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EFFECT OF AIRCRAFT NOISE ON THE EQUILIBRIUM OF AIRPORT RESIDENTS: LONGITUDINAL STUDY AROUND ROISSY - PHASE III.

Jacques Francois

Translation of "Les répercussions du bruit des avions sur l'équilibre des riverains des aéroports - etude longitudinale autour de Roissy, 3ème phase". Institut Francais d'Opinion Publique (IFOP), Paris, France, Report, September 1979, pp 1 - 73

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16. Abstract

This report studies the effects of airplane noise on the mental equilibrium of residents living near airports and is based on population sample surveys involving health questionnaires and self-administered personality tests. The purpose of the study is to observe progressive changes on the part of residents living near a large airport.

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In 1974, IFOP-ETMAR began a research program funded by the Scientific Commission on Noise and Vibrations of the Ministry of the Environment and the Fabric of Life. This program is intended to study the effects of airplane noise on the mental equilibrium of the residents living near airports and is based on population sample surveys involving health questionnaires and self-administered personality tests.

This report presents the results of a new survey which forms a part of this research program. A thousand residents living near Charles de Gaulle Airport, ranging from 20 to 65 years of age, were questioned in October-November 1977. Previously, two surveys, based on a comparable methodology, had been carried out on the same site: one on the eve of the opening of the airport, the other after one year of airport traffic.

The purpose of this longitudinal approach is to observe progressive changes on the part of the residents living near a large airport, while seeking to improve the knowledge of phenomena linked to the interindividual variability of the annoyance.

INTRODUCTION

In 1974 IFOP [French Institute of Public Opinion] began a program /1* of research centered on the study of populations exposed to airplane noise. Two topics were assigned to this research:

- *existence of disturbances* attributable to noise. This involved studying whether it would be possible to demonstrate any possible effects of airplane noise on the health and psychological equilbrium of the residents living near large airports. Does such ambient noise cause or favor the appearance of disturbances, in statistically significant proportions, within these populations? A multitude of assertions are circulating on this subject, but they have very rarely been dealt with by researchers.

- *sources of interindividual variations in annoyance*. All the surveys done on populations exposed to noise have shown that, for equal levels of noise, the level of annoyance varies strongly from one individual to another. To explain this phenomenon, two major types of hypotheses are invoked: those of one type postulate the existence of personal factors (in particular the characteristics of personality or health) which would have an influence on the sensitivity or the tolerance to noise; those of the other type invoke the effects of intraindividual variability (the annoyance varying within one and the same individual from one moment to another, according to his own attitudes, motivations, activities, or even by reason of problems related to the very methods for measuring the annoyance) which, when a measurement is done at a given instant t, will be interpreted incorrectly as a result of the interindividual variability. It is the validity of the first type of hypothesis that

* Numbers in the margins indicate pagination in original foreign text

our study sought to test.

This research program is based on a series of surveys: /2

First Phase *March 1974*	CHARLES DE GAULLE AIRPORT 690 residents of the area were questioned on the eve of the dedication of the airport		
Second Phase *March 1975*	CHARLES DE GAULLE AIRPORT 484 residents of the area were questioned (from the same sample as before)	ORLY AIRPORT 997 residents of the area	CONTROL STUDY, FRANCE AS A WHOLE 952 persons
Third Phase *November 1977*	CHARLES DE GAULLE AIRPORT 943 residents of the area were questioned (of those, 218 came from the preceding sample)		

In the interest of comparability, all of these surveys were based on an identical methodology. They have been carried out on samples of persons ranging from 20 to 65 years of age, the makeup of the samples having been established by the method of quotas.

Each time, the survey was represented as being a study on the daily life of the French people and the interview comprised several steps. /3

- a first battery of questions, posed orally, served to provide an introduction and paved the way for the next portions of the interview;

- the person being questioned was then asked to fill out in writing, by himself, a questionnaire including personality tests and questions on health. The anonymity of the answers was guaranteed to the interviewee; the investigator put the completed questionnaire in an envelope and sealed it at once;

- the interview was continued orally with questions on the environment, which gradually homed in on the noise aspect. The socio-demographic information was gathered at the close of the interview.

To characterize the level of noise to which the persons interviewed were being exposed, we used a map of isopsophic contours prepared at our request by the Paris Airport Authority: to each interviewee was assigned a value of the noise index Ie corresponding to his place of residence.

The results of the first two phases of the research have been presented in reports entitled:

"Effects of Airplane Noise on the Mental Equilibrium of Residents Living near Charles de Gaulle Airport. First Phase of the Research," --IFOP, April 1974.

"Effects of Airplane Noise on the Mental Equilibrium of Residents Living near Airports. Research Done in the Roissy and Orly Areas," --IFOP, September 1975. *(1)*

"Effects of Airplane Noise on the Mental Equilibrium of Residents Living near Airports. Analyses Complementary to the Survey Conducted in the Orly Area,"--IFOP, August 1977. /4

Once those first two phases were completed, it became possible to formulate the following principal conclusions:

- the personality tests employed did not enable the investigators to observe any deviations from the mean for the Orly area residents who had lived for a long time in the noisiest zones;
- on the other hand, the questionnaire on health brought out some significant deviations in the findings for persons living at least ten years in the noisiest sectors around Orly. This environment thus would seem to favor the appearance of certain troubles or, at least, the expression of subjectively perceived troubles;
- there exists a connection between the level of annoyance and the state of health. A correlation between annoyance and anxiety or nervousness is also observed. These correlations combine with each other to account for the interindividual variability of the annoyance. On the other hand, the annoyance is independent of the extraversion-introversion parameter;

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(1) - This report has been published in its entirety as a review article in SONDAGES, 1976, No. 2.

- in the area around Charles de Gaulle Airport, no deterioration discernable by means of the health questionnaire and personality tests was observed after one year of traffic.

The third phase of the research, the subject of the present report, /5 runs along the same lines as the earlier ones. This phase was organized around a dual objective:

- *effects of noise*. After three and a half years of airport traffic is the airplane noise from Charles de Gaulle Airport having effects on the area residents capable of being discerned by the technique employed? The noise in the vicinity of this airport appeared suddenly, while at Orly it increased gradually over the years. On the other hand, Charles de Gaulle Airport is open twenty-four hours a day, unlike Orly where the commercial traffic is restricted between 11 p.m. and 6 a.m. It would thus be possible to hypothesize that the "troubles" observed among the persons residing for a long time near Orly could have appeared sooner among residents of the Roissy area. Given different circumstances, of course, it would be possible to expect effects of a different kind.

- *interindividual variability of the annoyance*. Since it had been possible to show that the extraversion-introversion parameter was independent of the annoyance and since, on the other hand, the nervousness score was strongly correlated with anxiety (measured on the MAS scale), it appeared useless to continue using the EPI test, which is used to measure these two dimensions of an individual's personality. In the questionnaire

of the new survey, the MAS items were retained, and Kincannon MINIMULT items were incorporated. This MINIMULT test, constructed from the MMPI like the MAS, is scored on eight clinical scales and three validity scales *(1)*. As for the health self-evaluation questionnaire, it was enriched with the addition of a battery of supplemental items *(2)*. Therefore, an all-new series of personal variables was set up, hypothetically capable of cooperating to clarify the interindividual variability of the annoyance.

The survey was conducted between 24 October and 21 November 1977. /6 It was carried out in two stages. First of all, an attempt was made to reinterview the persons who had been respondents in the two previous surveys taken in the Roissy area. The number of "dropouts" was substantial in absolute value.

- 690 persons had been questioned in 1974
- 484 persons were able to be reinterviewed one year later
- 218 persons have been interviewed a third time three and a half years after the first survey.

This dropout rate is approximately 30% per year, which is about average for a survey by address.

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(1) - The MINIMULT was adapted for France by J. Perse, to whom we are grateful for advice on the use of this test, which was used according to the publisher's instructions.

(2) - These items were developed with the help of J. G. Henrotte (of the Human Biometrics Service of CNRS [National Center for Scientific Research]) in connection with another study.

Because of the attrition, a complementary sample of representative residents was drawn from the same population: persons living in the same survey zone and residing there at least since 1973 (i.e., before the opening of the airport); these persons thus belonged to the population studied at the time of the first survey.

In all, 943 interviews were conducted with area residents exposed to the noise of this airport from the beginning.

It was not possible for the "constant" sample to be analyzed separatedly to compare the responses of the same persons on different dates. Indeed, the results would not have been of very much value statistically since this sample, with its relatively severe attrition, was very thinly dispersed in terms of noise level. It was thus preferable to consider the 943 interviews as a whole.

The results, analyzed on this basis, have been grouped under three major headings: /7

- changes in opinions on the environment
- noise and personal characteristics
- annoyance and personal characteristics.

I - OPINIONS ON THE ENVIRONMENT

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On a very gross level, the opinions on the fabric of life seem stable, in that they have been only slightly affected by the opening of the airport: seven out of ten residents expressed a positive attitude on the conditions of life in their district. However, a slight shift in the detailed responses appeared in 1975 and held up in 1977: the respondents a little less often rated life in their district as "very" pleasant and a little more often considered it "fairly" pleasant (Table 1).

Other questions enable us to observe a noticeable change in the perception of the environment. The pessimistic tone which emerged from the responses collected after the opening of the airport seems to have softened: the proportion of area residents taking the view that "things are tending in the direction of an improvement of the fabric of life" had strongly decreased in 1975 but rose perceptibly in 1977, although without returning to the initial 1974 level.

This renewal of optimism can be explained if we look at the opinions on a series of specific aspects of the fabric of life:

- with respect to 1974 and 1975, the level of satisfaction significantly increased on several points: the educational and sports facilities, the means of public transportation, the green spaces, the possibilities for recreation, the upkeep of the town. The perception of these improvements in the fabric of life partly counterbalances the two aspects for which a substantial deterioration has occurred since 1974:
  - the satisfaction with regard to purity of the air in the district has not ceased to decline since 1974;

- as for ambient noise, the proportion of area residents very or fairly satisfied on this point had diminished by half in 1975, after the opening of the airport. In 1977, the result was analogous to that of 1975.

The interviews of the survey of 1977 have been divided into four groups as a function of the values of the noise index at the place of residence. To render these groups sufficiently comparable, an adjustment program was used to equalize the structure of the groups after the fact according to the criteria of sex, age, and socio-occupational status. /9

The influence of the degree of the annoyance caused by the airplane noise on the overall opinion of "life in the district" seems evident: the positive opinions decrease regularly as the level of the noise index increases.

It should be noted, however, that the annoyance does not constitute the only factor which would account for this apparent connection between the noise index and the overall opinion on the fabric of life. In fact, the zones with the greatest exposure to the noise are farther from Paris and consist of either small residential areas or urbanized sectors situated at the fringes of large population centers. It follows that the level of satisfaction in regard to certain aspects of the environment, not just the noise, would also decrease as the noise index increases: the means of public transportation, the possibilities for work in proximity to the home, the housing costs, and the possibilities for amusement. On the other hand, the opinions on the possibilities of getting around in traffic and parking are more negative in the sectors where the noise index is least high.

Table 1

	1974 SURVEY	1975 SURVEY	1977 SURVEY				
				Noise index			
			TOTAL	Less than 81	81-84	85-88	89 and above
BASE	690	484	943	226	226	280	211
	%	%	%	%	%	%	%
•Take the view that in their district life is:							
- Very pleasant	15	9	8	14	8	10	3
	71	70	70	76	74	67	63
- Fairly pleasant	56	61	62	62	66	57	60
- Not very pleasant	18	21	20	16	18	20	27
- Not pleasant at all	10	8	10	7	7	13	10
- No opinion	1	1	-	1	1	-	-
	100	100	100	100	100	100	100
•Things are tending in the direction of:							
- An improvement of the fabric of life	43	29	35	36	32	35	36
- A deterioration of the fabric of life	38	44	39	38	33	43	43
- No change	12	20	22	22	29	20	18
- No opinion	7	7	4	4	6	2	3
	100	100	100	100	100	100	100
•Are very or moderately satisfied in regard to:							
- Means of public transportation	34	43	49	53	51	49	44
- Green spaces	47	47	63	57	64	67	63
- Possibilities for work	22	21	17	20	18	16	12
- Ambient noise	64	34	31	44	35	23	21
- Housing costs	34	32	40	46	43	33	36
- Possibilities for amusement	15	21	29	36	26	30	25
- Educational facilities	52	55	74	79	74	77	72
- Upkeep of the town	64	65	73	72	72	75	78

Table 1 (continued)

- Possibilities for getting around in traffic and parking	55	58	58	48	61	60	61
- Purity of the air	78	67	54	57	62	53	42
- Housing conditions	85	85	86	87	85	87	88
- Work conditions	61	64	59	60	60	59	59
- Interactions with the people of the locality	74	79	74	76	76	75	73

As for the satisfaction with the purity of the air, it decreases in the noisiest zones, a phenomenon already observed in the area around Orly, doubtless related to the kerosene odors and the sight of exhaust fumes perceptible by the residents living near the runways.

The battery of questions which centered on the noise, and in particular the airplane noise, corroborates the above-mentioned finding in regard to the satisfaction about the ambient noise: between 1975 and 1977 the annoyance has not changed in a very noticeable way (Tables 2 and 3).

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Table 2

	In 1974		In 1975		In 1977		
	%		%		%		
• The noise annoys them							
- Very often	13	24	27	51	29	56	11
- Fairly often	11		24		27		

Table 2 (continued)

- Sometimes	35	34	32
- Never	41	15	12
	100	100	100

All the questions reflecting the intensity of the annoyance and its manifestations have been correlated with the noise level. Here we encounter the phenomenon observed in all the surveys on noise. Beyond this evidence, the examination of the change in the responses as a function of the noise level permits several remarks to be formulated:

- the frequency of times awakened at night and awakened in the morning ascribed to the airplanes increases strongly with the exposure to noise. On the other hand, the difficulties in falling asleep are much less strongly correlated to the noise index, even though--as will be seen later on--the annoyance is strong late in the evening;
- on a general level, the proportion of responses expressing the annoyance and its manifestations is placed about right as a function of the noise index, on the extension of the pattern observed in the 1975 study around Orly (Fig. 1). The sensitivity to the noise is thus homogeneous around the two large Paris airports *(1)*. For three questions, however, the

(1) - The incidence of annoyance at night (greater around Charles de Gaulle Airport, open to traffic arround the clock) is not such that it modifies the overall evaluation of the annoyance very appreciably.

Table 3

/13

	1974 SURVEY	1977 SURVEY				
			Noise index			
		TOTAL	Less than 81	81-84	85-88	89 and above
•Airplane noise	%	%	%	%	%	%
- Annoys them a lot	37	39	27	36	48	45
- Annoys them very often	29	32	25	28	34	39
- Is very loud	36	39	22	39	42	54
•Frequently or sometimes, airplane noise						
- Prevents them from conversing	59	70	55	68	77	79
- Interferes with radio/television listening	78	77	66	74	83	84
- Prevents them from opening the windows	40	51	40	45	58	62
- Startles them	18	15	10	11	18	19
- Prevents them from sleeping	29					
- Wakes them	41					
- Prevents them from getting to sleep		24	20	23	23	29
- Wakes them in the morning		31	18	33	30	44
- Wakes them during the night		29	20	29	30	38
•Very or fairly often, because of the airplane noise						
- Are edgy, irritable	27	30	21	26	36	40
- Have difficulties concentrating	19	23	16	17	26	33
- Experience a general tiredness	15	16	14	13	16	24
- Feel distressed, uneasy	(1)	12	7	7	13	19
- Have migraines, headaches	(1)	10	6	8	9	17

Table 3 (continued)

	1974 SURVEY	1977 SURVEY noise index			
		less than 81	81-85	85-89	89 and above
- Take the view that this noise is bound to have an influence on their state of health	23	27	19	21	28	42
- Very or fairly often have fear than an airplane is going to crash	26	20	18	16	19	28
- Very or fairly often see an airplane pass at too low an altitude	39	30	26	33	36	36
- Have signed a petition to protest against the noise	47	41	31	39	43	49
- Have soundproofed their homes	9	12	9	10	12	17

N.B. The questions on the annoyance at night were not formulated in the same way in the other two surveys.

(1) - Questions not asked in 1975.

residents of the Roissy area are clearly not in agreement with those of the Orly area.

Among the residents living near Roissy, the ones exposed to the most noise (noise index = 89 and above), 42% express the view that the noise is bound to have an influence on their state of health. Such a percentage does not appear in the Orly area except for exposure at a level with an index of at least 97 to 100.

/12

Figure 1.- EVALUATION OF THE ANNOYANCE AS A FUNCTION OF THE NOISE INDEX.

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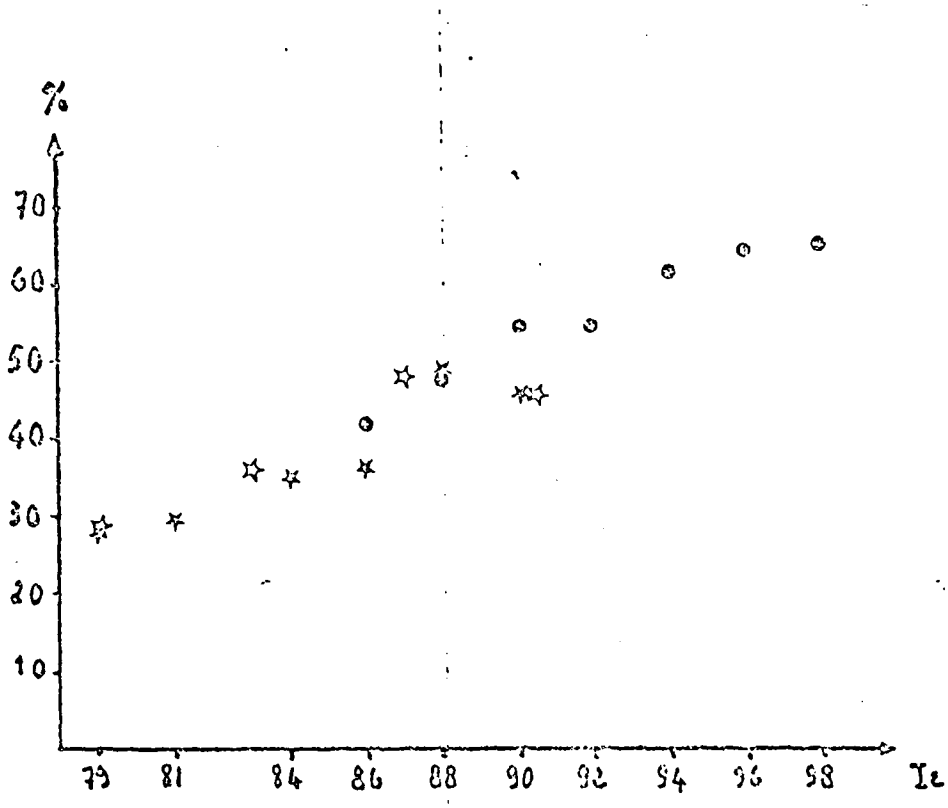

Those reporting that the noise annoys them a lot.

★ Roissy - 1975

● Orly - 1975

☆ Roissy - 1977

The same is true for the proportion who very or fairly often see airplanes pass at too low an altitude: the result obtained at Roissy is not attained around Orly except in the group exposed at a noise index level higher than 100. Finally, the fear of an airplane accident is more frequent in the most heavily exposed group in the Roissy area than among

the residents of the noisiest zone around Orly.

These "anomalies" are undoubtedly due to the relative newness of the traffic of Charles de Gaulle Airport: because the airplane is still not truly integrated into daily life, the residents living closest to the flight paths still often feel apprehension, which has to some extent softened over the years around Orly. Nevertheless, habituation is beginning to manifest itself around Roissy: the fear of an accident and airplanes passing at too low an altitude are items less often reported by respondents in 1977 than in 1975 (see Table 3). *(1)*

- It had been observed in the 1975 survey around Orly that certain questions relating to very subjective manifestations of the annoyance (difficulties in concentrating, restiveness, irritation due to the noise) were less well correlated than others with the level of noise, but had a stronger connection with some personality factors. The survey done around Roissy, on populations exposed to a lower noise index, enables that remark to be qualified: at the "low" levels of the noise index, these manifestations of the annoyance increase clearly as a function of the level of noise; when the index becomes relatively substantial, a saturation threshold is rapidly approached.

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(1) - The accident which occurred at the time of the Bourget International Air Show of 1973 (a Tupolev aircraft crashed over Goussainville) could explain the frequency of the fear of an accident in the years which followed. But it is not sufficient to account for the importance of the fears about effects of noise on health.

In the 1977 study, data on the day-night variations of the annoyance due to the noise were collected differently (see Figure 3 and Table 4). In all the time intervals that were treated separately, the proportion of persons annoyed increases with the noise index. This increase is stronger and the level attained is highest in the 7 p.m. to 11 p.m. period, where the tolerance to the noise is lower. /15

The results obtained can be compared to those of 1975 *(1)*, with one reservation though: the structure of the question and the possible responses have not been identical in the two surveys *(2)*. As one could expect, the results of the dichotomic question used in 1975 fall between the lumped total of persons who in 1977 declare themselves to be very or fairly annoyed and the lumped total of those who are very, fairly, or a little annoyed (Figure 3). Nevertheless, there would seem to be a substantial anomaly for the annoyance at night: during the period defined approximately as extending from 11 p.m. to 6 a.m., the annoyance seems less than in 1975. The nighttime flights thus appear to be better tolerated now by the residents, and it would be possible to describe this as habituation, at least on the conscious level.

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(1) - Cf. "Taking Nighttime Annoyance into Account in the Calculation of the Noise Index"--February 1977. Complimentary *analysis of the results of the 1975 studies around Orly and Roissy, carried out at the request of STNA.*

(2) - Question asked in 1975:

"At what times of the day do you usually hear the noises that annoy you?

. early in the morning (6 a.m. to 8 a.m.)

Figure 2, which indicates the changes in the nighttime annoyance as a function of the noise index Ie, confirms this phenomenon. The slope of the 1977 curves is much less than that of 1975. If the habituation is less pronounced for the lowest index levels, it is undoubtedly because in these sectors, farthest from the runways, some rather loud noises (overflights) occur in a chance manner, by reason of the dispersion of the flight paths. On the other hand, in the sectors with exposure at the highest index values, the nighttime noises have a regularity which would favor habituation.

. *in the course of the morning* *(8 a.m. to noon)*
. *at lunchtime* *(noon to 2 p.m.)*
. *in the afternoon* *(2 p.m. to 7 p.m.)*
. *at dinnertime* *(7 p.m. to 9 p.m.)*
. *in the evening* *(9 p.m. to 11 p.m.)*
. *during the night* *(11 p.m. to 6 a.m.)*
. *no particular time*

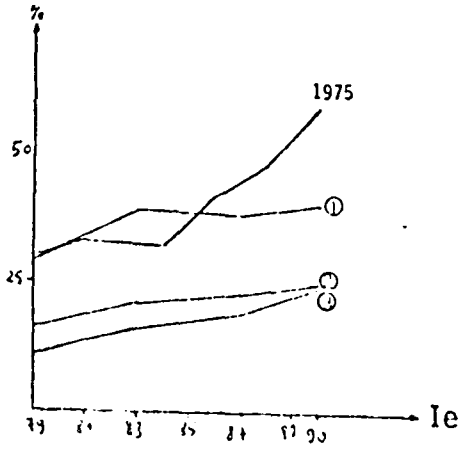
Question asked in 1977:

"I am going to ask you to think of the noises that you usually hear on a weekday, that is, noises that you hear here in your home and noises that you hear at your place of work, if you work."

"Presently, on a weekday, are you very annoyed, moderately annoyed, a little annoyed, or not at all annoyed by the noise early in the morning, that is, from 6 a.m. to 8 a.m." (same time intervals as in 1975).

Figure 2. ANNOYANCE FROM 11 P.M. TO 6 A.M.

/16



LEGEND

1975: annoyed by the noise (in general)

New survey:

① Very, moderately, or a little annoyed by the noise (in general)

② Very or moderately annoyed by the noise (in general)

③ Very or moderately annoyed by the noise (in general) and specifying that the annoyance is due to airplanes.

One study, based on electroencephalograms, electromyograms, and electrocardiograms, established that the residents living near Roissy exposed to the airplane noise for at most one year had attained a habituation clearly more pronounced than that observable in the laboratory *(1)*. The result obtained in the 1977 survey could signify that this habituation is still pronounced. We would be inclined to formulate a different hypothesis: it is conceivable that the area residents were very sensitive to nighttime

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(1) - *"Psycho-Acoustic Effects of Airplane Noise on Sleep. On-Site Study." M. Vallet, J. M. Gagneux, and F. Simonnet. CERN-IRT [European Center for Nuclear Research, Transport Research Institute].*

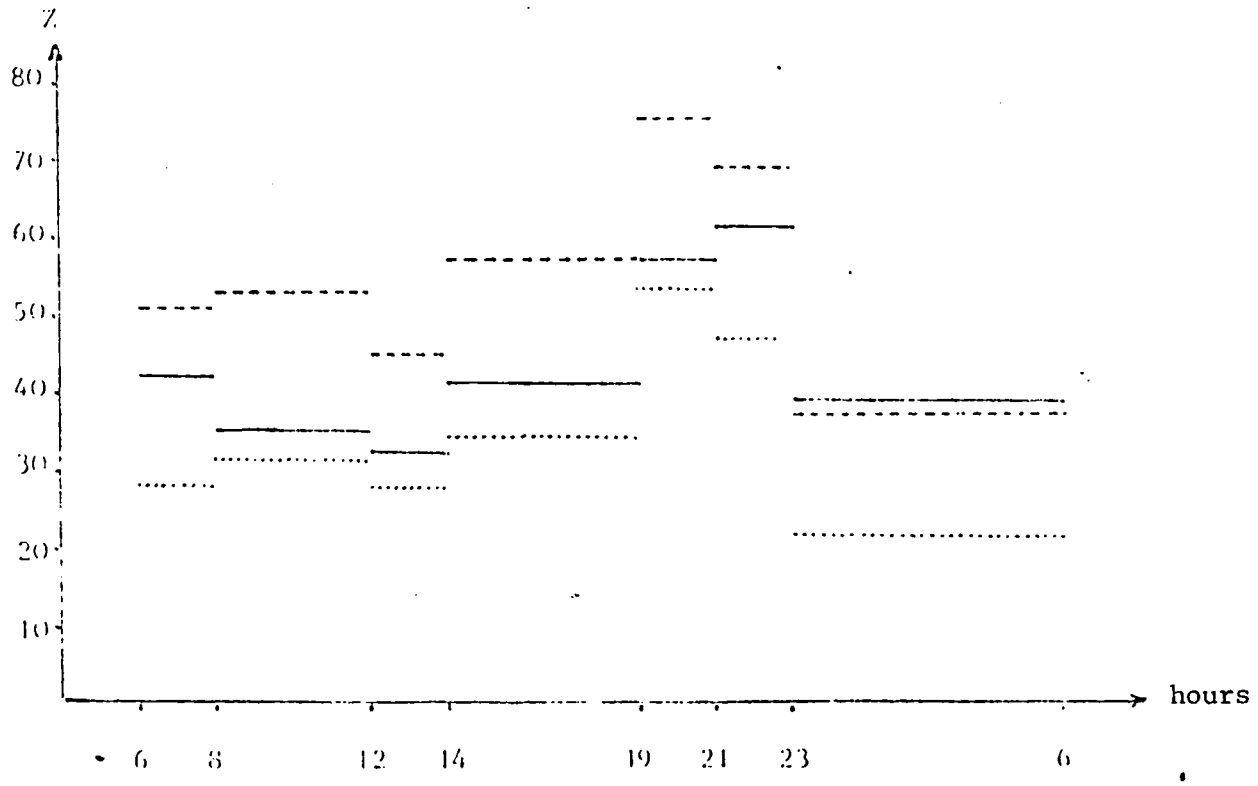
traffic when it constituted a new element of the sound environment: with time, they have tolerated this nuisance progressively better, and, by reason of the "tenacious" character of some opinions, the change in the evaluation of the nighttime annoyance came about slowly, ratifying the physiological habituation after some time lag. The decline in the annoyance felt and expressed would thus follow on the heels of the objective improvement in their sleep. Only new on-site recordings (EEG, EMG, ECG) would enable us to make a definitive choice between these nonexclusive hypotheses.

The interviewees were asked to specify, for each time interval, what were the sources of noise responsible for the annoyance expressed. /17 For index values of 81 and higher, the airplane noise was the preponderant source of annoyance all along the 24-hour scale, and the proportion of the annoyance due to air traffic increased with the level of the noise index. The background noise constituted by the automobile traffic lessened at lunchtime, while the airplane noise was always indicated in about the same proportions, which leads to a diminution of the overall annoyance; still, in the group characterized by the strongest noise index values, slight increases in annoyance due to the airplanes and in the overall annoyance are observed, perhaps by reason of a contrast effect.

In the evening, the automobile traffic noise diminishes while the annoyance due to airplanes and the overall annoyance both increase strongly. In all, the most critical period, if one refers to the number of persons annoyed, is in the evening, particularly from 7 p.m. to 9 p.m., the time when the sensitivity to noise is undoubtedly increased by the contrast

effect and by the importance of family conversations and listening to television *(1)*.

Figure 3. DAY-NIGHT CHANGES IN THE ANNOYANCE. /18



----- ROISSY 1977 "Very, moderately, or a little annoyed"

——— ROISSY 1975 "Annoyed"

····· ROISSY 1977 "Very or moderately annoyed"

(1) Time (24-hour clock)

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(1) - The increase of air traffic during this time interval is not sufficient to account for the strong increase in the annoyance. Therefore surely a poorer tolerance of the noise is involved. Cf. our report "Taking nighttime annoyance into account in the calculation of the noise index", 21

Table 4

	Early in the morning 6 a.m. -8 a.m.	In the course of the morning 8 a.m. -noon	At lunch-time noon-2 p.m.	In the afternoon 2 p.m. -7 p.m.	At dinner-time 7 p.m. -9 p.m.	In the evening 9 p.m.-11 p.m.	During the night 11 p.m.-6 a.m.
	%	%	%	%	%	%	%
- Very annoyed	12	10	10	11	24	19	10
- Moderately annoyed	16	21	18	23	29	28	12
- A little annoyed	23	22	17	23	22	22	15
- No annoyance	48	47	54	42	24	30	62
- no response	-	-	-	1	1	1	1
	100	100	100	100	100	100	100
•Reasons for the annoyance							
- Road traffic noise (autos, trucks, motorcycles, etc.)	19	16	11	19	17	10	5
- Airplane noise	33	35	33	38	67	60	31
- Noise of factories, shops, offices, work sites, etc.	3	9	4	8	1	1	-
- Noise from neighbors in the building (conversations, television, children)	7	2	1	3	9	10	4
- Noise from people or children in the street	1	1	1	2	1	1	1
- Other noises	5	4	4	5	4	4	2

Table 5

1977 SURVEY

	Noise index			
	Less than 81	81-84	85-88	89 and above
	%	%	%	%
•Are very or moderately annoyed by the noise				
- Early in the morning (6 a.m. to 8 a.m.)	21	24	32	36
. *airplanes*	9	17	26	28
. *road traffic*	10	8	11	23
- In the course of the morning (8 a.m. to noon)	25	28	36	31
. *airplanes*	12	19	26	19
. *road traffic*	10	10	11	11
- At lunchtime (noon to 2 p.m.)	21	26	32	34
. *airplanes*	13	19	26	25
. *road traffic*	5	7	6	9
- In the afternoon (2 p.m. to 7 p.m.)	27	29	37	37
. *airplanes*	14	18	27	25
. *road traffic*	13	12	12	12
- At dinnertime (7 p.m. to 9 p.m.)	35	52	60	63
. *airplanes*	28	45	56	67
. *road traffic*	7	14	14	12
- In the evening (9 p.m. to 11 p.m.)	37	46	50	54
. *airplanes*	30	36	45	51
. *road traffic*	5	7	8	7

Table 5 (continued)

- During the night (11 p.m. to 6 a.m.)	16	21	23	25
. *airplanes*	11	16	19	24
. *road traffic*	2	3	3	2

II - NOISE AND INDIVIDUAL CHARACTERISTICS

The study carried out in the Roissy area in 1975, after one year of traffic, did not bring out any connection between the noise and the personality or health factors. What is it like after three and a half years of traffic?

The data collected in 1977 lend themselves to analyses in two directions:

- comparison between the three successive surveys done in the vicinity of Charles de Gaulle Airport, to distinguish any overall deterioration that may be occurring;
- comparison, in the 1977 survey, among the responses given by the residents exposed to different levels of noise, to determine whether a deterioration shows up at the highest levels.

In these two cases, the deviations would, in the first analysis, justify an interpretation in causal terms; deviations that show up would be attributed to the noise.

A. Noise and Personality Tests

The Taylor anxiety scale (MAS [Manifest Anxiety Scale]) was utilized in the three surveys in the Roissy area. The mean score obtained in 1977 was a little higher than in the two preceding surveys (Table 6). However, we consider it imprudent to draw a conclusion on the increase in the anxiety of the residents. As a matter of fact, if there were such an effect, one ought to see the scores increase as a function of the level of noise. But the mean score does not increase significantly as a function of the noise index. Given these circumstances, it appears more reasonable not to

Table 6. PERSONALITY TESTS

/22

		1977 SURVEY				
			Noise index			
		TOTAL	Less than 81	81-84	85-88	89 and above
•ANXIETY SCALE (MAS)	M	18.5*	18.1	18.7	18.1	19.2
	σ	7.9	8.3	8.0	7.6	7.9
•MINIMULT--CLINICAL SCALES						
- Hypochondriasis	Hs	55.3	53.7	56.2	54.4	57.0
- Depression	D	51.1	50.2	51.4	50.4	52.4
- Hysteria	Hy	55.9	55.2	56.4	54.6	57.6
- Psychopathic deviation	Pd	52.2	52.3	52.2	51.4	52.9
- Paranoia	Pa	51.3	51.5	51.6	50.0	52.1
- Psychasthenia	Pt	52.4	51.5	52.9	51.3	53.9
- Schizophrenia	Sc	56.1	55.4	57.2	54.8	57.0
- Hypomania	Ma	55.2	55.0	55.0	54.4	56.3

*Previous results: 1974 m = 17.8, σ = 7.5

1975 m = 16.7, σ = 8.1

reject the null hypothesis.

The MINIMULT scales have been constructed in such a fashion that their mean is situated around 50, with a standard deviation on the order of 10 points.

The test, used for the first time in the 1977 survey, like the other tests, does not bring out any variations as a function of the level of exposure to noise (cf. Table 6). /23

There is no significant difference between the average scores obtained for each scale for the four groups of residents.

The MINIMULT, like the MMPI, permits calculation of the scores for various clinical scales. The analysis of these scores furnishes a description of the personality in terms of a profile or configuration. An attempt was made to determine whether a particular type of profile, known as the "conversion V" pattern *(1)* would appear more frequently in the noisiest sector. No significant variation could be found (Table 7).

Finally we examined the distribution of an overall index obtained from the MINIMULT results (Table 7): for each individual a count was made of the number of scales on which that person had obtained an "abnormal" score, that is, the number of scores higher than 70 (lying at least two standard deviations from the mean).

This number was a little higher in the group exposed to the most noise (noise index of 89 and above). Contrary to the other tests used (MAS and, in the prior surveys, the EPI test), the MINIMULT therefore does give reason not to reject the hypothesis of an effect of the noise on the psychological equilibrium. It indicates that for the most part

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(1) - For a treatment of the objective definition of this pathological profile, the reader is referred to the works of J. Perse (cf. "Nondiscal Sciaticas without Organic Connection," by Tadie, Debray, Perse, and Hirsch. Revue du rhumatisme--January 1978--No. 1). A V-shaped *configuration of the neurotic triad (hypochondriasis, depression, and hysteria)* indicates a tendency toward conversion and somatization reactions.

Table 7.- INDICES CONSTRUCTED FROM MINIMULT

/24

	1977 SURVEY				
		Noise index			
	TOTAL	Less than 81	81-84	85-88	89 and above
	%	%	%	%	%
- Conversion V, type A *(1)*	6	4	8	4	7
- Conversion V, type B *(2)*	14	12	15	14	15
• Number of scores higher than 70					
- None	72	75	73	74	(65)
- 1 or 2	19	16	16	21	22
- 3 to 8	9/100	9/100	11/100	5/100	13/100

(1) - The individual received a D score lower than Hs and Hy, Hs and Hy being greater than or equal to 70.

(2) - The individual received a D score lower than Hs and Hy, Hy being greater than or equal to 60 and higher than D by at least 10 points.

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the situation involves a diffuse perturbation and not accentuation of a deviation on a particular scale or a particular profile.

B. Noise and Health

The reader will find in Tables 8 and 9 the results of the set of health questions (Table 8 gives a comparison of 1974, 1975, and 1977

Table 8

/27

	1974 SURVEY	1975 SURVEY	1977 SURVEY				
				Noise index			
			TOTAL	Less than 81	81-84	85-88	89 and above
	%	%	%	%	%	%	%
•In the course of the last 12 months:							
Their health has been							
- Good	57	54	49	47	46	54	42
- Fairly good	33	35	40	42	38	34	45
- Poor	9	10	9	8	9	9	10
- Other responses or no response	1	1	2	3	7	3	2
	100	100	100	100	100	100	100
Have been hospitalized	14	11	10	11	10	7	9
Have taken "sick leave"	24	23	24	26	22	22	25
- Indicate they have a chronic illness	19	21	19	20	16	15	26
- Experience pains	32	32	34	35	35	31	35
- Have lost weight	21	21	24	26	22	24	20
- Have lost their appetite	9	7	10	10	11	11	9
- Are fatigued	29	31	33	34	34	27	43
- Their work exhausts them	21	21	22	24	19	19	27

Table 8 (continued)

- Have dizzy spells	13	14	20	18	20	17	21
- Have car sickness	15	12	14	13	14	15	14
- Have headaches	19	18	25	22	24	25	30
- Drink *(1)*	6	7	6	9	4	5	8
- Smoke *(2)*	31	32	29	30	25	28	31
•In the course of the last 7 days:							
- Have taken aspirin	26	22	14	18	15	12	11
- Have taken other medications	29	24	34	36	31	31	39

(1) - More than 4 glasses of alcoholic beverage per day.

(2) - More than 10 cigarettes per day.

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results, while Table 9 gives a breakdown for the 1977 survey according to /25
the noise index).

One can elicit from this two major phenomena:

a) In comparing the 1977 sample as a whole to the 1974 and 1975 samples, certain points indicate a deterioration of the situation.

- The proportion of persons declaring themselves to be in good health has diminished;
- The proportion of those who report dizzy spells and those who complain of headaches have increased;

Table 9

1977 SURVEY

Noise index

/28

	TOTAL	Less than 81	81-84	85-88	89 and above
	%	%	%	%	%
- Have suffered from "nervous depression:	16	19	13	13	18
- Regularly take medications for sleeping	9	10	8	7	12
- They still have after effects of serious illnesses or accidents	9	13	10	8	8
•Often or sometimes:					
- Have palpitations, angina	58	56	58	53	64
- Suffer from colic or intestinal or abdominal pains	40	38	44	36	39
- They sometimes faint	16	18	14	16	11
- Suffer from muscle cramps	51	49	55	46	53
- Have trembling or muscle tremors	40	43	40	35	39
- Have sensations of numbness in the extremities	54	53	53	52	54
- Suffer from bouts of anguish or anxiety	55	55	57	48	58
- Feel excessively emotional	63	64	63	56	61
- Feel irritable, act touchy	71	73	69	63	72

Table 9 (continued)

- They sometimes say "Nothing tastes good to me"	56	58	56	51	58
- Have the impression of a lump in the throat	50	48	50	47	53
•In the course of the last 12 months:					
- Their life has been upset by cares, serious worries, particular difficulties	39	41	39	36	39
- Have consulted a physician					
•YES: 1 to 8 times	60	65	57	60	59
9 times or more	13	11	11	12	18
•NO	27	24	32	28	23

N.B. These questions were not asked in the preceding surveys.

/26

The residents of the area take less aspirin but more of other medications.

b) In the 1977 sample, the persons whose place of residence is characterized by a noise index equal to or greater than 89:

- Are a little less numerous in declaring that their health is good;
- A little more often indicate having a chronic illness;
- Are more numerous in having consulted a physician more than eight times within the last twelve months;

- A little more often indicate that they are particularly fatigued and that their work exhausts them;
- Complain more of headaches;
- More often have palpitations, angina.

These results appear all the more significant as it is precisely on such questions that an increase of responses reflecting a "psycho-physiological malaise" had been observed among the residents exposed to the highest levels of noise in the survey around Orly. But, in the Orly area, these negative manifestations were showing up only among the persons subjected to air traffic noise for at least ten years, while they are being found to show up, among the residents of the Roissy area, before the fourth year of operation of the airport. Perhaps the fact that the environment had been altered so suddenly would account for an increased sensitivity on the part of the residents near Roissy, while the stability of the situation around Orly would explain a delay in the appearance of negative assessments.

The existence of nonnegligible nighttime traffic at Charles de Gaulle Airport could also contribute in explaining a more rapid deterioration.

These results, let us remember, are only based on declarations, self-evaluations, and not on medical examinations, and do not permit definitive conclusions. But they at least allow us to pose a question: does the change in the responses of the residents of the Roissy area constitute an early signal of a deterioration of health which will gradually become more manifest?

III - ANNOYANCE AND INDIVIDUAL CHARACTERISTICS

/29

A. Annoyance and Personality Tests

From the data collected in the 1975 survey, an attempt had been made to analyze in what measure the individual characteristics of health and personality could contribute to explaining the substantial interindividual variability of the annoyance. It had thus been possible to show that the persons very annoyed by the noise are on the average more anxious than the others. This anxiety-annoyance correlation becomes weaker when we look at objective questions on the annoyance (such as: does the noise interfere with radio-television listening) and when the ambient noise is such that the majority of the area residents are annoyed (it then becomes "normal" to be annoyed).

The utilization of the MINIMULT test permits observation of certain rather parallel phenomena, while bringing a new clarity to the results.

If we look at the question which best summarizes the intensity of the annoyance (does the airplane noise annoy you a lot, moderately, a little, or not at all), we find that the scores obtained on certain scales of the MINIMULT vary as a function of the level of annoyance (Table 10).

The persons very annoyed by the noise on the average score higher on the depression, hysteria, psychasthenia, and hypomania scales. The hypochondriasis, psychopathic deviation, paranoia, and schizophrenia scales on the other hand are independent of the overall annoyance.

Taken as a whole, the mean scores for the various clinical scales change very little as a function of the questions on the "objective" consequences of the noise. On the other hand, the scores rise perceptibly

Table 10

Mean MINIMULT SCORES

	Validity scales				Clinical scales								MAS
	%	L	F	K	Hs	D	Hy	Pd	Pa	Pt	Sc	Ma	
•Airplane noise annoys them													
- a lot	39	52.7	52.7	51.5	56.4	52.3	57.2	52.6	51.4	52.9	56.4	56.1	19.0
- moderately	28	54.1	52.0	51.0	54.7	51.4	55.6	52.4	50.3	52.4	55.7	54.7	18.7
- little	22	54.0	50.9	52.2	54.5	49.7	54.8	50.8	52.1	52.3	55.5	54.9	18.5
- not at all	11	56.7	52.8	55.7	54.6	48.0	54.2	53.1	51.7	50.1	56.7	53.4	16.3

for the persons who feel the most subjective negative aspects of the annoyance: fright due to the noise, sensation of anguish or apprehension, migraines, general fatigue, difficulty in concentrating attributed to the airplanes, fear that an airplane is going to crash, etc. The most remarkable thing is that all the clinical scales are correlated with this type of manifestation of the annoyance (Table 11). /30

The overall index obtained by coun ting the number of MINIMULT scores higher than 70 reflects this same phenomenon: the persons receiving the "abnormal" scores more frequently encounter these same aspects of the annoyance (see Table 12). The same goes for those who show a "type A conversion V" profile. The overall index and the "type A conversion V" are also correlated with sleep troubles ascribed to airplanes.

Table 11. TEST SCORES ACCORDING TO THE ANNOYANCE RESPONSES

/31

	MINIMULT Scales								MAS
	HS	D	Hy	Pd	Pa	Pt	Sc	Ma	
MEAN FOR THE WHOLE GROUP	55.3	51.1	55.9	52.2	51.3	52.4	56.1	55.8	18.5
•Airplane noises annoy them a lot	56.4	52.3	57.2	52.6	51.4	52.9	56.4	56.1	19.0
★frequently or occasionally:									
- Prevent them from sleeping	57.5	53.8	58.1	53.1	52.8	53.9	58.3	57.8	20.7
- Wake them in the morning	57.2	53.0	57.9	53.0	52.3	53.3	57.1	56.3	20.0
- Wake them during the night	56.9	53.0	57.1	51.8	52.7	53.5	57.0	56.4	19.7
- Prevent them from conversing	55.8	51.8	56.4	52.2	51.3	52.8	56.5	55.7	19.0
- Interfere with television listening	55.3	51.4	56.1	52.2	51.1	52.5	55.9	55.3	18.7
- Prevent them from opening windows	56.0	52.0	56.3	51.9	51.6	53.3	56.2	56.0	19.2
- Startle them	56.7	54.3	57.6	53.6	54.3	55.3	59.2	58.1	22.1
•Because of the noise									
★very or fairly often:									
- Edgy	57.2	53.9	58.2	53.2	53.4	55.1	58.3	57.9	20.7
- Difficulties in concentrating	56.8	54.8	58.0	53.8	54.0	55.8	59.5	59.3	21.0
- General fatigue	59.4	57.1	60.5	54.2	54.7	57.1	60.5	58.7	22.1

Table 11 (continued)

- Anguish, restlessness	59.0	58.6	60.7	54.9	57.9	59.1	64.3	62.0	23.9
- Migraines	60.8	55.6	61.1	52.7	55.8	55.4	60.2	59.5	23.3
- Fear that an airplane is going to crash	57.2	54.0	57.7	53.8	54.4	56.2	60.0	58.6	22.0

In sum, it is possible to say that in a general way the noise is more distressing for the persons having a "perturbed" personality. This /33 more negative coloration of the annoyance is not reflected completely and mechanically in the evaluation of the overall annoyance; the overall annoyance does not correlate with all the personality factors studied. Only some of the factors seem to affect the overall level of annoyance.

This conclusion can be coupled with two remarks:

- On a very general level, it must be observed that the perception of the environment as a whole is linked to all the personality traits of the MINIMULT. The overall opinion on the change in the fabric of life does not vary with each scale considered individually but does correlate to the number of responses higher than 70 (Tables 13 and 14).

  It thus appeared that, to a certain degree, some "perturbations" of the personality lead to negative judgements on the environment, with overemphasis of the inconveniences experienced. A nonspecific predisposition, positive or negative, would filter the overall perception

Table 12. ANNOYANCE RESPONSES ACCORDING TO THE MINIMULT INDICES

/32

	SAMPLE AS A WHOLE	SCORES HIGHER THAN 70			CONVERSION V	
		None	1 or 2	3 to 8	A	B
	%	%	%	%	%	%
• The airplane noises annoy them a lot	39	38	40	44	46	43
★ frequently or occasionally:						
- Prevent them from getting to sleep	23	21	26	32	36	25
- Wake them in the morning	32	30	37	36	41	38
- Wake them during the night	29	28	32	39	46	25
- Prevent conversing	70	68	73	74	74	76
- Interfere with television listening	78	77	78	80	81	80
- Prevent opening windows	51	49	57	50	59	52
- Startle them	15	13	20	21	15	14
•Because of the noise						
★very or fairly often:						
- Edgy	30	26	38	46	53	31
- Difficulties in concentrating	23	19	30	37	33	21
- General fatigue	16	13	20	37	28	19
- Anguish, restlessness	11	8	20	24	18	10
- Migraines	9	8	15	14	25	13
- Fear that an airplane is going to crash	20	17	27	30	30	21

TABLE 13

	MINIMULT											MAS
	VALIDITY SCALE			CLINICAL SCALES								
	L	F	K	Hs	D	Hy	Pd	Pa	Pt	Sc	Ma	
MEAN FOR THE WHOLE GROUP	53.8	52.1	52.0	55.3	51.1	55.9	52.2	51.3	52.4	56.1	55.2	18.5
• Life in their district is not at all pleasant	53.4	54.9	51.6	58.2	54.5	59.5	54.9	54.4	55.7	60.1	57.8	20.6
• Things on the whole are tending in the direction of a deterioration of the fabric of life	53.1	53.3	51.8	56.4	52.4	57.2	53.2	51.9	53.5	57.7	56.6	19.1
• Are not very or not at all satisfied in regard to:												
- means of public transportation	53.9	51.6	52.5	55.9	51.5	56.4	52.1	51.6	52.8	56.5	55.1	19.2
- green spaces	53.0	52.0	51.9	56.3	52.1	57.4	52.9	51.7	53.8	57.4	56.2	19.2
- possibilities for work	53.2	52.4	51.6	55.4	51.5	56.0	52.2	51.4	52.7	56.4	56.0	19.4
- ambient noise	53.3	52.1	51.7	55.4	51.9	56.3	52.3	51.1	52.9	56.0	56.5	19.2
- housing costs	54.0	52.2	51.9	55.7	51.6	56.3	52.5	51.2	52.9	56.8	55.8	19.1
- possibilities for amusement	53.7	52.5	51.8	55.5	51.5	56.3	52.5	51.8	53.0	56.8	55.8	19.5

Table 13 (con'd)

- educational facilities	53.5	50.7	53.9	56.0	51.5	56.6	52.7	51.3	53.2	57.5	54.8	18.9
- upkeep of the town	52.9	52.9	51.6	55.7	51.9	56.5	51.6	52.0	52.8	55.8	54.9	19.5
- possibilities for getting around in traffic and parking	52.7	52.1	51.0	54.7	51.3	55.2	51.7	51.2	52.1	55.9	55.7	19.2
- purity of the air	53.5	52.5	51.8	56.2	51.9	56.9	52.5	51.3	53.0	56.6	55.5	19.5
- housing conditions	52.8	55.0	51.7	56.1	52.8	56.7	55.0	53.7	54.8	59.6	57.8	19.9
- work conditions	52.5	54.8	51.0	57.3	54.4	58.1	54.2	52.6	56.1	59.1	57.3	20.7
- interactions with the people of the locality	51.9	55.4	49.6	56.3	53.6	57.6	53.6	55.5	55.7	60.1	56.4	21.4

of the environment and certain environmental elements, including not only the noise, but also the perceptions about housing and work conditions, the possibilities for amusement, the green spaces (Table 14). Only some personality traits would have a specific correlation with the reactions to noise and one or another aspect of the environment (the most characteristic is the correlation between certain scales and the degree of satisfaction in regard to work and surroundings).

In addition to the eight clinical scales, the MINIMULT has validity scales like the MMPI. But two of these scales are linked to the overall health evaluation (cf. Table 10):

* The "L" scale, called the lie scale, "can be used to estimate in what measure the subject attempts to falsify his results by always choosing the response which show him in the most favorable light from the social point of view" (1).

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(1) Hathaway and McKinley--Inventaire Multiphasique de personalité du Minnesota ("Minnesota Multiphasic Personality Inventory")--Les Editions du Centre de Psychologie Appliquée, Paris, 1966.

The average score obtained on this scale varies inversely with the annoyance. For the most part, it is reasonable to hypothesize that, among the very annoyed persons, certain individuals would deliberately tend to exaggerate their annoyance (in order to lodge a protest, for example). In fact, the opposite hypothesis would appear closer to the truth: the results obtained indicate that on the whole it is the persons saying they are not annoyed at all who are seeking to modify their responses and thus understate their annoyance. Certain are residents, because they are worried about the image that they give of themselves, tend to minimize their annoyance: they consider that to admit annoyances is generally less socially acceptable (perhaps they might think that it tends to put the blame on themselves indirectly for making a poor choice of a place of residence).

* The "K" scale involves a collection of slightly different factors of distortion. A high "K" result indicates "a defensive attitude on the part of the subject toward his psychological weakness, a defensive attitude which can go as far as a deliberate distortion with the aim of presenting himself in a more normal light" (2). As with the "L"

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(2) Ibid.

Table 14

/35

MINIMULT INDICES

	Scores higher than 70			Conversion V	
	None	1 or 2	3 to 8	A	B
	%	%	%	%	%
•Life in their district is not very or not at all pleasant	24	38	57	54	41
•Things on the whole are tending in the direction of a deterioration of the fabric of life	36	46	52	44	40
•Are not very or not at all satisfied in regard to:					
- Means of public transportation	37	37	44	44	38
- Green spaces	34	38	40	34	35
- Possibilities for work	65	73	73	67	69
- Ambient noise	69	67	73	73	67
- Housing costs	39	43	45	44	43
- Possibility for amusement	63	77	80	78	74
- Educational facilities	17	14	20	10	19

Table 14 (continued)

- Upkeep of the town	24	27	27	28	27
- Possibilities for getting around in traffic and parking	36	38	31	15	31
- Purity of the air	45	39	54	54	44
- Housing conditions	10	17	19	14	14
- Work conditions	11	18	22	26	15
- Interactions with the people of the locality	13	17	26	14	17

scale, the subjects claiming not to be annoyed by the noise have obtained a somewhat higher average "K" score. This result would appear to indicate there again that the persons saying they are not annoyed tend to "hold back" about their annoyance.

The analysis of the relationship between the annoyance and the personality factors can be clarified by calling on the notions of hypersensitivity and hyposensitivity to noise. If there exists a connection between the intensity of the noise and the results obtained on a personality test, it ought to show up clearly when one considers the persons whose annoyance is abnormally low or abnormally high.

In distinguishing these two extreme groups, the data collected permit two types of appraoach. An analysis could be based on the views expressed by the interviewees themselves. They were asked if they "have the impression of being more sensitive, as sensitive, or less sensitive to the noise than the persons living around them." The persons more sensitive to the noise in effect would feel a greater annoyance (Table 15).

Table 15. ANNOYANCE ACCORDING TO THE SENSITIVITY TO NOISE

	HAVE THE IMPRESSION OF BEING		
	Much more or a little more sensitive	As sensitive	A little less or much less sensitive
	%	%	%
• Airplane noise annoys them			
- A lot	57	41	27
- Moderately	26	30	23
- A little	14	21	31
- Not at all	2	8	18
- No response	1		1
	100	100	100

They collected a greater number of abnormally high scores on the MINIMULT and their average scores are much higher on each clinical scale; the MAS also shows that they have greater than average anxiety (Table 16).

Table 16. RESULTS ON THE TESTS ACCORDING TO THE SENSITIVITY TO NOISE

/38

	HAVE THE IMPRESSION OF BEING		
	Much more or a little more sensitive	As sensitive	A little less or much less sensitive
•Validity scales			
- L	52.0	54.1	53.8
- F	55.7	51.6	51.8
- K	48.0	52.6	52.5
•Clinical scales			
- Hs	57.7	55.4	54.0
- D	55.5	50.6	50.1
- Pd	58.9	55.6	55.0
- Pa	54.0	51.7	52.4
- Pt	54.9	50.7	51.4
- Sc	59.6	55.3	56.2
- Ma	58.5	54.8	54.7
•Scores higher than 70			
. None	57	72	75
. 1 or 2	29	19	16
. 3 to 8	14	9	9
	100	100	100
Conversion V, type A	12	6	5
Conversion V, type B	17	14	14
•Anxiety (MAS)	22.6	18.3	17.4

This result is certainly not without interest since it goes far toward confirming the existence of a connection between sensitivity to noise and psychological "perturbations," but it is not totally demonstrative to the degree that it rests partially on a tautology: declaring oneself more sensitive to noise is to some degree a recognition of an "anomaly" based on a subjective perception; in the limit, such a question could very well constitute an item for a personality questionnaire.

Therefore it would appear much more convincing to define hyper- or hyposensitivity to noise in an "objective" way. In the earlier research, we defined these notions by considering, for each noise level, the degree of the deviation about the mean annoyance, this mean having been estimated by use of an index constructed from a factorial analysis. In the present study, we chose to address ourselves purely and simply to the question on the intensity of the annoyance (does the noise annoy you a lot, moderately, a little, not at all) *(1)*. It was then possible to isolate two types of area residents: those that the noise annoys a lot in the sector where the noise index is lowest (Ie < 81), and those that the noise annoys "a little"

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(1) - The construction of a composite index for annoyance, by means of a factorial analysis by principal components has the merit of integrating various facets of the annoyance. It is particularly valuable for a descriptive point by point study of the annoyance since it indicates the respective "weight" of the various aspects of the annoyance taken into account. But it has the drawback of not being standardizable and reproducible since if the traffic is altered and/or if the survey zone is defined differently, the weights of the different questions will be

or "not at all" in the noisiest zone (Ie > 88). These two groups are minorities in their sectors.

The results obtained (Table 17) show once more the relative weakness of the explicative power of the personality factors in accounting for the hyper- and hyposensitivity to the noise: while the intensity of the annoyance was linked to certain clinical scales of MINIMULT and to the overall index when the sample was considered as a whole, this correlation does not stand up when the hyper- and hyposensitive groups are set apart.

Only the L and K validity scales demonstrate significant deviations in the expected direction.

The absence of significant differences for the clinical scales /40 does not necessarily imply that differences do not exist between the two groups considered. Because of the small numerical strength of these two groups, the deviations would have to be substantial for the significance tests to corroborate them. Absence of correlation should not be suggested, since, as indicated above, the annoyance is not independent of the MINIMULT and MAS results, but at the very least it is possible to conclude that the deviations are certainly not very substantial.

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altered. Besides, as J. Langdon and I. D. Griffiths remarked to us, we have no assurance that the index of annoyance elicited by a factorial analysis is more valid than the overall evaluation of the annoyance expressed by the subject himself. Under these conditions, it appears at the same time more straightforward and more feasible to base the analysis on the self-evaluation of the annoyance: the person is annoyed if he says he is annoyed.

Table 17

/41

	HYPERSENSITIVE Ie < 81 The noise annoys them a lot	HYPOSENSITIVE Ie > 88 The noise annoys them little or not at all
Base	60	53
•Validity scales		
- L	48.9	57.3
- F	54.7	51.7
- K	48.5	55.5
•Clinical scales		
- Hs	54.8	55.7
- D	53.1	49.8
- Hy	57.2	56.1
- Pd	53.2	54.8
- Pa	52.4	52.3
- Pt	53.0	52.9
- Sc	56.1	58.2
- Ma	57.0	54.5
•Scores higher than 70	%	%
. None	71	67
. 1 or 2	19	24
. 3 to 8	10	9
	100	100
Conversion V, type A	6	4
Conversion V, type B	9	19
•Anxiety (MAS)	20.3	17.5

B. Annoyance and Health

The results for the health questions substantially recapitulate the observations elicited from the MINIMULT, particularly since certain items on the health questionnaire relate to the subjective troubles that in some measure directly reflect psychological problems. *(1)*

As in the 1975 survey carried out in the Roissy area, it is observed that, at the noise levels considered, the overall evaluation of the annoyance is not well correlated to the battery of health questions: for the questions common to both surveys, the persons "very often" annoyed by the noise in general on many of the points give responses very close to the mean for the entire group of area residents (Table 18). Some items however serve as discriminants: the area residents who were very often annoyed indicate a little more frequently a chronic illness, pains in some part of the body, are more numerous in taking medications, and, in 1977 (even though that did not appear in 1975), they a little more readily indicate that they feel particularly fatigued and report more suffering from headaches.

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(1) - By agreement with the Ministry of the Environment, the data collected on noise and health have been communicated to J. G. Henrotte (Human Biometry Service, CNRS) who is analyzing them as an extension of his prior studies and plans to publish separately. Here our focus is on the presentation of the principal results entering the purview of the objectives of the present research (for example, the Human Biometry Service has been entrusted with the task of studying the internal relationships among the health questions).

Table 18. HEALTH ACCORDING TO THE FREQUENCY OF ANNOYANCE DUE TO THE NOISE IN GENERAL /43

	ROISSY 1975		ROISSY 1977	
	Whole group %	Very often annoyed %	Whole group %	Very often annoyed %
•In the course of the last 12 months:				
- Their health has been good	54	52	49	46
They have been hospitalized	11	9	10	12
They have taken "sick leave"	23	22	24	28
- Report that they have a chronic illness	21	30	19	24
- Feel pains	32	35	34	41
- Have lost weight	21	22	24	25
- Have lost their appetite	7	8	10	11
- Are fatigued	31	31	33	42
- Their work exhausts them	21	19	22	26
- They have dizzy spells	14	12	20	21
- Have car sickness	12	7	14	12
- Have headaches	18	19	25	32
- Drink	7	8	6	8
- Smoke	32	33	29	30
•In the course of the last 7 days:				
-Have taken aspirin	22	23	14	18
- Have taken other medications	24	31	34	42

As for the matter of the overall intensity of the annoyance due to the airplanes, it also reveals the slight deviations on these same questions. /44 The battery of questions introduced in the 1977 survey does not allow any marked differences to be found (Table 19).

If then the health questions do not permit a prediction of the intensity of the overall annoyance experienced, they are, like the personality tests, linked to the tone or the nature of the annoyance. The responses reflecting troubles (and in particular the most subjective troubles) are very noticeably more frequent among the persons who complain of certain aspects of the annoyance:

- the most marked correlation, since it involves most of the questions on health, appeared for the most trying aspects of the annoyance: ascribing to the airplane noise such problems as migraines, a general fatigue, a sensation of anguish, difficulties in concentrating, etc. Thus a sort of "global syndrome" seems to arise: a "psychophysiological malaise" and even poor health go hand in hand with (or lead to) an annoyance of a more severe tone which does not necessarily reflect on the evaluation of the intensity of the annoyance (which is in some senses a more "objective" estimation).
- the persons who ascribe sleep troubles to airplanes indicate a little more frequently certain "symptoms" fairly directly linked to the problem of sleep. Attributing to airplane noise the awakenings or difficulties of getting to sleep thus goes hand in hand with a greater frequency of cases of fatigue, dizzy spells, cardiac palpitations, anguish. The consumption of sleep aids is likewise heavier.

In the course of the last 12 months	WHOLE GROUP	Airplane noise annoys them a lot	BECAUSE OF THE AIRPLANE NOISE, ARE frequently or sometimes: prevents them from getting to sleep	wakes them in the morning	wakes them during the night	prevents them from conversing	interferes with radio-TV listening	prevents opening windows	startles them	very or fairly open.: edgy, irritable	difficulties in concentration	general fatigue	anguish restlessness	migraines	fear that an airplane is going to crash
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
their health has been good	39	50	40	44	41	[illegible]	[illegible]	4	[illegible]	[illegible]	[illegible]	27	27	27	[illegible]
have been hospitalized	10	11	10	12	11	[illegible]	[illegible]	[illegible]	[illegible]	12	[illegible]	16	14	13	[illegible]
have taken sick leave	24	29	29	30	27	27	[illegible]	[illegible]	[illegible]	[illegible]	36	[illegible]	32	33	[illegible]
report they have a chronic illness	19	23	25	23	24	20	20	[illegible]	[illegible]	[illegible]	[illegible]	32	40	35	26
experience pains	34	38	40	39	39	35	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	46	44	52	[illegible]
have lost weight	24	26	26	24	25	[illegible]	24	[illegible]	[illegible]	[illegible]	29	[illegible]	39	31	[illegible]
have lost their appetite	10	10	13	13	12	10	10	[illegible]	[illegible]	13	13	19	22	14	[illegible]
are fatigued	33	39	45	44	[illegible]	34	33	[illegible]	[illegible]	43	46	58	59	62	[illegible]
their work exhausts them	22	25	25	25	[illegible]	22	[illegible]	[illegible]	[illegible]	[illegible]	30	29	34	31	25
have dizzy spells	20	20	27	26	23	[illegible]	20	21	[illegible]	29	30	35	39	44	26
have car sickness	14	15	16	[illegible]	[illegible]	14	[illegible]	[illegible]	[illegible]	[illegible]	16	14	19	23	14
have headaches	25	30	36	35	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	33	[illegible]	39	42	75	[illegible]

	WHOLE GROUP	Airplane noise annoys them a lot	BECAUSE OF THE AIRPLANE NOISE, ARE frequently or sometimes: prevents them from getting to sleep	wakes them in the morning	wakes them during the night	prevents them from conversing	interferes with radio-TV listening	prevents opening windows	startles them	very or fairly open: edgy, irritable	difficulties in concentration	general fatigue	anguish restlessness	migraines	fear that an airplane is going to crash
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Often or sometimes:															
have palpitations, angina	58	58	67	62	63	59	59	60	69	67	63	69	75	70	
suffer from colic or intestinal or abdominal pains	40	44	46	46	47	43	42	43	55	53	53	56	56	64	
they some times faint	16	14	19	20	18	14	14	15	22	18	18	21	18	20	
suffer from muscle cramps	51	51	55	57	54	51	53	52	54	57	59	57	58	61	
have trembling or muscle tremors	40	43	46	46	44	41	40	41	41	47	49	50	49	48	
have sensations of numbness in the extremities	54	52	63	58	57	53	54	53	68	59	61	60	77	71	
suffer from bouts of anguish	55	59	66	64	61	57	56	57	68	65	71	72	78	79	
feel excessively emotional	63	63	67	68	64	62	63	65	71	69	74	77	73	76	
feel irritable, act touchy	71	71	70	73	71	70	69	70	73	76	76	79	83	79	
sometimes say "nothing tastes good to me"	56	58	63	62	59	[illegible]	58	59	72	66	66	71	74	73	
have the impression of a lump in the throat	50	51	55	57	53	51	51	49	62	54	59	59	64	64	

	WHOLE GROUP	Airplane noise annoys them a lot	BECAUSE OF THE AIRPLANE NOISE, ARE: frequently or sometimes: prevents them from getting to sleep	wakes them in the morning	wakes them during the night	prevents them from conversing	interferes with radio-TV listening	prevents opening windows	startles them	very or fairly open: edgy, irritable	difficulties in concentration	general fatigue	anguish restlessness	migraines	fear that an airplane is going to crash
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
drink	6	7	6	7	5	7	7	4	4	7	6	6	5	3	2
smoke	29	33	20	27	21	27	29	26	22	28	31	30	26	22	28
In the course of the last 7 days:															
have taken aspirin	14	17	15	16	15	16	15	15	19	19	18	20	16	26	17
have taken other medications	34	38	46	44	45	36	35	39	47	45	43	50	57	51	41
have suffered from "nervous depression"	16	16	20	21	19	15	15	17	25	22	26	25	37	26	
regularly take medications for sleeping	9	11	17	13	14	9	9	11	13	15	16	18	22	15	
they still have after effects of serious illnesses or accidents	9	12	14	12	12	10	10	11	14	15	15	19	17	21	

	WHOLE GROUP	Airplane noise annoys them a lot	BECAUSE OF THE AIRPLANE NOISE, ARE frequently or sometimes: prevents them from getting to sleep	wakes them in the morning	wakes them during the night	prevents them from conversing	interferes with radio-TV listening	prevents opening windows	startles them	very or fairly open: edgy, irritable	difficulties in concentration	general fatigue	anguish restlessness	migraines	fear that an airplane is going to crash
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
In the course of the last 12 months:															
Their life has been perturbed by cares, serious worries, particularly difficulties	39	38	42	40	37	40	39	40	47	41	44	45	53	43	
have consulted a physician:															
YES: 1 to 8 times.....	60	59	61	66	65	61	61	62	59	60	60	61	61	58	
9 or more times.	13	16	20	16	17	15	14	16	19	19	20	21	24	24	
NO:	27	25	19	18	18	24	25	22	22	21	20	18	15	18	

As for the questions relating to the more objective inconveniences /47 of the noise (interfering with radio-TV listening, preventing conversation, preventing opening of windows), they are independent of the responses to the health questions.

As a function of the sensitivity to noise, the health questionnaire allows us to draw two conclusions which serve to complement the remarks formulated on the basis of MINIMULT:

- when the self-evaluation of the noise sensitivity is considered, a very perturbed picture emerges for persons who declare themselves as being more sensitive than average. Here we find the "global syndrome" suggested earlier, which leads the persons showing physiological or psychophysiological troubles to be and/or at least judge themselves more sensitive than average to a noise which distresses them more (Table 20).
- when the experimentally defined hyper- and hyposensitivity is considered, some deviations are observed for certain questions, in spite of the low numbers of individuals in the two groups (Table 21). Thus the hypersensitive individuals indicate more frequently that they have lost weight, that they experience pains, that they have after effects remaining from illnesses or accident, that they suffer from abdominal pains, bouts of anguish, that they have muscle tremors, that they are irritable. Taken as a whole, these symptoms almost seem to suggest excitability phenomena of the spasmophilic type.

In agreement with what had been indicated in a preceding report *(1)*, the interindividual characteristics provide a better explanation for

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(1) - "Effects of Airplane Noise on the Mental Equilibrium of Residents Living near Airports. Analyses Complementary to the Survey Conducted in the Orly Area". August, 1977.

hypersensitivity than for hyposensitivity.

Table 20

/48

Part A	HAVE THE IMPRESSION OF BEING		
	Much more or a little more sensitive %	As sensitive %	A little less or much less sensitive %
•In the course of the last 12 months:			
- Their health has been good	26	50	56
Have been hospitalized	14	9	10
Have taken "sick leave"	31	25	19
- Report they have a chronic illness	33	19	12
- Experience pains	56	32	28
- Have lost weight	29	21	27
- Have lost their appetite	16	9	10
- Are fatigued	48	33	29
- Their work exhausts them	27	23	19
- Have dizzy spells	39	17	14
- Become carsick	18	13	13
- Have headaches	31	28	19
- Drink	6	6	9
- Smoke	28	28	30
•In the course of the last 7 days:			
- Have taken aspirin	19	15	10
- Have taken other medications	51	35	23

Table 20 (continued)

Part B			
- Have suffered from "nervous depression"	30	14	14
- Regularly take medications for sleeping	25	7	6
- They still have after effects from serious illnesses or accidents	17	8	8
•Often or sometimes:			
- Have palpitations, angina	66	59	50
- Suffer from colic or intestinal or abdominal pains	52	40	31
- They sometimes faint	28	14	11
- Suffer from muscle cramps	54	51	49
- Have trembling or muscle tremors	51	39	34
- Have sensations of numbness in the extremities	66	50	54
- Suffer from bouts of anguish or anxiety	30	53	46
- Feel excessively emotional	80	60	56
- Feel irritable, act touchy	81	70	61
- They sometimes say "Nothing tastes good to me"	72	55	49
- Have the impression of a lump in the throat	65	47	50
•In the course of the last 12 months:			
- Their life has been perturbed by cares, serious worries, particular difficulties	54	37	35
- Have consulted a physician			
. YES: 1 to 8 times	60	61	59
9 times or more	26	12	8
. NO	14	27	33

Table 21

Part A	WHOLE GROUP	HYPERSENSITIVE Ie < 81 The noise annoys them a lot	HYPOSENSITIVE Ie > 88 The noise annoys very little or not at all
	%	%	%
•In the course of the last 12 months:			
- Their health has been good	49	49	48
Have been hospitalized	10	12	6
Have taken "sick leave"	24	30	23
- Report they have a chronic illness	19	21	21
- Experience pains	34	46	27
- Have lost weight	24	40	20
- Have lost their appetite	10	10	11
- Are fatigued	33	44	40
- Their work exhausts them	22	34	22
- Have dizzy spells	20	27	25
- Become carsick	14	12	16
- Have headaches	25	23	18
- Drink	6	12	8
- Smoke	29	41	35

Table 21 (continued)

•In the course of the last 7 days:			
- Have taken aspirin	14	16	11
- Have taken other medications	34	42	31
Part B			
- Have suffered from "nervous depression"	16	22	16
- Regularly take medications for sleeping	9	18	12
- They still have after effects from serious illnesses or accidents	9	20	8
•Often or sometimes:			
- Have palpitations, angina	58	62	60
- Suffer from colic, or intestinal or abdominal pains	40	43	27
- Sometimes faint	16	19	19
- Suffer from muscle cramps	51	51	52
- Have trembling or muscle tremors	40	52	28
- Have sensations of numbness in the extremities	54	52	49
- Suffer from bouts of anguis or anxiety	55	72	51
- Feel excessively emotional	63	68	58
- Feel irritable, act touchy	71	85	69
- They sometimes say "Nothing tastes good to me"	56	68	55
- Have the impression of a lump in the throat	50	52	54

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Table 21 (continued)

•In the course of the last 12 months:			
- Their life has been perturbed by cares, serious worries, particular difficulties	39	44	39
- Have consulted a physician			
. YES: 1 to 8 times	60	63	57
9 times or more	13	15	16
. NO	27	22	27

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CONCLUSIONS

The third survey conducted around Charles de Gaulle Airport in 1977, nearly four years after its dedication, brings out the following principal points:

- In the group as a whole, the overall level of the annoyance is of the same order as the level observed in 1975, after one year of traffic. As a function of the noise index, the intensity of the annoyance is analogous to that which the residents of the Orly area reported.

  In 1975, the residents of the Roissy area expressed, more frequently than those of Orly, apprehension about the air traffic (fear of the harmful effects of the noise, fear of an accident). This phenomenon seems to attenuate progressively with time.

  The nighttime air traffic appears better tolerated than in 1975, notably among the residents residing in the sectors where the noise index values are highest.

  This lessening of the nighttime annoyance is probably linked to a psychophysiological habituation (demonstrable by EEG), which accompanies or slightly precedes the lessened annoyance.

- The MINIMULT test does not enable us to reject the hypothesis of an effect of noise on psychological equilibrium. This effect would be manifested as a diffuse perturbation and not by deviations on certain particular personality factors. /53

The health questionnaire brings out several indications of a perceptible deterioration among the area residents exposed to the strongest noise levels.

This deterioration is showing up around Charles de Gaulle Airport after about three and a half years, whereàs signs of this type appeared around Orly only among the persons residing at least ten years in proximity to the airport. It could be hypothesized that this great vulnerability of the Roissy area residents is linked to the relative suddenness of the change in the environment and perhaps also to the existence of nighttime airport traffic.

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- psychological perturbations, demonstrable by means of the MINIMULT test, go hand in hand with an annoyance of a more distressing character. On a rather general level, it is possible to hypothesize that there exists a nonspecific predisposition (linked to psychological troubles) which leads a person to exaggerate the inconveniences of the environment, including the noise. It nevertheless remains that the overall evaluation of the annoyance seems linked to certain particular personality factors.

On the other hand, certain results appear to indicate that the inter-individual variability of the annoyance can also be explained partially by the fact that the area residents little annoyed by the noise include some persons who have a tendency to bias their responses in a direction that they deem more normal, more socially acceptable: they can thus be prompted to underestimate their annoyance deliberately.

As for the health questionnaire, it also makes its contribution to the comprehension of the interindividual variability of the annoyance. A psychophysiological malaise, or even a poor state of health, leads to a more burdensome annoyance and predisposes a person to be more annoyed by the noise than is average for the area residents.

TECHNICAL SUPPLEMENT

The survey was carried out from 24 October to 21 November 1977 on a sample of 943 area residents ranging from 20 to 65 years of age.

It was carried out in two phases:

- First of all, an attempt was made to requestion the 484 persons who had been interviewed on two previous occasions, in February 1974 and in March 1975. In total, 218 usable interviews were able to be conducted.

  The others were not able to be interviewed again for the following reasons:

	1975 Survey %	1977 Survey %
- Refused	26	21
- Moved away	39	47
- Unknown at the indicated address	5	7
- Absent on the occasions of three successive visits by the investigator	15	12
- On extended absence from home	12	5
- Other reasons	3	8
	100	100

As compared to 1975, the number of persons who had moved away had increased, which is easily explained by the greater amount of time which

elapsed between the last two surveys.

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In fact, the level of people who have moved and more generally the level and the nature of the "dropouts" are comparable to those which one typically finds in surveys where one seeks to requestion the same persons.

- Therefore a complementary sample was set up, composed of persons residing in the same survey zone at least since 1973 (that is, before the opening of the airport, as was the case for the sample questioned by address). This sample was made up by the method of quotas, defined in such a way that the two samples taken as a whole would have a structure analogous to that of the preceding surveys, according to the criteria of sex, age, occupation of the head of the household, and activity of the person questioned. A sample of 725 usable interviews was thus obtained.

In total the survey thus included 943 interviews. The geographic plan of the sample has remained identical since the first survey conducted in the area around Charles de Gaulle Airport.

• Distribution of the sample among the various localities of the survey zone (see map which follows)	1974 Survey %	1977 Survey %
- Villiers le Bel	56	57
- Goussainville	16	16
- Ecouen	14	12
- Le Thillay	8	8
- Roissy en France	3	3
- Bouqueval, Le Mesnil Amelot, Epiais les Louvres, Mauregard, Villeneuve sous Dammartin	3	4
	100	100

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To analyze the results according to the level of exposure to the noise, each person was assigned a noise index value corresponding to his place of residence. This work was done by locating the residence on the map which had been worked out at our request by the Paris Airport Authority, on the basis of the 1975 traffic. To take into account the increase in traffic since that date, it was considered reasonable, as the competent services at the Paris Airport Authority agreed, to apply to these curves an upward translation of one index point, leaving the shape of the contours unchanged since the flight paths had remained the same.

Map

SURVEY AROUND ROISSY

--- (1)
(isopsophic curve for N = 90)

(2)
BOUNDARY OF SURVEY ZONE

On this basis, the sample was divided, after the fact, into four noise index classes. At the time of processing the data on the computer, a weighting procedure was applied to give each of these groups an identical structure according to the criteria of sex, age, occupation of the head of household, and activity. These groups were thus "matched" by eliminating the effect of parasitic variables which could have affected the comparisons among groups. For this adjustment, the structure of the 1975 sample was taken as a point of reference in order to permit comparisons between the new survey and the preceding survey. /59

The characteristics of the sample before and after adjustment are presented in a table at the end of this section.

The interviews were conducted according to the same principle as in the preceding survey: the survey was represented as being a general study on the daily life of the French and began with a first series of questions, asked orally; then the interviewee was asked to fill out in writing a questionnaire including the battery of MAS and MINIMULT items as well as some questions on health; after the investigator had put this confidential and anonymous questionnaire in an envelope, the interview was continued with questions on the environment, progressively homing in on the airplane noise.

These questionnaires have been accepted well in the group as a whole: only 19 interviews have had to be discarded because of refusal to fill out the written questionnaire or because the questionnaire was incompletely filled out.

The questionnaires employed have been appended to this report.

	STRUCTURE BEFORE ADJUSTMENT							STRUCTURE AFTER ADJUSTMENT (identical for each noise index level)	REFERENCE STRUCTURE (1975 survey)
	SAMPLE REQUESTIONED	COMPLEMENTARY SAMPLE	NOISE LEVEL <81	81-84	85-88	89 and more	TOTAL		
BASES	218	725	226	226	280	211	943		
	%	%	%	%	%	%	%	%	%
•SEX									
-Men	49	41	45	45	37	48	43	44	44
-Women	51	59	55	55	63	52	57	56	56
	100	100	100	100	100	100	100	100	100
•AGE									
20-34	38	42	46	44	37	38	41	43	43
35-49	39	36	34	33	40	39	37	39	39
50-64	23	22	20	23	23	23	22	18	18
	100	100	100	100	100	100	100	100	100
•OCCUPATION OF HEAD OF HOUSEHOLD									
-Farmer	1	2	2	2	2	1	2	2	2
-Proprietor in industry or commerce, member of liberal profession, managerial categories	17	18	19	17	18	17	18	18	18
-Lower-level salaried	33	34	37	32	36	29	33	37	37

Table (continued)

- Laborer, service personnel	37	38	34	40	36	42	38	36	36
-Not working	12/100	8/100	8/100	9/100	8/100	11/100	9/100	7/100	7/100
•Activity									
-Working	64	65	70	62	64	64	65	63	63
-Not working	36/100	35/100	30/100	38/100	36/100	36/100	35/100	37/100	37/100

THE QUESTIONNAIRES

/1

IFOP-ETMAR

20 RUE D'AUMALE, 75009 PARIS

Telephone: 280-65-00

Use this block to record the number of the survey contact roll ⌊_|_|_|_⌋

OCTOBER 1977

BO. 72

QUESTIONNAIRE TO BE USED IN INTERVIEWING A PERSON 20 TO 65 YEARS OF AGE, LIVING IN THE SAME LOCALITY SINCE 1973

IFOP is carrying out a study on the daily life of the French people. The study is meant to help us find out more about the French, their tastes, and the way they conduct themselves in their daily lives.

I am going to ask some questions to which I would ask you to answer YES or NO. I would like you to answer quickly, since what we want is your first reaction and not a carefully considered response.

---

①		YES	NO	?
a)	Do you like to have to make quick decisions?	Y	Y	E
b)	Do you have a good memory?	X	X	E
c)	Do you have difficulty keeping your attention fixed on something?	0	0	E
d)	Do you feel ill at ease in an elevator or in a tunnel?	1	1	E
e)	Do you have confidence in yourself?	2	2	E
f)	Do you often have moments when you feel depressed?	3	3	E

g)	Do you have a tendency to seek solitude?	4	4	E
h)	Are you sensitive to the cold?	5	5	E
i)	Do you have difficulties getting to sleep at night?	6	6	E
j)	Are you often awakened by nightmares?	7	7	E
k)	Do you make friends easily?	8	8	E

I am going to ask you to fill out a written questionnaire. It involves a series of questions of the same kind as those that I just asked you. Your answers will remain strictly anonymous: when you have finished filling out this questionnaire, I will put it in a sealed envelope.

Your responses ought to correspond to your usual way of acting or feeling. Here again I ask you not to spend too much time on each question and respond according to your first reactions. The entire questionnaire should not take more than a few minutes.

WITH THE PERSON BEING INTERVIEWED, READ THE INTRODUCTION OF THE WRITTEN QUESTIONNAIRE AND HELP THE PERSON RESPOND TO THE EXAMPLES. THEN LEAVE THE INTERVIEWEE TO FILL OUT THE WRITTEN QUESTIONNAIRE ALONE. AFTER HAVING PUT THE QUESTIONNAIRE IN THE ENVELOPE, CONTINUE THE ORAL INTERVIEW.

② *WE ARE NOW GOING TO SPEAK OF THE CONDITIONS OF LIFE OF THE INHABITANTS* /2

OF _____

From a general standpoint, what do you think of the conditions of life here, in this district? Would you say that the life here is:

. Very pleasant 1

. Fairly pleasant 2

. Not very pleasant 3

. Not pleasant at all 4

③ In this locality, do you have the feeling that things are tending mostly in the direction of:

. An improvement of the fabric of life 1

. A deterioration of the fabric of life 2

. *(SPONTANEOUS RESPONSE:* No change) 3

. ? 4

④ For each of a number of conditions of life that I am going to mention to you, please tell me whether you personally are very satisfied, moderately satisfied, not very satisfied, or not at all satisfied, in that regard, with the present situation in _____ *(MENTION THE LOCALITY WHERE THE INTERVIEWEE LIVES)*.

		Very satis-fied	Fairly satis-fied	Not very satis-fied	Not at all satis-fied	?
a)	The means of public transportation	1	2	3	4	0
b)	The green spaces: squares, public gardens, parks	1	2	3	4	0
c)	The possibilities for finding work not too far from one's home	1	2	3	4	0
d)	Quietness, from the standpoint of ambient noise	1	2	3	4	0
e)	Housing costs: rent or price per square meter for construction	1	2	3	4	0
f)	Possibilities for amusements	1	2	3	4	0
g)	Educational or sports facilities, schools, sports fields, swimming pools, etc.	1	2	3	4	0
h)	Upkeep of the town: cleanness of the streets, monuments, building facades	1	2	3	4	0
i)	Possibilities for getting around in traffic and parking	1	2	3	4	0
j)	The purity of the air in the district (Does it have odors? Smoke? Fumes?)	1	2	3	4	0
k)	Your housing conditions	1	2	3	4	0

l)	Your work conditions	1	2	3	4	0
m)	Your interactions with the people of your locality (or your district)	1	2	3	4	0

⑤ Since you have lived here, have you at any time in the past considered going somewhere else to live, are you presently considering doing so, or have you never considered doing so?

. YES, I have previously considered it 1
. YES, I am considering it at present 2
. NO, I have never considered it 3

⑥ For what reasons? *(KEEP PROMPTING WITHOUT SUGGESTING ANY ANSWERS):* Are there any more reasons?

⑦ Would you say that the noise here, in your district, annoys you very often, fairly often, sometimes, never?

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

⑧ What sorts of noise do you hear here in your district? *(DO NOT SUGGEST ANSWERS--ENCODE THEM IF THEY ARE MADE SPONTANEOUSLY)*

. Noises of road traffic (autos, trucks, motorcycles, etc.) 1

. Airplane noises	2
. Factory, shop noises	3
. Noises from neighbors in the building (conversations, television, children)	4
. Noises from people or children in the street	5
. Noises from work sites (construction, public works)	6
. Other noises *(SPECIFY)*	7
.....	
. No noise	8

⑨ Do you hear:	YES	NO
. Road traffic noise	1	1
. Airplane noises	2	2
. Factory, shop noise	3	3
. Noises coming from your neighbors in the building	4	4
. Noise from people or children in the street	5	5
. Noises from work sites (construction, public works)	6	6
. Other noises *(SPECIFY)*	7	7
.....		

(10) I am going to ask you to specify for me to what degree the noise which you hear here, at this time of year, annoys you personally. Please look at this card and tell me where, on a scale from 0 to 10, you would rate your annoyance, taking 0 to mean you are not at all annoyed by the noise and taking 10 to mean the opposite, that you are very annoyed by it. *(SHOW CARD A)*

	RATING
. Noise of road traffic	|____
. Airplane noise	|____
. Factory, shop noise	|____
. Noise from neighbors	|____
. Noise from people or children in the street	|____
. Noises from work sites (construction, public works)	|____
. Noise at one's place of work	|____
. Other noises *(SPECIFY)*	|____

(11) I am going to ask you to think of noises that you usually hear on a week day, that is, noises that you hear here in your home and noises that you hear at your place of work, if you work. *(SHOW CARD B)* /4

(11) a) Presently, on a weekday, are you very annoyed, moderately annoyed, a little annoyed, or not at all annoyed by the noise early in the morning, that is, from 6 a.m. to 8 a.m. in the morning.

(11) b) *If very, moderately, or a little annoyed:* By what are you annoyed at that time of the day? *(MAY ENCODE MORE THAN ONE RESPONSE)--THEN ASK QUESTIONS a) AND b) FOR ALL THE OTHER TIME INTERVALS.*

	Early in the morning 6 a.m. -8 a.m.	In the course of the morning 8 a.m. -noon	At lunch-time noon-2 p.m.	In the afternoon 2 p.m. -7 p.m.	At dinner-time 7 p.m. -9 p.m.	In the evening 9 p.m.- 11 p.m.	During the night 11 p.m.- 6 a.m.
a) .Very annoyed	1	1	1	1	1	1	1
.Moderately annoyed	2	2	2	2	2	2	2
.A little annoyed	3	3	3	3	3	3	3
.Not at all annoyed	4	4	4	4	4	4	4
If codes 1, 2, or 3							
b) .Road traffic noise (autos, trucks, motorcycles, etc.)	1	1	1	1	1	1	1
.Airplane noise	2	2	2	2	2	2	2
.Noise of factories, shops, offices, work sites	3	3	3	3	3	3	3
.Noise from neighbors in the building (conversations, television, children)	4	4	4	4	4	4	4
.Noise from people or children in the street	5	5	5	5	5	5	5

.Other noises 6 6 6 6 6 6 6

(specify)

.....

I am going to ask you for some further details on the airplane noise that you hear here, in your district.

(12) The airplane noise annoys you:

. A lot 1

. Moderately 2

. A little 3

. Not at all 4

(13) The airplane noise annoys you:

. Very often 1

. Fairly often 2

. Sometimes 3

. Never 4

(14) Most often, when you hear airplane noise, is this noise

. Very loud 1

. Moderately loud 2

. Moderately soft 3

. Very soft 4

/5

(15) Does the airplane noise sometimes cause you the following worries here, at your home? *(IF YES: HAVE THE PERSON SPECIFY, AS INDICATED BELOW, WHETHER IT OCCURS "SOMETIMES" OR "FREQUENTLY"--ONE RESPONSE PER LINE).*

	No	Yes, sometimes	Yes, frequently	?
Sometimes does the noise:				
a) prevent you from getting to sleep at night	1	1	1	E
b) wake you at an early hour in the morning	2	2	2	E
c) wake you during the night	3	3	3	E
d) prevent you from following a conversation with your family or friends	4	4	4	E
e) interfere with your listening to the radio or television	5	5	5	E
f) in mild weather, prevent you from opening the windows or going out on your balcony, if you have one	6	6	6	E
g) startle you	7	7	7	E

(16) Have you personally in the past done one or more of the things indicated on this card to protest against airplane noise and, if yes, which ones? *(SHOW CARD C AND RECORD THE RESPONSE OR RESPONSES IN THE FIRST COLUMN OF THE TABLE BELOW).*

(17) On this card are there any things that you have not done personally in the past to make a stand against the airplane noise, but which you would very much want to do? *(RECORD IN THE SECOND COLUMN).*

	Q. 16 Did in the past	Q. 17 Has not done, but would very much like to
. Write or telephone an official or a newspaper	1	1
. Go to see an official	2	2
. Sign a petition	3	3
. Assist with a public meeting	4	4
. Do something else (what?)	5	5
. Nothing	6	6

(18) Do you experience the following sensations because of airplane noise very often, fairly often, rarely, or never?

	Very often	Fairly often	Rarely	Never	?
Do you on occasion:					
a) feel edgy, irritable	1	2	3	4	0

b) have difficulties concentrating	1	2	3	4	0
c) experience a sensation of general fatigue	1	2	3	4	0
d) experience a sensation of anguish, restlessness	1	2	3	4	0
e) have migraines, headaches	1	2	3	4	0

(19) Would you say that on the whole a noise such as the airplane noise that you hear here, at your home: /6

. Is bound to have an influence on the state of health 1

. Could have an influence on the health of certain individuals 2

. Or really has practically no influence on the state of health 3

GENERAL

(20) Have you already done something or are you presently considering doing something to soundproof you home against external noises? *(MAY ENCODE MORE THAN ONE RESPONSE).*

. YES, have already done something 1

. YES, am presently considering doing something 2

. NO, have done nothing and am not considering doing anything 3

(21) Certain persons are more sensitive to noise than others. Do you have the impression that you personally are more sensitive, as sensitive, or less sensitive to noise than persons living around you? *(HAVE THE PERSON SPECIFY)*

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

(22) When you see an airplane passing at low altitude, do you sometimes have a fear that it is going to crash? Does that occur to you:

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

(23) Around the Roissy airport do you sometimes see airplanes pass which are flying abnormally low? Does that happen:

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

(24) On average, on a weekday, for how much of the time in all are you away from your home?

|_|_| hours |_|_| minutes

(25) And, during this time that you are not at home, on the average, do you hear more, as much, or less noise than if you had remained home?

. More 1
. As much 2
. Less 3
. ? 0

(26) During the week, in general,

a) At what time do you go to bed? |_|_| : |_|_| (Time, 24-hour clock)
b) At what time do you fall asleep? |_|_| : |_|_|
c) At what time do you awaken? |_|_| : |_|_|
d) At what time do you get up? |_|_| : |_|_|

(27) Presently, do you sleep with:

. The windows open 1
. The windows open a crack 2
. The windows closed 3

CHARACTERISTICS

A_1 Is the place where you live

- A farm 1
- A single-family dwelling 2
- An apartment in a building with less than 10 apartments 3
- An apartment in a building with 10 or more apartments 4

A_2 Number of floors

0 1 2 3 4 5 6 7 8 9 and more

B Your living quarters are located on what floor

(IF IT IS A DETACHED HOUSE, ENTER 0)

0 1 2 3 4 5 6 7 8 9

C Could you tell me the approximate date of construction of your apartment (building or house)? /7

Was it:

- Before 1945 1
- Between 1945 and 1954 2
- Between 1955 and 1964 3
- Between 1965 and 1969 4
- 1970 or later 5
- ? 0

D Are you the owner or tenant of your lodgings?

. Owner or co-owner 1

. Tenant 2

. Other 3

E_1 For how long have you lived in this district?

For |__|__| years

E_2 *IF THE PERSON HAS "ALWAYS" LIVED IN THIS DISTRICT, GO ON TO QU. F*

Before living in this district, where did you live?

LOCALITY: .....

E_3 Was the place where you used to live

. Much noisier than here 1

. A little noisier 2

. As noisy 3

. A little less noisy 4

. Much less noisy than here 5

F Number of persons in the home?

1 2 3 4 5 6 7 8 9 and more

G Number of children under 15 years of age living in the home?

1 2 3 4 5 6 7 8 9 and more

H We wish to analyze the results of this study as a function of the family incomes of the persons that we have interviewed. Look at this scale of monthly incomes. We would like to know at what level you place yourself, counting all the money coming in at your home, such as: salaries, dependents' allowances, pensions, incomes, receipts, etc.

(SHOW THE CARD OF INCOMES)

X 1 2 3 4 5 6 7 8 9 0

I SEX

. Male 1

. Female 2

J EXACT AGE

|_|_| years old

K Are you:

. Single 1

. Married (or cohabiting) 2

. Widowed 3

. Divorced 4

L LEVEL OF EDUCATION

- Primary, grammar school 1
- Primary, upper level 2
- Secondary 3
- Technical, commercial 4
- Upper division (university, specialized professional school) 5
- No formal education 0

M OCCUPATION OF THE PERSON INTERVIEWED

Do you pursue an occupation, and if YES, what is it?

.....

Salaried	A	Civil servant	C
Proprietor	B	Retired	D

N Are you

- the head of household 1
- mistress of the house in your home 2
- neither 0

O OCCUPATION OF THE HEAD OF HOUSEHOLD

Does the head of household pursue an occupation, and if YES, what is it?

.....

Salaried	A	Civil servant	C
Proprietor★	B	Retired	D

P ★*IF PROPRIETOR*

How many persons are employed in your business?

Number of persons _____

/8

Q NAME OF THE PERSON INTERVIEWED

.....

ADDRESS

Street ..... No. .....

Building..... Flight .....

LOCALITY

- BOUQUEVAL 1
- ECOUEN 2
- EPIAIS LES LOUVRES 3
- GOUSSAINVILLE 4
- LE MESNIL-AMELOT 5
- LE THILLAY 6
- MAUREGARD 7
- ROISSY 8
- VILLIERS LE BEL 9
- Other *(specify)* 0

.....

R BLOCK COORDINATES

- Vertical (letter) ⌊__⌋
- Horizontal (figures) ⌊__|__⌋

S DURATION OF THE INTERVIEW

. Less than 20 min	1
. 20-24 min	2
. 25-29 min	3
. 30-34 min	4
. 35-39 min	5
. 40-44 min	6
. 45-49 min	7
. 50-54 min	8
. 55-59 min	9
. 1 hr + 0-14 min	0
. 1 hr + 15-29 min	X
. 1 hr + 30 min or more	Y

INVESTIGATOR:

DATE OF INTERVIEW:

IFOP-ETMAR

20 RUE D'AUMALE, 75009 PARIS

No. 10987

OCTOBER 1977

BO. 71 /9

QUESTIONNAIRE TO BE FILLED OUT IN WRITING BY THE PERSON BEING INTERVIEWED AND TO BE PLACED IN A SEALED ENVELOPE

In filling out this questionnaire, we ask that you enter the digit of the code corresponding to your answer.

Example:

	TRUE	FALSE
1 - On the whole I am an optimist.	1	2

If your answer is "TRUE", you would enter the code 1. If your answer is "FALSE", you would enter the code 2.

Other examples:

	OFTEN	SOMETIMES	NEVER
2 - Are you nervous	1	1	1

3 - Are you an even-tempered person?

YES	1
NO	2

BE CAREFUL NOT TO FORGET TO ANSWER ANY QUESTION

	Often	Sometimes	Never	/10
. Do you ever have palpitations, angina?	X	X	X	
. Do you suffer from colic or intestinal or abdominal pains?	0	0	0	
. Do you ever faint?	1	1	1	
. Do you suffer from muscle cramps?	2	2	2	
. Do you ever have trembling or muscle tremors?	3	3	3	
. Do you ever have sensations of numbness in the extremities (hands, feet)?	4	4	4	
. Do you suffer from bouts of anguish or anxiety?	5	5	5	
. Do you sometimes feel excessively emotional?	6	6	6	
. Do you sometimes feel irritable, do you act touchy "exploding" for no real reason?	7	7	7	
. Do you ever say, "Nothing tastes good to me"?	8	8	8	
. Do you ever have the impression of a "lump in the throat"?	9	9	9	

	Yes	Don't know	No
. Have you lost weight recently?	X	X	X
. Have you lost your appetite?	0	0	0
. Are you particularly tired?	1	1	1
. Is your work exhausting to you?	2	2	2
. Do you have vertigo and dizzy spells?	3	3	3

. Do you become carsick, airsick, seasick?	4	4	4
. Do you frequently have headaches?	5	5	5
. Do you drink an abundance of alcohol, cocktails wine (more than 4 ordinary glasses per day)?	6	6	6
. Do you smoke more than 10 cigarettes per day?	7	7	7
. Have you suffered from nervous depression?	8	8	8
. Do you regularly take medications for sleeping?	9	9	9

In the course of the last 12 months, has your life been perturbed by cares, serious worries, particular difficulties?

. YES 1

. NO 2

If you are a woman, enter the number corresponding to your situation:

Are you:

. Menstruating 1

. Pregnant 2

. Menopausal 3

. Other 4

① In general, in the course of the last 12 months, has your health been: /11

. Good 1

. Fairly good 2

. Poor 3

. Other response 4 *Specify:* .....

② In the course of the last 12 months, have you had to take off from work or have you been prevented from devoting yourself to your usual duties for reasons of health?

. YES 1

. NO 2

If YES, *specify:*

a) How many times has it happened to you? ..... times

b) For how many days in all have you had to interrupt your activities? ..... days

c) Nature of the illness or illnesses

.....

.....

③ In the course of the last 12 months, have you been hospitalized?

. YES 1

. NO 2

If YES, *specify:*

a) Duration of hospitalization ..... days

b) Reasons for hospitalization: .....

.....

.....

④ In the course of the last 12 months, how many times have you consulted a physician?

..... times

⑤ Do you have a chronic illness?

. YES 1 If YES, *specify what:* .....

. NO 2

⑥ Do you have pains in one or another region of your body?

. YES 1 If YES, *specify:* what region? .....

. NO 2

⑦ In the past, have you had:

/12

- Any serious illnesses? . YES 1

. NO 2

- Any serious accidents? . YES 1

. NO 2

If YES, *specify:*

a) Nature of the illnesses or accidents: .....

.....

b) Do you still have after effects of illnesses or injuries?

. YES 1

. NO, none 2

⑧ In the course of the last 7 days, have you taken any medications?

. YES 1

. NO 2

If YES, what medications have you taken?

a) Aspirin tablets?

. YES 1 *Specify:* How many times?

. NO 2 ____ times

b) Sleep aids?

. YES 1 *Specify:* How many times? _____times

. NO 2 Name of medications:

---

c) Tranquilizers, sedatives?

. YES 1 *Specify:* How many times? _____times

. NO 2 Name of medications:

---

d) Tonics, stimulants?

. YES 1 *Specify:* How many times? _____times

. NO 2 Name of medications:

---

e) Other medications?

. YES 1 *Specify:* How many times? _____times

. NO 2 Name of medications:
