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# EFFECTS OF AIRCRAFT NOISE ON THE EQUILIBRIUM OF AIRPORT RESIDENTS: SUPPLEMENTARY ANALYSES TO THE STUDY CARRIED OUT AROUND ORLY

J. Francois

(Repercussion du bruit des avions sur l'equilibre des riverains des aeroports--Analyses complementaires de l'enquete realisée autour d'Orly), l'Institut Francais d'opinion Publique, Paris, France, (IFOP/BTMAR), August 1977, pp 1-42



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16. Abstract

This is a study of the effects of aircraft noise. Two main questions were considered:
1) in unusually intense noise sectors, do residents give evidence of psychological or physiological disturbances?
2) can personality or health factors account for the high inter-individual variability of annoyance?

The methodology used and results obtained ar presented. Samples of the survey questionnaires utilized are included.

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Within the framework of the "social cost of noise" program, the Institut Français d'Opinion Publique (French Public Opinion Institute) has carried out a study on the effects of aircraft noise on the equilibrium of airport residents, financed by the Ministère de la Qualité de la Vie (Quality of Life Ministry).

The results of this study were presented in a report dated September 1975.

At the request of the Comité Scientifique Bruit et Vibrations, an analysis of results was performed in two directions in order to provide a more detailed answer to the following questions:

- in sectors where noise is unusually intense, do residents give evidence of having psychological or physiological disturbances?

- can personality or health factors account for the high inter-individual variability of annoyance?

This report gives the results of the supplementary analyses performed on a sample of one thousand Orly residents in March 1975

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# EFFECTS OF AIRCRAFT NOISE ON THE EQUILIBRIUM OF AIRPORT RESIDENTS: SUPPLEMENTARY ANALYSES TO THE STUDY CARRIED OUT AROUND ORLY

J. Francois*

## INTRODUCTION

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In 1974-1975, IFOP carried out an investigation on the "effects of aircraft noise on the equilibrium of airport residents". This investigation included a survey of a thousand ORLY residents between the ages of 20 and 64 years living in the same district for at least two years (1).

The sample consisted of four groups of equal value, defined by the correspondence of two dichotomic criteria:

- the length of residence in the district: 2-9 years, longer than 10 years.
- the noise level: residents of zone C (characterized by a psophic index between 84 and 89) and residents of zone A and zone B (psophic index above 89).

The geographic distribution of the interviews is based on the chart of isopsophic curves established by STBA on the basis of 1974 traffic. Curves B and C are plotted on the map of all districts surrounding the airport. We were able to obtain maps per block from INSEE. We counted the blocks in each of the two survey zones in order to define the sampling rate. We agreed to keep almost all of the blocks and to conduct two interviews per block and to refer to neighboring blocks in the event it was impossible to conduct interviews in a given block. The aim of this method was to obtain a uniform distribution of the sample in the two noise zones.

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*This report was prepared by the author for the Noise and Vibration Science Committee of the Ministry of Culture and Environment.

**Numbers in the margin indicate foreign text pagination.

(1) A detailed description of the methodology used was given in an earlier report (September 1975).

In the earlier report, the results were analyzed as a /2
function of the noise level upon the basis of a comparison between the residents of zone C and the residents of zone AB. We were not able to detect any significant difference in these two groups relative to personality factors and to health aspects. This absence of variations as a function of noise level may be interpreted in two ways:

.either it corresponds to a real effect: the influence of ambient noise on the psychic and physiologic equilibrium is zero, even if the noise is intense.

.or, an influence exists, but the measuring instrument used did not have enough sensitivity to detect it. This second assumption is probably insidious and relatively weak compared to all factors which may determine the state of health of an individual or population group. With this situation, only an epidemiologic investigation (accounting for biological data rather than counting on declarations of interviewed individuals) performed on large sample groups will provide an accurate conclusion about the existence of a noise influence.

Before deciding whether it is impossible or not to define a variation of personality variables or health variables as a function of noise, based on data collected from ORLY residents, a last assumption should be tested: a general comparison of residents in the two noise zones may hide variations which would be obvious only in the case of very intense noises. If disturbances appear only at a very high noise level (and therefore in a sub-group comprised of relatively small numbers of residents from sector A-B), the method of analyzing the survey does not bring them to light.

To explore this assumption, it was necessary to isolate the /3
sub-group exposed to the highest noise level. To accomplish this, the PARIS AIRPORT drew a detailed chart of the isopsophic curves (scaled every 2 points) established from actual traffic data of 1975, year of the survey. We were thus able to determine for each subject interviewed the value of the psophic

'index of the place of residence (1).

Since an ambient noise level was assigned for each interview, we were able to continue the analysis of the correlation between noise and psychophysiologic equilibrium.

We were also able to study another phenomenon: the variability of annoyance. We know that annoyance may vary considerably from one individual to another for the same noise exposure.

The different factors which account for these variations are still not very well known. Data collected in the survey using personality tests and a health questionnaire are shown in the number of factors which, by assumption, may explain the inter-individual variability of annoyance. We were thus able to analyze the correlation between these factors and annoyance, by considering the noise level estimated by the psophic index.

These two analyses are presented successively in the next few pages.

## I. THE CORRELATION BETWEEN NOISE AND PSYCHOPHYSIOLOGICAL EQUILIBRIUM /4

Before examining the distributions of answers according to the index of exposure to noise, we performed a series of weightings.

In the preceding analysis of the survey, the sub-samples of residents living in zone C, and in zone A-B, were matched according to the length of residence and the main socio-demographic criteria. To provide an accurate analysis of the variation of the answers as a function of the noise level, we subdivided the total sample group into subclasses. Since the variables of personality

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(1) During the survey we wrote down the address of the subjects. An index value was assigned by finding the place of residence on the map, or, in the case of ambiguity by a marking on the spot.

and health are correlated to these characteristics, such as sex and age, it is important to eliminate the influence of these characteristics to allow for comparisons.

By using a rectification program (the REDRESS programme), we were able to calculate the weighting coefficients which would make the structure identical to each sub-class (defined by the sections of the psophic index) that we wanted to isolate in order to make it similar to the overall marginal structure. This rectification was applied to the following criteria: sex, age, length of residence in the district, professional status of the head of family, activity of the interviewed subject. This rectification made it possible to assign the possible differences observed to the noise by comparing the population groups exposed to the different noise levels.

1. Noise and Personality Factors /5

The results of the two personality tests used: the MAS or the TAYLOR Anxiety Scale and the EYSENCK EPI do not vary with the noise level. Where the length of residence in the district crosses with the noise level, there is no significant variation (see the next table). The mean degree of anxiety, neurosis extroversion are not affected by ambient noise, even if this noise is intense (psophic index exceeding 100) and the duration of exposure to it is long (more than 10 years).

The series of items on emotivity, mood, social integration (1) do not bring to light differences according to noise level either.

IN SUMMARY, THE DATA COLLECTED DO NOT GIVE EVIDENCE OF ANY EFFECTS OF AMBIENT NOISE ON THE PSYCHOLOGICAL EQUILIBRIUM OF ORLY RESIDENTS.

2. Noise and Health /7

The reader will find on the next three tables the results of the health questionnaire as a function of the noise level established

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4 (1) These items were asked at the beginning of the interviews in the introduction.

| | PSOPHIC INDEX | | | | |
|---|---|---|---|---|---|
| | Below 89 | 89 to 92 | 93 to 96 | 97 to 100 | Above 100 |
| Number of interviews..... | 238 | 292 | 198 | 148 | 120 |
| .ANXIETY RATING (MAS) -The entire sample | | | | | |
| m ..... | 17.5 | 17.2 | 16.8 | 17.0 | 17.0 |
| σ ..... | 7.7 | 7.6 | 7.7 | 8.8 | 8.1 |
| -Length of residence | | | | | |
| • 2 to 9 years m ..... | 17.7 | 17.0 | 16.4 | 17.3 | 16.7 |
| σ ..... | 7.8 | 7.5 | 7.3 | 8.5 | 9.1 |
| • 10 years or more m ..... | 17.3 | 17.4 | 17.2 | 16.7 | 17.3 |
| σ ..... | 7.5 | 7.6 | 8.1 | 9.0 | 6.9 |
| NEUROSIS RATING (EPI) -The entire sample | | | | | |
| m ..... | 9.6 | 9.5 | 9.5 | 9.2 | 9.5 |
| σ ..... | 4.8 | 4.9 | 5.2 | 5.2 | 4.9 |
| -Length of residence | | | | | |
| • 2 to 9 years m ..... | 9.3 | 9.5 | 9.3 | 9.2 | 8.8 |
| σ ..... | 4.7 | 5.0 | 5.0 | 4.9 | 5.0 |
| •10 years or more m ..... | 9.9 | 9.6 | 9.7 | 9.2 | 10.1 |
| σ ..... | 4.9 | 4.8 | 5.3 | 5.5 | 4.7 |
| EXTROVERSION RATING (EPI) -The entire sample | | | | | |
| m ..... | 10.6 | 10.9 | 10.5 | 10.3 | 10.1 |
| σ ..... | 3.5 | 3.7 | 3.7 | 3.9 | 3.5 |
| -Length of residence | | | | | |
| • 2 to 9 years m ..... | 10.7 | 11.2 | 10.7 | 10.7 | 10.6 |
| σ ..... | 3.5 | 3.5 | 3.8 | 3.8 | 3.3 |
| • 10 years or more m ..... | 10.5 | 10.7 | 10.3 | 10.0 | 9.6 |
| σ ..... | 3.6 | 3.9 | 3.7 | 4.0 | 3.6 |

for the entire sample group as well as individually for people who have been living in the same district from 2 to 9 years and for those who have been living there for 10 years or more.

Significant differences show that there is a correlation between the ambient noise level and the state of health.

The percentage of residents who declare that their health has been good over the past 12 months decreases when the psophic index exceeds 96. This phenomenon may be observed at the level of all samples, but it actually stems from answers of people who have been living around ORLY for less than ten years.

A RELATIVELY LONG EXPOSURE TO AMBIENT NOISE OF A HIGHER LEVEL THUS AFFECTS THE STATE OF HEALTH OR AT LEAST THE EVALUATION EXPRESSED BY THE RESIDENTS.

In a first analysis, and in the absence of medical check-ups or biological analyses, we may conclude that noise is more related to a feeling of "uneasiness", to subjective symptoms than to directly identifiable organic illnesses.

A. The frequency of people who have to stay at home for health reasons, of hospitalizations, of chronic illnesses does not increase as a function of the psophic index. Conversely, inactivity and hospitalizations are significantly more frequent among people who have been living for at least 10 years in a home characterized by a psophic index of less than 89.

B. Conversely: /8

.People who answer that they are "unusually tired" are significantly more numerous for an index exceeding 92 of residents who have been living for 10 or more years around ORLY.

."Pains in some part of the body" are reported more frequently by residents who have been living at least 10 years in a home characterized by a psophic index of more than 96.

.When the index is above 100, the residents complain more of dizziness and fainting spells.

.An account of all medication taken during the week preceding the interview does not increase significantly with the psophic index. However, the use of psychotropes seems to increase as a function of the psophic index: the use of tranquilizers is quite a bit greater when the index exceeds 100. The use of neuroleptics and antidepressants is found only among those living in the noisiest zones.

## II - THE INTER-INDIVIDUAL VARIABILITY OF ANNOYANCE /12

Studies conducted on airport residents have generally given evidence of a very high individual variability in the evaluation of the annoyance level.

To explain this variability, we have frequently brought in the influence of psychological and/or physiological factors which would lead to hypersensitivity or hyposensitivity to noise. Such factors, however, have been taken into account very little until now and what we know about them has remained at the assumption level.

The survey conducted around ORLY included a data collection about health and personality, thus making it possible to test the assumption of a correlation between these variables and the sensitivity to noise. To accomplish this, we have taken several steps.

For each interview, an annoyance rating was calculated. Since each interview was characterized by the value of the psophic index of the place of residence, we were able to establish the distribution of the averages of this annoyance rating as a function of the psophic index. After smoothing the resulting curve, we calculated for each interview the value of its difference with this average curve. The distribution of these values was used as a basis for analysis and was considered as the "variable to be explained" of a multivaried analysis.

| | PSOPHIC INDEX | | | | |
|---|---|---|---|---|---|
| | Below 89 | 89 to 92 | 93 to 96 | 97 to 100 | Above 100 |
| Total of each group..... | *238* | *292* | *198* | *148* | *120* |
| Over the past 12 months: | | | | | |
| .Their health has been: | % | % | % | % | % |
| -Good..... | 55 | 57 | 58 | 50 | 46 |
| -Fairly good..... | 32 | 34 | 31 | 37 | 37 |
| -Poor..... | 11 | 9 | 10 | 9 | 15 |
| -Other..... | 2 | - | 1 | 3 | 1 |
| -Did not answer..... | - | - | - | 1 | 1 |
| | 100 | 100 | 100 | 100 | 100 |
| .They were hospitalized..... | 16 | 9 | 16 | 5 | 15 |
| .They were bedridden at home.... | 25 | 21 | 25 | 18 | 22 |
| -They declared they have a chronic illness..... | 17 | 25 | 21 | 21 | 19 |
| -They experience pains..... | 33 | 39 | 37 | 43 | 37 |
| -They have lost weight..... | 27 | 21 | 17 | 24 | 20 |
| -They have a loss of appetite... | 7 | 9 | 10 | 5 | 8 |
| -They are fatigued..... | 29 | 28 | 34 | 31 | 35 |
| -They have a tiring job..... | 22 | 21 | 20 | 22 | 26 |
| -They have dizzy spells..... | 13 | 15 | 16 | 11 | 23 |
| -They are prone to car-sickness. | 15 | 13 | 13 | 15 | 13 |
| -They have headaches..... | 17 | 21 | 18 | 20 | 23 |
| -They drink*..... | 10 | 6 | 8 | 5 | 6 |
| -They smoke**..... | 26 | 27 | 28 | 27 | 29 |
| Within the past 7 days | | | | | |
| .They have taken aspirin..... | 25 | 24 | 18 | 22 | 24 |
| .They have taken other medication including: | 28 | 33 | 30 | 34 | 35 |
| .Hypnotics..... | 3 | 3 | 3 | 6 | 4 |
| .Tranquilizers..... | 5 | 10 | 7 | 6 | 12 |
| .Neuroleptics..... | - | - | 2 | 1 | 1 |
| .Anti-depressants..... | - | 1 | - | 1 | 3 |

*More than 4 glasses per day.
**More than 10 cigarettes per day.

| | PSOPHIC INDEX | | | | | |
|---|---|---|---|---|---|---|
| | Below 89 | 89 to 92 | 93 to 96 | 97 & more | | |
| | | | | 97 to 100 | Above 100 | TOTAL |
| Total for each group..... | *118* | *157* | *96* | *63* | *51* | *114* |
| Over past 12 months | | | | | | |
| .Their health was | % | % | % | % | % | % |
| -Good..... | 60 | 62 | 61 | 59 | 56 | 58 |
| -Fairly good..... | 29 | 28 | 27 | 29 | 27 | 28 |
| -Poor..... | 8 | 10 | 11 | 8 | 17 | 12 |
| -Other..... | 3 | - | 1 | 4 | - | 2 |
| -No answer..... | | | | | | |
| | 100 | 100 | 100 | 100 | 100 | 100 |
| .Were hospitalized..... | 15 | 8 | 23 | 6 | 20 | 12 |
| .Stayed home from illness.. | 22 | 22 | 26 | 21 | 22 | 22 |
| -Answered they have a chronic illness | 15 | 17 | 22 | 17 | 9 | 13 |
| -Feel pains..... | 28 | 39 | 38 | 33 | 28 | 31 |
| -Have lost weight..... | 27 | 25 | 16 | 26 | 19 | 23 |
| -Suffer loss of appetite.. | 7 | 10 | 9 | 7 | 12 | 9 |
| -Are fatigued..... | 32 | 29 | 30 | 30 | 34 | 32 |
| -Their job fatigues them.. | 21 | 26 | 21 | 24 | 26 | 25 |
| -Have dizzy spells..... | 13 | 11 | 13 | 13 | 20 | 16 |
| -Become car sick..... | | | | | | |
| -Have headaches..... | 18 | 20 | 16 | 18 | 25 | 21 |
| -Drink (1)..... | 10 | 7 | 9 | 3 | 7 | 5 |
| -Smoke (2)..... | 30 | 31 | 28 | 26 | 38 | 32 |
| During the past 7 days | | | | | | |
| .Have taken aspirin ..... | 26 | 20 | 16 | 20 | 22 | 21 |
| .Have taken other medication..... | 22 | 26 | 29 | 27 | 25 | 26 |
| including: | | | | | | |
| -Hypnotics..... | 2 | 1 | 4 | 4 | 2 | 3 |
| -Tranquilizers..... | 2 | 6 | 4 | 6 | 6 | 6 |
| -Neuroleptics..... | - | - | 2 | 1 | - | 1 |
| -Anti-depressants..... | - | - | - | - | - | - |

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(1) More than 4 glasses per day.

(2) More than 10 cigarettes per day.

| | PSOPHIC INDEX | | | | | |
|---|---|---|---|---|---|---|
| | Below 89 | 89 to 92 | 93 to 96 | 97 or more | | |
| | | | | 97 to 100 | Above 100 | TOTAL |
| Total of each group..... | *120* | *135* | *102* | *85* | *69* | *154* |
| Over past 12 months .Their health was | % | % | % | % | % | % |
| -Good..... | 49 | 51 | 54 | 40 | 36 | 38 |
| -Fairly good..... | 35 | 41 | 35 | 44 | 46 | 45 |
| -Poor..... | 16 | 7 | 9 | 11 | 14 | 13 |
| -Other..... | - | 1 | 2 | 3 | 2 | 2 |
| -Did not answer..... | - | - | - | 2 | 1 | 2 |
| | 100 | 100 | 100 | 100 | 100 | 100 |
| .Were hospitalized..... | 17 | 10 | 8 | 5 | 9 | 7 |
| .Stayed home from work... | 28 | 21 | 24 | 15 | 21 | 18 |
| -Chronic illness..... (Feel they have) | 20 | 32 | 19 | 25 | 29 | 27 |
| -Feel pains..... | 38 | 40 | 37 | 52 | 46 | 49 |
| -Have lost weight..... | 28 | 17 | 18 | 23 | 20 | 21 |
| -Have lost appetite..... | 8 | 8 | 10 | 3 | 4 | 4 |
| -Are fatigued..... | 25 | 28 | 38 | 33 | 36 | 35 |
| -Their job fatigues them.. | 22 | 17 | 19 | 20 | 26 | 22 |
| -Have dizzy spells..... | 12 | 19 | 18 | 10 | 27 | 18 |
| -Become car sick..... | 16 | 10 | 16 | 12 | 12 | 12 |
| -Have headaches..... | 16 | 23 | 21 | 21 | 20 | 21 |
| -Drink (1)..... | 9 | 5 | 8 | 7 | 4 | 6 |
| -Smoke (2)..... | 22 | 22 | 27 | 27 | 21 | 24 |
| <u>During the past 7 days</u> | | | | | | |
| -Have taken aspirin ..... | 24 | 29 | 21 | 24 | 26 | 25 |
| -Have taken other medication..... | 33 | 41 | 31 | 41 | 45 | 43 |
| <u>including</u> | | | | | | |
| -Hypnotics..... | 4 | 5 | 3 | 9 | 5 | 7 |
| -Tranquilizers..... | 7 | 13 | 11 | 6 | 17 | 11 |
| -Neuroleptics..... | - | - | 1 | 1 | 1 | 1 |
| -Antidepressants..... | - | 1 | - | 3 | 7 | 5 |

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(1) More than 4 glasses per day.

(2) More than 10 cigarettes per day.

## 1. Development of an Annoyance Indicator and a Sensitivity to Noise Indicator

The annoyance caused by aircraft noise being a multifaceted phonomenon, a series of questions were asked. Each subject was given a series of answers indicating the intensity of his annoyance and some of its manifestations.

Since it was deemed preferable not to define an annoyance indicator through assumption (and therefore arbitrarily), we tried to construct it in terms of the answers given by the subjects interviewed. To accomplish this, it was necessary to determine the effect each question could have on the constituency of this index. /13

The best way to solve this kind of problem is to do a factorial analysis of the main components. We know that the factorial analysis will bring to light the main factors which account for the variance in results. In other words, it brings out the underlying dimensions in terms of how the answers to the questions asked are organized. We may thus summarize the data collected from an individual not by studying the whole set of answers given but by locating its position on the axes or factors which constitute the latent variables.

This manner of data processing was well suited to the objective defined, since it permitted the determination of the weighting coefficients of each question and the calculation of the "rating" obtained by each individual on the different significant factors found.

We essentially knew that the questions used to perform the factorial analysis made it possible for the various degrees of annoyance to be expressed in such a manner that the main factor of this analysis would indicate the intensity of the annoyance felt. A simple transformation would then make it possible to construct an annoyance index from this factor.

The questions retained for this analysis are shown below. The different answers to each question were given ratings from 1 to the maximum number of answers classed in the order of an annoyance or an increasing dissatisfaction.

.Question 4

Degree of satisfaction toward environment regarding ambient noise.

.Questions 7 and 8 are summarized as follows: /14

-Hear aircraft noise and mention it spontaneously,
-Hear it and mention it after it was pointed out,
-Do not hear aircraft noise.

.Question 10

-Rating from 0 to 10 assigned to annoyance caused by aircraft noise.

.Question 12

-Intensity of Annoyance caused by aircraft noise.

.Question 13

-Frequency of annoyance caused by aircraft noise.

.Question 14

-Intensity of aircraft noise.

.Question 15 A to F

-Different circumstances in which annoyance is brought about by aircraft noise.

.Questions 17-18

Actions taken to prevent aircraft noise.

-Have already initiated 2 or more measures,
-Have already initiated 1 measure,
-Have no more comments, but would like to take at least one of the actions suggested,
-Miscellaneous.

.Question 19 (3 items)

-Sensations experienced as a result of aircraft noise.

.Question 22 /15

-Fear of airplane crash.

In short, 17 variables were thus chosen.

The program is based on the Hotelling method which calculates as many independent factors F (i.e. linear combinations between variables) as introduced variables. Since the program is iteratif, the determined factors are placed hierarchically according to their decreasing explanatory value (expressed in percentage of explained variance).

The results derived seem very satisfactory: the factor we were trying to find was clearly brought out from the others.

The average percentages of explained variance are as follows:

-Factor I: 38.3%
-Factor II: 10.6%
-Factor III: 6.5%
-Factor IV: 5.5%
-Factor V: 5.0%
etc.

Coefficients $a_i$ (correlation coefficients between questions and the factor) make it possible to know the weight of each question in the factor.

The questions assigned to the largest coefficients are those which occur the most frequently in this factor and those for which answers have the greatest influence on the position of an individual in this factor. The meaning of the different factors may be interpreted by examining coefficients $a_i$.

The variables which occur the most in the first factor are questions 13, 12, 10, 19A, 14, 15C, 15D (see the next table).

Examination of the various aspects of these questions shows that this factor provides a good measurement of the intensity of the annoyance caused by aircraft noise by synthesizing the importance, the frequency and the nature of this annoyance.

The fact that all $a_i$ coefficients are positive indicates that /17 all questions which were initially selected as possible intensity indices of the annoyance felt are correlated in a positive manner with this factor.

The series of questions asked brought to light an important underlying variable making it possible to situate each individual in a continuum from zero noise to a strong noise.

An annoyance index was constructed from this first factor. For clarity of analysis, it was agreed that this index would increase with annoyance and that it would have 100 for its average and 20 for its standard deviation.

As a result of this factorial analysis, each individual could be characterized by an annoyance rating and the psophic index value of the place of residence.

THE $a_i$ COEFFICIENTS CORRESPONDING TO THE FIRST FACTORS

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| Reduced variables | $a_i$ |
|---|---|
| Q. 13: Annoyance frequency..... | 0.8337 |
| Q. 12: Annoyance intensity..... | 0.829 |
| Q. 10: Annoyance rating..... | 0.747 |
| Q. 19a: Irritation from noise..... | 0.719 |
| Q. 15d: Annoyance to radio or TV listening..... | 0.702 |
| Q. 15c: Disturbance caused to conversations..... | 0.699 |
| Q. 14: Intensity of noise heard..... | 0.695 |
| Q. 19b: Difficulty to concentrate..... | 0.661 |
| Q. 4: Satisfaction with regard to ambient noise. | 0.641 |
| Q. 15e: Impossibility to open windows..... | 0.594 |
| Q. 19c: Feeling of general fatigue..... | 0.572 |
| Q. 15a: Annoyance caused to sleeping..... | 0.505 |
| Q. 15b: Awakens..... | 0.502 |
| Q. 17-18: Suits undertaken or considered..... | 0.445 |
| Q. 7-8: Spontaneous mention of aircraft noise.... | 0.393 |
| Q. 15f: Fright from aircraft noise..... | 0.341 |
| Q. 22: Fear that an airplane will crash..... | 0.301 |

The relationship between these two types of variables has already been the subject of numerous studies which have all led to the same conclusion: the average annoyance level increases fairly steadily as a function of the noise index, but the inter-individual variability is very high.

The present survey confirms once again the following results: /18

.The correlation coefficient between the annoyance rating and the noise index is not very high: r = .20. An identical coefficient (r = .21.) was observed in an earlier survey conducted around ORLY where the annoyance index was established by a similar method (1). The assumption of a linear regression being easily adopted, the low value of this correlation coefficient demonstrates the wide range of the annoyance ratings as a function of the psophic index.

.The distribution of the averages of the annoyance indicator as a function of the psophic index grouped in a class clearly brings to light the progressive growth of the average annoyance (see the next graph). This distribution may be summarized by a straight line or by a flattened "S" curve. The next psophic index table also illustrates the growth of annoyance as a function of the psophic index.

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(1) Refer to the report: "Correlation Between Noise and Annoyance Around ORLY", January 1973. This study was carried out for STNA on 5,000 residents living near this airport.

It should be pointed out that some surveys give much higher correlation coefficients. This is generally because instead of considering the individual values of the annoyance rating and the noise index, they are based on the average of the noise index in relatively large zones or for the average value of the annoyance rating for a group of residents. In this perspective, our previous study made it possible to establish a correlation coefficient of .56 by taking into account "average individuals" rather than individuals obtained by grouping the 5 interviews conducted in each of the 1,000 survey points.

AVERAGE RATINGS OF ANNOYANCE IN TERMS OF THE PSOPHIC INDEX

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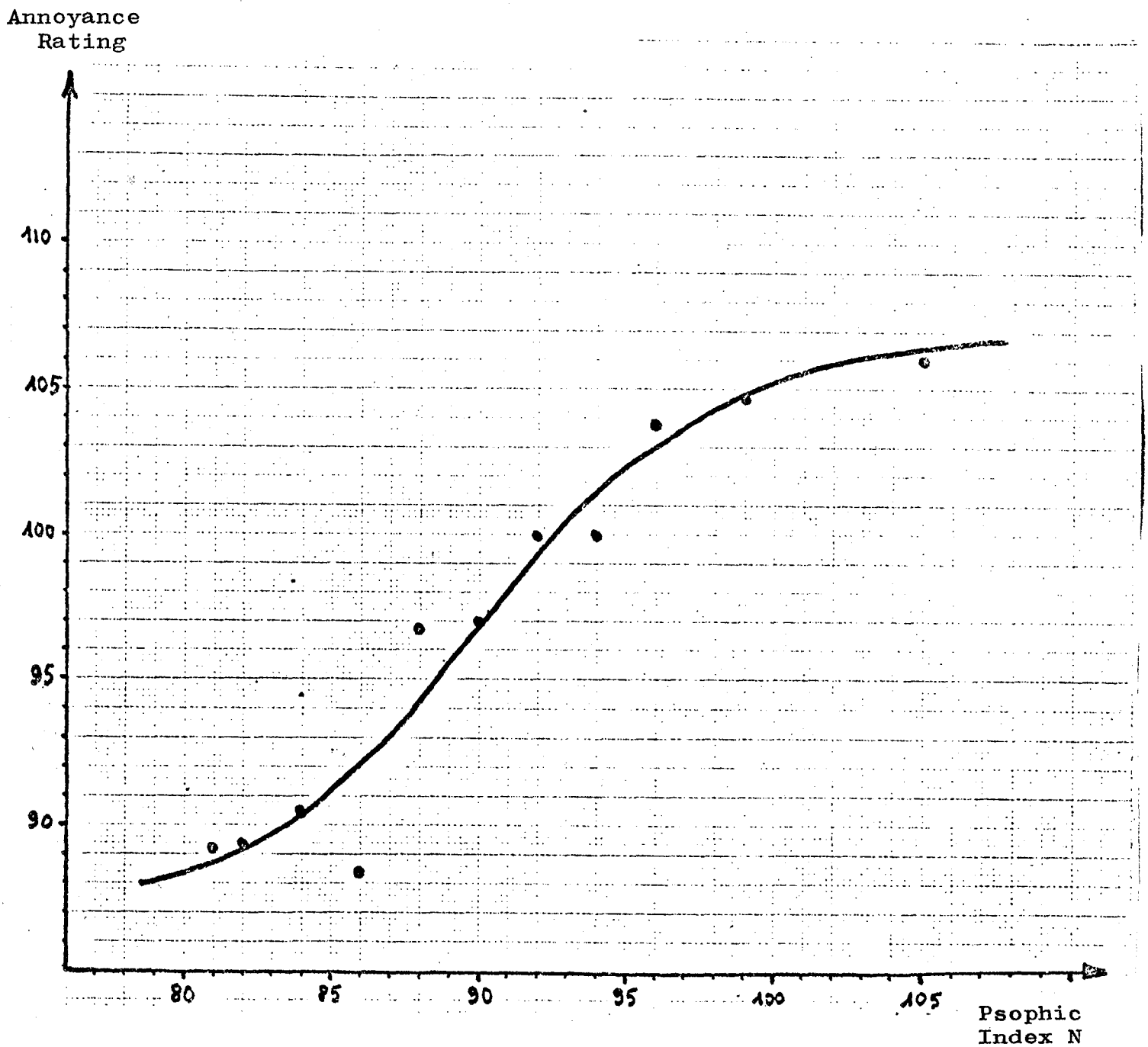

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| | PSOPHIC INDEX | | | | |
|---|---|---|---|---|---|
| | Below 89 | 89 to 92 | 93 to 96 | 97 to 100 | Above 100 |
| | % | % | % | % | % |
| .Aircraft noise: | | | | | |
| -Annoys them considerably... | 45 | 55 | 61 | 66 | 64 |
| -Annoys them very often..... | 36 | 45 | 48 | 58 | 57 |
| -Is very loud..... | 53 | 52 | 56 | 61 | 71 |
| .Aircraft noise frequently: | | | | | |
| -Disturbs conversations.... | 36 | 41 | 52 | 51 | 61 |
| -Annoys radio or TV listening..... | 55 | 65 | 67 | 81 | 80 |
| -Prevents them from opening the windows..... | 33 | 52 | 56 | 56 | 70 |
| -Prevents them from sleeping | 8 | 8 | 10 | 9 | 13 |
| -Awakens them..... | 9 | 10 | 12 | 11 | 18 |
| -Frightens them..... | 4 | 2 | 3 | 3 | 4 |
| .Aircraft noise very often or fairly often makes them: | | | | | |
| -Unnerved..... | 38 | 35 | 45 | 46 | 50 |
| -Have a hard time concentrating..... | 31 | 29 | 35 | 32 | 34 |
| -Feel general fatigue..... | 19 | 16 | 23 | 26 | 38 |
| -Consider that noise necessarily influences health.. | 26 | 31 | 34 | 42 | 46 |
| -Very often fear that an airplane will crash..... | 15 | 10 | 19 | 19 | 22 |
| -See airplanes flying overhead very or fairly frequently..... | 27 | 26 | 33 | 33 | 37 |
| -Have signed a petition to protest against airplane noise..... | 39 | 42 | 42 | 39 | 44 |

Since we are trying to find out to what extent the data collected will help us to understand why some people are very annoyed by noise at a given noise level, whereas others say they are not annoyed at all, we have defined a variable called "sensitivity to noise": for each individual, we have calculated the difference between his annoyance rating and the average annoyance rating (read on the smoothed curve) of people whose place of residence is characterized by the psophic index value. This new variable equals 0 if the recorded annoyance is "normal"; it is positive in the case of hypersensitivity to noise and negative in the case of hyopsensitivity. /21

## 2. Results

The "sensitivity to ambient noise" or "noise tolerance" variable expresses the portion of annoyance which cannot be determined by the psophic index. It therefore indicates to a large extent the hyper or hyposensitivity to noise (1)

Based on this variable, we have divided the sample into 3 groups:

.hyposensitivity: deviation from the average by more than - 15,
.mean sensitivity: rating between + 15 and - 15,
.hypersensitivity: deviation from the mean by more than + 15.

---

(1) Apart from the sensitivity to noise, this variable also reflects the "local abnormalities" from the psophic index. The psophic index taken into account in the present study is an index calculated from traffic parameters and is not an index which is measured on location. Unusual exposure situations may modify the noise level at a given point. Thus, for example, an apparent "hyposensitivity" may simply stem from a mask effect from a building facing the living quarters and which reduces the local noise level. The diversity in the exposure conditions undoubtedly gives a random function to these variations. They nevertheless constitute a factor of inertia in the analysis undertaken: part of the effect we are trying to explain is produced by uncontrolled objective variables.

Large variations confirm that sensitivity to noise is related to personality and to health factors: /22

."Hypersensitive" Individuals:

-are given an above average anxiety rating,
-complain most often about a series of subjective "symptoms":

.fatigue,
.their job is tiring,
.dizzy and fainting spells,
.headaches.

-are more numerous to take medication during the 7 days prior to the interview,
-estimate less often that their health has been good over the past 12 months.

| | | SENSITIVITY TO NOISE | | |
|---|---|---|---|---|
| | | Hypo-sensi-tivity | Mean sen-sitivi-ty | Hyper-sensi-tivity |
| .ANXIETY..... | m | 16,9 | 16,2 | [19,1] |
| | σ | 8,3 | 7,4 | 7,5 |
| .EXTROVERSION..... | m | 10,8 | 10,6 | 10,3 |
| | σ | 3,7 | 3,7 | 3,7 |
| .NEUROSIS..... | m | 9,2 | 9,0 | [10,8] |
| | σ | 5,1 | 4,9 | 4,9 |

| | SENSITIVITY TO NOISE | | |
|---|---|---|---|
| | Hyposensitivity | Average sensitiv. | Hypersensitiv. |
| Total of each group..... | *194* | *525* | *277* |
| Over the past 12 months: | % | % | % |
| .Their health has been | | | |
| -Good..... | 57 | 59 | [43] |
| -Fairly good..... | 31 | 30 | 42 |
| -Poor..... | 10 | 10 | 12 |
| -Other..... | 2 | 1 | 3 |
| | 100 | 100 | 100 |
| .They were hospitalized..... | 14 | 11 | 13 |
| .They were bedridden at home..... | 23 | 20 | 28 |
| -Declare they have chronic illness ..... | [15] | 19 | [29] |
| -Experience pains..... | [30] | 39 | [42] |
| -Have lost weight..... | 26 | 20 | 22 |
| -Have a loss of appetite..... | 10 | 7 | 7 |
| -Are fatigued..... | 31 | 27 | [40] |
| -Their job fatigues them..... | 20 | 18 | [29] |
| -Have dizzy spells..... | 14 | 13 | [19] |
| -Become car-sick..... | 16 | 14 | 14 |
| -Get headaches..... | 17 | 18 | [24] |
| -Drink (1)..... | 8 | 7 | 5 |
| -Smoke (2)..... | 29 | 26 | 25 |
| Over the past 7 days | | | |
| .Have taken aspirin ..... | 23 | 20 | 26 |
| .Have taken other medication..... | 32 | 28 | [38] |
| including: | | | |
| -Hypnotics..... | 2 | 3 | 5 |
| -Tranquilizers..... | 7 | 7 | 8 |
| -Neuroleptics..... | 1 | - | 1 |
| -Anti-depressants..... | 1 | 1 | 1 |

(1) More than 4 glasses per day.

(2) More than 10 cigarettes per day.

.On all of these points, "hypersensitive" individuals are /24
not different from people with an average sensitivity. On the other hand, for two questions, hyposensitive individuals have a below average rating and hypersensitive individuals have an above average rating: these are the questions about chronic illnesses and "pains in some part of the body".

On the whole, personality and health factors give us a better understanding of hypersensitivity to noise than of hyposensitivity.

The expected results were obtained for hypersensitivity: an above average annoyance coincides with a slightly higher anxiety and a slightly lower health status. This is indicated by a series of "subjective symptoms" and a higher number of medical treatments. If, however, "poor health" and an accumulation of symptoms are correlated to a greater intolerance to ambient noise, a "good health" status does not imply hyposensitivity. Factors accounting for an above average tolerance have to be found, then, in physiological or psychological variables or others than those which were measured in the present study.

Apart from noting meaningful correlations between sensitivity to noise and personal factors, we tried to estimate mathematically the predictive value of these factors.

Using a multivaried analysis program (the MULTIVAR program ), we tried to find out whether it is possible to determine for each individual the rating of the sensitivity to noise (variable to be explained) through various explicative variables (results of personality tests, questions about health, etc.).

This program calculates the correlations between the variable to be explained and each explicative variable. We then look for a polynomial relationship which will help us to calculate the value of the variable to be explained for each individual as a function of the values considered for the explicative variables.

This relationship is obtained by successive iterations (adding or eliminating variables). In other words, this mathematical treatment will indicate which variables or combinations of variables will help to explain whether an individual is less annoyed or more annoyed than average and it can be used to calculate the predictive value of these variables (percentage of explained variance). /25

A first multivaried analysis was based on personality and health variables. The self-administered questionnaires were used to construct 19 explicative variables (1). The variable to be explained was the "sensitivity to noise" defined above without regroupings.

---

(1) The 19 explicative variables thus constructed are:

1. The anxiety rating (Taylor Scale),
2. The extroversion rating (Eysenck EPI Test),
3. The neurosis rating (Eysenck EPI Test),
4. The amount of aspirins taken (during the past 7 days),
5. The quantity of psychotrope medication taken (in the last 7 days),
6. The quantity of other medication taken (in the last 7 days),
7. The general health picture over the past 12 months,
8. Staying home or hospitalization over the past 12 months (absence from work),
9. Chronic illness,
10. The presence of pains in some part of the body,
11. Recent loss of weight,
12. Loss of appetite,
13. Fatigue,
14. Fatiguing job,
15. Dizzy and fainting spells,
16. Car-sickness,
17. Headaches,
18. Drinking more than 4 glasses per day,
19. Smoking more than 10 cigarettes per day.

The correlation coefficients between the explicative variables and the variable to be explained are low. Only five of them are higher than .10. They are: /26

- the neurosis rating..... .13
- the anxiety rating..... .13
- the existence of a chronic illness .13
- the general evaluation of health for the past 12 months..... .11
- the presence of pain in some part of the body..... .10

These correlations are not meaningful: while the calculation of $X^2$ shows that the "hyperannoyed" class differed from the whole sample group on certain points, calculation of the correlation does not give evidence of a relationship. In other words, the neurosis rating of a resident (or any other variable considered separately), does not help us to predict his sensitivity to noise rating, although we can discard the assumption that these variables are independent when the sensitivity to noise is grouped into large classes.

The multivaried analysis, using 5 variables, helps us to find a correlation of .27 between the variable to be explained and the prognosticated variable: since we know the answers given by residents for these 5 variables, we can calculate their sensitivity to noise rating. The distribution of ratings thus prognosticated correlates .27 with the ratings actually obtained (1).

The program uses the iterative process to derive this result. This is carried out by extracting successively from the variables which are the best correlated with the variable to be explained those which have the highest marginal percentage of explanation. If two variables are highly correlated, one will be /27

(1) The addition of three supplementary variables which are the most explicative (general health picture, extroversion, car sickness) does not really improve the correlation with the variable to be explained, which increases by only .02.

chosen in the first step. The second variable will then be considered only if it explains the residual variance better than the others. In this case, anxiety and neurosis are both correlated by .13 with the variable to be explained and are highly inter-correlated (.79). Only anxiety was chosen. Neurosis was not reintroduced because its marginal percentage, after using anxiety, was too low.

The 5 variables chosen are:

| | Correlation with Sensitivity to Noise |
|---|---|
| .the anxiety rating..... | .13 |
| .chronic illness..... | .13 |
| .pain in the body..... | .13 |
| .tiring job..... | .08 |
| .loss of appetite..... | .03 |
| .combination of 5 variables..... | .26 |

On the whole, anxiety and certain health questions account partially for the inter-individual variability of annoyance. However, a good portion of the annoyance felt by an individual cannot be explained by the noise level or by the personality and health factors considered in this study.

The socio-demographic and housing characteristics do not really help us to explain this phenomenon. A multivaried analysis based on only these values (1) makes it possible to determine the distribution of the sensitivity to noise rating correlated by .15 with the real values. This result was derived mainly from the correlation of the sensitivity to noise rating with the length of residence (.11) and age (.10), these 2 variables being themselves inter-correlated by .37. /28

(1) The following variable were taken into account: sex, age, professional status of the head of family, occupation of the subject interviewed, number of people in the home, number of children, owner or renter status, type of living quarters, length of residence.

Since these variables are related to personality and health, they do not contribute to the accuracy of the prediction of the annoyance felt by an individual: we therefore performed a third multivaried analysis, this time accounting for the socio-demographic and housing characteristics as well as personality and health factors; the quality of the prognosis of annoyance thus obtained is exactly identical (correlation of .27 with the real "sensitivity to noise") to that resulting from the multivaried analysis performed using only the psychological and health variables.

The insertion of socio-demographic and housing characteristics did not help us to improve the prediction of the sensitivity to noise rating of a given individual.

## CONCLUSIONS /29

### CORRELATION BETWEEN NOISE AND PSYCHOPHYSIOLOGICAL EQUILIBRIUM

The data collected do not show any effect of ambient noise on the psychological equilibrium of Orly airport residents. The average degree of anxiety, neurosis and extroversion does not vary as a function of the psophic index.

Conversely, a correlation between ambient noise and health is noted: a relatively long exposure to high level ambient noises has a negative effect on health, at least in the opinion of the airport residents interviewed.

Fewer people in the sample group living for at least 10 years in the vicinity of Orly in a living quarters characterized by a psophic index higher than 96 think that their health has been good over the past 12 months. These people complain more often of "pains in some part of the body".

Those who have been living around the airport for less than 10 years have a higher percentage who say they are "unusually tired", for indices above 92.

These results show that noise causes some residents to feel a discomfort which is expressed by "subjective symptoms". However, a higher noise level does not cause people to stay home from work due to illness or hospitalizations. Noise is therefore not a causal factor in the onset of organic or functional illnesses.

However, it would not be wise to conclude that noise has no /30
pathological effects. As a matter of fact, the method of data collection (self-administered questionnaires) is possibly not accurate enough to detect slight deviations in physiological parameters from the norm.

We cannot rule out the assumption that such deviations occur and contribute to the onset of pathological effects in a few cases or to the aggravation of certain disorders in percentages that the methodology used cannot detect.

THE INTER-INDIVIDUAL VARIABILITY OF ANNOYANCE

The sensitivity to noise is related to personality factors and to health, but these factors -at least those considered in this study give us a better understanding of the "hypersensitivity" to ambient noise than of the "hyposensitivity".

People who feel an above average annoyance for different noise levels receive a slightly higher anxiety rating than others. Their health status is lower: they record more chronic illnesses, headaches, dizziness or fainting spells, pains. Poor health is thus related to a higher intolerance to ambient noise.

On the other hand, little difference is noted between "hyposensitive" people and people with average sensitivity. Factors which account for an above average tolerance should therefore be looked for in different personality or health variables than those which were measured in this study.

# SURVEY QUESTIONNAIRES

20 RUE D'ALMALE, 75009 PARIS TEL. 285 05 51

FILL IN QUESTIONNAIRE NO. 0 0 0

/32

U. 021

FEBRUARY 1975

QUESTIONNAIRE TO BE PRESENTED TO AN INDIVIDUAL BETWEEN 20 TO 65 YEARS OLD WHO HAS BEEN LIVING FOR AT LEAST 2 YEARS IN THE DISTRICT.

IFOP is conducting a nationwide survey on the life-style of French people. The survey is an attempt to learn more about the daily habits and tastes of the French people.

I am going to ask you a few questions which you can answer by YES or NO. Please answer quickly, because we are interested in your immediate reaction and not thought-out answers.

| | YES | NO | ? |
|---|---|---|---|
| 1. a) Do you like group living?..... | 1 | 1 | E |
| b) Do you like to make fast decisions?..... | 2 | 2 | E |
| c) Do you feel ill-at-ease in an elevator or in a tunnel?..... | 3 | 3 | E |
| d) Do you have self-composure?..... | 4 | 4 | E |
| e) Are you normally care-free and happy?... | 5 | 5 | E |
| f) Do you prefer working in teams rather than alone? | 6 | 6 | E |
| g) Does your thinking become confused when you act too fast?..... | 7 | 7 | E |
| h) Do you ever have the impression of no longer being yourself?..... | 8 | 8 | E |
| i) Do you have self-confidence?..... | 9 | 9 | E |
| j) Do you think life is worth living?..... | Y | Y | E |
| k) Do you make friends easily?..... | X | X | E |
| l) Do you have difficulty concentrating? | 0 | 0 | E |
| m) Are you often awakened by nightmares?... | 1 | 1 | E |
| n) Are you even-tempered?..... | 2 | 2 | E |
| o) Do you often feel down?..... | 3 | 3 | E |
| p) Are you easily annoyed?..... | 4 | 4 | E |
| q) Do you have a good memory?..... | 5 | 5 | E |
| r) Are you annoyed by strange ideas?..... | 6 | 6 | E |
| s) Do you often give up something you have started?..... | 7 | 7 | E |
| t) Do you ever have a hard time understanding what you are reading?..... | 8 | 8 | E |

I am going to ask you to answer a written questionnaire containing the same type of questions I have just asked you. Your answers will be confidential: when you have completed this questionnaire, I will put it in a sealed envelope. /33

Your answers should show how you normally feel and act. Here again I will ask you not to spend too much time on each question and to answer with your first reaction. The entire questionnaire should not take more than a few minutes.

Read the written questionnaire with the person being interviewed and help him to answer 3 examples. Then let the person being interviewed complete the written questionnaire. After putting it in an envelope, continue the oral interview.

WE ARE NOW GOING TO ASK QUESTIONS ABOUT THE ENVIRONMENTAL CONDITIONS OF THE INHABITANTS OF...

2. On the whole, what do you think of the environmental conditions of this neighborhood? Would you say that life here is:

- .Very pleasant?..... 1
- .Fairly pleasant?..... 2
- .Not very pleasant?..... 3
- .Not very pleasant at all?. 4

3. In this neighborhood, do you feel that present changes:

- .Improve the life-style?....1
- .Bring about a less satisfactory life-style?..... 2
- .(SPONTANEOUS ANSWER: do not change the life-style?.3
- . ? ..... 0

4. For each environmental condition I am going to mention, would tell me if you are personally very satisfied, fairly satisfied, not very satisfied or not satisfied at all with the present environmental conditions at ..... (GIVE NAME OF NEIGHBORHOOD) in regard to the aspect mentioned? /34

| | Very satisfied | Fairly satisfied | Not very satisfied | Not satisfied at all | ? |
|---|---|---|---|---|---|
| a) Public transportation facilities..... | 1 | 2 | 3 | 4 | 0 |
| b) Green areas: squares, public gardens, parks..... | 1 | 2 | 3 | 4 | 0 |
| c) Possibility of finding work near the home..... | 1 | 2 | 3 | 4 | 0 |
| d) Peacefulness from the viewpoint of ambient noise..... | 1 | 2 | 3 | 4 | 0 |
| e) Cost of housing: cost of rent or construction/m2..... | 1 | 2 | 3 | 4 | 0 |
| f) Amusement facilities..... | 1 | 2 | 3 | 4 | 0 |
| g) Educational or sports facilities: schools, sports areas, swimming pools, etc..... | 1 | 2 | 3 | 4 | 0 |
| h) City maintenance: cleaning streets, monuments, buildings. ..... | 1 | 2 | 3 | 4 | 0 |
| i) Traffic and parking facilities ..... | 1 | 2 | 3 | 4 | 0 |
| j) Quality of air in the neighborhood (smells? Smoke?)..... | 1 | 2 | 3 | 4 | 0 |
| k) Housing conditions..... | 1 | 2 | 3 | 4 | 0 |
| l) Working conditions..... | 1 | 2 | 3 | 4 | 0 |
| m) Relationships with people in your area (or neighborhood)... | 1 | 2 | 3 | 4 | 0 |

5a Since you have been living here, have you ever considered living somewhere else?

.YES, in the past..... 1 → 5b
.YES, I am considering it now... 2
.NO, I have never though of it.. 3 → 6

5b Why? GIVE SPECIFIC REASONS: anything else?.....

6 Would you say that the noise in your neighborhood annoys you...

.Very often..... 1
.Fairly often..... 2
.Sometimes..... 3
.Never..... 4
.?..... 0

7 What type of noise do you hear around here, in your neighborhood. DO NOT SUGGEST ANSWERS - MARK THOSE WHICH YOU ANSWER SPONTANEOUSLY.

.Traffic noise (cars, trucks, two-wheelers.....1
.Aircraft noise.....2
.Factory noise.....3
.Noise from neighbors (TV, talking, children).....4
.Noise from the street (children, people).....5
.Construction noise.....6
.Other (SPECIFY).....7
.No noise.....8

8 Do you hear?

| | YES | NO |
|---|---|---|
| .Traffic noise..... | 1 | 1 |
| .Aircraft noise..... | 2 | 2 |
| .Factory noise..... | 3 | 3 |
| .Noise from neighbors in your home... | 4 | 4 |
| .Noise from people or children in street | 5 | 5 |
| .Construction noise.. | 6 | 6 |
| .Other (specify)..... | 7 | 7 |

/35

IF YOU HEAR ONLY ONE TYPE OF NOISE GO ON TO Q. 10.

9 Of the noises you hear in your area, which one annoys you the most? Second most? Third most?

| | 1 | 2 | 3 |
|---|---|---|---|
| .Traffic noise... | 1 | 1 | 1 |
| .Aircraft noise.. | 2 | 2 | 2 |
| .Factory noise... | 3 | 3 | 3 |
| .Neighbors..... | 4 | 4 | 4 |
| .Children from the street..... | 5 | 5 | 5 |
| .Construction noise..... | 6 | 6 | 6 |
| .Other (SPECIFY). | 7 | 7 | 7 |

10 I am going to ask you to what extent the noise you hear annoys you during this time of the year. Look at this card & give a rating from 1 to 10 beginning with the least annoyed and progressing to the most annoyed. (SHOW CARD A)

| | RATING |
|---|---|
| .Traffic noise..... | ___ |
| .Aircraft noise..... | ___ |
| .Factory noise..... | ___ |
| .Noise from neighbors. | ___ |
| .Noise from people or children in the street. | ___ |
| .Construction noise.... | ___ |
| .Other (SPECIFY)..... | ___ |

11a What times of the day do noises normally bother you? (SEVERAL POSSIBLE ANSWERS). /36

11b What time of the day are you the most bothered by noise? (ONLY ONE ANSWER).

| | | 11a | 11b |
|---|---|---|---|
| .at the beginning of the morning | (6-8 a.m.)..... | 1 | 1 |
| .during the morning | (8-12 a.m.)..... | 2 | 2 |
| .at lunchtime | (12-2 p.m.).... | 3 | 3 |
| .in the afternoon. | (2-7 p.m.)..... | 4 | 4 |
| .after dinner | (7-9 p.m.)..... | 5 | 5 |
| .in the evening | (9-11 p.m.).... | 6 | 6 |
| .at night | (11 p.m.-6 a.m.). | 7 | 7 |
| .never | | 8 | 8 |

IF YOU DO NOT HEAR AIRCRAFT NOISES (NO TO Q. 8) GO ON TO Q. 21.

I am going to ask you to give more details about the aircraft noise you hear in your neighborhood.

12. Does the noise bother you:

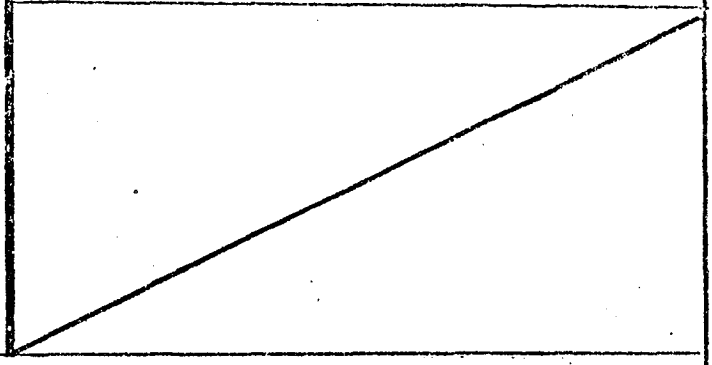
.considerably?.....1
.a fair amount?.....2
.a little?.....3
.not at all?.....4

13. Does aircraft noise annoy you:

.very often?.....1
.fairly often?.....2
.sometimes?.....3
.never?.....4

14. Is this aircraft noise mostly:

.very loud?.....1
.fairly loud?.....2
.fairly distant?.....3
.very distant?.....4



15. Does aircraft noise ever bother you in the following ways, here in your home? (IF YES: INDICATE IF THIS HAPPENS "SOMETIMES" OR "FREQUENTLY" - ONE ANSWER PER LINE).

| Does aircraft noise ever: | NO | YES sometimes | YES often | ? |
|---|---|---|---|---|
| a) keep you from sleeping?..... | 1 | 1 | 1 | E |
| b) awaken you?..... | 2 | 2 | 2 | E |
| c) disturb your conversations with your friends or family members?..... | 3 | 3 | 3 | E |
| d) annoy you when you are trying to listen to TV or the radio?..... | 4 | 4 | 4 | E |
| e) keep you from opening windows or going out on your balcony when it is nice outside?..... | 5 | 5 | 5 | E |
| f) frighten you?..... | 6 | 6 | 6 | E |

16.)

Have you ever thought of soundproofing your home from external noises or are you considering it now?
(SEVERAL POSSIBLE ANSWERS).

.yes, have already soundproofed my home.....1
.yes, I am planning to.....2
.no, I have never considered it.....3

17. Have you ever personally done any of the things mentioned on this card to protest against aircraft noise? (SHOW THE CARD & INDICATE ANSWERS IN APPROPRIATE COLUMN BELOW).

18. Does this card list any action you have personally taken or would like to take to protest against aircraft noise?
(MARK 2ND COLUMN).

| | Q.17 Have already | Q.18 Would like to |
|---|---|---|
| .contact public official | 1 | 1 |
| .personally see public official | 2 | 2 |
| .sign a petition | 3 | 3 |
| .attend public meeting..... | 4 | 4 |
| .other(what?)... | 5 | 5 |
| .not applicable. | 6 | 6 |

20. Would you say that a noise such as aircraft noise near your home:

.has affected your health?.1
.may affect the health of some people..... 2
.has no effect on health.. 3

/3

EVERYONE

21. Some people are more annoyed by noise than others, would you say that you are more, less or as annoyed than other people in your neighborhood?
(ASK THEM TO SPECIFY).

.Much more annoyed..... 1
.A little more annoyed.... 2
.As annoyed..... 3
.Slightly less annoyed.... 4
.Much less annoyed..... 5
.?..... 0

22. When you see an airplane flying overhead, are you ever afraid it will crash? Does this happen:

.Very often..... 1
.Fairly often..... 2
.Rarely..... 3
.Very rarely..... 4
.Never..... 5

23. Have you ever seen aircraft near Orly airport flying abnormally low? Does this happen:

.Very often..... 1
.Fairly often..... 2
.Rarely..... 3
.Very rarely..... 4
.Never..... 5

19. How often does aircraft noise cause you to feel the following sensations?

| | Very often | Fairly often | | Rarely | Never | ? | ? |
|---|---|---|---|---|---|---|---|
| .unnerved, irritable..... | 1 | 2 | | 3 | 4 | 5 | |
| .hard to concentrate..... | 1 | 2 | | 3 | 4 | 5 | 0 |
| .general fatigue..... | 1 | 2 | | 3 | 4 | 5 | 0 |
| | | | | | | | 0 |

34

CHARACTERISTICS

$A_1$ Do you live...

.on a farm.....1
.in a single family home.....2
.in an apartment building with less than 10 apartments.....3
.in an apartment building with more than 10 apartments..... 4

$A_2$ Number of stories

0 1 2 3 4 5 6 7 8 9

B Which floor do you live on? (MARK 0 FOR SINGLE FAMILY HOME)
0 1 2 3 4 5 6 7 8 9

C Could you give an approximate date that your dwelling was constructed (apartment or home).
-Before 1945..... 1
-Between 1945 and 1954..... 2
-Between 1955 and 1964..... 3
-Between 1965 and 1969..... 4
-1970 or after..... 5
.?..... 0

D Do you own or rent your home?

.Owner or co-owner..... 1
.Renter..... 2
.Other..... 3

$E_1$ How long have you lived in your neighborhood?

For ..... years

$E_2$ IF YOU HAVE ALWAYS LIVED IN YOUR NEIGHBORHOOD GO ON TO Q. F

Before living in this neighborhood, where did you live?.....

$E_3$ Is the place where you live

.much noisier than here..... 1
.slightly noisier than here.. 2
.as noisy as here..... 3
.somewhat less noisy..... 4
.much less noisy..... 5

F Number of people in the home?
1 2 3 4 5 6 7 8 9 +

38

G Number of children 15 years old or younger in the home?

1 2 3 4 5 6 7 8 9 +

H We would like to analyze the results of this study in terms of total family income. Please indicate where you belong on the scale of total income, including all revenues (salary, social security, retirement, etc.) (SHOW INCOME CARD 1 to 9 E).

1 2 3 4 5 6 7 8 9 E

I SEX

.Male.....1
.Female.....2

J. EXACT AGE

..... years

K PROFESSIONAL STATUS

Do you work and if so what do you do?

.....

salaried A Owner B Executive C Retired D

L IF THE INDIVIDUAL BEING INTERVIEWED WORKS:

Is your place of work...
.Very noisy.....1
.Fairly noisy.....2
.Not very noisy.....3
.Not noisy at all.....4

M Are you

.head of household.....1
.housewife.....2
.neither.....0

N PROFESSIONAL STATUS OF HEAD OF HOUSEHOLD

Salaried A Owner B Executive C Retired D

*IF OWNER

O How many people are employed in your company?

No. of people.....

/39

P ADDRESS OF INDIVIDUAL BEING INTERVIEWED

Street.....No.....
City.....Zip.....

Q BLOCK NUMBER

COMMUNITY NO.

NAME OF INVESTIGATOR

.....
DATE OF INTERVIEW.....

R LENGTH OF INTERVIEW

| | |
|---|---|
| .Less than 20 mn..1 | .45 - 49 mn.7 |
| .20 - 24 mn.....2 | .50 - 54 mn.8 |
| .25 - 29 mn.....3 | .55 - 59 mn.9 |
| .30 - 34 mn.....4 | .1h-1h14mn.Y |
| .35 - 39 mn.....5 | .1h15-1h29.X |
| .40 - 44 mn.....6 | .1h30 +....0 |

NO. 002625
U 021
FEBRUARY 1975

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WRITTEN QUESTIONNAIRE TO BE COMPLETED
BY THE INDIVIDUAL BEING INTERVIEWED
AND TO BE PLACED IN SEALED ENVELOPE

To fill in this questionnaire, please circle the appropriate answer

| Example: | YES | NO |
|---|---|---|
| 1. I am an optimist | 1 | 1 |

If you agree with this statement, circle code "1" under the "YES" column. If this statement does not apply to you, circle code "1" under the "NO" column.

| Other examples: | TRUE | I DO NOT KNOW | FALSE |
|---|---|---|---|
| 2. Do you have a good memory?..... | Y | Y | Y |

3. Are you even tempered?

YES.....1
NO.....2

CIRCLE THE APPROPRIATE ANSWER /41

-Has your health over the past 12 months been generally:

.Good.....1
.Fairly good...2
.Poor.....3
.Other.....4 Specify: .....

-Over the past 12 months, have you been hospitalized?

.YES...1 If so, specify .Length of hospitalization..... days
.Reasons for hospitalization.....
.....

.NO....2

-Over the past 12 months, has your illness prevented you from working or carrying out your normal duties?

.YES...1 If so, specify .How long.....days
.Nature of illness.....
.....

-Do you have a chronic illness?

.YES...1 If so, specify what kind.....

.NO....2

-Do you have pains in some part of your body?

.YES...1, If so, in what part?.....

.NO....2

| | YES | ? | NO |
|---|---|---|---|
| .Have you lost weight recently?..... | 1 | 1 | 1 |
| .Do you have a loss of appetite?..... | 2 | 2 | 2 |
| .Are you unusually fatigued?..... | 3 | 3 | 3 |
| .Is your work tiring?..... | 4 | 4 | 4 |
| .Do you have dizzy or fainting spells..... | 5 | 5 | 5 |
| .Do you become car sick, air sick, sea sick?..... | 6 | 6 | 6 |
| .Do you have frequent headaches?..... | 7 | 7 | 7 |
| .Do you drink excessive amounts of alcohol?..... (more than 4 glasses per day)?..... | 8 | 8 | 8 |
| .Do you smoke more than 10 cigarettes per day?... | 9 | 9 | 9 |

-During the past 7 days, have you taken:

.Aspirin tablets?

YES...1 If so, about how many?.....tablets.
NO....2

.Sleeping pills?

YES...1 If so, how often?.....times.
Give name of medication.....

.Tranquilizers, relaxants?

YES...1 If so, how often? .....times.
Give name of medication.....
NO....2

.Other medication?

YES....1 If so, give names.....
.....
NO.....2