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RESEARCH PLAN FOR ESTABLISHING THE EFFECTS OF TIME VARYING NOISE EXPOSURES ON COMMUNITY ANNOYANCE AND ACCEPTABILITY

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PREFACE

This report is a team effort of the Columbia University Noise Research staff. Special mention must be made of the contributions of Dr. Philip Cheifetz in statistical and analytical design, and Frances Gach as Office Manager, who took care of all the administrative details. Special thanks also to Harkey Mayo and J. Donald Reilly of the Airport Operators Council International who secured the cooperation of the airport managers in the survey of their operations. Dr. Clemens A. Powell was the NASA Technical representative, under NASA Grant NSG-1616.

Abstract

The controversy over how best to integrate time varying noise exposures in residential communities can only be resolved by an analysis of objective data secured from well-designed community noise surveys. Past community studies have provided clarification of the important complex physical and human variables involved in the harmful health and welfare effects of environmental noise, but new research is needed to quantify the number-level trade-offs and time of day penalties. Previous field surveys have failed to control for various combinations of time varying noise parameters and thus, were unable to assess the independent and interacting effects of these factors. Community reactions can be compared where noise exposures are equal in day or evening but differ in the night time. The effects of ambient noise on more intense aircraft noise exposures can also be ascertained. A mail survey of the top 50 airports reveals at least 13 different time of day and type of operation situations with exposed populations up to 8-10 miles from the airport. Considering regional variation, about 16 airports were selected to represent the range of physical exposures. A detailed personal interview questionnaire was developed as well as specific instructions to interviewers.

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I. Introduction

Some of the most difficult problems in community noise control continue to involve issues of the compatability of environmental noise and community goals of uninterrupted activities and quality of life styles. Current levels of community noise propagation are not considered acceptable by large numbers of residents. For example, the U.S. Census 1/, in a national survey, just reported that street noise was the most often mentioned undesirable neighborhood condition, with over a third of all people mentioning noise. The U.S. National Research Council 2/ estimates that over 40 million U.S. residents are disturbed by traffic noise and some 14 million by airplane noise. Some 12 million are said to be contemplating moving due to noise. The report concludes, "Noise would seem clearly to be imposing a very real and very substantial cost on American Society." Reports from other countries indicate similar conditions.

While there are many technical, political and economic reasons why community noise abatement has made such slow progress, the psycho-acoustic and related scientific researchers must accept their share of the responsibility. Lack of agreement among themselves on standardized units of measurement and comparable methods for obtaining and analyzing objective data has contributed to confusion among administrators and consequent delays at noise control. Quantitative relationships between measures of physical noise exposure and human response have not been reliably established.

With the continued progress in engineering technology to reduce noise levels propagated by different sources, regulators urgently need more precise information on the relationships between standardized measures of integrated noise and human

responses. As the threshold of acceptability is approached by noise reduction technology, it becomes increasingly important from a cost-benefit consideration, to have a more accurate data base for critical administrative decisions. A few additional decibels of noise reduction becomes more and more costly and precisely where the noise limits are actually set has substantial relevance to designers and users of noise sources, as well as to land use planners and real estate operators. Yet, no comprehensive research program has been undertaken to secure the answers required. A review of past research indicates bits and pieces of suggestive relationships, with sometimes opposite and confusing findings. Some of these conflicting reports will be reviewed and an effort will be made to emphasize the remaining gaps in knowledge which need urgent attention.

II. Review of Past Research on Human Response to Noise

A. Overall Conceptual Scheme of Human Response to Noise

Studies of human response to environmental noise are intrinsically complex, and multi-disciplinary. Attempts to develop simplified dose-response relationships inevitably produce gross average annoyance predictions with a large unacceptable variability in response. Typically, in such over simplified schemes, noise accounts for only 10-25% of the individual variance in response. In a more complex laboratory study 3/, where both acoustic and non-acoustic variables were more controlled, as much as 50% of the total response variance was explained with about three-fourths due to acoustic and one-fourth to non-acoustic conditions. In a less controlled field survey by Columbia University at JFK Airport 4/, noise alone accounted for only 10% of the individual annoyance response. But when both an integrated acoustic descriptor (CNR) and three interacting human response variables were included in a multiple regression analysis, about 60% of individual variance was explained.

Based on a number of survey results in the U.S. 5/6/7/, Great Britain 8/9/, Sweden 10/, Switzerland 11/, France 12/ and West Germany 13/, a theoretical scheme has been developed describing the process in which noise is perceived, integrated and

responded to by residents in different communities. While there is general agreement that this scheme has identified all of the most important variables, the quantification of the relationships still needs to be fully developed. To do this effectively, international cooperation is essential among researchers.

In brief, the initial variable stimulating annoyance and other human responses is the unwanted external environmental noise. The physical characteristics of noise related to community response must be accurately defined and measured in order to understand the related differences in human response. A number of physiological, situational and psychological factors filter the physical noise stimuli and determine the variations in human perceptions. The processing of the perceived noise in the higher brain centers and the interaction of a number of socio-psychological personal factors interact with these adverse feelings to determine the final behavioral responses that may follow. Each of these stages in the chain of human response to noise must be defined and measured in order to establish reliable objective numerical relationships among them.

B. Factors Affecting the Physical Characteristics of Sound

1. Single Noise Exposures

In order to regulate and control individual noise sources and the way they are operated, an understanding of how the physical characteristics of sound are related to human auditory perception and response is essential. The diversity and complexity of different noise descriptors that have been developed primarily by engineers, on an ad-hoc basis, have created confusion and impeded comparisons of research findings among different studies. The need for standardization is most urgent.

a. What is known

(I) Loudness and noisiness

One of the primary characteristics of sound that affects its "unwantedness" is its perceived intensity or loudness. This psychological judgement of auditory magnitude has been found to be primarily a function of the spectrum or tonal distribution of the complex sound and its intensity (dB). There is a considerable literature

on the complexities of loudness judgements. Scharf 14/17/ and Yaniv 15/ have both recently prepared comprehensive summaries on this question and some of their findings will be summarized. Scharf in his paper, states, "A noise impinging upon our ears sets off a complex series of physiological events that usually result in an auditory perception. If we ask a listener to judge the loudness of the noise, his response will depend primarily on the neural output of the auditory system. If, on the other hand, we ask the listener to judge how annoying the noise is, his response will depend on the output of his auditory system, as represented primarily by loudness, plus a host of other factors such as the time of day, the meaning of the noise, his general mood, and so forth. To the extent that loudness is a non-linear function of the acoustic input, we should come closer to predicting the annoyance by starting with loudness rather than with the raw acoustical measure." 17/

Besides loudness and annoyance, it has been suggested that a noise may evoke an intermediate quality usually called noisiness. 18/19/20/ As defined by Berglund et al, noisiness is "the quality of the noise". More important, Berglund et al showed that listeners judged the noisiness and loudness of a series of airplane and community noises significantly differently. However, the differences were small, especially at high noise levels, with annoyance differing considerably more from loudness than did noisiness. Both annoyance and noisiness were linear functions of loudness, but annoyance was 1.4 times greater than loudness over the range of noises sampled, while noisiness was only 1.16 times greater.

A number of different calculation procedures and sound-level frequency weightings have been proposed or used for making loudness calculations. Scharf in examining 11 of these noise descriptors which have been used to measure either loudness or noisiness 17/ concludes, "An ideal (weighting) system would give the same value for all sounds that had been judged subjectively equal and the standard deviation would be zero ..... While the standard deviations for the calculation procedures (Mark VI and VII, PNL, PNLC and Zwicker) were lower than for the simple weighting system of dBA, the differences were less than one decibel". Since it has been found

that the loudness of two sounds separated by a few minutes interval cannot be reliably judged as different unless their levels are more than 3 dB apart 21/, it can be concluded that the relatively simple dBA unit can generally be used to integrate spectral characteristics of sound in loudness measures used in community response studies. Results of a Columbia University laboratory study 22/ also found no significant differences in annoyance judgements when dBA, PNL or dBD were used to describe individual aircraft flyovers and the intensities were equal. A more recent laboratory study at Columbia University 3/ also indicates that loudness is the most important physical variable in annoyance judgements. Yaniv 15/ reaches a similar conclusion.

b. What is not known

(1) duration and pure-tone corrections

The Deerfield, Florida workshop 23/, on noise standards and research, a three-day meeting of 68 top professionals, concludes, "A national standard exists which permits the calculation of the loudness of noise from the acoustical properties of broadband, diffuse and steady state sound. This standard, ANSI-S-3-1949 (R 1972) does not consider the contribution to annoyance or aversiveness of other acoustical factors such as sound duration and tonal components and should be revised to do so. Evidence from different studies on the importance of duration and tonal components, however, are contradictory, and therefore, more work needs to be done on these questions".

Scharf, in his review 16/17/, states, "It has often been suggested that tonal components make noise more annoying and several procedures for taking this effect into account have been proposed 24/25/. However, the effect does not extend to loudness as distinct from the annoyance of noise. For example, Mark VI yielded an average difference of approximately 0 dB between the calculated and observed loudness levels of 325 sounds with and without tonal components. The 81 sounds were judged with respect to loudness, but given the large variability in these data (standard deviation was 4.5 dB), the 2-dB difference is not meaningful. On the other hand, in

the study by Ollerhead [26], Mark VI overestimated the noisiness of 60 noises with tonal components by 1.4 dB less than the 44 noises without tonal components". (Not only were the Ollerhead sounds judged for noisiness, but the SPLs were all above 90 dB, where the 81 sounds with tonal components from Scharf were all below 90 dB.) Although the difference reported by Ollerhead is small, it does suggest the possibility that when the noisiness of intense sounds is judged, the subjective magnitude may increase slightly.

Stephens and Powell [27], in studying noisiness judgements of supersonic aircraft as well as standard jet transports and helicopters found that EPNL, which has a pure tone and duration correction, predicted noisiness judgements with an accuracy of about ± 3dB, within the range of overall accuracy of human judgements.

With respect to questions of duration, McKennell [28], in a recent Heathrow Airport study found that the relatively shorter duration of Concorde overflights appeared to offset somewhat the perceived greater loudness of the Concorde compared to conventional jets in resulting annoyance responses.

(2) impulsiveness of noise

Little is known about the impulsiveness of sound and its relation to annoyance judgements. Stephens and Powell [27], in studying helicopter noise, found that "the level of impulsiveness is positively correlated with noisiness, but across helicopter types and flight conditions the addition of an impulsiveness correction does not significantly improve the correlation between noisiness judgements and the predictive measure, EPNL." A large scale field study of helicopter and field artillery noise is now underway by the U.S. Corps of Engineers and it is hoped that the results of this study may indicate the relative importance of impulse noise on community annoyance.

(3) vibrations and noise

Perceived vibrations from airplane and traffic noise have been found factors in annoyance responses by most investigators. McKennell [28] in his recent study, found that the Concorde noise has generated almost as many reports of disturbance due to

vibrations as interruptions in speech and communication. In other studies of conventional jets, communication interruption has always been much more important than vibrations. Stephens and Powell 27/ also found that the threshold of vibration detection, defined as the level at which 50% of the observers perceived the vibration appears to be in the range of from 62-68 dB vertical floor acceleration. This range corresponds to an outdoor SPL of 96-104 dB and suggests that most jet aircraft which generate such levels at close distances from the airport probably induce structural vibrations which are clearly perceptible to residents inside their homes. Thus, the possible interaction of vibration and audible noise probably contributes to overall annoyance.

(4) intrusiveness or signal/noise ratio

Few field surveys have been able to collect sufficient 24-hour samples of community noise measurements to make reliable judgements of the contribution to annoyance responses of "intrusiveness" or the signal/noise ratio of a given sound source. Recently, Bradley 29/ in Ontario, Canada, made such a study and found that day-night differences in traffic noise levels were extremely important. This effect may be partly due to the usually lower volume and level of traffic noise at night, or to the lower signal/noise level at night. Warner et al 31/ in a similar study in Zurich, Switzerland, found comparable results. Ollerhead 30/ also found significant effects of intrusiveness in studies of airplane and street traffic noise. At low level aircraft noise exposures, annoyance was rank ordered by the relative level of street traffic noise. But at higher aircraft noise exposures, the reverse effects on annoyance were noted. The greatest annoyance was reported when street traffic noise were each separately measured and separately correlated with annoyance responses, the relationships were different than when both noise sources were considered together; aircraft noise alone had the highest annoyance. Stephens and Powell 27/, on the other hand, found that a combined measure of aircraft and traffic noise generally produced greater annoyance than when each source was considered separately. The importance of intrusiveness is another factor that needs greater attention.

2. Multiple events

a. Number and level of exposures

If the question of how people perceive and process a single noise exposure is complicated and still unclear, the real environmental situation in which many different sources produce intricate time varying patterns of noise which somehow are integrated by the exposed person, may appear overwhelmingly complex. Just to cite a number of these time varying variables; there may be different numbers of different sources with varying noise levels and durations, with fluctuating combinations and intervals between exposures at different times of the day, from day to day, season to season and year to year. In addition, a person may be inside or outside a structure involved in a variety of tasks or activities. If an area experiences large variations in noise exposure with many intense sources during some time periods and practically none at other periods, should the zero exposures be averaged together with the intense noise periods? Would this mathematical average represent the noise level to which residents respond? And should seasonal variations be averaged or measured separately?

When the EPA in the United States published in March 1974, an Information Document on the "Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety", it selected the L_{dn} as the best available descriptor for integrating time varying noise. However, it recognized that the L_{dn} "does not correlate uniquely with any specific effect on human health and performance", and as such, this methodology may or may not be the best suited for defining noise criteria or standards. Rice 32/, who has studied this problem for a number of years, also concludes, "the scientific data currently available are insufficient to adequately specify the form such a dose-response relationship should take ..... Field studies of aircraft noise have shown that although the notion of some kind of trade-off effect between aircraft noise and number may survive conceptually, satisfactory quantification of this effect has not yet been achieved." In reanalyzing the

relationships of numbers and levels of noise exposure from Schultz's 53/57/ study, including "non-clustering surveys" omitted by Schultz, Rice finds at least three different "dose-response" relationships, which are much more dependent on numbers of exposures. In those communities with less than 50,000 movements a year, the relationship between annoyance and noise is flatter than studies with 50,000-200,000 movements. But studies of communities with greater than 200,000 movements per year have more annoyance below 75 L_{dn} and less annoyance above 75 L_{dn} when compared to the middle group. Yaniv 33/ found "several temporal parameters, i.e. number of events in noise, intermittency or interruption rate and duration, have been identified as important, but the exact form of the quantitative relationship between these temporal parameters and the subjective response is not clear." Most of the research on time varying noise has been done on aircraft or traffic noise sources. Pearsons 34/, Langdon 35/ and Rice 36/ found that adverse response increases as a function of the number of events, but each found different mathematical functions.

Rylander 37/38/ found a minimum number of events, about two per hour or 50 per day was needed to register a significant number of "very annoyed" responses. Further increases of relatively low level (70 dBA) noises resulted in little increase in annoyance, but increased numbers of 80 and 90 dBA noise exposures produced increased annoyance up to about 4 per hour or 100 per day. Then at about 200 flights per day annoyance appeared to stabilize. It should be noted that the largest number of events (174 per day) included by Rylander, is far below the numbers experienced at major United States and other international airports. Thus, his work does not include the full range of noise exposures. In a laboratory study, Rylander also found that after 6 events per hour, the percent (rather and very) annoyed persons stabilized and then at 45-70 per hour annoyance appeared to drop. A laboratory study by Columbia University, however, did not find such a drop in annoyance after a rate of 48 exposures per hour.

Rice 36/37/, suggests a general hypothesis of the number-level relationships which attempts to include Rylander's and other research findings. He compares his

laboratory results with those from the field studies of Rylander, interpreted in terms of an 85 average peak dB(A) level, and finds that the results line up quite well. It could be argued that in the range of about 3-16 flights per hour the influence of number is small, and a case for the peak level concept is presented. Decreasing importance of the number of events is also suggested at the very lower rates. Above about 16 aircraft per hour, however, Rice indicates that annoyance may begin to increase again and becomes more dependent upon number. These are both important departures and tend to argue against an all inclusive peak level concept. It is interesting to note that a similar relationship to that shown by Rice can be deduced from the laboratory study of Langdon, Gabriel and Creamer 35/, who investigated judged acceptability during television viewing. While Rice agrees that an energy or linear fit can be applied to most community studies, he feels that the energy concept conceals the true nature of the trading relationships. If one insists on a single index number, then L_{eq} appears to overstate annoyance response at some levels and understates it at other levels. In any specific community, with a given number of operations and a given traffic mix which establishes the specific levels of noise exposure, the use of an average measure such as L_{eq} could distort the predicted community annoyance response for that area.

Fields 48/ conducted a community survey of railway noise effects in England and found that the annoyance relationships to common units of noise exposure were different for railway noise, aircraft and road traffic noise. Berglund 49/ in a study of street traffic, speech in a foreign language, music, pile driving, typing, jack hammer drilling and a jet overflight also found different psychological functions for different types of noise. These results raise serious questions about the feasibility of developing a universal noise descriptor for all noise sources. Bradley 29/ in his study of street traffic noise, also found that while L_{eq} was best correlated overall with annoyance, ($r=.50$), a number of other noise measures and the logarithms of vehicle flow rate produced similar correlations, reflecting the common energy summation assumption. The L_{np} noise measure, however, including a fluctuation component

was not a successful predictor. For sleep annoyance, the L_{10} for night time exposure was best correlated to the sleep response. This further emphasizes the importance of the relevant time frame and activity in any computation scheme.

b. Day-Night penalty

In evaluating the day-night penalty (10 dB) used in NEF indices, Ollerhead 30/ found this too high. His study suggested a 5-6 dB penalty for evening and possibly night traffic. Studies by Columbia University 44/45/ also suggest a penalty less than 10 dB, but the exact number needs to be established. In a Columbia University study in which field survey annoyance responses were compared to different simulated field conditions in the laboratory, annoyance with simulated peak rather than average (24-hour) traffic volume in the laboratory was best correlated with the field survey annoyance response.

c. Seasonality

The effect of seasonality of exposure also has not been studied in any systematic fashion, but a priori judgements have recognized this factor. In the New York area, where wind patterns and weather changes during the winter and summer not only alter air traffic patterns, but modify indoor-outdoor and closed and open window living patterns, a recent yet unpublished study by Columbia University of 2000 residents at JFK Airport indicates that the effects of seasonal noise on annoyance is substantial. About a third of all residents reported decreases in perceived aircraft noise level in the winter period. A special factor that may have limited this reduction was the beginning of operations of the Concorde during the winter months of this study, and the ambiguity in the question of the reference location as inside or outside. Overall annoyance, however, was reported decreased by about half of all residents. Substantial decreases in percent of residents with "high annoyance" (25-50%) were reported for all key residential activities, with the greatest relative declines (60-80%) reported by the more distant residents, where the inside noise level during the winter is the lowest.

C. Factors Affecting Perception of Sound

The process of human response begins with the perception of the stimulus. The fact that the stimulus can be measured objectively by an instrument does not necessarily mean it is equally perceived by all persons exposed to it. At least two key factors may influence how a stimulus is perceived in the real environment. Recognition of these factors in selecting subjects for laboratory and field studies could reduce subject variance.

1. Variability in Sensitivity

This refers to differential capabilities of individuals or groups of people to perceive the stimulus and generally is related to physiological differences in their sensory systems. Persons who feel noise affects their health may also be particularly sensitive to it. Evidence also suggest that people with anxieties and mental illness may also be very sensitive to noise.

2. Activity Contexts

What one is doing or wants to do at the time of noise exposure may also affect how the stimulus is perceived. For example, whether one is asleep, reading or playing with children may differentially influence perception. In this connection, the attention mechanism (cochlear inhibitory reflex) may actually prevent the sound from being received by the higher brain centers. Indirect survey evidence of this attention mechanism is provided from a reanalysis of 1975 Columbia University survey data. For each environmental noise heard, each resident was asked, "Would you say it is at all possible for anyone to reduce the noise or not? -- And almost every time you hear the noise do you pay attention to it until it passes or do you usually ignore it and hardly ever hear it?" For persons who were highly fearful of airplanes and to whom the aircraft noise was a signal of possible danger, 60% said they always pay attention until it passes. In contrast, of those residents with little or no fear of airplanes, only half as many or only 32% said they pay attention. Those with a sense that the noise is unavoidable and for whom the noise has no special meaning or warning, say they generally ignore the sound.

D. Factors Affecting Feelings of Annoyance Acceptability

Just as there is lack of agreement about definitions of proper physical descriptors of noise exposure, there is as yet no standardization of definitions and methods of measuring the intensity of annoyance, acceptability or other human responses. Some suggested definitions are presented in this review.

1. General Definition of Annoyance

Annoyance may be defined as a general feeling of displeasure or adversiveness toward a noise source which is believed to have a harmful affect on a person's health and well-being. 46/ It is relatively easy to ascertain whether or not a person has any feelings of annoyance, but the measurement of degree of annoyance presents many problems. One of the major difficulties reflects the highly individual variations in interpretations of a unit of annoyance. 49/ If a categorical scale is used, and a person is asked, "Is the noise very annoying, moderately annoying, a little annoying or not at all annoying?", and he answers "very annoying", we know the ordinal ranking of his feelings. But the absolute amount of annoyance that qualifies as "very annoying" to one person may be quite different from that of other persons. Moreover, there is no indication of the precise absolute interval between one category and another. For practical purposes, when categorical scales are used, each category is assumed to have the same meaning to all persons and the interval between categories is usually assumed to be one digit, i.e. "very annoying" is given a value of 3, "moderately annoying" is given a value of 2, etc. These numbers are then used in all statistical computations.

Some ten years ago, TRACOR 50/ in its social surveys, shifted to a modified ordinal annoyance scale, using an "opinion thermometer" which had five categories, 0-4, with the extreme categories defined (0-not at all and 4-extremely). Because of the general common meaning of numbers to most people, a number "1" represents the lowest amount of annoyance and "2" apparently means about twice as much as "1", etc., although the interval is not explicitly given. This inference is reinforced by recent results of special analyses of 1972 survey responses reported by Columbia University 51/. While there are considerable differences in opinions among statisticians, non-parametric statistics are usually used for ordinal data and parametric for interval data.

To test empirically for the differences in these statistical methods, every correlation in the Columbia University field study was calculated both ways, parametric Pearson and non-parametric Spearman methods. In the hundreds of pairs of correlations calculated, not one proved significantly different in the two methods.

The use of a modified ordinal scale such as initiated by TRACOR, thus appears to have distinct advantages over the traditional categorical scales, since each person is free to select a given number from a limited range of extremes that represents his own intensity of feeling. In using the five-point scale, however, it was found that in areas close to airports, where noise exposure is fairly high, there was an undesirable clustering of annoyance responses at the upper level of "4". Consequently, in a 1975 Columbia University field-laboratory study [45], a ten-point scale was used (0-9) with the extreme categories defined as before. A special comparable question using the 5-point scale was also asked in this study, so a transfer function could be derived between the two scales and comparisons made with previous studies. The 10-point scale succeeded in greater differentation of responses and, therefore, has been used in more recent research.

From a purest point of view, a magnitude estimation or ratio scale is most precise. Thus, the order and intervals between units would be explicitly defined. The use of such a scale in field surveys, however, has not been feasible. No way has yet been found to use a standard reference level for magnitude estimation in social surveys. Berglund [49] has tried to develop a calibration procedure which is a transfer function between loudness and annoyance. The variability in response, however, is still considerable and many assumptions have to be made to get back to the real environment. Galanter [52] has also tried to develop a "Utility Comparison Scale (UCS)", which is a transfer function between intensities of feeling about life-familiar events, that have been scaled by magnitude estimation methods in laboratory studies and field survey annoyance responses. In two recent field studies, Columbia University has also tried to relate reported perceptions of loudness in field surveys to speech interference as a common reference level, but results were inconclusive. Until more development

work clearly demonstrates the advantages and feasibility of a magnitude estimation technique in field surveys, it is proposed that the simpler modified 10-point ordinal scale be used.

From an administrator's point of view, simple annoyance responses are not really the kind of information desired for establishing noise limits. Most people in a complex urban society expect some tension, irritation and annoyance with environmental conditions. Few expect or could live in a "perfect" society in which there is no dissatisfaction with living conditions. In fact, there is considerable evidence that the absence of some tensions and stress would be as unhealthy for a person as over-stressing. The key question is how much tension or annoyance is considered acceptable or compatible with a given quality of life goal. Webster's third New International Dictionary defines "compatible" as "indicates capacity for existing together without discord or conflict, although not necessarily in positive agreement or harmony". The goal, then, is to define the amount of noise that is acceptable to a community so that compatability would exist between the noise source and the community. When an effort was made in a field survey [45] to ask residents direct specific questions about the acceptability of their noise environments, it was found ineffective and confusing. Many residents insisted on interpreting "acceptable" not as a judgement of what they felt was a fair compromise, but what was in fact feasible. If they felt the situation was hopeless and they could not move, they said, "of course it is acceptable .....I'm here", even though their annoyance was high. In a number of laboratory studies, however, by Columbia University [3-5], where the artificiality of the situation was clear that a theoretical option existed, respondents answered more rationally as to what they would settle for or find acceptable. The relationship between reported degree of annoyance and acceptability, as reported in the latest study, is shown in Table 1.[3]

TABLE 1

REPORTS OF ANNOYANCE AND ACCEPTABILITY REPORTED IN LABORATORY JUDGEMENTS

Annoyance	Scores	Number	Percent Judgements Acceptable	Unacceptable
Highly	7-9	643	7.2 %	92.8 %
Moderately	5-6	368	57.6	42.4
Slightly	0-4	525	94.09	4.1
	9	220	0.0	100.0
	8	214	5.6	94.4
	7	209	16.3	83.7
	6	166	41.6	58.4
	5	202	70.2	29.2
	4	187	88.8	11.2
	3	149	96.0	4.0
	2	99	100.0	0
	1	56	100.0	0
	0	34	100.0	0

As can be seen, an annoyance score of 0-4 is acceptable to almost 95% of all respondents, while at the upper end of the scale (7-9), 93% find it unacceptable. In mid-scale (5-6), about half find it unacceptable. Using 1975 survey data, a series of cross tabulations were prepared of different cutting points for defining highly or slightly annoyed, (0-2, 3-4, 5+; 0-3, 4-6, 7-9; 0-4, 5-6, 7-9) on the single annoyance question and other activity and behavioral responses. The first two sets of intervals produced a number of inconsistent non-scale relationships, i.e. the lowest or highest annoyance groups had significant opposite type answers on other response questions. The third grouping of annoyance responses shown in Table 1 had the fewest inconsistent responses and, therefore, it is recommended as the best for defining high, moderate and slight annoyance for single questions. It also seems best related to judgements of "acceptability" and depending on political policy decisions on the proportions of people to be protected at different noise exposures, data from the full 10-point annoyance-acceptability scale can be used in establishing noise regulations. Agreement on such a standard response measurement scale is essential to facilitate comparisons among future studies and to secure agreement on noise standards.

2. Definitions of Intensity of Annoyance

In the early 1960s, it was recognized that if international standards were to be established on aircraft noise exposures, agreement would be required on standardization of definitions of data and methods of collection and analysis. The OECD, for a few years, attempted to coordinate such an effort, but for a variety of political and budgetary reasons ceased its attempts before it could complete its objectives. Consequently, a number of subsequent field surveys have been completed in different countries, using diverse definitions of acoustic and non-acoustic factors and a variety of methodologies and analytical procedures. Schultz 53/ has made an heroic effort to compare "dose-response" relationships of reports of "highly annoyed" residents from eleven selected studies. Many arbitrary decisions were involved in adjusting non-comparable data and although most of these judgements may be as good as any one could expect, they are no substitute for standardized data collection, and Schultz recognizes this. As Rice indicates in his recent review, Schultz omitted certain studies which, when added, appear to alter his curvelenear relationships. More objective reanalysis of 1975 survey data by Columbia University also suggest different definitions of high annoyance than those used by Schultz.

a. Single question vs. multiple activity annoyance scales

It has generally been found by social survey researchers that answers to single questions are subject to so many "happenstance" situations, that they are less reliable as measures of intensity of feelings than indexes or scales based on a series of consistently related questions. McKennell 8/9/28/ at Heathrow, Francois at Orly 54/, Langdon in London 55/, Columbia University 51/ and TRACOR 50/ studies all found support for this general finding. Consequently, practically all researchers have used an activities annoyance index as the dependent response variable. Different studies have used a variety of items and scale cutting points in developing their annoyance index, but in general, they include questions on annoyance with interference of the following six key activities: radio and TV listening, conversation, sleep, rest and

relaxation, rattles and vibrations and startle responses. A recent reanalysis of earlier Columbia University survey data indicates that the addition of five other items added little to the basic six items in differentiating annoyance responses. Based on a factor analyses, it was determined to use these six items in a Likert summation scale. When a simple Likert summation scale was compared by TRACOR 50/ to unequal weighting systems, little improvement was noted. Furthermore, the hierarchal importance of any item such as sleep interference, can vary from one community to another and for each community from one time period to another, depending on changes in actual noise exposures. Such changes in a weighted annoyance scale would complicate comparisons of data and add little precision for any single study. The use of the simpler Likert scale which adds all scores from each question, is therefore, recommended.

b. Establishing uniform definitions of intensity of annoyance

Schultz, after much deliberation, concluded that the top 29% of the total annoyance scale values should be considered "highly annoyed". Quite independently, TRACOR and Columbia University staff reached different conclusions. The reanalysis of 1975 survey data indicated that with a total of 54 scale points (6 items @ 9 annoyance pts), the following three categories best describe consistent responses to three intensities of annoyance; with high annoyance including almost half of all possible scores.

Scores	Description of Annoyance
0-15	little or none
16-25	moderate
26-54	high

Table 2 compares these three categories of intensities of annoyance with separate answers to selected related questions, clearly demonstrating that the low and high annoyance groups are both consistent in their responses, while the moderate group is usually somewhere in between. Only 15% of the low annoyance group gave a high annoyance response to the single summary annoyance question and about an equal number of

the high annoyance group report less than high annoyance for the single question. The internal consistency of the summated annoyance scale is further demonstrated by the second group of items. Only 1-2% of the low annoyance group report high annoyance with sleep, rattles and vibrations and rest and relaxation. About a third of the low annoyance group have high annoyance with being startled, 26% with TV and radio interference and 22% with conversation interruption. In contrast, the high annoyance group reports 97% have high annoyance with TV and radio interference, conversation and startle reactions. In addition, 84% report high annoyance with interruption of rest and relaxation and 68% with sleep interference and rattle and vibration.

A further indication of the consistency of these scale categories are the answers to the early questions of the interviews. In reply to the open question about "things disliked around here", 57% of the high annoyance group voluntarily mention aircraft compared to only 17% of the low annoyance group. The answers to the first direct question, however, on degree of dislike reveals the inadequacy of single question indexes. Almost 40% of the low annoyance group report high dislike, while 92% of the high annoyance group also report high dislike. The question on "poor neighbor" is presented as a control, to show there was no significant difference on this item among annoyance groups and that residents were giving different answers to questions that were unrelated to annoyance with noise and consistent answers to related questions.

In connection with some behavioral issues, almost half the highly annoyed felt like moving compared to only 28% of the low annoyance group. Furthermore, practically all "highly annoyed" volunteered that aircraft operations was the reason for choosing to move, in contrast to only 3% of the low annoyance group.

TABLE 2

COMPARISON OF OVERALL ANNOYANCE RESPONSES WITH AIRCRAFT ON NOISE WITH SELECTED ITEMS-1975 SURVEY

		ANNOYANCE SCALE		
		Low	Moderate	High
1. Annoyance-single question		N=261	N=174	N=856
Low (0-4)		67 %	20 %	4 %
Moderate (5-6)		18	36	12
High (7-9)		15	44	84
2. Annoyance with Activity Disturbance by Aircraft Noise				
TV or Radio	Low	59	9	2
	Moderate	15	6	1
	High	26	85	97
Sleep	Low	98	84	30
	Moderate	1	5	2
	High	1	11	68
Rattle and Vibrations	Low	93	75	28
	Moderate	5	12	4
	High	2	13	68
Rest and Relaxation	Low	96	72	15
	Moderate	3	8	3
	High	1	20	83
Conversation	Low	65	16	2
	Moderate	13	8	1
	High	22	76	97
Startle	Low	43	9	1
	Moderate	24	10	2
	High	33	81	97
3. Volunteered things disliked Aircraft		17 %	46 %	57 %
4. Direct question on Degree disliked Aircraft noise	Low	42	11	3
	Moderate	20	16	5
	High	38	73	92
	Low	97	95	93
	Moderate	1	1	4
	High	2	4	3
5. Felt like moving	Yes	28 %	36 %	49 %
	No	72	64	51

3. Psycho-Social Factors that Affect Annoyance and Acceptability Responses

a. General evidence of importance of psycho-social factors

A number of intervening factors have been identified as significantly modifying annoyance responses in both field 5/6/7/8/9/10/11/12/13/ and laboratory studies. 3/22/

All of these studies were based on early U.S. research [5/6/] and used similar sampling and questionnaire designs. The specific questions, however, were often different. The sampling plans usually selected areas at different noise exposures and randomly sampled residents in homogeneous areas. The questionnaires masked the objective of the study and proceeded from general open questions to more specific questions on noise.

McKennell [28/] in his recent study of the Concorde, found "the degree of annoyance with aircraft in general and the level of patriotic feeling about Concorde were the two variables with the highest correlations with Concorde annoyance ..... higher even than the correlation with its noise level." Bradley [29/], in his comprehensive traffic survey, found the same psycho-social factors important in explaining annoyance variance in road traffic as in the aircraft noise studies. He concludes, "The following individual subject variables were found to be quite successful in increasing the variance explained: concern for accidents, perceived difficulty to reduce noise, psychological stress and satisfaction with the neighborhood ..... Similarly subjects perceived traffic noise was harmful to their health ..... demographic variables were generally unsuccessful as in many previous studies (in explaining variance in annovance) ..... It appears that people resent unfair treatment. Thus, if they think it is easy to reduce traffic noise levels, or that vehicles are not very necessary, they are more annoyed by traffic noise. Similarly, subjects were more annoyed by unnecessary noises such as squealing tires." This latter factor is comparable to "feelings of misfeasance" which will be discussed below. Tarnopolsky [56/] in an innovative study of aircraft noise, annoyance and mental health around Heathrow Airport, concludes, "Noise per se does not appear to be a major cause of 'frank psychiatric illness' ..... Psychiatric cases are very vulnerable to noises and easily annoyed in the community .....Psychiatric cases, however, only contribute a third of the total 'very annoyed', therefore, cannot be suspected of suffering frank mental illness." Francois [54/] in a study of about 1000 residents around Paris-Orly Airport, had similar findings. "The average degree of anxiety, nevrosism and extroversion is not modified

by the aircraft noise level, even among respondents exposed to a loud noise for a long period of time (10 years or more) ..... Noise seems more related to feelings of malaise or to subjective symptoms, than to specific organic illnesses ....." In addition to the evidence of the above field surveys, an unpublished laboratory study by Galanter and two studies by the Columbia University noise research laboratory 3/45/ also confirmed that tension, fear and residential experience significantly modify annoyance responses.

b. Evaluation of Selected Psycho-social Factors

The basic desired activities affected by noise and causing differential annoyance when they are disturbed, are presented in Table 2. Likert scales developed by Columbia University to indicate intensity of feelings of fear, misfeasance and other selected psycho-social variables which affect annoyance will be discussed below.

(1) Fear

The fear scale used in Columbia University studies consists of a summation of four items from the community questionnaire. Respondents were asked to rate; 1) their dislike of unsafe low-flying airplanes, 2) how much the noise from airplanes startle or frighten them, 3) how often they felt airplanes were flying too low for the safety of the residents, 4) how often they felt there was some danger that they might crash nearby.

These four items have strong face validity as well as high item intercorrelation. In addition, a number of the items have been shown to be related to annoyance in previous research 5/6/7/. The coefficient of reliability (alpha) for the fear scale is .84. Reanalysis for consistency of score responses from the Columbia University 1975 study indicated that a score of 0-5 represented low fear, 6-17 moderate fear and 18-36 high fear. The correlation of fear and annoyance in the Columbia University 1972 study was r=.72 and about the same in the 1975 reanalysis of Columbia University data (r=.70).

(2) Misfeasance

The concept of misfeasance is an outgrowth of Borsky's 6/ concept of

"considerateness", McKennell's 8/ concept of "preventability", and TRACOR's 7/ terminology of "misfeasance". This scale was intended to measure the respondents' belief that various agents connected with aircraft noise propagation are capable of reducing the noise but for some insufficient reason are not. The agents in the Columbia University scale include "the people who run the airlines", "the airport officials", "the other governmental officials", "the pilots", "the designers and makers of airplanes", and "the community leaders". The coefficient of reliability (alpha) for the misfeasance scale is .76. The correlation with annoyance was r=.32 in the Columbia University 1972 study and r=.37 in the 1975 reanalysis. Evaluation of the 1975 data indicate that scale scores of 0-15 represent little misfeasance, 16-25 moderate and 26-54 high misfeasance.

(3) Health Attitudes

McKennell 8/ reported a strong relationship between the belief that aircraft exposure affected the respondent's health and annoyance. In recent Columbia University questionnaires, respondents were asked "how harmful do you feel the airplane noise is to your health?" This item was scored 0-9 with 9 being very much. The correlation with annoyance was r-.63 in 1972 and r=.61 in 1975. Scale scores of 0-4 indicate low health effects, 5-6 moderate and 7-9 high health effects.

(4) Importance of Aircraft

A small relationship (r=.12) was reported by McKennell 8/ between an aircraft importance scale and annoyance. In the present 1975 study respondents were asked how important they felt commercial airplanes were to national welfare, the community and their own family. Each item was scored 0-9 with 9 meaning very important. The sum of these three items was termed respondent's feelings of aircraft importance. The correlation in 1972 was r=.22, but in 1975 it was r=.13.

(5) Other factors

The relationship between many other items in survey questionnaires and annoyance were computed. Number of dislikes with other than noise conditions had a correlation of r=.49 with 1975 annoyance responses. General noise sensitivity in 1975 had a correlation with annoyance of r=.26. All traditional demographic variables, such as

age, sex, education, income, marital status, etc. had little, if any, significance to annoyance responses.

The above intervening psycho-social variables have all been found important in most field surveys that have attempted to measure them. Table 3 shows the relationships of some of these most important variables.

TABLE 3

COMPARISON OF ANNOYANCE RELATED FEELINGS ABOUT AIRCRAFT NOISE

Attitude Indexes		Intensity of Annoyance		
		Low	Moderate	High
1. Fear of Crashes	Low	49 %	25 %	5 %
	Moderate	42	40	20
	High	9	35	75
2. Extent affects health	Low	84	66	25
	Moderate	9	17	16
	High	7	17	59
3. Feelings officials are misfeasant	Low	50	30	18
	Moderate	22	24	20
	High	28	46	62
4. Feel aircraft important	Low	12	17	20
	Moderate	25	24	30
	High	63	59	50
5. Intensity of dislikes in neighborhood	Low	73	54	30
	Moderate	24	35	44
	High	3	11	26

Only 9% of the low annoyance group reports high fear of aircraft, while 75% of the high annoyance group reports high fear. With respect to feelings that noise adversely affects health, 84% of the low annoyance group have low scores on the health item, compared to 25% for the high annoyance group. Similar contrasting relationships are shown for feelings of misfeasance, aircraft importance and dislikes in neighborhood. Low annoyance is associated with feelings of low fear, low health effects, low misfeasance, high aircraft importance and low dislikes of general conditions in the neighborhood. The interactions of noise intensity, fear, misfeasance and health effects on reports of annoyance are shown in Table 4. The close distance residents were exposed to noise levels over 90 L_{dn}, the middle distance to 80-85 L_{dn} and the distant areas to 65-70 L_{dn}. When all three attitudinal variables are combined

with physical exposure levels, the overwhelming importance of these sociopsychological effects on annoyance is apparent. If one considers only residents living close to airport areas with equal noise exposures greater than 90 L_{dn}, residents with feelings of great fear, a high degree of misfeasance and marked adverse health effects report that 94 percent have a high degree of annoyance and only 2 percent have a low degree of annoyance. Likewise, residents living in much quieter, distant areas with an L_{dn} of 65-70, who have the same feelings of great fear, a high degree of misfeasance and marked adverse health effects report almost the same annoyance; 86 percent high, 8 moderate and 6 percent low annoyance.

In contrast, among persons living close to airport areas who have the opposite combination of attitudes (i.e., a low level of fear, a low degree of misfeasance and low adverse health effects), only 10 percent have feelings of great annoyance and 2 percent low annoyance. Table 4 presents these relationships.

Other Factors: The relationships among many other items in survey questionnaires and annoyance were computed. Importance of aircraft and aviation had a correlation of r=0.13 with annoyance, number of dislikes with other than noise conditions had a correlation of r=0.49 and general noise sensitivity had a correlation with annoyance of r=0.26. All traditional demographic variables, such as age, sex, education, income and marital status, had little if any relationship to annoyance responses.

TABLE 4

INTER-RELATIONSHIPS OF FEELINGS OF FEAR, MISFEASANCE AND ADVERSE HEALTH EFFECTS ON ANNOYANCE WITH AIRCRAFT NOISE

Intensity of Feelings				Distance Groups (%)			
Fear	Misfeasance	Health	Annoyance	Close	Middle	Distant	Total
High	High	High		N=249	N=79	N=81	N=370
			High	94	84	86	90
			Moderate	4	9	8	6
			Low	2	7	6	4
Moderate	Moderate	Moderate		N=7	N=5	N=12	N=24
			High	43	60	50	50
			Moderate	14	40	17	21
			Low	43	0	33	29
Low	Low	Low		N=20	N=37	N=117	N=174
			High	10	5	3	4
			Moderate	15	16	4	8
			Low	75	79	93	88

E. Factors Affecting Other Behavioral Responses

1. Whether or not a feeling of annoyance is ever expressed to someone else or whether it remains a silent psychological emotion depends on a number of other intervening variables. It should be noted that expressions may be voluntary or elicited and that different factors facilitate and impede such expressions. Some of the forms of expressions are: a) Personal communication of the residents' feelings with other neighbors, the operators of the noise source or the authorities. This could be verbal or written. b) Support of group action - if asked to sign a petition, attend a meeting or participate in some other group action designed to reduce or modify the noise source. c) Helping to organize group action - a more difficult expression, involving more effort and activity. d) Legal action - the decision to resort to legal action to modify or eliminate the source or even obtain compensatory damages is an extreme form of annoyance expression.

Table 5 presents some data from the 1975 Columbia University reanalysis of reported complaint behavior. The combined action potential scale was constructed from the questions dealing with feelings or desires to engage in various types of complaint. Indicating that annoyance is the underlying basis of desires to complain, 60% of the low annoyance group had a low complaint potential, compared to only 12% of the high annovance group. The high annoyance group reported that 75% had a high complaint potential. In contrast, while 76% of the high annoyance group actually said they talked to friends about their hostile feelings, less than half even signed a petition and less than 30% wrote or telephoned or contacted an official or local organization. The disparity between desires to complain and actual complaint behavior is the reason why complaint files are poor predictors of basic noise problems.

TABLE 5

RELATIONSHIP OF COMPLAINT BEHAVIOR AND ANNOYANCE

Item		Intensity of Annoyance: Low	Moderate	High
1. Combined Action Potential	Low	60 %	31 %	12 %
	Moderate	11	26	13
	High	19	43	75
2. Feel like doing				
Discuss with friend		19	48	81
Sign petition		16	40	71
Write or phone official		10	24	62
Visit official		3	10	33
Contact local organization		7	17	53
Help organize committee		3	8	26
Ever do something				
Discuss with friend		18	44	76
Sign petition		9	24	42
Write or phone official		5	10	29
Visit official		2	3	7
Contact local organization		5	9	27
Help organize committee		2	3	6

There are a number of factors that probably explain the relatively low complaint behavior in this study. First, is the extent of underlying motivation or annoyance level, already shown in Table 5. Second, there is the question whether it is physically possible to reduce the noise. As Table 6 shows, 68% of the high action potential group feel it is possible compared to 37% for the low action potential group. Third, there is the question of knowledge of the complaint process. Responses in Table 6 indicate that only 42% of the "high complaint potential" group even said they knew whom to call and only 21% correctly said the FAA. In contrast, the less annoyed and low complaint potential group only said 24% knew whom to call and only 11% actually gave a correct answer. Fourth, there is the question whether the respondent has any expectations of success or what he believes past experiences have been with complaining. Only 11% of the high complaint potential group and 7% of the low complaint group feel individual complaints would do any good. Even if the community were organized, only from 3-15% felt the chances of success were high, 60-70% felt they were low. Of the relatively few who actually said they did something in complaining, only

9% of the high complaint potential and 6% of the low complaint potential groups felt it did any good. In summary, while many residents with high complaint potential felt noise abatement was possible, and were highly annoyed, only 21% knew where to complain and only about 10% believed individual complaints were effective. These factors inhibited complaint.

In considering other personal characteristics and their relation to complaints, it has generally been found that better educated, higher income, higher social status persons are more prone to express their feelings in the form of complaints. Table 6 indicates that 36% of the high complaint potential group had college education, compared to 23% of the low complaint group. Likewise, 54% of the high complaint group reported incomes of $15,000 or more compared to 36% of the low complaint potential group.

The relative availability of behavioral avoidance measures may also be a factor in whether or not a person complains. When asked, whether they ever felt like moving, only about 40% said they did, while most did not consider moving a reasonable alternative. Only about half of the high complaint potential group gave airplane noise as a reason for desiring to move.

TABLE 6

FACTORS AFFECTING COMPLAINT BEHAVIOR

Item		ACTION POTENTIAL Low	Moderate	High
Possible Reduce Aircraft Noise	Yes	37 %	[illegible] %	68 %
	No	43	[illegible]	22
	Don't Know	20	[illegible]	10
Know Whom to call to Complain	Yes	24	[illegible]	42
	No	76	[illegible]	58
Whom would you call				
FAA		11	[illegible]	21
Community organization		4	[illegible]	6
Local police		3	[illegible]	5
Other		7	[illegible]	12
Would individual complaint do any good	Yes	7	[illegible]	11
	No & Don't Know	93	[illegible]	89
If Community organized, what are chances of success in reducing noise	Low	73	[illegible]	58
	Moderate	9	[illegible]	21
	High	3	[illegible]	15
	Don't Know	15	[illegible]	6
Felt like moving	Yes - Reason Aircraft	9	[illegible]	20
	Yes - Other Reasons	33	[illegible]	24
	No	58	[illegible]	56
Personal Characteristics				
Sex	Male	69	[illegible]	69
	Female	31	[illegible]	31
Education	1-3 Grade School	19	[illegible]	7
	4-5 High School	58	[illegible]	57
	College	23	[illegible]	36
Family Income	Less than $6,000	12	[illegible]	6
	$6,000 less than $10,000	10	[illegible]	9
	$10,000 less than $15,000	20	[illegible]	18
	$15,000 less than $20,000	16	[illegible]	23
	$20,000 or more	20	[illegible]	31
	Refusal/Don't Know	22	[illegible]	13

F. Summary of Review of Past Research Findings

The following are the principal conclusions from the review of past research:

1. Measurement of single events

a. dBA can be used as a standard noise descriptor for integrating spectral differences of different sources in community noise studies.

b. More laboratory research is needed on the effects of durations (greater than ? seconds) on loudness, noisiness and annoyance judgements.

c. More laboratory research is needed on the effects of pure tone components, especially at higher intensity levels, on loudness, noisiness and annoyance responses.

d. More laboratory research is needed on the interaction of low frequency vibrations and noise intensity on loudness, noisiness and annoyance responses.

e. More laboratory and field research is needed to determine the effects of impulse noise on annoyance responses.

f. More laboratory and field research is needed to study the intrusiveness of a single noise exposure against different ambient noise levels and specific effects on loudness, noisiness and annoyance judgements.

2. Measurement of Multiple Events

a. More laboratory and field research is needed to establish the relationships between annoyance responses and number and level of noise exposures of different sources, per given time period.

b. More laboratory studies are needed of fluctuating rates of noise exposures, intervals between events per given time period and annoyance responses.

c. More field research is needed to determine the possibly different effects of noise exposures during time of day (day-evening and night) on annoyance responses.

d. More longitudinal field studies are needed to determine the effects on annoyance of seasonal and other changes in noise exposure over longer time periods.

e. More laboratory and field research is needed to determine the special relationships between different types of noise exposures and sleep disturbance.

f. More field research and possibly laboratory studies are needed to determine whether the location of a residence directly under a flight track or off to the side, makes a difference in annoyance judgements when the sound levels of both residential areas are comparable. This information is urgently needed to justify the use of noise level contours.

3. Measurement of Human Response

a. Standard definitions are needed for annoyance, acceptability and complaint behavior.

b. Standard methods of measurement are needed for determining feelings of annoyance, acceptability and complaint potential.

c. A standard list of the principal psycho-social variables which influence annoyance and complaint responses and their methods of measurement are required.

d. Field studies are interdisciplinary and require more precise sampling and field measurements of both noise exposure variables and human responses. Laboratory studies can develop the hypotheses of relationships between noise exposure and human response, but field studies provide the validation and measurement of absolute numerical relationships. Laboratories can systematically test variables while in real environments not all combinations of variables are available for study.

III. Research Plan

A. Research Objectives

One of the principal goals of noise regulatory agencies is to ascertain what noise exposures under different land use conditions are compatible with the health and well being of exposed populations. Most of the recent pressures for noise abatement and control have come from occupational and residential sources. This research plan is designed to provide basic statistical information on the way residents integrate time varying noise exposures and how their reactions vary with different

residential noise conditions. By establishing a statistically reliable data base on these human response relationships, a more valid noise predictor can be developed for regulatory and other purposes. Such a predictor is urgently needed to guide noise regulators in determining where to establish residential noise exposure limits.

Previous community noise studies have failed to control adequately for combinations of different time varying variables that occur in realistic noise environments. Consequently, it has not been possible to establish valid statistical weights for these time varying factors or to develop a single reliable noise descriptor to integrate these different noise exposures. The plan of this proposed study is to simultaneously control for four primary acoustic variables: 1) number and 2) level of aircraft noise exposures and 3) ambient noise during 4) different time periods of the day, evening and night. It should provide answers to the following questions:

1. How are different numbers and different levels of noise exposure integrated by residents engaged in different activities? In most existing schemes it is assumed that an energy rule operates, i.e, a doubling of number of events or level of noise is worth 3 dB. Recent laboratory studies suggest that this is an oversimplification of how people react. Results of these limited studies suggest that different rules apply when the number of exposures are few or many.

2. Are exposures during different time periods of equal importance or are evening and night events more annoying and, therefore, different weights should be given to each period. Those who believe in the equal importance hypothesis now use an L_{eq} noise index; others use a 10:1, 15:1 or 20:1 day-night penalty. (L_{dn} uses a 10:1 penalty). It should be emphasized that there is no firm data base for supporting any of these views. There is some evidence that there is a day-night differential and that 10:1 may be too high, but what the day-night weight should be needs this empirical research.

3. How does the fluctuating ambient noise resulting from road traffic and commercial and industrial and other noise sources influence perception and annoyance

with an intrusive aircraft noise flyover? Limited laboratory studies suggest contradictory effects.

4. What are the modifying effects of human attitudes and experiences on annoyance responses under the controlled acoustic conditions?

B. Overall Research Plan

The research strategy is to find different communities in the vicinity of airports where the noise conditions would be comparable during two of the three time periods, day, evening and night, but different during one of the periods. Then, responses obtained from samples of residents actually living under these measured different environments could be compared and the day-evening and night time penalties could be calculated. Likewise, by measuring the actual numbers and levels of noise exposures during each time period, the best statistical relationships could be obtained between the acoustic and human response variables. Presently used descriptors such as L_{eq}, L_{dn}, L_{np}, etc. could also be derived from the basic data and tested against the human response variables.

With the cooperation of the Airport Operators Council International, about 50 of the major commercial airports were contacted (see Appendix A) and detailed information was obtained on flight operations, flight tracks and exposed populations. From these basic reports a sample design was developed.

C. Sample Design

The sample areas will be selected according to combinations of the four physical variables: 4 groups of numbers of aircraft operations by 3 time periods, by 4 peak noise levels, by 2 ambient noise levels.

1. Aircraft Operations Criteria by Time Period

From the detailed review of previous research reported in the first section of this report and after consultation with a number of acoustic experts, the following four groupings were established for aircraft operations by 3 time periods as shown in Table 7.

TABLE 7

NUMBER OF AIRCRAFT OPERATIONS BY SELECTED TIME PERIOD

	Number of Operations			
	None (N_0)	Low (N_1)	Moderate (N_2)	High (N_3)
Time Period	(0)	(-3 per hr.)	(6-10 per hr.)	(15+ per hr.)
T1 - 12 hr. Day - (0700 - 1859)	0	-36	72-120	180
T2 - 3 hr. Eve. (1900 - 2159)	0	- 9	18-30	45
T3 - 9 hr. Night (2200 - 0659)	0	-27	54-90	135
Daily Total	0	-72	144-240	360
30 days	0	-2160	4320-7200	10,800
365 days	0	-26,280	52,560-87,600	131,400

The groupings of aircraft operations presented in Table 7 and the peak levels of noise exposure discussed below are used only for initial selection of sample areas. Analyses of actual flight operations during the survey period and acoustic field measurements will be used to describe more accurately the actual noise exposures.

2. Peak Levels of Aircraft Noise

Four (4) outdoors peak aircraft noise levels were established as follows:

PEAK LEVELS OF NOISE

L_1	L_2	L_3	L_4
80 dBA	90 dBA	100 dBA	110+ dBA

By tracking different distances from the airport along approach and departure flight paths, the approximate peak noise levels can be estimated. The numbers actually used in the analyses as previously stated, will be based on actual field measurements and operations data for the time of the field study.

3. Ambient Noise Levels

Two (2) ambient noise classifications were established; low (B_1) - Leq-55, high (B_2) - Leq 65+.

4. Proposed Design of Sample Areas

In most airport areas, communities can be found with the 4 peak aircraft and 2 ambient noise levels. But of the 64 possible combinations of the 4 classes of numbers

airports studied. These 13 primary cells, however, will enable the accomplishment of the stated objectives of this study. The list of 13 groups is presented below:

Group No. of Oper.	Time of Day T1	T2	T3	Group	T1	T2	T3	Group	T1	T2	T3
1	N1	N1	N1	5	N2	N1	N0	9	N3	N3	N3
2	N1	N1	N2	6	N2	N1	N1	10	N3	N3	N2
3	N1	N1	N0	7	N2	N2	N0	11	N3	N3	N1
4	N1	N2	N1	8	N2	N2	N1	12	N3	N2	N0
								13	N3	N2	N1

Group 1 has a low number of operations for all three time periods. Groups 2 and 3 also have low operations during the day and evening, but Group 2 has moderate operations during the night and Group 3 has no operations at night. By varying conditions for only one time period, analyses can be made of the human effects of night operations.

The total sample based on these 13 primary groups will include 104 distinct acoustic exposure situations and about 10,400 residents. The calculations for sample size are shown below:

	13	primary groups (no. aircraft operations X T1-3)
X	4	peak aircraft noise levels
	52	groups
X	2	background noise groups
	104	different acoustic exposure areas
X	100	representative residents per group
	10,400	total sample of residents

Sixteen airports, as shown in Table 8, have been selected to represent the 13 primary exposure groups. Within each airport exposure group, 8 separate communities will be selected, representing the 4 peak noise and 2 background noise situations. The airports were selected so that there would be some geographic balance and wherever possible, each airport would contain a number of different flight tracks representing more than one primary acoustic situation. Such a design optimizes the efficiency of field costs and operations.

Thus, in San Francisco and Boston, 4 different primary noise exposure groups can be tested and in Los Angeles, Dallas, St. Louis, Cleveland, Chicago, N.Y., Miami and Atlanta, at least 3 primary exposure groups can be interviewed. At least three different geographic airport areas are included in each primary exposure group whenever possible to reduce any unique effects which may be characteristic of a particular area. Thus, for most of the 104 acoustic exposure areas, only about 20-30 residents would be randomly selected from a small cluster of adjacent blocks. The exact number would be assigned after an actual listing is made of dwelling units in each cluster. Table 8 shows the 13 primary groups by airport areas. Table 9 groups the airport areas by each of the 13 primary groups. By examining each vertical row in Table 8, the distribution of primary acoustic conditions for each area can be seen at a glance.

TABLE 8

TENTATIVE SAMPLE OF AIRPORTS

No.	Region	
4	WEST	
	San Francisco	(111, 112, 221, 332)
	Los Angeles	(111, 221, 333)
	Salt Lake	(220)
	Dallas	(111, 110, 221)
5	CENTRAL	
	St. Louis	(111, 121, 221)
	Cleveland	(111, 110, 221)
	Louisville	(121)
	Chicago	(221, 331, 332)
	Milwaukee	(110, 220)
4	EAST	
	Boston	(111, 110, 211, 331)
	JFK - N.Y.	(221, 331, 332)
	Nwk - N.Y.	(221, 321)
	Lga - N.Y.	(330)
3	SOUTH	
	Miami	(111, 331, 321)
	Nashville	(210)
	Atlanta	(333, 331, 332)

TABLE 9

TENTATIVE SAMPLE OF AIRPORTS BY NUMBER OF AIRCRAFT AND TIME PERIOD

111	San Francisco St. Louis		Dallas Miami	Boston	Cleveland	Los Angeles
112	San Francisco					
110	Milwaukee		Dallas	Boston	Cleveland	
121	St. Louis		Louisville			
221	San Francisco St. Louis	Newark	Dallas	Chicago	Cleveland JFK	Los Angeles
220	Salt Lake City Milwaukee					
211				Boston		
210	Nashville					
333			Atlanta			Los Angeles
331			Miami Atlanta	Boston Chicago	JFK	
332	San Francisco		Atlanta	Chicago	JFK	
330	NY Lga					
321		Newark	Miami			

5. Analysis Plan

The analysis will proceed in four stages:

a. First, prediction equations will be developed for combinations of numbers of aircraft operations by level of exposures for each time period separately. As will be described in the discussion of the questionnaire, all residents will be asked whether they are usually at home during each time period, and if at home, how annoyed they are by aircraft and other types of noise. Thus, respondents can be divided into three groups: those at home during all three time periods; two or only one time period. Multiple regression equations can be computed for each resident group in the form:

	No.	Level
Y_{T1}	$= AX_1 +$	BX_2
Y_{T2}	$= CX_3 +$	DX_4
Y_{T3}	$= EX_5 +$	FX_6

The beta weights and slopes of the different regressions can be compared to establish any differences for time periods. The transfer function between annoyance and acceptability will be introduced so that acceptability levels can be calculated for different combinations of aircraft operations. Each flyover will be tabulated separately.

i.e. 1 @ 100 dBA
4 @ 90 dBA
6 @ 85 dBA

Different averages can also be computed and compared.

b. Multiple regression equations will be developed for all time periods combined. This is the real environment situation where there are interactions of time exposures. A hypothetical equation would be of the form:

	Day	Evening	Night
$Y =$	$2X_1 + .5X_2$	$+ 3X_3 + .75X_4$	$+ 10X_5 + 2X_6 - C$

If X_1, $_3$ and $_5$ are number of operations, then a comparison of beta weights for Day (2) and Night (10) suggest each night operation is equivalent to 5 day flights. Thus, defensible time of day penalties will be computed. Further analyses will indicate the relative contributions of each time period to overall annoyance (Y) and whether a rule of diminishing returns can be used in a predictive equation.

Two types of dependent annoyance responses can be tested; the answers to a single question (Q5 (3) and 11Z) and to a combination of activity annoyance questions. (Q.11, Appendix B2) The calculation of acceptability levels can be included to indicate different options to regulators.

Special regression and analyses of variance will be possible for eight sets of acoustic situations where two time periods are comparable but one is different as follows:

Code	Number flights per hr.
3	15+
2	6-10
1	-3
0	0

	T1	T2	T3
(1)	1	1	1
	1	1	2
	1	1	0
(2)	1	2	1
	1	1	1
(3)	1	2	1
	2	2	1
	3	2	1
(4)	2	2	1
	2	2	0
(5)	2	1	1
	1	1	1
(6)	2	1	0
	1	1	0
(7)	3	2	1
	3	3	1
(8)	3	3	3
	3	3	1
	3	3	2
	3	3	0

c. The effects of background noise can be introduced in the above analyses.

d. The effects of human factors can be introduced in the above analyses. This will lead to the development of the final prediction equation including all the experimental factors both acoustical and human.

IV. The Community Questionnaire

A. Design of Questionnaire

Two forms will be used to record standard information on the samples of residents:

F_1 - Interviewer Report Form (Appendix B1), will be used to record sufficient descriptive information about the household so that a random selection can be made of the respondent. In addition, qualitative observations will be recorded by the interviewer about the interview situation.

F_2 - Community Questionnaire (Appendix B2), will be used to record perceptions, attitudes, experiences and reactions of respondents to their residential environments.

B. Sponsorship and Purposes of the Study

Previous experience and methodological studies in the U.S., Sweden and elsewhere 58/59/60/, have shown that when the respondent is told that a government regulatory agency is sponsoring the noise research, that responses are likely to be biased in the direction of the respondents' general annoyance reaction. Those who are highly annoyed will tend to overstate their feelings in the hope that the

regulator will be sufficiently impressed to reduce the noise exposure. Those who are "slightly" annoyed or "not at all" annoyed will deny any negative reactions to emphasize their feelings. Since the purpose of research is to ascertain the objective facts, as free from bias as possible, the purpose and sponsorship of the study must be masked.

It is suggested, therefore, that the introduction printed on the questionnaire (F2) be used. By indicating that this is a general study about people's attitudes about their living environments and that it is an impartial university project, the objectivity of the answers will be enhanced. A more detailed discussion of these important questions will be presented in Section V - Instructions to Interviewers.

C. Overall Structure of Questionnaire

The total interview should average well under an hour. The residents living under the more intense noise situations will usually have much more to say than those living under more distant and less noisy flight paths. The interview begins with 8 general questions about the living environment. An overall rating is recorded of their location as a place to live. This is followed by an "open" question about positive, "good" qualities and negative, poor qualities. No mention is made of general noise, or aircraft and highway noise in particular. All answers will be spontaneous reports, and the salience of particular issues will be ascertained. Question 5 is a general "closed" question in which 13 environmental conditions are mentioned and the respondent indicates which apply to his locality. This type of "closed" question is a backstop to possible personality and memory factors that sometimes modify "open" questions. It insures that each respondent has been given an equal opportunity to comment on all 13 items. It also enables the construction of a scale of intensity of overall negative feelings about the area. Question 6 provides another measure of comparative dislikes, and Questions 7 and 8 provide the local behavioral patterns about reactions to local dislikes.

Question 9 is the first direct inquiry about local noise and provides an overall noise rating. Question 10 indicates the expectations about local noise before moving

to the neighborhood and Question 11 provides detailed information about the noises reported heard in the locality and their possible effects. All noises heard are treated equally; no bias about any single source is emphasized.

Question 12 queries about changes in annoyance in recent years and possible adaptation. Questions 13-18 ask about variations in noise perception and annoyance during different time periods. These answers and those to Question 11 are the basis for the detailed analyses previously described. Questions 19 and 20 deal with possible health effects of all local noises and Questions 20-27 deal with complaint behavior regarding aircraft noise, while Question 28 deals with possible feelings of "misfeasance" toward those responsible for producing noise. Question 29 deals with attitudes toward the importance of aviation and Questions 30-31 concern experiences with flying as a passenger and possible economic ties to the aviation industry. The remaining Questions 32-37 deal with demographic variables. Question 38 records any possible pre-conceived notions about the survey due to word of mouth or other publicity.

V. Interviewer's Instructions for Survey 001

A. General Information

1. Administrative details and materials used

a. Survey Number--This is Survey 001. Please refer to it by that number in filling out your forms and in any correspondence.

b. Address correspondence and telephone calls to field supervisor

_____ is your field supervisor and our office phone is: _____

c. Time Limits--Interviewing will begin on or about _____. A completion date for each phase of the study will be given to you. This deadline must be rigidly adhered to because of special features in the study design. It follows that all assignments must be completed as quickly as possible to avoid any last minute complications. Call back at each assigned address at least three times at different hours before contacting your supervisor for further instructions.

To accomplish these fixed time schedules, each interviewer must complete about 3-4 interviews a working day or about 10-15 per week. Your actual working time should total about 35 hours per week.

d. Assignments

(1) General procedure: Each assignment will consist of approximately 5-10 interviews. Pairs of assignments will generally be given to each interviewer to increase the number of "at home" possibilities for each day's effort.

(2) First assignment: After you complete your first three-four regular interviews, you must call your supervisor and arrange for a post training review of your interviews. This will make certain that you are proceeding correctly and avoid costly mistakes. At this time, individual arrangements should be made to bring the remaining completed assignments to the supervisor.

(3) Other assignments: After completion of each assignment, you will be given additional assignments.

e. I.D. (Identification Letter) -- This letter states that you are working on a University research program and should be used when necessary to prove you are associated with a bona fide research organization.

f. Interviewer report - CU Form F-1 -- This form will be used after each interview to record your experiences. Your answers are read very carefully and are used in improving our future research.

g. Time and expense reports -- This form must be completed and accompany all completed questionnaires returned to the office. It is the legal basis for audit control.

B. Background and Purpose of Study

1. Study Objectives

This is a community survey of how different people feel about living in different areas. It attempts to record systematically the kinds of things people like and dislike about their residential environments and the kinds of individual and group actions taken to improve undesirable situations.

Before doing a study in a particular area, the study director visits the locality and talks to key people about local problems. In this way, the questionnaire can be geared to relevant and meaningful local problems. For Your Information Only - In your area, noise from civilian airplanes and other sources are of particular interest to us.

Obviously, this information about our special interests must not be volunteered to a respondent. As you will see when you read the questionnaire, the early questions are very general and are designed specifically to record the problems which are most salient and important to the respondent. If he were informed in advance of our special interests in airplane noises, this would probably influence his spontaneous responses and bias our analysis. During the latter parts of the interview, however, when many specific questions are asked about airplanes and other noises, the respondent, himself, may inquire why we are so interested in airplanes and noise. Then, only as a direct answer to a respondent's question, you may tell him "In some areas, schools, roads or transportation are major problems and we ask detailed questions about them. In this area, the study director found in preliminary interviews that noise from airplanes and other sources are important, so he included questions about them in this questionnaire."

2. Uses of Data Secured from Interviews

The respondent may ask what is the purpose of this study -- or wo will use these answers? Local, state and federal government officials, city planners, and private social welfare organizations have an urgent need for the kinds of information included in this study. The results of this area study will be combined with comparable data from other areas and published as an independent research report. With the rapid growth of new suburban areas and the many changes in older residential communities, there is an urgent need for accurate factual information on how people react to various neighborhood disturbances. We have every assurance that our findings will prove useful to improving future neighborhood and community development.

3. Sponsorship of the Study

If asked about the sponsorship, tell your respondent that this study is part of the regular University research program and is supported by a number of Funds. If

asked, you may assure the respondent that it is not sponsored by any local groups, but is part of our nationwide research program on community studies. In preparing the questionnaire, local government officials may have been interviewed and expressed an interst in the overall statistical results, but they are not sponsors or directors of this study.

If asked, "Is this sponsored by the government (FAA or the local airport authority), answer "I really don't know, but don't think so. I've been told there are a number of non-profit groups supporting these studies." Be sure to record verbatim any questions about purposes or sponsorship of the study, either in the margins of the page you are working on or on the interviewer report.

4. Your approach

Most respondents are generally curious about the "purpose" of a study and will usually ask about it some time or other during an interview. A simple approach which has been thoroughly pretested on hundreds of similar surveys is printed on the first page of the questionnaire and should be used as your introduction. You greet your respondent. You explain that you are working on a public opinion survey, you tell him you want his ideas and opinions, and you go immediately into the first question. The wording of the suggested introduction follows:

> "Hello. I'm from the University research center. We are doing a study about how people feel about living in different places, and I'd like to get some of your views."

Usually this brief statement is sufficient to start the interview. You do not ask him whether he wants to be interviewed, or whether he has the time to be interviewed. You do not go into details about (our research organization) unless he is curious or suspicious. Your aim is to forestall any hesitancy on his part by getting immediately to the most interesting thing -- the questions -- and to avoid wasting time in lengthy explanations. You will find that most of your respondents will answer Q.1, start thinking about Q.2, and very often will go through the entire interview without once raising the question of whom you represent and why you want their answers. In such cases, when you complete the interview, thank the respondent for his help and make your farewell. We may want to talk to the respondent again, so try your very utmost to leave on good terms.

If the respondent wants to know what the survey is about, what kind of questions you have, say, "Well, the first one is "How long have you lived around here at your present address or within a few blocks of this address?" If he seeks further information, explain that, "This survey is designed to assist City Planners in their work and is concerned with the ways in which different people in different communities feel about various problems. The ways in which you and other people have actually attempted to solve your local problems will assist in the planning of new communities and improving existing ones."

If he asks for identification, produce your I.D. letter, but do not offer it unless asked, because it may create additional questions, where none existed.

If he wants to know, "Why pick me?", tell him, "The office assigns me to an area and I follow a rule of calling on every second or third house in a block." If he says, "I'm not typical," answer, "We're interested in all kinds of people in order to get a true cross section of all opinions. Yours is as important to us as anyone else's and no one can substitute for your own views.

If he says, "I was interviewed by another community survey group a few years ago, "express interest and answer as follows: "I see, I heard something about that study, but this research program is different, and we need your help if we are to succeed." He might also mention that he heard the University has already been in the area - just agree and add that the University is always interested in continuing such important research to keep up with current attitudes and opinions.

C. Locating Your Respondent

Each sampling area has been very carefully selected to represent specific characteristics. Be sure, therefore, to interview only in the assigned areas. Other interviewers may be working in adjacent blocks so you must strictly adhere to your assignment. In case of doubt, consult your supervisor.

In selecting these very specific areas, we unfortunately found that only a limited number of homes fell within the boundaries of the study's requirements. Consequently, we sometimes are required to complete an interview in almost all assigned housing units. There are no available substitute houses. Naturally, we must expect a few "incompletes" due to persons being too ill, or not at home even after repeated call backs, etc., but the importance of your all-out efforts in every contact can not be emphasized too strongly.

1. Preparing for the Interview

To prepare for the personal interview, you should do the following:

a. Familiarize yourself with these instructions.

b. Locate your assigned area (s) on a (street) map so you know how to reach it.

c. Walk or ride around the assigned sides of the assigned block (s) before you begin your contacts.

d. Note the number of the house on Side A you are to contact first.

2. Making your Visits

a. Introduction - The comments under Section B-4, "Your Approach", fully cover this section.

b. Use of Block Assignment List (CU-1 in Appendix B3)

(1) Assigned Sides are listed as sides A-J. Most assignments will have less than 4 assigned sides, or be limited to about 15-20 specific addresses on a given street. Remember to stay within the assigned sides or specific addresses of your assignment.

(2) Procedure for Selection of Homes - Starting on Side A (corner D) of your assignment, list the house number, date and time on Form CU-1, and make your first contact at the first assigned house. (1st, 2nd, 3rd, etc.) If you are successful and complete the interview with an eligible respondent, enter "C" in the result column and proceed to the next house on side A,B,C,etc. in alphabetical sequence. Other types of outcomes of contacts are listed on Form CU-1. Continue to contact houses listed on your assignment as instructed until the required number of interviews per pair of assignments has been completed.

3. Different types of samples

a. Predesignated individuals

The most precise sample is one in which the household or dwelling unit is randomly selected and the adult within the unit is also randomly pre-designated. If time and funding permit, this type of sampling is preferred. To make this selection, Form F-1 should be used (Appendix B-1).

(1) The processing number is the sequential number entered by the office on completed interviews as they are received by the office.

(2) The "area number" is the first two digits of the assignment number (CU-1).

(3) The "segment number" is the number to the right of the hyphen, in the "assignment number" and should be entered from your assignment sheet. You will enter the respondent number sequentially, 01, 02, etc., as you complete each interview in an assigned segment.

(4) The address will be entered from the assignment sheet and the name and phone number at the end of the interview (Q.39).

(5) The remaining entries on Form F-1 are self-explanatory.

b. Modified quota sample

Where time and financial constraints prevent the use of a "predesignated individual" type sample, the "modified quota sample may be used. Other studies have found that there is much more variance in individual responses between different communities and neighborhoods than among residents within the same neighborhood or household. Furthermore, the differences in noise annoyance responses between men and women are usually not significantly different. Therefore, when the households are randomly selected as before, but any eligible adult within the household is interviewed, there is probably little loss in the validity of information obtained.

There will be an additional requirement in this type of sampling. While there is no fixed quota for men and women in each assignment, an effort should be made to interview at least one man out of every four interviews. The purpose of this suggestion is to provide enough male respondents to permit comparisons of answers from men and women. Since numbers of assigned homes will vary by assignment, a suggested number of male respondents will be entered under "special instructions."

4. When to Interview

The most fruitful hours are from 9:00 AM until 3 or 4:00 PM, Saturday mornings or Sunday afternoons. Between 6:00 PM and 9:00 PM appear to be the best hours for reaching male respondents, as well as weekends.

Try to work at least five-six hours a day and complete at least three interviews between 9:00 AM and 4:00 PM, and 6:00 PM and 9:00 PM. Other hours will usually be unproductive and time wasting. Exceptions to this rule will be granted if they can be properly justified, but special permission must be obtained.

If at any time you find you are getting a series of "Not at Homes", abandon that assignment temporarily and go to your next assignment. If that also is unproductive, start at a different hour. Neighborhoods differ in their habits. An area that contains mostly single people or working couples will probably not produce many interviews as a result of daytime calls, whereas daytime calls to another area may almost always find someone at home. If necessary, call your supervisor for suggestions on another assigned area.

D. Special Reminders

Please refer to the training manual you were given and review the notes you took during the training sessions. The general rules of good interviewing are not repeated here, except as they are particularly relevant to the study.

1. Be Patient - Use only Neutral Probes

The general interviewing instructions have pointed up the general rule for all interviewers to maintain an impartial, objective attitude while interviewing. You should be especially conscious of this in the present survey, because the problems of community disturbances are probably particularly important to the people we will interview. Some of the respondents may be slow in answering questions because they may not have thought through the problem. You may be tempted, therefore, to show your approval of certain responses, or you may unintentionally use a biased probe to elicit a certain response. Forget your own interests and attitudes toward the problem while in the process of interviewing and concentrate only on giving your respondents the maximum opportunity for the free expression of their own opinions and ideas within the limits set by the questionnaire.

2. Use a Clear, Legible Handwriting

Unless we can read the answers, your hard work will be of little value. Therefore, as soon as you can, take the time to edit the completed questionnaire and to clean up any bad writing.

3. Ask all the Questions including the Relevant Sub-parts

In most instances, a series of related questions have been included on each different psychological factor under study. If one or more parts of the series is accidentally left blank, the entire battery of questions may be voided in the analysis.

To help select the appropriate sub-parts, a code of asterisks has been used. For example: in Question 7, if the respondent answers "YES", Code 1 is circled. Note the asterisk next to Code 1 and immediately below an explanation of the asterisk. It says, "*If YES, ask "A-C". Therefore, whenever you circle a code that has one or more asterisks next to it, look for the subpart immediately below with the same number of asterisks, and ask the subpart question as directed.

Below each pre-coded question is usually a category, "Office Use". This code is used whenever a question is accidentally left blank by an interviewer. You are never to circle this category, and we hope we never have to circle it either.

4. Record all Relevant Comments

Some of the questions are the free-answer type and require the recording of verbatim comments. This is extremely important because the exact language used is very often a significant clue to the intensity of the respondent's feelings.

Even more important are the extra-unsolicited comments which a respondent may offer in connection with a pre-coded question - or as an after-thought, to a previous question. The subject of this study involves the complex emotions of fear, annoyance, personal security, etc., and our experience indicates that the most revealing comments are often made at the most unexpected moments of the interview.

BE ALERT TO ALL RELEVANT COMMENTS WHENEVER THEY ARE MADE AND RECORD THEM IN THE MARGINS OF THE QUESTIONNAIRE OR ON THE BACK OF EACH PAGE. Remember, our only clues about the respondent's feelings are the pre-coded answers and the comments which you actually record on the questionnaire. When using the margins or back pages, code question numbers to which comments were made.

5. Avoid lazy "Don't Knows"

We are asking the respondents to pin-point their attitudes and experiences. But for many of them, the process of answering our questions will be the first opportunity to think through the problem. Be patient and reassuring. If the respondent gets impatient or unsure of himself, interrupt your questioning and explain, "There are no right or wrong answers - we are interested in finding out just how you feel about these things....." Don't accept an "I don't know" answer immediately. It may be an easy way out - of not thinking about the question. Use such neutral probes as, "Well, nobody can be sure - but what do you think from what you've heard or read....." or "Nobody really knows - but what do you believe (the situation) to be....."

"Don't know" answers make the analysis of the questionnaire more difficult, but some "don't know" answers are bona fide answers. You will learn to judge a real "don't know" from a "lazy don't know". After making an extra effort to get the respondent to answer the question, and he still does not know, accept it as such. In some cases, the "don't know" is the real answer and reflects the lack of knowledge or crystalization of thought among a certain segment of the population.

6. Avoid tedious Repetition whenever possible

In Question 11, for example, the Frequency and Degree Scales are used over and over. To avoid unnecessary repetition which is usually tedious, the following approach is suggested:

a. In Question 11, Part A, ask as directed, "How often do you hear the noise from (1st noise heard)....." The respondent, by this time may use the Frequency Scale without specific instruction. But, if necessary, prompt "please use the Frequency Scale; Zero means not at all and "9" extremely often.

VI. The Questionnaire

A. General Structure of the Questionnaire

One of the major problems involved in devising a standard questionnaire is the arrangement of questions in a natural sequence. Certain questions frequently stimulate a typical pattern of thought and unless the questionnaire is organized to correspond with the natural flow of answers, interviewing problems are increased. In general, this questionnaire is divided into four sequences:

1. General questions about likes and dislikes and overall rating of area.

2. Direct questions outlining a pattern of local behavior in response to a major annoyance or dislike.

3. General reaction to noise and R's behavior, including feelings of interferences, annoyance and desires to do something about their annoyance.

4. Background information on attitudes and characteristics of the respondent.

B. Specific Questions

Identification Information - The processing number will be entered in the office. Enter "the date and the time interview began" and at the end of the interview, the "time interview ended". The "Area Number", "Segment Number" and "Respondent Number" will be entered from your "Interviewer Report".

Also fill in the name and telephone number later from the answer to Question 39, at the end of the interview. If you are unable to obtain the name of the respondent, the description of the respondent should also be entered after the interview, using the answers on the Interview Report as the source. For example, enter "Wife", "Husband", "Mother-in-Law", etc. This information is extremely important and will be used to identify the respondent in case of a callback interview. Please make sure to record "Mr.", "Mrs.", "Miss", and the first as well as the last name of respondent. Under "address", enter number of house or apartment as well as any peculiarities to help identify the respondent's location, i.e., "to rear of apartment house".

QUESTION 1: This is an easy factual opener and helps define "around here" as within a few blocks of his address.

QUESTION 2: The second question is also an "easy opener". It ties in very neatly with your explanation of the purpose of the interview and helps to set the respondent at ease right at the outset with a simple and familiar topic of discussion. The question has an important objective, however, so be sure that the person hears all of the pre-coded items from "very good" to "very poor" before giving his answer. We want a measure of the respondent's generalized feelings about the area in which he lives before it is possibly colored by the discussion of particulars.

Some people start right in to discuss particular things that they like or dislike, either expanding on their general rating or without actually giving it. This is perfectly natural, and you should go right along with them - writing down their responses verbatim. Before leaving the question, however, get their rating by reformulating the question as follows: "That is fine, now, taking everything into consideration, how do you feel, etc."

QUESTION 3: This question directs the respondent towards things he may like about the area. Once positive aspects are reported, it is usually easier to encourage a respondent (R) to mention negative things about his area, which we ask about in Question 4. Remember, if you need more room for voluntary comments, use the margins and the back of the page and be sure to reference the question number.

This question is directed toward the respondent's values in his residential environment. Any aspect which he values, social or physical, tangible or intangible, is an appropriate response. You will observe that the question has many aspects of it. It asks for "things you like", "things that you feel are advantages" or "that make this a good place to live". All of these phrases have been pretested very successfully both as parts of separate questions and in combination. The combination form is employed here to avoid duplication in response and to suggest the generality of our interests. Probe for "Anything else?" as long as the respondent has anything to offer. Be sure to probe for clear, intelligible and complete answers. The tendency

to classify and generalize has often proven to be troublesome. When the respondent says, "Oh, I sort of like the environment", for example, he hasn't really told you much. You will have to ask, "mm, hmm, I see, and what is it about the environment that you like?" Similarly, a respondent may say, "It's very peaceful". We've found in pretesting this may mean the absence of noise, or a comparative social isolation such that one is not often disturbed by callers or the telephone. It may also mean the slow pace of activities, or the absence of disagreeable, bickering people in the vicinity. There are many other specific meanings which the term could have for different people. The moral is obvious: you must be alert to vague and unspecific answers and you must probe patiently for clear and specific ones. "What about the so-and-so?" "What are you thinking of particularly?" What sort of thing do you have in mind?" "Can you tell me a little more about it?", etc. are examples of neutral probes that you can use.

Don't, on the other hand, pursue answers which are actually irrelevant to the questions. Keep in mind that we are interested in learning about things which influence the respondent's satisfaction with living where he does, conditions which contribute to personal happiness, but which have no particular connection with his residence, since they would exist wherever he resided - like a "happy marriage" or "my wonderful children", are not actually relevant to the question. Record all such responses, probe for further feelings in terms of "living around here".

NOTE: You will find that a question about "things you like" will sometimes prompt the respondent spontaneously to tell you about something he doesn't like. This is perfectly all right. Don't cut him off. Probe for a clear picture of what he has in mind. When you resume your questioning, however, return to the particular question sequence you were following before he digressed. A suggested transitional phrase might be, "I see, now are there any other things you like ....."

QUESTION 4: This parallels Question 3 but is concerned with sources of dissatisfaction.

Both Parts A and B must be asked of every respondent. You should practice reading these questions aloud until you can deliver them smoothly and naturally -- without giving undue stress to particular phrases and understressing other parts of the question. Ask Part A and record answers in appropriate space. Then ask Part B, as a standard probe, and keep recording the answers after the "X" probe mark.

Keep in mind here, too, that not all factors which affect the life satisfaction of the respondent; an unhappy marriage, illness uncomplicated by climate, etc., are connected with his residence, and such responses should not be pursued at length. Rather, you will have to shift the emphasis to things connected with "living around here", as discussed earlier for Question 3.

It cannot be stressed too emphatically that you will have to be on your guard against vague and general answers to all parts of Question 4. Beware of too easily accepting one-word answers, which all too often seem plausible enough in the interview situation but are later found to be hopelessly vague. In response to Question 4A, for example, the respondent may say emphatically, "The neighbors" in a tone and manner that suggests that he expects you to know exactly what he means. But what, in fact, does he mean? Are they over-friendly or not friendly enough? Too old or too young? Do they make too much noise or don't they like people (like him) who make noise? Probe -- "Uh, huh, now could you tell me, what is it about the neighbors (you don't like)?", etc.

Certain answers seem clear enough on first hearing, for example: "The heavy traffic on this corner is pretty annoying". But again, the question is, what is the specific annoyance; what is it about the traffic that is annoying? There are several

possibilities, any or all of which may apply for a particular respondent. Among these are vibrations of the house, interference with hearing other desired sounds, the danger involved in crossing the street for the respondent himself or other members of his household, and so on. Remember always probe vague answers such as: airplanes, dangerous and noise, i.e. what is disliked about the airplanes; what is disliked about the noises you hear.

CAUTION: While it has been stressed above that you must probe conscientiously for a clear statement of the nature of the "dislike", "annoyance" or "disagreeable condition", you must exercise reasonable caution to avoid going too far into details with respect to questioning about various aspects of noise and aircraft matters at this stage of the interview. Unfortunately, if the respondent goes into considerable detail in describing his feelings about aircraft operations in the vicinity of his residence, he frequently becomes uneasy later on when this matter is taken up intensively in the battery of direct and detailed "airplane" and "noise" questions. On this account, caution is necessary in exploring these subjects in the early part of the interview. On the other hand, one of the major purposes of these open questions is to permit the respondent to volunteer his feelings freely and to describe them in the context of other environmental circumstances which are sources of satisfaction or of dissatisfaction to him. Therefore, when you feel the respondent has gotten his most important feelings "off his chest", proceed to Question 5.

QUESTION 5: This question establishes the relative importance of various dislikes. Hand Card 1 and then Card 2 when you ask Part B. Read question carefully, so you are certain it is understood.

Ask all items 1-13 in Part A and circle a "YES" or "NO" code before proceeding to Part B. For each "YES" (Code 1) in Part A, ask Part B. Use the introduction "is it ..... does it have?" for Part A.

QUESTION 6: This is a key question, because it establishes the first and second most disliked conditions in the respondent's area. Use the parenthetical phrase (there must be some) if R's answer to Question 1 was "Very good" and very few dislikes were recorded in Question 5. This may further reassure him that "criticism" is acceptable and not an act of disloyalty.

The question is asked in "free answer" form, but the item should be recorded in the pre-listed items of Question 5; circle the item number in the appropriate space. If the respondent balks at making one selection, say, "I know it isn't always easy to make a choice and you know there's no right or wrong answer, so which one would you choose?" If he mentions two or three and refuses to make one selection, record verbatim answers. Otherwise, ask Part B after recording answer to Part A. If R answers "I dislike nothing at all", circle "0". If he mentions an item not listed on the questionnaire, record it verbatim under Item 13.

Remember: Always probe vague answers such as: Airplanes, Dangerous and Noise; i.e., "What is disliked about the airplanes", "What is disliked about the noise?"

QUESTION 7: This question records base line behavioral patterns. It determines what experiences R has had with attempting to improve his living conditions. Under Parts A and B, be sure to probe for explicit answers. Part D is asked if nothing was ever attempted and is an effort to record R's expectations. It's an "ify" question and if R is reluctant to speculate, reassure him", Just suppose you did.....

QUESTION 8: This question is asked of everybody. If R ever felt like moving from the area (not the house), ask A in open form, but circle appropriate precoded categories. Probe for other than one possible reason. The word ever is used so that if R ever felt like it, even once or twice, the answer is "YES". If R never felt like moving, ask B as an "ify" question to measure values of R that he would avoid. Note the question is in negative form.

Part C is asked of EVERYBODY. It aims to record any inhibiting factors that would prevent "free" choice of residential location.

QUESTION 9: THIS QUESTION IS ASKED OF EVERYBODY. It aims at the respondent's overall assessment of the noise level in his residential environment. If the respondent qualifies his answer, "It's generally quiet, except for those planes or trucks", record the comment and probe, "I see, but including all the different noises.....etc.?" Be sure to get an overall rating in terms of the Degree Scale. This is also a transitional question introducing for the first time the issue of noise.

QUESTION 10: The awareness of the noise conditions and R's expectations before moving to the present address are recorded here. If the noise is "more than expected", record explicitly in what ways the expectations were different.....Use neutral probes, but try to record whether it was, frequency of occurence, level of noise, times heard or just what was different.

QUESTION 11: This question concerns the kinds of noises heard in the residential area and specific reactions to them.

The main question is asked in open fashion and should be probed as an open question, with "Anything else?" until the respondent says, "No, that's all." After circling Code 1 for all noises, spontaneously mentioned, use specific probes for those items not already mentioned (pre-listed in columns) and circle a Code 2 or 0 for each. Viz., if cars not spontaneously mentioned, use probe "Do you ever hear noise from "cars or trucks" going by?" If other noises not pre-listed are mentioned, list them in the last column (others).

If any noise pre-listed is not heard (Code 0 is circled), skip Parts A-AA for that noise. Ask Parts A-AA only if a Code 1 or 2 is circled in the main question.

Part A - This is the first direct question on specific aspects of all noises mentioned as being heard. It should be probed in terms of "taking everything into consideration", etc. Ask Part A for each noise heard (Codes 1 or 2) before asking subsequent parts of Question 11. This question inquires about frequency of hearing the noise. The definition of "often" must be the respondent's own. Whatever he considers "extremely often", suggest he use the Degree Scale if R needs reminding, etc. If he says, "Sometimes it's 'extremely' and other times it's only 'occasionally'", record the comment in the margin (noting the type of noise to which the comment applies) and probe for a general rating. The reference time period will be different in different areas, so the supervisor will provide it.

Part B - concerns "usual loudness" ratings when R hears the noise. Comments under Part B also apply to Part C.

Part C - concerns the physical and technical avoidability of the noise. Is it physically possible for the noise to be reduced? If the noise source wanted to do so, could he reduce the noise? This is the intent of the question, not whether social pressure could force the noise source to reduce the noise. If the respondent says, "It could be reduced, but they won't", circle 1 and record comment.

Part D - is asked only if R feels it is possible to reduce the noise. It concerns the behavior of those in a position to do so, or rather R's assessment of that behavior.

Part E-F - deals with possible fear or apprehension responses. Part E asks if the R is ever startled or frightened. If YES, we ask "F", which records the intensity of fear. Notice - it is also in terms of usual intensity.

Part G - questions the extent to which R is aware or conscious of almost every noise occurrence. It attempts to distinguish those who only occasionally are conscious of the noise from those who listen attentively to almost every occurrence.

Part H-S - These subquestions and others in this question are the heart of the interview. They record possible interferences and reactions to the noises heard. Be careful to ask all parts as they apply. If any parts are omitted which should be asked, the entire series may be invalidated in the analysis.

Part T-Y - deal with various behavioral responses.

Part Z - is a summary question. After thinking and answering how R feels about Parts A-Y, this question asks for a summation of feelings of overall annoyance.

If the respondent qualifies his response, "Sometimes it bothers me extremely, etc.", record verbatim and probe for general response. If the respondent indicates that he has already mentioned some of the items on previous questions, indicate that, "It is important to find out the extent of the disturbances..... that is why we are asking about them again in this way."

Part AA - This question asks for a comparison of the noise heard during the past (period) to the same months last year or the year before. Here again R has to take the time to pinpoint the annoyance experienced this last period with his experiences from the same noise during the past few years. If the R was not in the same house or area a year ago, circle the appropriate answer (Code 4).

Try to use a conversational tone and humor R when you finish Part AA of the first noise heard. Then go back to the second noise heard, etc.....

QUESTION 12A - This is a direct question on the relative annoyance of all noises mentioned and which one bothers the most and the second most. It should be probed in terms of "taking everything into consideration", etc..... It is asked in open form, but the answer category on the quex should be circled.

Part B - records R's expectations about the future of noise abatement in his area.

QUESTIONS 13-18: This group of questions is equally as important as Question 11. It asks about R's usual presence at home, at least half the time, during different time periods and whether different noises are bothersome and annoying during these time periods at home. Please note to avoid tedium, if any noises are bothersome, during a given period. The next part is asked first in open form and then, if cars or trucks and airplanes are not volunteered, they are probed. These two sources are singled out since they are usually the most frequently mentioned noises and we want to be sure R doesn't overlook them.

QUESTION 19: This question inquires in open form about any possible health effects. If the answer is YES, ask "A" and "B". Probe for as specific answers as possible in Part A. In Part B, probe for "cars or trucks" and "airplanes" if necessary. Ask Part C for each noise mentioned in Part B.

Part D - is a direct question about possible health effects. Ask about each source mentioned previously (19B). Ask Part 1 of all sources before asking about Part 2, etc.

QUESTIONS 20-21: THESE QUESTIONS ARE ASKED OF EVERYBODY. Questions 11-19 were asked only if noises were heard. Even though R may have said he doesn't hear planes, he may see them and have answers to these questions.

QUESTION 22: This question is only asked if noise from airplanes is not heard by R (Question 11). The answer is needed to compute an analytical scale of possible fear responses.

QUESTIONS 23-29: These questions are asked only if airplane noise is heard (Question 11), and establish the pattern of behavior in response to reported aircraft noise interference.

QUESTION 23: This question establishes knowledge of local authorities and organizations involved in a complaint process. If R asks, "Do you mean a civic association or a government person?", answer, "Whomever you'd call or go to if you wanted to complain". We are not interested in the exact telephone number or address, but in general knowledge of the type of place, like the police, the FAA center, the airport, etc.

QUESTION 24: Part A starts as an open question, but you should continue with the "For example, did you ever feel like 'discussing it with a friend or neighbor?", and circle Code 1 or 0 under A. Then repeat the probe for Items 2-7.

Part B - is asked after all of the items in Part A are probed. It is asked globally, for all items, not separately for each item, as Part A. If the respondent says "yes" to Part B, ask him to specify which items he, or members of the family, actually did and circle Code 1 for items done, and 0 for items not actually done. Each item of Part B must have a Code 1 or 0 circled.

Part C - is asked of all persons who answered "yes" to any Part B item. It measures his feelings about the success of action.

Part D - is asked if all answers to Part B were NO. It is a hypothetical question designed to measure overall expectations for successful action. If R says, "I never felt like doing anything", answer, "Just suppose you did, do you think.....?"

QUESTION 25: This question determines R's awareness of organized efforts to improve the situation. If the answer is, "I don't know of any group", circle NO (Code 0). If R previously mentioned a group, use the phrase in parenthesis and ask the question.

Part A - is asked only if R knows of a group or organization. Notice that a YES to Part A includes "any improvement at all".

QUESTIONS 26-27: These are also "ify" questions, and R should be urged to "just suppose". Each item listed should be inserted in the question and asked separately. The first is "calling or writing an official", etc. If R asks, "What organization do you mean", answer, "Well, any group that might concern itself with this type of problem." Be sure to circle an answer in each of the four columns. If R didn't know of any group (NO in Q.25), use the phrase in parenthesis (was organized, and they).

QUESTION 28: THIS QUESTION IS ASKED OF EVERYBODY. However, omit (around here) if R answered NO to Question 11, (not hear airplane noise). Ask about each item in Part A before asking Part B for each YES to Part A. Part A refers to ability and know-how to do something if they wanted to do so.

Part B - refers to whether R believes they are combining their best knowledge and desires to do all they possibly can or not. It is not a test of R's knowledge of specific actions taken, but of R's general feelings about the extent actions are being taken. Use the probe in parenthesis where necessary to reassure R. Avoid lazy Don't Know's.

IMPORTANT: For tabulating purposes only, we find it necessary to use a combination of two (2) numbers for the degree scale. The R will be using the Degree Scale with the numbers 9-0. Please circle the answer corresponding with the "top" number on the questionnaire and circle the entire combination, i.e., if the R answers 8, circle 81. If the R answers 4, circle 45. If the R answers 0, circle 09.

QUESTION 29: This question attempts to focus on R's beliefs in the importance of commercial airlines. Reassure R that it is just his belief, not a right or wrong answer that is important.

QUESTION 30: This question inquires about R as a passenger.

QUESTION 31: The question says the airport. Actually, if there is more than one and if R mentions any airport in the United Stated, circle Code 1.

Aircraft industry could include Government, Manufacturers, Airlines and any service industry doing work for the aviation industry.

QUESTIONS 32-33: These questions cover differences in general noise sensitivity. Emphasize the word "ever annoy when you hear them" in Question 32 to indicate our understanding that they may seldom actually hear them.

In Question 33, if the answer is "average", circle Code 3 for "same".

QUESTIONS 34-36: In most cases the respondent continues to answer these questions without any hesitation. If he does hesitate or becomes suspicious, assure him the information is for statistical purposes only to help identify the kinds of people we are talking to.

If necessary, we have also found it helpful to explain the purposes of these "background" questions as follows: "You know, all of your answers are strictly confidential. They are put on tabulating cards and combined with answers from many other people. But to help in the analysis of answers, the office has to know something about the people we talk to - that's why we have these questions about yourself."

QUESTION 34: We are concerned only with years of formal schooling; usually eight years of grammar school, four years of high school, and four years of college. Do not count trade schools, correspondence or adult education courses. Circle the one code that describes the number of years of formal schooling the person had.

QUESTION 36: Hand Card 4 to R and read the list of income categories and have him select the income group that reflects the entire family's earnings from all sources; wages and salaries, self-employment income, interest and dividends, pensions, relief checks, etc. If he objects that he doesn't know for sure, indicate that we only want his best guess of the income group for statistical purposes only. If he absolutely refuses to make a selection, circle Code 9.

QUESTION 37: This question deals with possible medical problems and awareness of some hearing loss. Just let R define average himself. If the answer is YES, probe for specific reasons of belief.

QUESTION 38: Since we are attempting to interview most neighbors and it will take about a week or two to cover all persons in an assignment, it is important to learn whether R knew about the Questionnaire before the interview. This is one important reason to complete an assignment as soon as possible to avoid neighbor's discussions and R's prior knowledge of the question.

QUESTION 39: This is the last but one of the key questions. Try your utmost to get the answers and leave on friendly terms. Make sure when you get R's name to get first as well as last name (no initials).

Good Rapport is Essential

Be sure to thank the respondent and to leave promptly after you are through.

Interviewer's Comments: After completing Question 39, answer Questions 1-10 on Interviewer Report (F-1), as completely as possible. They will be most useful in interpreting the recorded answers.

You are literally our eyes and ears and we are dependent on what you record on the questionnaire for all analyses of the data. Be sure to enter the date and sign your name at the end of the questionnaire.

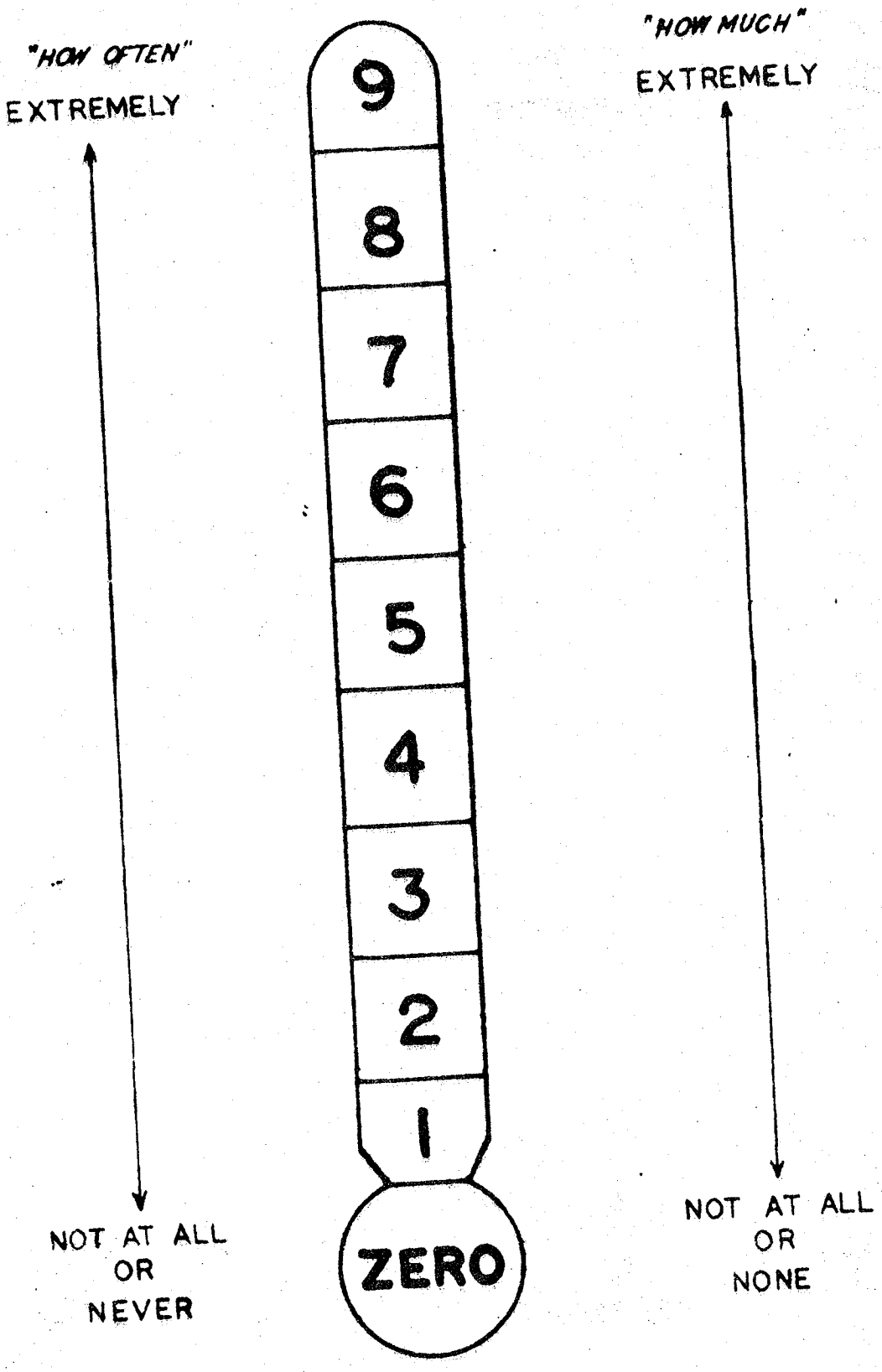
GOOD LUCK!

CARD 1 - DISLIKES

1. Poor or inconvenient location
2. Inadequate shopping facilities
3. Aircraft noise
4. Inadequate schools
5. Traffic and other noise
6. Dangerous street traffic conditions
7. Dangerous airplane traffic conditions
8. Overcrowded, not enough privacy
9. Poor recreation facilities
10. Poor neighbors - unfriendly
11. Unsafe to walk at night
12. Bad odors and air pollution
13. Lack ob job opportunities

CARD 2

OPINION THERMOMETER



CARD 3 - LIST OF AVIATION GROUPS

1. The people who run the airlines
2. The airport officials
3. Other local government officials
4. Other state government officials
5. Other federal government officials
6. The pilots
7. The designers and makers of airplanes
8. The community leaders

CARD 4 - INCOME

1. Less than $6,000
2. $6,000 but less than $8,000
3. $8,000 but less than $10,000
4. $10,000 but less than $15,000
5. $15,000 but less than $20,000
6. $20,000 but less than $25,000
7. $25,000 but less than $30,000
8. $30,000 and over

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AIRPORT OPERATORS COUNCIL INTERNATIONAL

APPENDIX A1

February 2, 1979

TO: Selected official Representatives

SUBJECT: Improving Cumulative Noise Measurement Systems
Important Data Needed by March 1, 1979

Ladies and Gentlemen:

Professor Paul N. Borsky, of Columbia University, has been contracted by NASA to improve the correlation between cumulative noise measurement systems and actual human responses. The NASA contract will require detailed information regarding actual flight tracks over populated areas near airports at different times of the day. Although much of the necessary information is currently in hand, information regarding flight tracks around your airports is urgently needed so that over-flight areas can be identified.

The information needed has been sought through the the FAA already. While they are willing to collect it, government regulations would hold approval of a survey form for 6-9 months. By checking with your tower chief, you may be able to develop some "best judgments" as to the required information much sooner.

Please fill out the attached questionnaire and return it to the address shown on the questionnaire not later than March 1, 1979. Professor Borsky has assured us that the results of the survey and the study's preliminary conclusions will be made available to us as soon as they are in. Therefore, your earliest assistance in this matter is needed so that we can expedite those results.

Thank you for your cooperation in this matter.

Sincerely,

J. Donald Reilly
Executive Vice President

/etl

Attachments

FEB 5 '79

International Headquarters: 1700 K Street, Northwest, Washington, D.C. 20006 Phone: (202) 296-3270 Cable: AOCIHQ

RETURN TO:

Pro. Paul N. Borsky, Director
Columbia University -
Noise Research Unit
367 Franklin Avenue
Franklin Square, NY 11010

PLEASE RETURN BY: March 1, 1979

APPENDIX A2

SURVEY OF AIRPORT FLIGHT TRACKS
(Summer, 1978)

Absolute detail and accuracy in your responses is not required. Please provide your best informed judgment regarding the following questions.

1. On a local map which shows the different runways and population centers within a radius of about 10 miles of your commercial airport(s), please draw the approximate different approach and departure flight paths. Label each different flight path related to each runway as the runway heading and subscripts 1, 2, 3, etc.

2. On the flight path summary table below, please indicate the approximate percent of Summer, 1978, operations that would apply to each flight path. (Extra space is provided on the back, if necessary.)

Approaches		Departures	
Runway flight paths	%	Runway flight paths	%
	100%		100%

Airport: _____

By: _____

Date: _____

APPENDIX B1

O.M.B. # _____
Expires _____

F-1

Area # _____

INTERVIEWER REPORT

Processing # _____

Segment # _____

Respondent # _____

Household Name _____

Respondent Name _____

Phone # _____ If On Post, Rank (if possible) ____

Street Address _____

City _____ Zip (City) Code _____

County _____ County Code # _____

State _____ State Code _____

Description and/or Location of HU:

_____

_____

_____

CONTACT RECORD

Contact Attempt	Date	Time	Result	Notes	Int. I.D.#
1		AM PM	1 2 3 4 5 6 7 8 9 0		
2		AM PM	1 2 3 4 5 6 7 8 9 0		
3		AM PM	1 2 3 4 5 6 7 8 9 0		
4		AM PM	1 2 3 4 5 6 7 8 9 0		
5		AM PM	1 2 3 4 5 6 7 8 9 0		

Final Result

No one home/no answer _____ 1

Respondent not at home _____ 2

HH vacant or no dwelling _____ 3

No eligible respondent _____ 4

Appointment made (specify)_____ 5

Busy - no appointment _____ 6

Ill - no appointment _____ 7

Appointment cancelled _____

Completed _____ 9

Refusal (specify) _____ 0

Interviewer Comments

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

7 _____

_____

9 _____

0 _____

Hello, My Name is _____. I'm from the University Research Center. We are doing a study about how people feel about living in different places and I'd like to get some of your views about living around here.

a. Ask: "How many people 18 years or older live here at the present time?"_____

b. If there is more than one such person, say: "Starting with the head of the house, please tell me the sex and age of each such person and their relation to the head."

Relation to Head	Sex	Age	Adult No.	Check Resp.
Head				

INTERVIEWER: Assign the number 1 to the youngest adult, 2 to the next youngest adult, and so on, until each adult in the household has been assigned a number.

eligible in HH _____

IRF. No.	If the number of adults in the household is: 1	2	3	4	5	6 or more
	then select:					
1	1	1	2	2	3	3
2	1	2	3	3	3	5
3	1	2	3	4	5	6
4	1	1	1	1	2	2
5	1	1	1	1	1	1
6	1	2	3	4	5	5
7	1	2	2	3	4	4
8	1	1	1	2	2	2
9	1	1	2	2	3	3
10	1	2	3	4	5	6
11	1	2	2	3	4	4
12	1	1	1	1	1	1

INTERVIEWER REPORT
ON INTERVIEW SITUATION

1a. Was the respondent suspicious of the stated purpose of the interview or the interviewer?

Yes 1
No 2

(If YES)

b. Explain: _____

_____

c. Was there any reason to believe that the respondent's hearing was not as good as average hearing?

Yes 1
No 2

(If YES)

d. Explain: _____

_____

(Please use the word-pair technique to give the following ratings on the basis of your observation of the respondent. Circle one answer code for each row.)

e. Respondent in interview situation:

Relaxed	1	2	3	4	5	6	..... Tense
Friendly	1	2	3	4	5	6	..... Hostile
Silent	1	2	3	4	5	6	..... Talkative
Frank	1	2	3	4	5	6	..... Defensive
Helpful	1	2	3	4	5	6	..... Uncooperative
Interested	1	2	3	4	5	6	..... Disinterested
Honest	1	2	3	4	5	6	..... Dishonest

3a. During the interview could you hear ...	Yes	No	(If YES) b. Did it interfere with the interview? Yes	No
a. Cars or trucks going by ...	1	2	1	2
b. Motorcycles	1	2	1	2
c. Airplanes	1	2	1	2
d. People	1	2	1	2
e. Other (Specify)	1	2	1	2

_____

_____

c. Did you notice anything in the area that would cause especially loud noise levels?

Yes 1

No 2

(If YES)
d. What did you notice?

_____

_____

_____

_____

4. Circle race of respondent.

White 1
Black 2
Spanish American 3
American Indian 4
Asian, Oriental 5
Other (Specify) 6

_____

5. Circle sex of respondent.

Male 1
Female 2

6a. Type of structure:

A one family house detached from any other house.. 1
A mobile home 2
A building for 2 families 3
A building for 3 or 4 families 4
A building for 5 to 9 families 5
A building for 10 or more families 6
A rooming house 7
Other (DESCRIBE) _____ 8

b. How many stories (floors) are in this building?

1 to 3 stories 1
4 to 5 stories 2
6 or more stories 3

7. Outside construction:

Frame only 1
Frame with some brick 2
All brick 3
Other (Specify) 4

8. Inside walls:

Block 1
Plaster 2
Other (Specify) 3

9. Interviewer's signature and ID#: _____

10. Date of interview: _____

APPENDIX B2

Columbia University
School of Public Health

O.M.B. # _____
Expires _____

COMMUNITY QUESTIONNAIRE

Processing No. _____

Date _____

Time Interview Began _____

Time Interview Ended _____

Area No. _____

Segment No. _____

Respondent No. _____

Description of Respondent NAME: _____

Address _____

Telephone No. _____

Hello. I'm from the University research center.
We are doing a study about how people feel about living in different places and I'd like to get some of your views.

1. The first question is: How long have you lived around here, at your present address or within a few blocks of this address?

Less than 1 year	1
1 year to under 2 years	2
2 years - under 4 years	3
4 years - under 7 years	4
7 years - under 10 years	5
10 years - under 20 years	6
20 years or more	7
Always lived here	8
Don't know	X
Office	Y

2. In general, how do you rate (name of area) as a place to live. Do you rate it as a Very good, Good, Fair, Poor or Very poor place to live?

Very good	1
Good	2
Fair	3
Poor	4
Very poor	5
Don't know	X
Office	Y

3. What are some of the things you like about living around here? Things that you feel are advantages, or that make this a good place to live? (Anything else?)

4A. Now, very few places are entirely perfect. So I'd like you to tell me some of the things you don't like about living around here - things that you may feel are nuisances, irritations, or are bothersome or disturbing to you?

B. Have we overlooked anything that may recently have annoyed or irritated you, or interfered with your everyday living - even little things that you just take for granted because nothing much can be done about them? RECORD ANSWERS TO "A" AND "B" BELOW.

5A. Now here is a list of things some people dislike about where they live. (Hand Card 1 to Respondent). For each item, please tell me whether it is something you feel about this area. First, do you feel this area has a poor or inconvenient location? (Is it ..... does it have?)

ASK ALL ITEMS IN "A" BEFORE ASKING "B" FOR EACH "YES" IN "A"

B. (Hand opinion thermometer card 2 to Respondent). Here is a card with an "opinion thermometer" which we will use in several questions to show how you feel about certain things. For example, on the left is a Frequency Scale to show "how often you may have an experience. On the right side is a Degree Scale, to show "how much" you feel about certain things. If you pick number "9", it means "extremely" or the very most; zero, of course, means the "least". Any number in between would show just where your feelings might be if more than zero, but less than "9".

Now, thinking of this place having (item disliked), how much does this bother or annoy you? Remember that "extremely" would be "9", "not at all" would be "zero". (Read each item circled "YES", and circle code).

	A. Dislikes			B. How Much?												
		Yes	No	Don't Know	Extreme									None	Don't Know	Office
1.	Poor or inconvenient location.	1	0	X	9	8	7	6	5	4	3	2	1	0	X	Y
2.	Inadequate shopping facilities.....	1	0	X	9	8	7	6	5	4	3	2	1	0	X	Y
3.	Aircraft noise	1	0	X	9	8	7	6	5	4	3	2	1	0	X	Y
4.	Inadequate schools	1	0	X	9	8	7	6	5	4	3	2	1	0	X	Y
5.	Traffic and other noise	1	0	X	9	8	7	6	5	4	3	2	1	0	X	Y
6.	Dangerous street traffic conditions	1	0	X	9	8	7	6	5	4	3	2	1	0	X	Y
7.	Dangerous airplane traffic conditions	1	0	X	9	8	7	6	5	4	3	2	1	0	X	Y
8.	Overcrowded, not enough privacy	1	0	X	9	8	7	6	5	4	3	2	1		X	Y
9.	Poor recreation facilities ...	1	0	X	9	8	7	6	5	4	3	2	1	0	X	Y
10.	Poor neighbors - unfriendly ..	1	0	X	9	8	7	6	5	4	3	2	1	0	X	Y
11.	Unsafe to walk at night	1	0	X	9	8	7	6	5	4	3	2	1	0	X	Y
12.	Bad odors and air pollution ..	1	0	X	9	8	7	6	5	4	3	2	1	0	X	Y
13.	Lack of job opportunities	1	0	X	9	8	7	6	5	4	3	2	1	0	X	Y

6A. Now, of all the things you dislike or consider inadequate around here (there must be some), which <u>one thing</u> would you most like to improve?

B. And which is the second thing you would most like to improve?

Circle item mentioned below	A. First	B. Second
Nothing	0	0
1. Poor or inconvenient location	1	1
2. Inadequate shopping facilities	1	1
3. Aircraft noise	1	1
4. Inadequate schools	1	1
5. Traffic and other noise	1	1
6. Dangerous street traffic conditions	1	1
7. Dangerous airplane traffic conditions	1	1
8. Overcrowded, not enough privacy	1	1
9. Poor recreation facilities	1	1
10. Poor neighbors - unfriendly	1	1
11. Unsafe to walk at night	1	1
12. Bad odors and air pollution	1	1
13. Lack of job opportunities	1	1

7. Have you or your family ever tried to do anything to improve any of the conditions in this neighborhood?

Yes 1*
No 0**
Don't know X
Office ..... Y

*<u>If YES, ask "A-C"</u>

A. Which conditions have you tried to improve?

B. What did you do?

C. Did it do any good?

Yes 1*
No 0**
Don't know X
Office ..... Y

**<u>If NO, ask "D"</u>

D. If you or your family tried to do something, do you think it would do any good?

Yes 1
No 0
Don't know X
Office ..... Y

8. Have you ever felt like moving away from this community or neighborhood?

Yes 1*
No 0**
Office ..... Y

*If YES, ask "A" and "C"

A. What are some of the reasons you felt like moving? (Any others?) (Circle each item mentioned below)

**If NO, ask "B" and "C"

B. Let's suppose you did feel like moving, which disadvantages would you try to avoid in a new neighborhood? (Circle each item mentioned below)

REASONS FOR MOVING OR DISADVANTAGES TO BE AVOIDED

		Yes
1.	Poor or inconvenient location	1
2.	Inadequate shopping facilities	1
3.	Aircraft noise	1
4.	Inadequate schools	1
5.	Traffic and other noise	1
6.	Dangerous street traffic conditions	1
7.	Dangerous airplane traffic conditions	1
8.	Overcrowded, not enough privacy	1
9.	Poor recreation facilities	1
10.	Poor neighbors - unfriendly	1
11.	Unsafe to walk at night	1
12.	Bad odors and air pollution	1
13.	Lack of job opportunities	1

C. Are there any reasons why you would be unable to move out of this neighborhood if you wanted to? What reasons?

9. In general, how noisy would you rate this neighborhood? Please use the opinion thermometer and remember "9" means "extremely noisy" and zero means "very quiet".

Extremely noisy	9
	8
	7
	6
	5
	4
	3
	2
	1
Very quiet	0
Don't know	X
Office	Y

10. Are the noises around here about what you expected before moving here or are they less, or are they more than you expected?

Less	1
As expected	2
More	3*
Always lived here	0
Don't know	X
Office	Y

*If MORE, ask "A"

A. In what way is it more than you expected?

11. And what are some of the different kinds of noises you sometimes hear around here? (Any others?) Circle Code 1 for each of the noises listed below which is mentioned spontaneously. Then prompt for any of these noises not mentioned, by asking, "Do you ever hear noise from .....?"

	Cars or trucks going by?	Motor-cycles or "hot rods?"	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others
Yes (mentioned spontaneously)	1*	1*	1*	1*	1*	1*
Yes (prompted)	2*	2*	2*	2*	2*	2*
No, never hear	0	0	0	0	0	0
Office	Y	Y	Y	Y	Y	Y

*If YES (Code 1 or 2) to any item, ask "A" for each item before going to Part "B". If NO to all items, skip to Q.20, Page 24.

A. How often did you hear the noise from (source of noise) during the past (time period). (Please use thermometer)

	Cars or trucks going by?	Motor-cycles or "hot rods?"	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others
Extremely	9	9	9	9	9	9
	8	8	8	8	8	8
	7	7	7	7	7	7
	6	6	6	6	6	6
	5	5	5	5	5	5
	4	4	4	4	4	4
	3	3	3	3	3	3
	2	2	2	2	2	2
	1	1	1	1	1	1
Not at all	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y

B. And how loud would you say this noise is usually, when you hear it? (Use thermometer)

	Cars or trucks going by?	Motor-cycles or "hot rods?"	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others
Extremely.....	9	9	9	9	9	9
	8	8	8	8	8	8
	7	7	7	7	7	7
	6	6	6	6	6	6
	5	5	5	5	5	5
	4	4	4	4	4	4
	3	3	3	3	3	3
	2	2	2	2	2	2
	1	1	1	1	1	1
Not at all	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y

11C. Would you say it was at all possible for anyone to reduce this noise, or not?

	Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Yes, could be reduced.....	1*	1*	1*	1*	1*	1*
No, couldn't be	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y

*If YES to "C", ask "D"

D. Would you say everything possible is actually being done to reduce this noise? Please use the Degree Scale. Remember, a "9" means that the "Most" is being done and a "0" means that practically nothing is being done.

	Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Most.....	9	9	9	9	9	9
	8	8	8	8	8	8
	7	7	7	7	7	7
	6	6	6	6	6	6
	5	5	5	5	5	5
	4	4	4	4	4	4
	3	3	3	3	3	3
	2	2	2	2	2	2
	1	1	1	1	1	1
Not at all	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y

11. E. Does the noise from (item) ever startle or frighten you?

	Cars or trucks going by?	Motor-cycles or "hot rods?"	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Yes	1*	1*	1*	1*	1*	1*
No	0	0	0	0	0	0
Office	Y	Y	Y	Y	Y	Y

*If YES, ask "F" If NO, skip to "G"

11F. How much does it startle or frighten you? (Use Degree Scale)

	Cars or trucks going by?	Motor-cycles or "hot rods?"	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Extremely	9	9	9	9	9	9
	8	8	8	8	8	8
	7	7	7	7	7	7
	6	6	6	6	6	6
	5	5	5	5	5	5
	4	4	4	4	4	4
	3	3	3	3	3	3
	2	2	2	2	2	2
	1	1	1	1	1	1
Not at all	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y

G. Almost every time you hear the noise do you pay attention to it until it passes, or do you usually ignore it and hardly even hear it?

	Cars or trucks going by?	Motor-cycles or "hot rods?"	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Pay attention	1	1	1	1	1	1
Ignore	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y

11 H. During the past (period), did the noise from (source) interfere with your listening to radio or TV?

	Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Yes	1*	1*	1*	1*	1*	1*
No	0	0	0	0	0	0
Office	Y	Y	Y	Y	Y	Y

*If YES, ask "I"

I. And how bothered or annoyed did this make you feel? (Use Degree Scale)

	Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Extremely	9	9	9	9	9	9
	8	8	8	8	8	8
	7	7	7	7	7	7
	6	6	6	6	6	6
	5	5	5	5	5	5
	4	4	4	4	4	4
	3	3	3	3	3	3
	2	2	2	2	2	2
	1	1	1	1	1	1
Not at all	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y

J. During the past (period), did the noise from (source) make it difficult to concentrate on what you were doing?

	Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Yes	1*	1*	1*	1*	1*	1*
No	0	0	0	0	0	0
Office	X	X	X	X	X	X

*If YES, ask "K"

K. And how bothered or annoyed did this make you feel? (Use Degree Scale)

	Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Extremely	9	9	9	9	9	9
	8	8	8	8	8	8
	7	7	7	7	7	7
	6	6	6	6	6	6
	5	5	5	5	5	5
	4	4	4	4	4	4
	3	3	3	3	3	3
	2	2	2	2	2	2
	1	1	1	1	1	1
Not at all	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y

11 L. During the past (period), did the noise from (source) disturb your sleep?

	Cars or trucks going by?	Motor-cycles or "hot rods?"	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Yes	1*	1*	1*	1*	1*	1*
No	0	0	0	0	0	0
Office	Y	Y	Y	Y	Y	Y

*If YES, ask "M"

M. And how bothered or annoyed did this make you feel? (Use Degree Scale)

	Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Extremely	9	9	9	9	9	9
	8	8	8	8	8	8
	7	7	7	7	7	7
	6	6	6	6	6	6
	5	5	5	5	5	5
	4	4	4	4	4	4
	3	3	3	3	3	3
	2	2	2	2	2	2
	1	1	1	1	1	1
Not at all	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y

N. During the past (period), did the noise from (source) make your house rattle or shake?

	Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Yes	1*	1*	1*	1*	1*	1*
No	0	0	0	0	0	0
Office	Y	Y	Y	Y	Y	Y

*If YES, ask "O"

O. And how bothered or annoyed did this make you feel? (Use Degree Scale)

	Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Extremely	9	9	9	9	9	9
	8	8	8	8	8	8
	7	7	7	7	7	7
	6	6	6	6	6	6
	5	5	5	5	5	5
	4	4	4	4	4	4
	3	3	3	3	3	3
	2	2	2	2	2	2
	1	1	1	1	1	1
Not at all	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y

11. P. During the past (period), did the noise from (source) interfere with your rest or relaxation?

	Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Yes	1*	1*	1*	1*	1*	1*
No	0	0	0	0	0	0
Office	Y	Y	Y	Y	Y	Y

*If YES, ask "Q"

Q. And how bothered or annoyed did this make you feel? (Use Degree Scale)

	Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Extremely	9	9	9	9	9	9
	8	8	8	8	8	8
	7	7	7	7	7	7
	6	6	6	6	6	6
	5	5	5	5	5	5
	4	4	4	4	4	4
	3	3	3	3	3	3
	2	2	2	2	2	2
	1	1	1	1	1	1
Not at all	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y

R. During the past (period), did the noise from (source), interfere with ordinary conversation?

	Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Yes	1*	1*	1*	1*	1*	1*
No	0	0	0	0	0	0
Office	Y	Y	Y	Y	Y	Y

*If YES, ask "S"

S. And how bothered or annoyed did this make you feel? (Use Degree Scale)

	Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Extremely	9	9	9	9	9	9
	8	8	8	8	8	8
	7	7	7	7	7	7
	6	6	6	6	6	6
	5	5	5	5	5	5
	4	4	4	4	4	4
	3	3	3	3	3	3
	2	2	2	2	2	2
	1	1	1	1	1	1
Not at all	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y

11. T. During the past (period), did the noise from (source), make you keep your windows shut during the day?

	Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Yes	1*	1*	1*	1*	1*	1*
No	0	0	0	0	0	0
Office	Y	Y	Y	Y	Y	Y

*If YES, ask "U"

U. And how bothered or annoyed did this make you feel? (Use Degree Scale)

	Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Extremely	9	9	9	9	9	9
	8	8	8	8	8	8
	7	7	7	7	7	7
	6	6	6	6	6	6
	5	5	5	5	5	5
	4	4	4	4	4	4
	3	3	3	3	3	3
	2	2	2	2	2	2
	1	1	1	1	1	1
Not at all	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y

V. During the past (period), did the noise from (source) make you keep your windows shut at night?

	Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Yes	1*	1*	1*	1*	1*	1*
No	0	0	0	0	0	0
Office	Y	Y	Y	Y	Y	Y

*If YES, ask "W"

W. And how bothered or annoyed did this make you feel? (Use Degree Scale)

	Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Extremely	9	9	9	9	9	9
	8	8	8	8	8	8
	7	7	7	7	7	7
	6	6	6	6	6	6
	5	5	5	5	5	5
	4	4	4	4	4	4
	3	3	3	3	3	3
	2	2	2	2	2	2
	1	1	1	1	1	1
Not at all	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y

11. X. During the past (period), did the noise from (source) interfere with your activities out-of-doors around here?

	Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Yes	1*	1*	1*	1*	1*	1*
No	0	0	0	0	0	0
Office	Y	Y	Y	Y	Y	Y

*If YES, ask "Y"

Y. And how bothered or annoyed did this make you feel? (Use Degree Scale)

	Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Extremely	9	9	9	9	9	9
	8	8	8	8	8	8
	7	7	7	7	7	7
	6	6	6	6	6	6
	5	5	5	5	5	5
	4	4	4	4	4	4
	3	3	3	3	3	3
	2	2	2	2	2	2
	1	1	1	1	1	1
Not at all	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y

Z. Now, in general, taking everything into consideration, how much does the noise from (item) disturb, bother or annoy you?

	Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Extremely	9	9	9	9	9	9
	8	8	8	8	8	8
	7	7	7	7	7	7
	6	6	6	6	6	6
	5	5	5	5	5	5
	4	4	4	4	4	4
	3	3	3	3	3	3
	2	2	2	2	2	2
	1	1	1	1	1	1
Not at all	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y

AA. On the whole, would you say that you have been more bothered or less bothered by (item) this past (period) compared to other years?

	Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
More bothered	1	1	1	1	1	1
About same	2	2	2	2	2	2
Less bothered	3	3	3	3	3	3
New to area	4	4	4	4	4	4
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y

12. A. Now, taking everything into consideration, which one noise that you hear around here bothers you the most? The second most?

	Most	2nd Most
Cars or trucks	1	1
Motorcycles	2	2
Airplanes	3	3
Neighbors or children	4	4
Dogs or cats	5	5
Others	6	6

B. What about the future, do you think the amount of noise around here will be much more, a little more, about the same, a little less or much less?

Much more	1
Little more	2
Same	3
Little less	4
Much less	5
Don't know	X
Office	Y

13A. During the week, Monday through Friday, are you usually home from around ven in the morning to seven at night?

Yes 1*
No (Skip to Q.14A) 2

*If YES, ask "B"

B. Do any of the noises we've been talking about bother or annoy you during the day from around seven in the morning to seven at night?

Yes 1**
No (Skip to Q.14A) 2

**If YES, ask "C"

C. What noises do that? (Circle all that apply)
(How about cars or trucks? How about airplanes?)

Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
1***	1***	1***	1***	1***	1***

***If "C" is circled, ask "D"

D. And taking everything into consideration, how annoyed are you by noise from (source) during the day?

	Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Extremely	9	9	9	9	9	9
	8	8	8	8	8	8
	7	7	7	7	7	7
	6	6	6	6	6	6
	5	5	5	5	5	5
	4	4	4	4	4	4
	3	3	3	3	3	3
	2	2	2	2	2	2
	1	1	1	1	1	1
Not at all	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y

14A. Are you usually home during the day on weekends?

Yes 1*
No (Skip to 15A) 2

*If YES, ask "B"

B. Do any of the noises we've been talking about bother or annoy you during the day on weekends?

Yes 1**
No (Skip to 15A) 2

**If YES, ask "C"

C. What noises do that? (Circle all that apply)
(How about cars or trucks? How about airplanes?)

Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____
1***	1***	1***	1***	1***	1***

***If "C" is circled, ask "D"

D. And, in general, and taking everything into consideration, how annoyed are you by the noise from (source) during the day on weekends?

	Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cars?	Other _____
Extremely	9	9	9	9	9	9
	8	8	8	8	8	8
	7	7	7	7	7	7
	6	6	6	6	6	6
	5	5	5	5	5	5
	4	4	4	4	4	4
	3	3	3	3	3	3
	2	2	2	2	2	2
	1	1	1	1	1	1
Not at all	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y

15A. During the week, Monday through Friday, are you usually home in the evenings from around 7:00 PM to 10:00 PM?

Yes 1*
No (Skip to Q.16A)..... 2

*If YES, ask "B"

B. Do any of the noises we've been talking about bother or annoy you during the evenings from around 7:00 PM to 10:00 PM?

Yes 1**
No (Skip to Q.16A)..... 2

**If YES, ask "C"

C. What noises do that? (Circle all that apply)
(How about cars or trucks? How about airplanes?)

Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
1***	1***	1***	1***	1***	1***

***If "C" is circled, ask "D"

D. And, in general, and taking everything into consideration, how annoyed are you by the noise from (source) during the evening?

	Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Extremely	9	9	9	9	9	9
	8	8	8	8	8	8
	7	7	7	7	7	7
	6	6	6	6	6	6
	5	5	5	5	5	5
	4	4	4	4	4	4
	3	3	3	3	3	3
	2	2	2	2	2	2
	1	1	1	1	1	1
Not at all	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y

16A. Are you usually home during the evening on weekends?

Yes 1*
No (Skip to 17A) 2

*If YES, ask "B"

B. Do any of the noises we've been talking about bother or annoy you during the evening on weekends?

Yes 1**
No (Skip to 17A) .....

**If YES, ask "C"

C. What noises do that? (Circle all that apply)
(How about cars or trucks? How about airplanes?)

Cars or trucks going by?	Motor-cycles or "hot rods?"	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____
1***	1***	1***	1***	1***	1***

***If "C" is circled, ask "D"

D. And, in general, and taking everything into consideration, how annoyed are you by the noise from (source) during the evening?

	Cars or trucks going by?	Motor-cycles or "hot rods?"	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____
Extremely	9	9	9	9	9	9
	8	8	8	8	8	8
	7	7	7	7	7	7
	6	6	6	6	6	6
	5	5	5	5	5	5
	4	4	4	4	4	4
	3	3	3	3	3	3
	2	2	2	2	2	2
	1	1	1	1	1	1
Not at all	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y

17A. During the week, Monday through Friday, are you usually home at night from around 10:00 PM to 7:00 AM?

Yes 1*
No (Skip to 18A) 2

*If YES, ask "B"

B. Do any of the noises we've been talking about bother or annoy you during the night from around 10:00 PM to 7:00 AM?

Yes 1**
No (Skip to 18A) 2

**If YES, ask "C"

C. What noises do that? (Circle all that apply)
(How about cars or trucks? How about airplanes?)

Cars or trucks going by?	Motor-cycles or "hot rods?"	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
1***	1***	1***	1***	1***	1***

***If "C" is circled, ask "D"

D. And, in general, and taking everything into consideration, how annoyed are you by the noise from (source) during the night?

	Cars or trucks going by?	Motor-cycles or "hot rods?"	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Extremely	9	9	9	9	9	9
	8	8	8	8	8	8
	7	7	7	7	7	7
	6	6	6	6	6	6
	5	5	5	5	5	5
	4	4	4	4	4	4
	3	3	3	3	3	3
	2	2	2	2	2	2
	1	1	1	1	1	1
Not at all	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y

18A. Are you usually home during the night on weekends?

Yes 1*
No (Skip to 19A) 2

*If YES, ask "B"

B. Do any of the noises we've been talking about bother or annoy you during the night on weekends?

Yes 1**
No (Skip to 19A) 2

**If YES, ask "C"

C. What noises do that? (Circle all that apply)
(How about cars or trucks? How about airplanes?)

Cars or trucks going by?	Motor-cycles or "hot rods?"	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
1***	1***	1***	1***	1***	1***

***If "C" is circled, ask "D"

D. And, in general, and taking everything into consideration, how annoyed are you by the noise from (source) during the night?

	Cars or trucks going by?	Motor-cycles or "hot rods"?	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Extremely	9	9	9	9	9	9
	8	8	8	8	8	8
	7	7	7	7	7	7
	6	6	6	6	6	6
	5	5	5	5	5	5
	4	4	4	4	4	4
	3	3	3	3	3	3
	2	2	2	2	2	2
	1	1	1	1	1	1
Not at all.....	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y

19. Do you feel that noise is harmful in any way to your health and well being?

Yes	1*
No	0
Don't know	X
Office	Y

*If YES, ask "A"

A. In what ways is noise harmful?

B. What kinds of noise around here do you feel are harmful? (How about cars or trucks? How about airplanes?)

	Cars or trucks going by?	Motor-cycles or "hot rods?"	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Yes (mentioned spontaneously)	1*	1*	1*	1*	1*	1*
Yes (prompted)	2*	2*	2*	2*	2*	2*
No, never hear	0	0	0	0	0	0
Office	Y	Y	Y	Y	Y	Y

*For each YES, ask "C" and "D"

C. And how harmful to your health is (source) (Use Degree Scale)

	Cars or trucks going by?	Motor-cycles or "hot rods?"	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
Extremely harmful	9	9	9	9	9	9
	8	8	8	8	8	8
	7	7	7	7	7	7
	6	6	6	6	6	6
	5	5	5	5	5	5
	4	4	4	4	4	4
	3	3	3	3	3	3
	2	2	2	2	2	2
	1	1	1	1	1	1
Not at all	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y

19D. Does (source) affect you in the following ways?

	Cars or trucks going by?	Motor-cycles or "hot rods?"	Air-planes?	Neigh-bors or Children?	Dogs or Cats?	Others _____ _____
1. Give you headaches?						
Yes	1	1	1	1	1	1
No	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y
2. Make you feel tired?						
Yes	1	1	1	1	1	1
No	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y
3. Make you feel nervous?						
Yes	1	1	1	1	1	1
No	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y
4. Make you feel irritable?						
Yes	1	1	1	1	1	1
No	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y
5. Cause hearing loss or difficulties?						
Yes	1	1	1	1	1	1
No	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y
6. Make other health problems worse?						
Yes	1	1	1	1	1	1
No	0	0	0	0	0	0
Don't know	X	X	X	X	X	X
Office	Y	Y	Y	Y	Y	Y

ASK EVERYBODY

20. When you see or hear airplanes fly by, how often do you feel they are flying too low for the safety of the residents around here? (Use Frequency Scale)

Extremely	9
	8
	7
	6
	5
	4
	3
	2
	1
Not at all	0
Don't know	X
Office	Y

21. And how often do you feel there is some danger that they might crash nearby?

Extremely	9
	8
	7
	6
	5
	4
	3
	2
	1
Not at all	0
Don't know	X
Office	Y

*/ASK ONLY IF NOISE FROM AIRPLANES IS NOT HEARD Q.11/

22. And did the airplanes this past period ever startle or frighten you? (Use Degree Scale)

Extremely	9
	8
	7
	6
	5
	4
	3
	2
	1
Not at all	0
Don't know	X
Office	Y

ASK Q. 23-29 ONLY IF AIRCRAFT NOISE IS HEARD (Q.11)

23. If you wanted to do something about the airplane noise, do you happen to know whom to call or where to go to complain?

Yes 1*
No 0
Don't know X
Office ..... Y

*If YES, ask "A"
A. Whom would you call or where would you go?

24A. Did you or anyone in the family ever feel like doing something about reducing the airplane noise? For example, did you ever feel like:

ASK ALL ITEMS IN "A" BEFORE ASKING PART "B"

	A			B		
	Yes	No	Office	Yes	No	Office
1. Discussing it with a friend or neighbor?	1	0	Y	1*	0**	Y
2. Writing or telephone an official about it?	1	0	Y	1*	0**	Y
3. Visiting an official?	1	0	Y	1*	0**	Y
4. Signing a petition?	1	0	Y	1*	0**	Y
5. Getting in touch with a local neighborhood organization	1	0	Y	1*	0**	Y
6. Helping to set up a committee to do something?	1	0	Y	1*	0**	Y
7. Doing something else? What?	1	0	Y	1*	0**	Y

ASK "B" AFTER FINISHING PART "A", AND CIRCLE "YES" OR "NO" CODES ABOVE FOR EACH OF THE SIX ITEMS

B. Did you or anyone in your family ever actually do any of these things? (Which?)

*If YES to any part "B", ask "C"
C. Did it do any good in helping to improve the situation?

Yes 1
No 0
Don't know X
Office ..... Y

**If NO to all parts "B", ask "D"
D. If you or your family did any of these things, do you think it would do any good in improving the situation?

Yes 1
No 0
Don't know X
Office use ..... Y

25. **(You may have partly answered this but) Have you heard of any group or organization around here that was trying to improve the noise situation?**

Yes	1*
No	0
Don't know	X
Office	Y

*If YES, ask "A"

A. Do you feel their efforts have helped to improve the situation?

Yes	1
No	0
Don't know	X
Office	Y

26. If a local group (was organized and they) asked you to join their campaign to do something about the situation, by (insert time), how likely do you think you would do this? Use Degree Scale to indicate the extent to which you would or would not (call or write). How about (next item)?

	Calling or writing an official	Attending a Meeting or Rally	Visiting an Official	Signing a Petition	Helping set up the group
Extremely	9	9	9	9	9
	8	8	8	8	8
	7	7	7	7	7
	6	6	6	6	6
	5	5	5	5	5
	4	4	4	4	4
	3	3	3	3	3
	2	2	2	2	2
	1	1	1	1	1
Not at all	0	0	0	0	0
Don't know	X	X	X	X	X
Office	Y	Y	Y	Y	Y

27. Now, using the Degree Scale again, what do you think the chances are that such a group could succeed in improving the situation? Use Degree Scale.

Extremely	9
	8
	7
	6
	5
	4
	3
	2
	1
Not at all	0
Don't know	X
Office	Y

ASK EVERYBODY

28. A. Would you say any of these people are in a position to do anything about the aircraft noise (around here)? *Ask each item in "A" before asking "B" for each YES in "A". (Hand Card 3 to Respondent)

B. How much do you feel (item) are doing to reduce the noise? (Use Degree Scale) (Even though you feel that you may not have exact knowledge about what the _____ are doing, just tell us from what you have heard or read or believe about how much they are doing to reduce the noise.)

	A. Can Do			*B. Doing												
	Yes	No	Office	Extreme									None		DK	Office
1. The people who run the airlines	1*	0	Y	9_0	8_1	7_2	6_3	5_4	4_5	3_6	2_7	1_8	0_9		X	Y
2. The airport officials	1*	0	Y	9_0	8_1	7_2	6_3	5_4	4_5	3_6	2_7	1_8	0_9		X	Y
3. Other local gov't. officials	1*	0	Y	9_0	8_1	7_2	6_3	5_4	4_5	3_6	2_7	1_8	0_9		X	Y
4. Other state gov't. officials	1*	0	Y	9_0	8_1	7_2	6_3	5_4	4_5	3_6	2_6	1_8	0_9		X	Y
5. Other federal gov't. officials	1*	0	Y	9_0	8_1	7_2	6_3	5_4	4_5	3_6	2_7	1_8	0_9		X	Y
6. The pilots	1*	0	Y	9_0	8_1	7_2	6_3	5_4	4_5	3_6	2_7	1_8	0_9		X	Y
7. The designers and makers of airplanes	1*	0	Y	9_0	8_1	7_2	6_3	5_4	4_5	3_6	2_7	1_8	0_9		X	Y
8. The community leaders	1*	0	Y	9_0	8_1	7_2	6_3	5_4	4_5	3_6	2_7	1_8	0_9		X	Y

29A. How important do you feel commercial airplanes are to the national welfare? (Use Degree Scale)

B. How important do you feel they are to this community?

C. And how important do you feel commercial airplanes are to your own family and friends?

	Extreme									None	DK	Office
A. National	9	8	7	6	5	4	3	2	1	0	X	Y
B. Community	9	8	7	6	5	4	3	2	1	0	X	Y
C. Family & friends	9	8	7	6	5	4	3	2	1	0	X	Y

ASK EVERYBODY

30. Have you ever flown in an airplane?

Yes 1*
No 0
Office ..... Y

*If YES, ask "A"
A. Have you flown within the last twelve months?

Yes 1
No 0**
Office ..... Y

**If NO, ask "B"
B. When did you last fly in an airplane?

1 year - under 2 years 2
2 years - under 5 years ... 3
5 years or more 4
Don't know X
Office ..... Y

31. Do you or anyone in your family happen to work at the airport, or for a company doing business with the aircraft industry?

Work at airport 1
For company doing business there 2
Neither 3
Office ..... Y

32. **Now, here's a different kind of question. I have a list of noises which sometimes annoy people. Do these ever annoy you when you hear them? (Read list) First:**

	Annoy Yes	Annoy No	Never Hear	Office
A. The noise of a lawn mower	1	0	2	Y
B. A dripping faucet	1	0	2	Y
C. A dog barking continuously	1	0	2	Y
D. The sound of a knife scraping on a plate	1	0	2	Y
E. Somebody whistling out of tune	1	0	2	Y
F. Chalk scraping a blackboard	1	0	2	Y
G. A pneumatic drill or air hammer	1	0	2	Y
H. A banging door	1	0	2	Y
I. Musical instruments in practice	1	0	2	Y
J. Typewriters	1	0	2	Y

33. Would you say you were more sensitive or less sensitive than most people are to noise?

More sensitive 1
Less sensitive 2
Same 3
Don't know X
Office ..... Y

34. Now, what is the highest grade of school you've completed

Completed 0-4 years of grade school 1
5-6 years of grade school 2
7-8 years of grade school 3
1-3 years of high school 4
4 years of high school 5
1-3 years of college 6
4 or more years of college ... 7
Don't know X
Office ..... Y

35. Do you own or rent this house (apartment)?

Own 1
Rent 2
Don't know X
Office ..... Y

36. (HAND RESPONDENT CARD 4) Now, for statistical purposes, we need to know something about family incomes. Would you just tell me which of the following eight categories comes closest to the amount all members of your family earned all together last year? I mean, how much did they get all together from all sources before taxes and other deductions? (Read categories)

A.	Less than $6,000	1
B.	$6,000 but less than $8,000	2
C.	$8,000 but less than $10,000	3
D.	$10,000 but less than $15,000	4
E.	$15,000 but less than $20,000	5
F.	$20,000 but less than $25,000	6
G.	$25,000 but less than $30,000	7
H.	$30,000 and over	8
	Refused	9
	Don't know	X
	Office	Y

37. Do you have any reason to believe that your hearing is not as good as the average (hearing)?

Yes	1*
No	0

*If YES, ask "A"
A. Why is that?

38. (Casually) By the way, had you heard anything about this survey before this interview?

Yes	1*
No	0
Office	Y

*If YES, ask "A"
A. What have you heard? (Who was doing the survey? For what purpose?)

39. Now, in case the office finds I've left something out, will you please give me your name and telephone number? (Enter on first page) _____

Is there anything else you'd like to tell me that I haven't already asked you?

Well, I guess that's it. Thanks for all your help.

_____
Signature of Interviewer

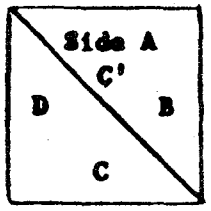
BLOCK ASSIGNMENT LIST

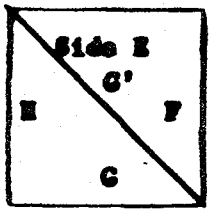
Assignment # _____ - _____

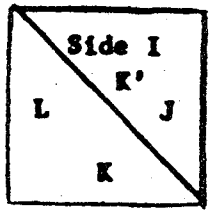
CU-1

Interviewer _____

Start here →







Special Instructions:

RECORD RESULTS OF EVERY APPROACH: Use the following notations in the "Results" column to indicate the outcome of each approach to a dwelling unit:

May Be Re-visited
S = Skipped
TNE= Eligible person temporarily not home
NH = No one at home
TR = Temporary refusal, call back

Terminated Visits
BO = Breakoff
Ref= Firm refusal
NE = Not Eligible (language, too ill, etc.)

C = Completed interview
O = Other (Use comments section)
V = Vacant
BP = Business address

DESCRIPTION OF DWELLING UNIT Give street and house number Identify apts. by number or location	APPROACH 1			APPROACH 2			APPROACH 3			COMMENTS
	Date	Time	Result	Date	Time	Result	Date	Time	Result	

CONTINUE OVER

CONTINUE OVER

DESCRIPTION OF DWELLING UNIT	APPROACH 1			APPROACH 2			APPROACH 3			COMMENTS
	Date	Time	Result	Date	Time	Result	Date	Time	Result	