next noise. The first four noises will be for practice. There are no right or wrong answers. You should answer each question according to your own feelings. This question will be asked for the first 12 noises:

"Imagine that you lived in a home where this road traffic noise is heard. How much would this much noise from the road traffic bother, disturb, or annoy you? *(Circle a number from 0 to 10)*

            0   1   2   3   4   5   6   7   8   9   10

Not at all   Extremely

Now turn to page #2 and wait for the first noise.

NOISE # 1:

Imagine that you lived in a home where this road traffic noise is heard.   How much would this much noise from the road traffic bother, disturb, or annoy you? *(Circle a number from 0 to 10.)*

         0 1 2 3 4 5 6 7 8 9 10

Not at all   Extremely

NOISE # 2:

Imagine that you lived in a home where this road traffic noise is heard.   How much would this much noise from the road traffic bother, disturb, or annoy you? *(Circle a number from 0 to 10.)*

0   1   2   3   4   5   6   7   8   9   10

Not at all   Extremely

Note: A total of 12 noises are presented following this format.   The only aspect of these sheets that varies is the number of the noise.   Accordingly, the remaining 10 have been omitted.

INTRODUCTION TO ADDITIONAL NOISES

The remaining questions ask the same question but use the following five point answer scale.

"Imagine that you lived in a home where this road traffic noise is heard. How much would this much noise from the road traffic bother, disturb, or annoy you? *(Check your answer)*

     _____ Extremely
     _____ Very
     _____ Moderately
     _____ Slightly
     _____ Not at all

Now turn to the next page and listen for NOISE #13

NOISE # 13 :

Imagine that you lived in a home where this road traffic noise is heard. How much would this much noise from the road traffic bother, disturb, or annoy you? *(Check your answer)*

_____ Extremely

_____ Very

_____ Moderately

_____ Slightly

_____ Not at all

Note: As this pattern is followed through "NOISE #20," the remaining sheets have been omitted.

SECTION II:
QUESTIONS ABOUT
SOME COMMON NOISES

Please wait for the instructor to tell you to open the seal for Section II.

Next are questions about five noises that are sometimes heard near homes. Please again imagine what it would be like if you lived in a home with this noise. Answer the following question about each noise:

Q   How much would this noise bother, disturb, or annoy you? *(Circle a number from 0 to 10.)*

#	Situation	Not at all										Extremely
1	Hearing big trucks (when you are in your home) every time the traffic signal changes at a nearby intersection	0	1	2	3	4	5	6	7	8	9	10
2	Hearing a dog that barks in the middle of the night about once a week outside a nearby building	0	1	2	3	4	5	6	7	8	9	10
3	Having to always raise your voice at the entrance to your home because of the noise from a high traffic street	0	1	2	3	4	5	6	7	8	9	10
4	Hearing the entrance door of your home squeak every time it is opened	0	1	2	3	4	5	6	7	8	9	10
5	Hearing a distant aircraft about once a week	0	1	2	3	4	5	6	7	8	9	10

QUESTIONS ABOUT MORE COMMON NOISES

Next are questions about five more noises that are sometimes heard near homes. Please again imagine what it would be like if you lived in a home with this noise. Answer the following question about each noise:

Q   How much would this noise bother, disturb, or annoy you? *(Place a check in the box for your answer for each noise.)*

#	Situation	Not at all	Slightly	Moderately	Very	Extremely
6	Hearing about ten airplanes a day that make your television hard to hear when they fly by					
7	Hearing the background music from a nearby business when your windows or doors are open					
8	Being woken up by motorcycles about once a week					
9	Hearing your neighbor's radio, television or stereo when your doors or windows are open					
10	Hearing the back-up warning signals beeping on trucks about once an hour during the daytime at your home					

124

SECTION III:
QUESTIONS ABOUT VARIOUS PROBLEMS

Please open the seal to Section III. Do not return to Section II.

Next are questions about many different types of problems. Please again imagine what it would be like if you lived somewhere with this problem. Answer this question about each possible problem:

Q If you had this problem, how annoying or unpleasant would this problem be for you?
  (Circle a number from 0 to 10)

#	Situation	Not at all										Extremely
1	Being able to see a business with piles of scrapped cars from your home	0	1	2	3	4	5	6	7	8	9	10
2	Having a door inside your house that is sometimes hard to open	0	1	2	3	4	5	6	7	8	9	10
3	Having such bad hearing that a doctor would recommend a hearing aid	0	1	2	3	4	5	6	7	8	9	10
4	Hearing about ten big trucks a day that make your television hard to hear when they go by	0	1	2	3	4	5	6	7	8	9	10
5	Living next to a factory that makes things outside your home dirty	0	1	2	3	4	5	6	7	8	9	10
6	Hearing your neighbors shouting at their children in the evening	0	1	2	3	4	5	6	7	8	9	10
7	Living on a street where cars go so fast that it is dangerous for children	0	1	2	3	4	5	6	7	8	9	10
8	Having a neighbor's outside light shine into your bedroom at night	0	1	2	3	4	5	6	7	8	9	10
9	Having cockroaches in your home	0	1	2	3	4	5	6	7	8	9	10
10	Having a refrigerator in the kitchen that you can clearly hear from your bedroom	0	1	2	3	4	5	6	7	8	9	10
11	Having a car that will not start once or twice a year	0	1	2	3	4	5	6	7	8	9	10
12	Not being able to see well out of one eye	0	1	2	3	4	5	6	7	8	9	10
13	Not being able to remember the names of people you just meet for the first time	0	1	2	3	4	5	6	7	8	9	10
14	Being woken up by airplanes about two nights a week	0	1	2	3	4	5	6	7	8	9	10
15	Having neighbors who leave trash in front of their home	0	1	2	3	4	5	6	7	8	9	10
16	Having a nearby streetlamp burn out and not be replaced for about a month	0	1	2	3	4	5	6	7	8	9	10
17	Hearing a distant expressway when you listen outside your home	0	1	2	3	4	5	6	7	8	9	10
18	Living in a home where you are bothered by mosquitoes when you are trying to sleep	0	1	2	3	4	5	6	7	8	9	10
19	Having to raise your voice outside your home due to noise from airplanes landing at a nearby airport	0	1	2	3	4	5	6	7	8	9	10
20	Having unhealthy air pollution in the area where you live	0	1	2	3	4	5	6	7	8	9	10
21	Hearing noise from the faucets and water pipes in your home	0	1	2	3	4	5	6	7	8	9	10
22	Smelling a bad odor from an industry when you are in your home	0	1	2	3	4	5	6	7	8	9	10

APPENDIX 3:

EXAMPLE OF JAPANESE QUESTIONNAIRE USED IN EXPERIMENT DISCUSSED IN CHAPTER 3

騒音に関する意識調査

この調査票は３つのセクションからできています。セクションⅡとⅢは今のところ閉じられています。開けるように言われるまで、これらを開けないでください。実験が始まるまでこの最初のページの項目すべてを記入してください。

今日の日付（西暦年／月／日）：　_____／_____／_____

性別（〇印をつけてください）：　　１　男性　　　　　２　女性

生年月日（西暦年／月／日）：　_____／_____／_____

就学年数（昨年度までの大学の在学期間も含む）　_____　年

セクション　Ⅰ：騒音を聞く

２、３分すると、録音された２０種類の道路交通騒音がスピーカから流れてきます。これらの道路交通騒音の各々についてあなたの印象を聞かれるでしょう。そのさい各騒音ごとに家でこの道路交通騒音が聞こえてくる状況を想像するように言われるでしょう。各騒音は３０秒間流されます。実験者が次の騒音をアナウンスするまでの７秒間にその質問に答えてください。最初の４つの騒音は練習です。この質問には正解も不正解もありません。あなた自身の感覚にしたがって、それぞれの質問に答えてください。最初の１２の騒音に対しては、以下のように質問されるでしょう。

いま、あなたは道路交通騒音が聞こえてくる家に住んでいると想像してください。その場合、この道路交通騒音はどれくらいうるさい、または気になるでしょうか。*（該当するところに〇印をつけてください。）*

　　　　　_____　非常に
　　　　　_____　かなり
　　　　　_____　多少
　　　　　_____　あまり…ない
　　　　　_____　まったく…ない

２ページを開けて、最初の音を待ってください。

騒　音　＃1

いま、あなたは道路交通騒音が聞こえてくる家に住んでいると想像してください。その場合、この道路交通騒音はどれくらいうるさい、または気になるでしょうか。（該当するところに〇印をつけてください。）

_____ 非常に

_____ かなり

_____ 多少

_____ あまり…ない

_____ まったく…ない

騒　音　　＃２

　　いま、あなたは道路交通騒音が聞こえてくる家に住んでいると想像してください。その場合、この道路交通騒音はどれくらいうるさい、または気になるでしょうか。（該当するところに○印をつけてください。）

　　_____　非常に

　　_____　かなり

　　_____　多少

　　_____　あまり…ない

　　_____　まったく…ない

Note: A total of 12 noises are presented following this format. The only aspect of these sheets that varies is the number of the noise. Accordingly, the remaining 10 have been omitted.

残りの騒音に対する説明

このあとも以前と同じ質問を繰り返しますが、次の０から１０までの数値尺度を使います。

いま、あなたは道路交通騒音が聞こえてくる家に住んでいると想像してください。その場合、この道路交通騒音はどれくらいうるさい、または気になるでしょうか。*(0 から 10 までの１つの数字に○印をつけてください。)*

<div align="center">

0　1　2　3　4　5　6　7　8　9　10

</div>

まったく…ない   非常に

次のページをめくり、騒音♯１３を聞いてください。

騒 音 ＃１３

　いま、あなたは道路交通騒音が聞こえてくる家に住んでいると想像してください。その場合、この道路交通騒音はどれくらいうるさい、または気になるでしょうか。*(0 から 10 までの 1 つの数字に○印をつけてください。)*

<div align="center">

0　1　2　3　4　5　6　7　8　9　10

</div>

まったく…ない　　　　　　　　　　　　　　　　　　非常に

Note: As this pattern is followed through "NOISE #20," the remaining sheets have been omitted.

セクション II :
いくつかの一般的な騒音に関する質問

実験者がセクション II のシールを開けるように言うまで待ってください。

次に５つの騒音について質問します。再びあなたが次の騒音が聞こえてくる家に住んでいると想像してください。その場合にそれぞれの騒音について以下の質問に答えてください。

Q．以下の騒音はどれくらいうるさい、または気になるでしょうか。(それぞれの騒音の該当する欄に〇印をつけてください。)

#	状　況	まったく…ない	あまり…ない	多少	かなり	非常に
1	近所の交差点で信号が替わるたびに、あなたの家で大型トラックからの音が聞こえる					
2	近所の建物の外で１週間に一回くらい深夜に犬がほえるのが聞こえる					
3	交通量の多い通りからの騒音のために、あなたはいつも家の玄関先で大声を出さなければいけない					
4	あなたの家の玄関扉が開くたびにきしむ音が聞こえる					
5	１週間に１回くらい遠くの航空機騒音が聞こえる					

135

次は近所でときどき聞こえるもう５つの騒音に関する質問です。再びそのような騒音が聞こえる家に住んでいると想像して、各騒音について以下の質問に答えてください。

Q．以下の騒音はどれくらいうるさい、または気になるでしょうか。（０から１０までの１つの数字に〇印をつけてください。）

#	状　　　　況	まったく …ない　　　　　　　　　　　　　　　　非常に
6	航空機が飛来すると、テレビが聞き取りにくいことが１日に１０回くらいある。	0　1　2　3　4　5　6　7　8　9　10
7	窓やドアを開けているとき、近所の営業用の音楽（ＢＧＭ）が聞こえる。	0　1　2　3　4　5　6　7　8　9　10
8	寝ているときに１週間に１回くらいオートバイで起こされる。	0　1　2　3　4　5　6　7　8　9　10
9	窓やドアを開けているとき、隣人のラジオ、テレビ、ステレオの音が聞こえる	0　1　2　3　4　5　6　7　8　9　10
10	あなたの家で昼間に１時間に１回くらいトラックからのピィピィ…という後方へ動く警告音が聞こえる	0　1　2　3　4　5　6　7　8　9　10

セクション III：
様々な問題に関する質問

次はさまざまなタイプの問題に関する質問です。あなたにこのような問題が生じている状況を想像してください。その場合にそれぞれの起こりそうな問題について質問に答えてください。

Q. 次の状況で生活することはあなたにとってはどれくらい不快なことでしょうか。（０から１０までの１つの数字に○印をつけてください。）

#	状況	まったく…ない										非常に
1	家にいるとき工場から悪臭がする	0	1	2	3	4	5	6	7	8	9	10
2	家で水栓や水道からの騒音が聞こえる	0	1	2	3	4	5	6	7	8	9	10
3	あなたが住んでいる地域で健康上良くない大気汚染が生じている	0	1	2	3	4	5	6	7	8	9	10
4	近くの空港で着陸する航空機の騒音のために、家の外で大声を出さなければいけない	0	1	2	3	4	5	6	7	8	9	10
5	家で寝ようとしているとき蚊にじゃまされる	0	1	2	3	4	5	6	7	8	9	10
6	家の外で聞こうとすれば、遠くの高速道路の音が聞こえる	0	1	2	3	4	5	6	7	8	9	10
7	近所の街灯が切れているが、１ヶ月ほど取り替えられていない	0	1	2	3	4	5	6	7	8	9	10
8	近所の人が自分たちの家の前にゴミを放置している	0	1	2	3	4	5	6	7	8	9	10
9	１週間に２晩くらい航空機で起こされる	0	1	2	3	4	5	6	7	8	9	10
10	あなたが最近会った人々の名前を思い出せない	0	1	2	3	4	5	6	7	8	9	10
11	一方の目がよく見えない	0	1	2	3	4	5	6	7	8	9	10
12	１年に１、２度あなたの車が発進しない	0	1	2	3	4	5	6	7	8	9	10
13	あなたの寝室で台所の冷蔵庫の音が明瞭に聞こえる	0	1	2	3	4	5	6	7	8	9	10
14	家にゴキブリがいる	0	1	2	3	4	5	6	7	8	9	10
15	夜中に隣人の屋外灯の光があなたの寝室に入ってくる	0	1	2	3	4	5	6	7	8	9	10
16	家の前の道路は車が猛スピードで通過するため子供たちにとって危険である	0	1	2	3	4	5	6	7	8	9	10
17	隣人が夕方に彼らの子供をどなるのが聞こえる	0	1	2	3	4	5	6	7	8	9	10
18	隣に工場があるため、あなたの家の外にあるすべてのものが汚くなる	0	1	2	3	4	5	6	7	8	9	10
19	大型トラックが通過するために、テレビの音声が聞きにくいことが１日に１０回くらいある	0	1	2	3	4	5	6	7	8	9	10
20	医者が補聴器を勧めるほどに、あなたの聴力が悪い	0	1	2	3	4	5	6	7	8	9	10
21	室内のドアがときどき開けにくい	0	1	2	3	4	5	6	7	8	9	10
22	あなたの家からスクラップされた車を積み上げる事業所の作業が見える	0	1	2	3	4	5	6	7	8	9	10

APPENDIX 4:

EXAMPLE OF QUESTIONNAIRE USED IN
SOCIAL SURVEY DISCUSSED IN CHAPTER 4

該当する項目の（　　　）内に〇印をつけてお答えください。

１．あなたの住宅は以下のどれですか。

　　　　　　　（　　　）１　持ち家
　　　　　　　（　　　）２　賃貸住宅
　　　　　　　（　　　）３　その他 ＿＿＿＿＿＿＿＿＿＿＿＿＿＿

２．あなたは現在の住宅に住んで何年になりますか。

　　　　　　　　　　　　　　＿＿＿＿＿＿＿＿＿＿年

３．あなたの住宅の延べ床面積はおおよそどの程度ですか。

　　　　　　　　　　約 ＿＿＿＿＿＿＿ ㎡　（または　約 ＿＿＿＿＿＿＿ 坪）

４．あなたの住宅の敷地面積はおおよそどの程度ですか。

　　　　　　　　　　約 ＿＿＿＿＿＿＿ ㎡　（または　約 ＿＿＿＿＿＿＿ 坪）

５．あなたの住宅の構造は以下のどれですか。該当するものをすべて選んでください。

　　　　　　　（　　　）１　木造
　　　　　　　（　　　）２　鉄骨造（ユニット住宅を含む）
　　　　　　　（　　　）３　ブロック造
　　　　　　　（　　　）４　鉄筋コンクリート造
　　　　　　　（　　　）５　その他　＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿

６．あなたの居間の開口部（窓、ガラス戸等）のガラスは何層ですか。
　　ペアガラス（複層ガラス）入りのサッシの場合は二重ガラスと答えてください。

　　　　　　　（　　　）１　三重ガラス以上
　　　　　　　（　　　）２　二重ガラス
　　　　　　　（　　　）３　一重ガラス
　　　　　　　（　　　）４　その他　＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿

７．あなたの居間の開口部の枠のタイプは以下のどれですか。
　　該当するものをすべて選んでください。

　　　　　　　（　　　）１　アルミ枠
　　　　　　　（　　　）２　木枠
　　　　　　　（　　　）３　樹脂（プラスチック）
　　　　　　　（　　　）４　その他　＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿

8．あなたの**居間**の開口部（窓、ガラス戸等）は以下のどれに面していますか。
また、どの方位に位置していますか。該当するものをすべて選んでください。

    （ ）1 公園、緑地や空き地
    （ ）2 線路
    （ ）3 主要道路
    （ ）4 小さな道路
    （ ）5 工場等
    （ ）6 駐車場
    （ ）7 隣家
    （ ）8 その他 _____

方位 （ ）（ ）（ ）（ ）（ ）（ ）（ ）（ ）
     東   南東   南   南西   西   北西   北   北東
     1   2   3   4   5   6   7   8

9．あなたの**寝室**の開口部（窓、ガラス戸等）のガラスは何層ですか。
ペアガラス（複層ガラス）入りのサッシの場合は二重ガラスと答えてください。

    （ ）1 三重ガラス以上
    （ ）2 二重ガラス
    （ ）3 一重ガラス
    （ ）4 その他 _____

10．あなたの**寝室**の開口部の枠のタイプは以下のどれですか。
該当するものをすべて選んでください。

    （ ）1 アルミ枠
    （ ）2 木枠
    （ ）3 樹脂（プラスチック）
    （ ）4 その他 _____

11．あなたの**寝室**の開口部（窓、ガラス戸等）は以下のどれに面していますか。
また、どの方位に位置していますか。該当するものをすべて選んでください。

    （ ）1 公園、緑地や空き地
    （ ）2 線路
    （ ）3 主要道路
    （ ）4 小さな道路
    （ ）5 工場等
    （ ）6 駐車場
    （ ）7 隣家
    （ ）8 その他 _____

方位 （ ）（ ）（ ）（ ）（ ）（ ）（ ）（ ）
     東   南東   南   南西   西   北西   北   北東
     1   2   3   4   5   6   7   8

１２．あなたの住宅には庭がありますか。

    （　　）１　いいえ
    （　　）２　はい

１３．以下の項目についてあなたが住んでいる住宅を評価してください。

	1 非常に良い	2 良い	3 普通	4 悪い	5 非常に悪い
１）家の広さ	（　）	（　）	（　）	（　）	（　）
２）庭の広さ	（　）	（　）	（　）	（　）	（　）
３）夏の快適性	（　）	（　）	（　）	（　）	（　）
４）冬の快適性	（　）	（　）	（　）	（　）	（　）
５）断熱性	（　）	（　）	（　）	（　）	（　）
６）通風	（　）	（　）	（　）	（　）	（　）
７）日照	（　）	（　）	（　）	（　）	（　）
８）遮音性	（　）	（　）	（　）	（　）	（　）

１４．あなたはこの地域（現在住んでいる土地またはこの近辺）に住んで何年になりますか。

            _____年

１５．あなたは現在住んでいる地域をどの程度好きですか。

    （　　）１　非常に好きである
    （　　）２　好きである
    （　　）３　どちらともいえない
    （　　）４　嫌いである
    （　　）５　非常に嫌いである

１６．あなた自身の近所づきあいについて該当するものを選んでください。

    （　　）１　非常に良い
    （　　）２　良い
    （　　）３　普通
    （　　）４　悪い
    （　　）５　非常に悪い

１７．もし、他の地域に適当な住宅があれば引っ越したいと思いますか。

    （　　）１　いいえ
    （　　）２　はい　→　その理由は何ですか。　該当するものをすべて選んでください。
            （　　）１　環境上の理由　――――→　（　　）騒音
            （　　）２　家庭の事情　　　　　　　（　　）振動
            （　　）３　その他＿＿＿＿＿＿　（　　）その他＿＿＿＿＿＿

１８．あなたが住んでいる地域の四季の気候について、それぞれ該当するものを一つ選んでください。

	1 非常に快い	2 快い	3 どちらとも いえない	4 不快	5 非常に不快
1）春	（　）	（　）	（　）	（　）	（　）
2）夏	（　）	（　）	（　）	（　）	（　）
3）秋	（　）	（　）	（　）	（　）	（　）
4）冬	（　）	（　）	（　）	（　）	（　）

１９．ほとんどの居住地域は良い面と悪い面を兼ね備えています。そこで、以下の８つの項目についてあなたが住んでいる地域を評価してください。

	1 非常に良い	2 良い	3 普通	4 悪い	5 非常に悪い
1）緑地などの 　自然環境	（　）	（　）	（　）	（　）	（　）
2）町並み	（　）	（　）	（　）	（　）	（　）
3）郵便局、銀行、 　買い物の便	（　）	（　）	（　）	（　）	（　）
4）通勤の便	（　）	（　）	（　）	（　）	（　）
5）学校、幼稚園	（　）	（　）	（　）	（　）	（　）
6）医療施設	（　）	（　）	（　）	（　）	（　）
7）道路の安全性	（　）	（　）	（　）	（　）	（　）
8）線路の安全性	（　）	（　）	（　）	（　）	（　）

２０．過去（１２ヶ月くらい）を振り返って、あなたは自宅で以下の項目でどの程度悩まされる、
あるいは、じゃまされる、うるさいと感じていますか。

	1 まったく …ない	2 それほど …ない	3 多少	4 だいぶ	5 非常に
1）自動車騒音	（　）	（　）	（　）	（　）	（　）
2）航空機騒音	（　）	（　）	（　）	（　）	（　）
3）列車騒音	（　）	（　）	（　）	（　）	（　）
4）排気ガス	（　）	（　）	（　）	（　）	（　）
5）工場騒音	（　）	（　）	（　）	（　）	（　）
6）悪臭	（　）	（　）	（　）	（　）	（　）
7）工場からの煤塵	（　）	（　）	（　）	（　）	（　）
8）隣近所からの騒音	（　）	（　）	（　）	（　）	（　）

※　質問２０の　8）隣近所からの騒音　について「まったく…ない」と答えた方は質問２１をとば
して、次の質問２２へ進んでください。

２１．隣近所からの騒音で悩まされる、あるいは、じゃまされる、うるさいと感じるものを答えてく
ださい。該当するものをすべて選んでください。

（　）　1　排水音
（　）　2　話し声
（　）　3　ペットの鳴き声
（　）　4　ドアの開閉音
（　）　5　音楽、テレビ、ラジオの音
（　）　6　楽器や歌の練習音
（　）　7　空調室外機の音
（　）　8　車のアイドリングや発車音
（　）　9　ボイラーの音
（　）10　その他　＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿

２２．次は、あなたが自宅で列車からの騒音でどの程度悩まされる、あるいは、じゃまされる、うるさいと感じるかを示すための０から１０までの数字で表した尺度です。もし、あなたがまったくうるさくないと感じるなら０を選んでください。非常にうるさいと感じるなら１０を選んでください。もし、その程度がこれらの間のどこかにあれば、０から１０までの数字のうち適当なものを選んでください。

　　　過去（１２ヶ月くらい）を振り返って、あなたが列車からの騒音で悩まされたり、あるいは、じゃまされたり、うるさいと感じる程度を最も良く表すのは０から１０までのどの数字でしょうか？（０から１０までの１つの数字に〇印をつけてください）

　　　　　　　　　　０　　１　　２　　３　　４　　５　　６　　７　　８　　９　　１０
まったく...ない　　　　　　　　　　　　　　　　　　　　　　　　　　　非常に

※　質問２０の　３）列車騒音　について「まったく...ない」と答えた方は質問２３～２７をとばして、８ページの質問２８から答えてください。

２３．列車騒音で悩まされる、あるいは、じゃまされる、うるさいと感じる割合を答えてください。

　　　　　（　　　）１　ほぼ毎日
　　　　　（　　　）２　週に１、２回
　　　　　（　　　）３　月に１、２回
　　　　　（　　　）４　年に数回

２４．一日のうち、列車騒音で悩まされる、あるいは、じゃまされる、うるさいと感じる時間帯はありますか。

　　　　　（　　　）１　いいえ
　　　　　（　　　）２　はい　──→　該当するものをすべて選んでください。
　　　　　　　　　　　　　　　　　　　（　　　）１　早朝　　　６時～８時
　　　　　　　　　　　　　　　　　　　（　　　）２　午前中　　８時～１２時
　　　　　　　　　　　　　　　　　　　（　　　）３　午後　　　１２時～１６時
　　　　　　　　　　　　　　　　　　　（　　　）４　夕方　　　１６時～１９時
　　　　　　　　　　　　　　　　　　　（　　　）５　夜　　　　１９時～２２時
　　　　　　　　　　　　　　　　　　　（　　　）６　夜中　　　２２時～６時

２５．一年のうち、列車騒音に悩まされる、あるいは、じゃまされる、うるさいと感じる季節はありますか。

    （　　）１　いいえ
    （　　）２　はい ――＞ 該当するものをすべて選んでください。
                              （　　）１　春
                              （　　）２　夏
                              （　　）３　秋
                              （　　）４　冬

２６．次の列車のうち、特に騒音に悩まされる、あるいは、じゃまされる、うるさいと感じるものはありますか。

    （　　）１　普通列車
    （　　）２　特急列車
    （　　）３　貨物列車
    （　　）４　あるけれど違いはない
    （　　）５　ない

２７．次の列車のうち、特に振動が気になるものはありますか。

    （　　）１　普通列車
    （　　）２　特急列車
    （　　）３　貨物列車
    （　　）４　あるけれど違いはない
    （　　）４　ない

28．日常生活で列車の走行が原因で様々な迷惑をこうむることがありますが、以下の項目についてどのように感じていますか。

	1 まったく ...ない	2 それほど ...ない	3 多少	4 だいぶ	5 非常に
1）住宅内での会話の際に どの程度じゃまになりますか。	（　）	（　）	（　）	（　）	（　）
2）電話で相手の話声を聴き取る際に どの程度じゃまになりますか。	（　）	（　）	（　）	（　）	（　）
3）テレビやラジオを聴き取る際に どの程度じゃまになりますか。	（　）	（　）	（　）	（　）	（　）
4）住宅内で読書や考え事をする際に どの程度じゃまになりますか。	（　）	（　）	（　）	（　）	（　）
5）住宅内で休息する際に どの程度じゃまになりますか。	（　）	（　）	（　）	（　）	（　）
6）寝付く際に どの程度じゃまされますか。	（　）	（　）	（　）	（　）	（　）
7）夜中に目を覚まさせられることで どの程悩まされますか。	（　）	（　）	（　）	（　）	（　）
8）窓を開けたいときに開けられないことを どの程度不快に感じますか。	（　）	（　）	（　）	（　）	（　）
9）列車の通行による住宅の振動 がどの程度気になりますか。	（　）	（　）	（　）	（　）	（　）
10）列車の通行によるテレビ画面の乱れが どの程度気になりますか。	（　）	（　）	（　）	（　）	（　）

※　庭をお持ちの方は以下の３つの質問にもお答え下さい。

11）庭での作業が どの程度じゃまされますか。	（　）	（　）	（　）	（　）	（　）
12）庭での会話が どの程度じゃまされますか。	（　）	（　）	（　）	（　）	（　）
13）庭での休息が どの程度じゃまされますか。	（　）	（　）	（　）	（　）	（　）

２９．あなたは窓を開けて寝ることがありますか。

       （   ）１　めったにない／まったくない
       （   ）２　ときどきある
       （   ）３　よくある
       （   ）４　ほとんどいつも

３０．普段のあなたの睡眠状態はいかがですか。

       （   ）１　非常に良い
       （   ）２　良い
       （   ）３　普通
       （   ）４　悪い　　→　┐
       （   ）５　非常に悪い　→　┘理由＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿

３１．あなたは居間でくつろいでいるとき窓を開けていますか。

	1 めったにない／ まったくない	2 ときどきある	3 よくある	4 ほとんどいつも
1）春	（　）	（　）	（　）	（　）
2）夏	（　）	（　）	（　）	（　）
3）秋	（　）	（　）	（　）	（　）
4）冬	（　）	（　）	（　）	（　）

３２．日常生活の中で私たちはいろいろな環境要因にさらされていますが、あなたは以下の要因に
　　　対してどの程度敏感ですか。

	1 まったく 敏感でない	2 それほど 敏感でない	3 多少 敏感	4 だいぶ 敏感	5 非常に 敏感
1）寒さ	（　）	（　）	（　）	（　）	（　）
2）暑さ	（　）	（　）	（　）	（　）	（　）
3）騒音／音	（　）	（　）	（　）	（　）	（　）
4）ほこり、花粉、空気の汚れ	（　）	（　）	（　）	（　）	（　）
5）化学物質	（　）	（　）	（　）	（　）	（　）

３３．ここ３、４０年間で私たちの生活は豊かになりました。しかしその反面、地球温暖化、酸性雨、熱帯雨林の破壊といった地球規模での環境問題が出現しています。そこであなたはこれらの環境問題について一般にどのように考えていますか。

    （　　）１　やむをえない
    （　　）２　答えにくい
    （　　）３　すぐに何らかの行動を起こすべきである

３４．現在、あなたは何をしておられますか。

    （　　）１　仕事に就いている
    （　　）２　学生　　　　　　────────→
    （　　）３　主婦　　　　　　────────→　　質問３５と３６をとばして
    （　　）４　退職している　　────────→　　質問３７に進んでください。
    （　　）５　無職　　　　　　────────→
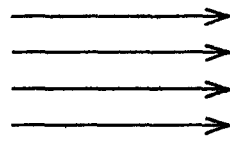
３５．あなたの働いている時間帯を答えてください。

    （　　）１　日中のみ
    （　　）２　夜間のみ
    （　　）３　交代制

３６．あなたのお仕事は何ですか。

_____

３７．あなたを含めて、ご家族は何名ですか。

_____ 名

３８．あなたの満年齢はいくつですか。

_____ 歳

３９．性別

    （　　）１　男
    （　　）２　女

４０．以上の質問以外に生活環境に関して意見がございましたらお聞かせください。

_____

_____

_____

_____

_____

_____

_____

_____

_____

※申し訳ございませんが、最後にもう一度記入漏れがないか確認してください。

　もし差し支えなければ、この調査に関してさらに意見をお聞きしたいときのために、あなたの電話番号と都合のよい時間帯を記入してください。

| 電話番号　　_____ |
| 都合のよい時間帯　（午前・午後）_____時　〜　（午前・午後）_____時 |

ご協力ありがとうございました。