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EFFECTS OF INTERIOR AIRCRAFT NOISE ON SPEECH INTELLIGIBILITY AND ANNOYANCE

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SPEECH INTELLIGIBILITY AND ANNOYANCE

By Karl S. Pearsons and Ricarda L. Bennett
Bolt Beranek and Newman Inc.

SUMMARY

This report focussed upon the effects of interior air-
craft background levels and speech intelligibility on
perceived annoyance. Sample recordings of the aircraft
ambiance from ten different types of aircraft were used in
conjunction with four distinct speech interference tests
as stimuli for this study. Thirty-six subjects evaluated
the background stimuli, which were presented with and
without speech, on two annoyance response scales. They
first rated the background in terms of its general annoy-
ance. Then they rated the background for its suitability
as a speech communication environment.

Both speech intelligibility and background level signi-
ficantly affected judged annoyance. However, the inter-
action between the two variables showed that above an
85 dB background level the speech intelligibility results
had a minimal effect on annoyance ratings. But, below
this level people rated the background as less annoying
if there was adequate speech intelligibility.

BACKGROUND

Noise as a product of progress in the design and use of
air transports can become a factor which places very
real limitations upon the operational use of such
vehicles. Unwanted noise inside an aircraft can present
problems of varying magnitude for both aircraft per-
sonnel and aircraft passengers. The air-crew, by virtue
of being exposed to high noise levels over longer periods,
can experience auditory fatigue, or more seriously,
suffer permanent noise-induced hearing loss. However,
noise interference with voice communications affects
anyone engaged in air travel. Thus, crew members and
passengers alike would experience a general physical
fatigue due to increased vocal effort required to
achieve successfully face-to-face communication (Ref. 1).
Further, even with the aid of electroacoustical systems
(intercom), efforts at voice communication may be frus-
trated due to the masking effects of the background noise.
In addition to increasing people's annoyance with their
immediate environment, a more paramount concern is that
lack of adequate voice communication could result in an
increase in aircraft related accidents. For example,
due to high noise levels, the pilot could fail to under-
stand the landing instructions; or the passengers could
delay in responding to the crewmember's commands in an
emergency situation. This concern for the safety and
comfort of people who use air transportation vehicles
merits careful assessment of the effects of interior
background noise.

This study focussed on two effects of aircraft interior noise: speech intelligibility and annoyance judgments. Recent research on the relationship of these two factors used traffic noise as the speech interfering background. The interdependency of judged annoyance and the amount of speech intelligibility available to the listener was clearly evident (Ref. 2). Thus, for a constant level of background noise, annoyance ratings of the noise varied with the speech to noise ratio, a value which determines the degree of speech intelligibility. However, it was also noted that as the background noise level increased, the correlative annoyance ratings also increased. When the background noise was presented at a certain high level, the listeners rated the noise as highly annoying regardless of whether the noise interfered with the speech intelligibility or not.

Thus, prior research using stimuli other than aircraft noise suggests that speech intelligibility should be considered in specifications for aircraft interior noise.

This study examined the effect of noise level and speech intelligibility on annoyance ratings using a wide variety of aircraft ranging from helicopters to commercial jet aircraft.

APPROACH

Stimuli

Aircraft Interior Noise

Interior noise environments of ten different aircraft

were recorded. The recordings represented five classes
of aircraft body design: (1) general aviation,
(2) narrow body jets, (3) wide body jets, (4) turboprop
aircraft, and (5) helicopters. The specific background
interior stimuli and presentation levels are listed in
Table I and the spectra are plotted in Figures 1
through 5.

Speech

Four different types of speech interference tests were
used to assess the effects of background noise on
speech intelligibility and the interaction of speech
intelligibility with annoyance. The recorded speech
material was presented with various aircraft backgrounds
to the test subjects. Levels of speech were presented
at values shown in Table I and the spectra are plotted
in Figures 6 and 7.

The speech material includes: (1) Continuous Discourse,
(2) Speech Perception in Noise Tests (SPIN Test) (Ref. 3),
(3) Tri-Rhyme (Ref. 4), and (4) Phonetically Balanced
Word List (PB Words) (Ref. 5). The Continuous Discourse
test was used solely in assessing annoyance and not in
determining speech intelligibility. An explanation of
the speech intelligibility tests, the test instructions,
and sample response sheets are in the Appendix.

Subjects

A total of thirty-six test subjects participated in
this study. There were twenty-two women and fourteen
men. The average age was 31.0 years.

TABLE I

STIMULI PRESENTATION LEVEL

A-LEVEL (L_{eq})

TYPE OF AIRCRAFT	INTERIOR A/C	SPEECH INTELLIGIBILITY TESTS			
		Tri-Rhyme	Spin	PB Words	Continuous Discourse
GENERAL AVIATION					
Rockwell Commander 112A	91.0	82.3,77.3	82.8		
Beechcraft 35B-33 Debonair	89.6	83.3,78.3	83.8		
NARROW BODY JETS					
Boeing 727	80.6	75.3,70.3	75.8	78.6	78.0
Douglas DC-9	78.4	73.3,68.3	74.8	76.6	76.0
WIDE BODY JETS					
Boeing 747	70.0	67.3	71.8		70.0
Douglas DC-10	72.3	69.3	70.8		72.0
TURBOPROP AIRCRAFT					
Lockheed Electra	78.2	73.3,68.3	73.8		76.0
Lockheed P3-B Orion	82.8	76.3,71.3	76.8		78.0
HELICOPTERS					
Bell 206-S	86.8	78.3	79.8	82.6	
Sikorsky S-61 (H-3)	93.2	82.3	83.8	86.6	

All subjects were audiometrically screened to within
20 dB of normal hearing as defined in ISO recommended
standards (Ref. 6). The subjects were divided into
six groups. An attempt was made to maintain an equal
distribution of males and females in each group. Some
of the subjects had participated in previous subjective
tests at the NASA facility.

Test Description

Test Design

The ten aircraft interior noises were heard with and
without speech for a total number of 35 test conditions.
A counterbalanced test design was utilized to minimize
effects associated with presentation order. For example,
three of the groups heard the backgrounds alone, as
their first ten stimuli. This was balanced by presenting
the ten backgrounds as the last conditions for the re-
maining three groups. The other 25 conditions were
arranged by speech intelligibility tests within each
experimental set and counterbalanced such that no one
group faced the same order of presentation.

In an effort to simulate realistic speech communication
situations, information on actual speaking and back-
ground levels (Ref. 7) were utilized as guidelines in
this study for setting the speech to background ratios.
Careful attention was paid to maintaining a realistic
speech to noise ratio even as the background noise level
increased.

This criterion was modified when the speech to noise ratio was lowered by 5 dB for six of the backgrounds combined with the Tri-Rhyme Test. These stimuli were presented-twice, first at a realistic speech to noise ratio and later at the decreased ratio.

Procedure

The subjects were instructed to judge each background noise on a five point annoyance scale from the perspective of hearing the noise while riding in an aircraft. The annoyance scale on the Rating Response Questionnaire (Appendix and below) incorporated numbers with adjective modifiers. An example of the scale is: *0 - not at all annoying, 1 - slightly annoying, 2 - moderately annoying, 3 - very annoying, and 4 - extremely annoying.*

After each background noise presentation (with or without speech), the subjects used this scale to first rate the *general annoyance* of the background noise. The second scale on the questionnaire instructed the subjects to rate the annoyance of the background noise assuming that people would want to be able to converse in it. This rating was later termed the *communication annoyance* rating. The aim here was to provide the subjects with a more defined framework within which to judge their annoyance of the ambiance.

When the aircraft backgrounds were presented with speech, the subjects were asked to complete a speech intelligibility test. For the Tri-Rhyme Test, the subjects indicated the word they thought they heard, by circling one

of six words. The other three tests: SPIN, PB Words, and Continuous Discourse required the subjects to write in the word they thought they heard. While the subjects were asked to complete the questions for the Continuous Discourse Test, the responses were not analyzed and included in the speech intelligibility results.

Equipment

The tests were performed in the exterior effects room at NASA Langley's laboratory facilities. A block diagram for the equipment is shown in Figure 8. Subjects were seated as shown in the photograph in Figure 9. All equipment shown in the block diagram was furnished by the NASA laboratory with the exception of the mixer which was supplied by Bolt Beranek and Newman Inc.

The speech and noise stimuli levels were independently controlled by attenuators to enable precise control of the speech to noise ratios. Noise levels in the exterior effects room were continually monitored throughout the experiment at a central location.

RESULTS

The results are presented in two parts. First the speech intelligibility results are given in terms of percent of words correctly understood and compared with earlier speech intelligibility data.

The second part concerns itself with the annoyance judgments of aircraft interior noise. The general annoyance is presented first without speech for two measurement procedures: A-level and Speech Interference Level. Next the results are given for test conditions with speech present. A comparison of general and communication annoyance instructions follows.

Speech Intelligibility

Speech intelligibility was measured with three standard tests: (1) Tri-Rhyme, (2) Spin Test, and (3) Phonetically Balanced Words (PB).

Figure 10 shows the results for the speech intelligibility tests relative to the calculated Articulation Index for each background. The Articulation Indices (AI) were computed from samples of the narrator's speech for each of the intelligibility tests. AI scores (Ref. 8) represent the percentage of speech material that is not masked by the background noise; i.e., the weighted difference in one-third octave bands between speech level and the background noise.

The percent correct for the PB word test and the SPIN test agreed fairly well with the psychometric curve that described the results for 1000 PB words found in the ANSI Standard (Ref. 8). However, the percent correct for the Tri-Rhyme test yielded a much flatter psychometric function positioned mid-way between the Rhyme test and the 1000 PB words.

Annoyance

Information on the test subjects' annoyance with the background noises was derived from the general annoyance and communication annoyance scales. The annoyance judgments were initially made on a 5 point scale, with potential responses ranging from *not at all annoying* to *extremely annoying*. The data analysis, however, concentrated on the last two categories *very* and *extremely annoying*. The results for these two categories were combined, compared to the total responses, and plotted as 'percent highly annoyed'.

Figure 11 shows the increase in the percent highly annoyed as a function of increasing background noise levels. This relationship held for the general annoyance instructions for the ratings of background noises without speech. A strong relationship between level and annoyance was observed ($r = .95$) over a range of 23 dB.

Another strong relationship ($r = .90$) between percent highly annoyed and SIL* was observed in Figure 12. It may be inferred from the regression lines of Figures 11 and 12 that 28 percent highly annoyed corresponds to an SIL of 65 dB which is comparable to 77 dB in Figure 11. Hence, the difference between the A-level and SIL measurement procedures was 12 dB.

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*Speech Interference Level (SIL) is a method of estimating the effect of noise interference on speech communication using an arithmetic average of four octave bands (500, 1000, 2000, & 4000 Hz) of the ambient noise.

Figure 13 plots percentage highly annoyed versus
background noise levels in the presence of speech.
The speech material was contained in three intelligibility
tests, and annoyance was judged on the general annoy-
ance scale.   The spread in percent highly annoyed across
all levels, particularly in the central region, from 75
dB to approximately 85 dB, increased greatly.   The
correlation coefficient between percent highly annoyed
and level for all data decreased to $r = .85$.

Differences between general annoyance ratings and annoy-
ance ratings for a communication environment were exa-
mined in Figure 14.   The Tri-Rhyme intelligibility test
was used to illustrate the effect of this difference
in annoyance instructions.   The most notable differences
in annoyance ratings (up to 38%) were observed for the
middle ambient levels, between 75 and 85 dB.

To further illustrate the difference in annoyance instruc-
tions, the increase in percent highly annoyed was plotted
in Figures 15 and 16 for all backgrounds presented with
and without speech.   The points on the graphs correspond
to the increase in percent highly annoyed for communi-
cation annoyance responses relative to the general
annoyance responses indicated by the base line at zero
percent.

Since most of the points in Figures 15 and 16 lie above
the base line, it can be inferred that the majority rated
the background noise more annoying when asked to judge
its adequacy for a communication environment.   Figure 15
contains the results for all ten backgrounds which were

presented without speech. For noise levels between 75
and 85 dB the average increase was 12 percent. This
was compared at the same noise levels to the average
increase of 18 percent between ratings of communication
and general annoyance for backgrounds presented with
speech (Figure 16). Thus, when using the communication
scale, more subjects rated the backgrounds highly annoy-
ing when they contained speech.

At levels outside the 75 - 85 dB range the effects of
instructions were not as great. In the analysis of
the data with no speech, the increase was 0 percent for
levels below 75 dB and 3 percent for levels above 85 dB.
Similarly, for tests where speech was present, the average
annoyance increase due to instructions was 6 percent for
levels below 75 dB and 5 percent for levels above 85 dB.

DISCUSSION

Speech Intelligibility

The Articulation Indices and percent correct results for
the data of the three speech intelligibility tests were
compared in Figure 10. This graph illustrates the
difference between the tests themselves and how they
related to prior research conducted with Modified Rhyme
Tests (Ref. 9) and PB words.

The most obvious difference was between the 'closed set'
test design (exemplified by the Tri-Rhyme Test) and the
'open set' design (such as the SPIN test and PB words).
Undoubtedly the higher percent correct for the Tri-Rhyme

test was due to a limited possibility of answers. That is, the subject could choose from a group of 6 words and circle the word he thought he heard and obtain 17 percent correct by chance alone. In an 'open set' design, the test subject has to <u>write</u> the word he thought he heard. This allowed an unlimited choice, especially if the carrier sentence was not contextually related to the correct answer.

While the results from this study closely approximated earlier findings, there were noticeable differences from the two psychometric curves plotted in Figure 10. These differences can be explained in terms of modification in test design and presentation.

The major change in test presentation was that for this study the test subjects received no exposure to the word lists prior to taking the actual test. This lack of familiarity with the possible answers probably accounted for the lower percent correct scores for PB words as noted for the data in Figure 10.

The Tri-Rhyme test results paralleled the trend of the psychometric curve (Figure 10) which described the results for the Modified Rhyme Test (Ref. 9). The overall percent correct, however, was lower for the same AI results. The difference in the results could be attributed to a difference in the test design. For the Tri-Rhyme test, the test subjects had to identify three words (one from each of three groups containing six words). In the Modified Rhyme Test, the subject was required only to

identify one word at a time out of six possibilities.
Thus, an increase in task difficulty could account for
the decrease in performance.

In addition, the Articulation Indices for the PB words
were lower than the results for the SPIN or Tri-Rhyme
Test, even though the speech to noise ratio was slightly
better. This is because AI, which is based on the
speech to noise ratio for certain critical one-third
octave bands, shows the effect of the narrator's word
articulation on speech intelligibility. An analysis of
the narrator's speech spectrum (Figure 7) used in the
PB test revealed higher sound pressure levels at the low
frequencies where the AI weighting factors were less in-
fluential.

Speech Intelligibility and Annoyance

The analysis of the annoyance data showed (most notably
in Figures 14, 15, and 16) that the question directed
to communication annoyance elicited a greater percentage
of highly annoyed responses. Thus, the communication
annoyance ratings were used as a more sensitive measure
of people's perception of an acceptable background in
an environment where conversation would take place. It
therefore appeared worthwhile to re-focus the data analysis
in terms of the communication annoyance instructions.
However, comparisons were made to the results obtained
from the general annoyance instructions when relevant.

Figure 17 illustrates the effect of speech intelligibility
on judged annoyance using the communication instructions.

A third dimension was added to this graph to show the
effect of high background levels. The points were coded
to indicate which background noises were heard at levels
above (open symbols) and below (closed symbols) 85 dB.
For the stimuli presented at levels of 85 dB and above,
all of the responses were above 70 percent highly
annoyed. It was also noted that none of the responses
exceeded 80 percent correct on the speech intelligibility
tests. However, for stimuli with levels below 85 dB
only 28 percent of the responses were above 70 percent
on the annoyance axis. There was also a comparable in-
crease in the percent of responses falling above 80 percent
correct.

The regression lines in Figure 17 were calculated to
explore the relationship between speech intelligibility
and communication-annoyance. The solid regression line
represents the relationship for *all* of the speech data.
The resulting coefficient (r = -.74) was compared to the
stronger relationship (r = -.85 for the broken regression
line) derived from an analysis of the same data without
the high level stimuli.

Partial correlations were calculated to further examine
the interdependency of the three variables: speech intelli-
gibility (measured in percent correct), background level,
and annoyance in a communication environment. Using the
Tri-Rhyme results, the partial correlation between per-
ceived annoyance and speech intelligibility with the
ambient level held constant was -.79.

The partial correlation between annoyance and background
level with speech intelligibility held constant was .91.

Thus, while there was a significant relationship between annoyance and speech intelligibility, a greater impact on judged annoyance was made by the changes in background level. For the higher background levels, as shown in Figure 17, the high intelligibility scores seemed to play a subordinate role to level in influencing the test subjects' annoyance ratings.

Annoyance

Figures 18 and 19 both contain the same data but indicate different data groupings. They differ from Figure 13 only in that the percent highly annoyed was based upon communication instructions rather than general annoyance instructions. A comparison of the correlation coefficients for all the data showed that there was more association with background level for general annoyance instructions (Figure 13) ($r = .85$) than (Figure 18) for communication annoyance instructions ($r = .75$). Nevertheless, the communication-annoyance data were used because the results appeared to be a more sensitive measure of perceived annoyance.

The same data which appears in Figure 18 were plotted in Figure 19, but with additional analyses of the speech intelligibility results. Three regression lines were calculated to determine the relationships of speech intelligibility (as measured by percent correct) to annoyance and background level. The data were divided into three groups based upon the percentage of correct answers achieved over all of the speech intelligibility tests. Group 1 was 0-40% correct response with a correlation coefficient of $r = .58$,

Group 2 was 40-70% correct response with r = .90, and Group 3 was 70-100% correct response with r = .96.

An examination of percent highly annoyed to speech intelligibility for Group 1 shows that 100 percent of the responses were above 70 percent highly annoyed. The results for Group 2, where subjects achieved between 40 and 70% correct on the speech intelligibility tests, yielded 58 percent of these responses above 70 percent highly annoyed. Group 3 which achieved between 70 and 100% correct had only 20 percent of the responses ab ove 70 percent highly annoyed. Thus as speech intelligibility increased, there was a correlative decrease in perceived annoyance.

The effect of background level on annoyance for a communication environment was also explored. The average background level for stimuli used in Group 1 was 87 dB and the average percent highly annoyed was 93 percent. This was compared to Group 2 with an average background level of 84 dB and 74 percent highly annoyed; and Group 3 with an average ambient level of 79 dB but only 37 percent highly annoyed. There was only an 8 dB difference between the average background levels of Group 1 and 3, but the average percent highly annoyed differed by 56 percent. While this indicated a significant relationship between level and annoyance, the interaction of speech intelligibility partially contributed to the high annoyance ratings.

The average percent correct for speech intelligibility for Group 1 was 19 percent and for Group 2 and 3 it was 62 percent and 81 percent respectively. Again supporting the

previous finding that people's rating of the background level is markedly influenced by the adequacy of the speech communication.

The orderly progression of the annoyance data when grouped according to degrees of intelligibility (Figure 19) indicated the pronounced effect intelligibility had on annoyance judgments of aircraft interior noise. Similar results were also found for the general annoyance ratings. Since speech communication is a common and important occurrence in aircraft, it is vital that intelligibility as well as level be considered in determining appropriate environments inside aircraft.

CONCLUSIONS

1.   Annoyance of aircraft interior noise depends primarily upon level. Speech intelligibility also influences annoyance judgments, especially at levels below 85 dB.

2.   A greater percentage of people rated the background noise highly annoying when instructed to consider it as a speech communication environment, then when asked to rate the noise quality alone.

3.   Results for the speech intelligibility tests in aircraft interior background noise may be approximated using the Articulation Index procedure. However, direct application of AI results to the standard curves would result in over estimation of the speech intelligibility.

4.   The type of speech intelligibility test used can greatly influence the results for the same Articulation Index calculation.

FIGURES

LIST OF FIGURES

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FIGURE 1. GENERAL AVIATION AIRCRAFT INTERIOR NOISE SPECTRA

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FIGURE 2. NARROW BODY AIRCRAFT INTERIOR NOISE SPECTRA

FIGURE 3. WIDE BODY AIRCRAFT INTERIOR NOISE SPECTRA
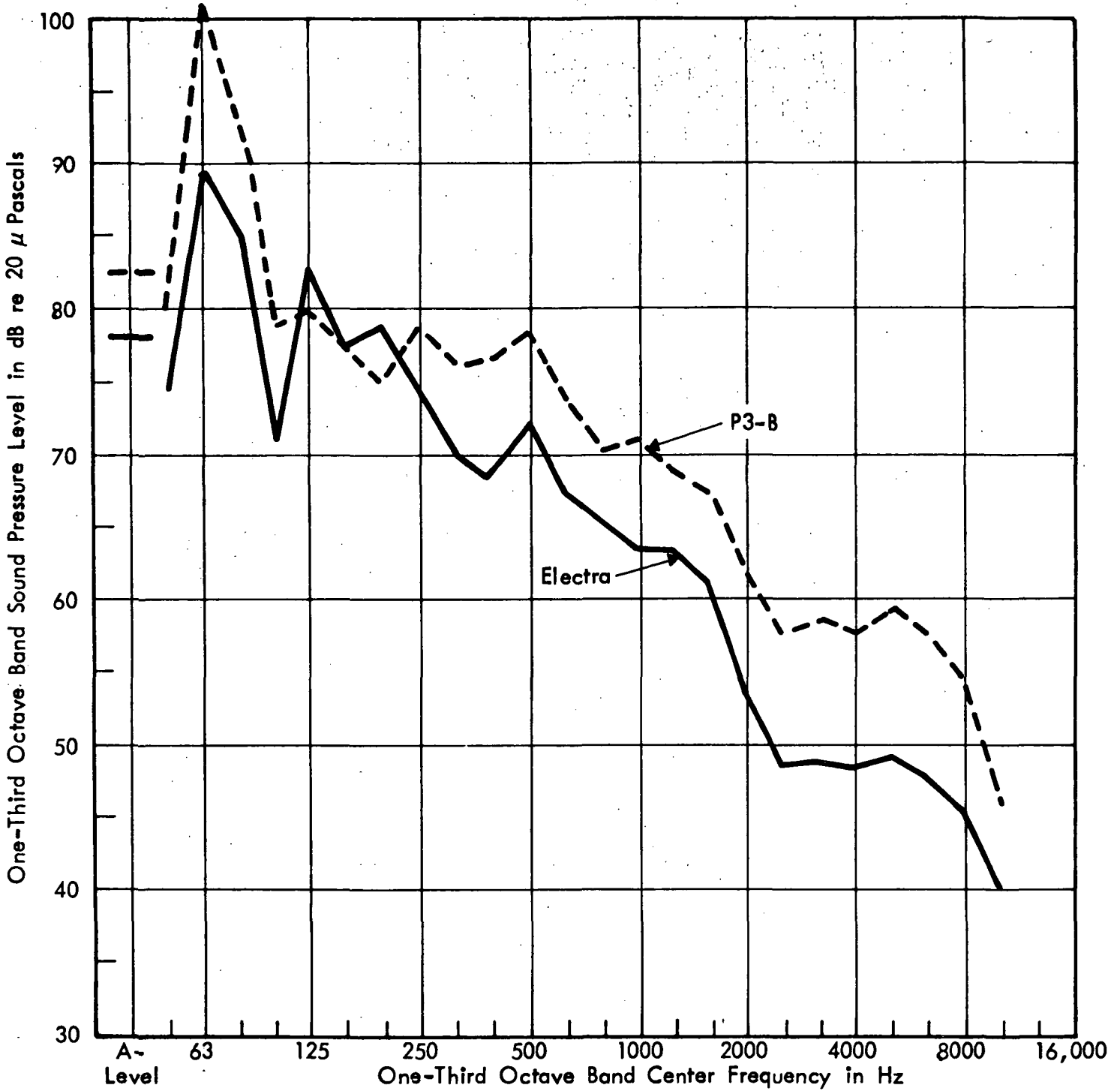
FIGURE 4. TURBO-PROP AIRCRAFT INTERIOR NOISE SPECTRA

24
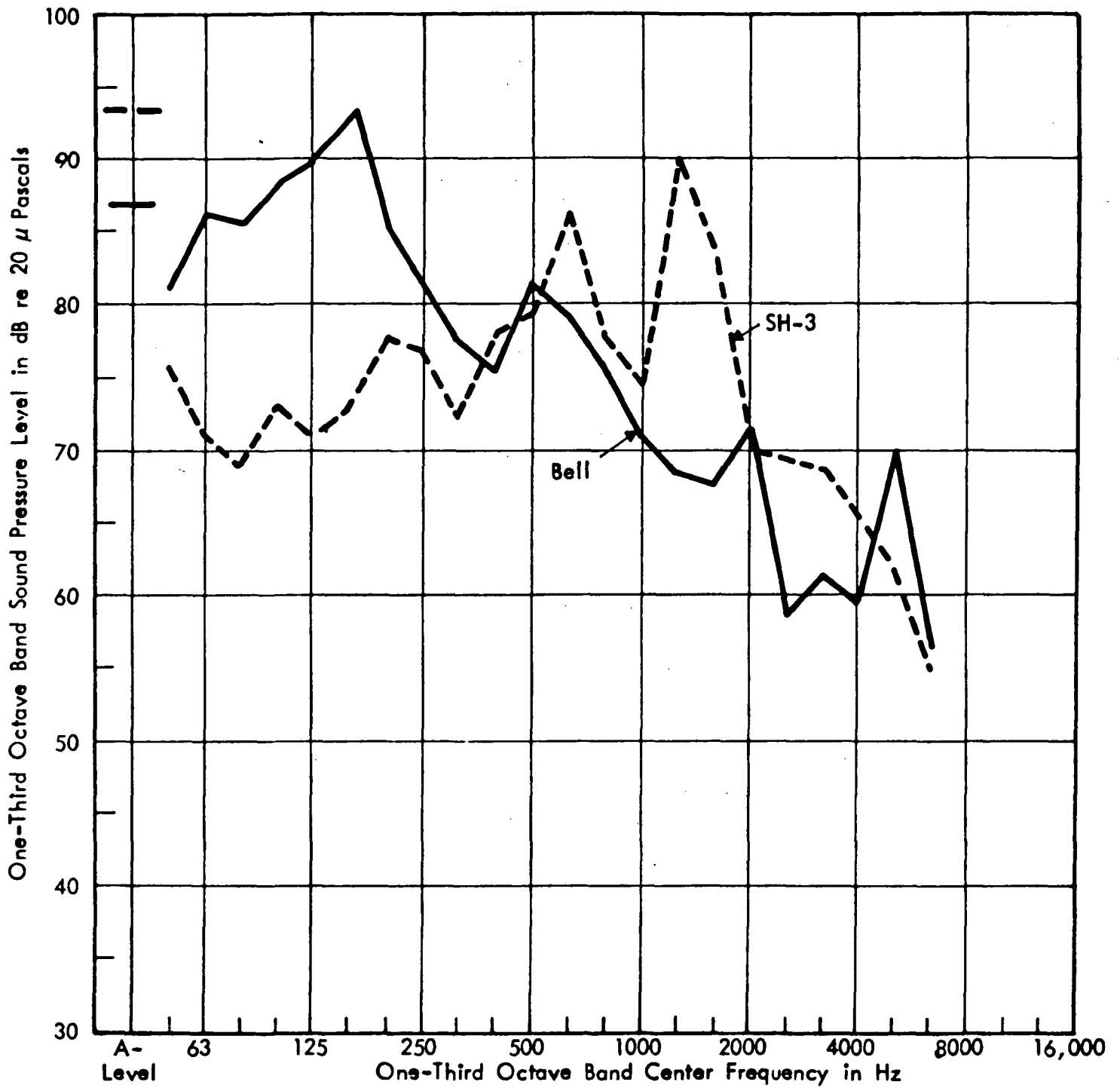
FIGURE 5. HELICOPTER INTERIOR NOISE SPECTRA
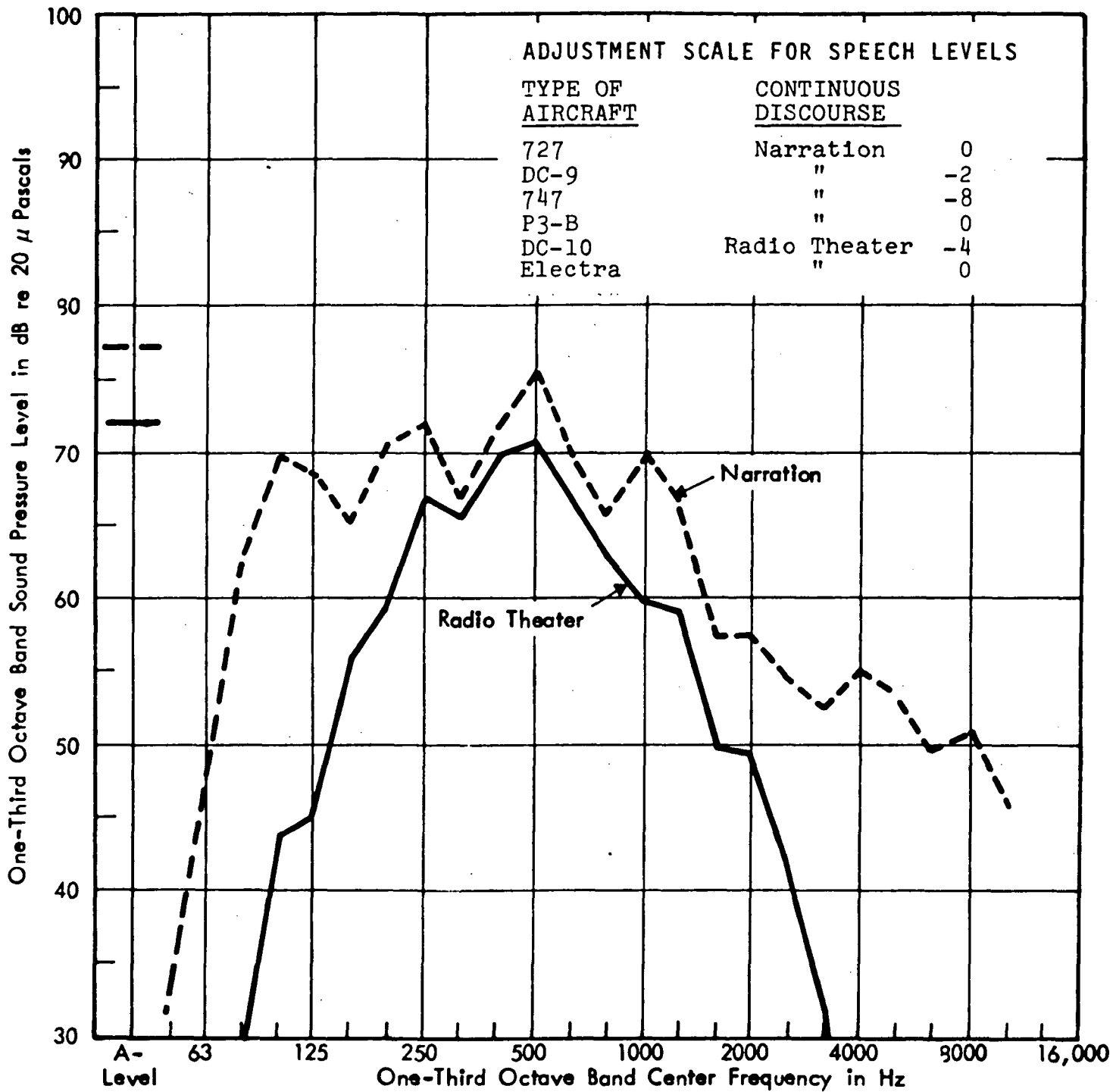
FIGURE 6.   SPEECH SPECTRA FOR SPEECH INTELLIGIBILITY TESTS -
CONTINUOUS DISCOURSE

SPEECH INTELLIGIBILITY TESTS

TYPE OF AIRCRAFT	TRI-RHYME	SPIN	PB WORDS
Rockwell	+7, +2	+7	
Beechcraft	+8, +3	+8	
727	0.0, -5	0	0
DC-9	-2, -7	-1	-2
747	-8	-7	
DC-10	-6	-5	
Electra	-2, -7	-2	
P3-B	+1, -4	+1	
Bell Heli	+3	+4	+4
SH-3	+7	+8	+8
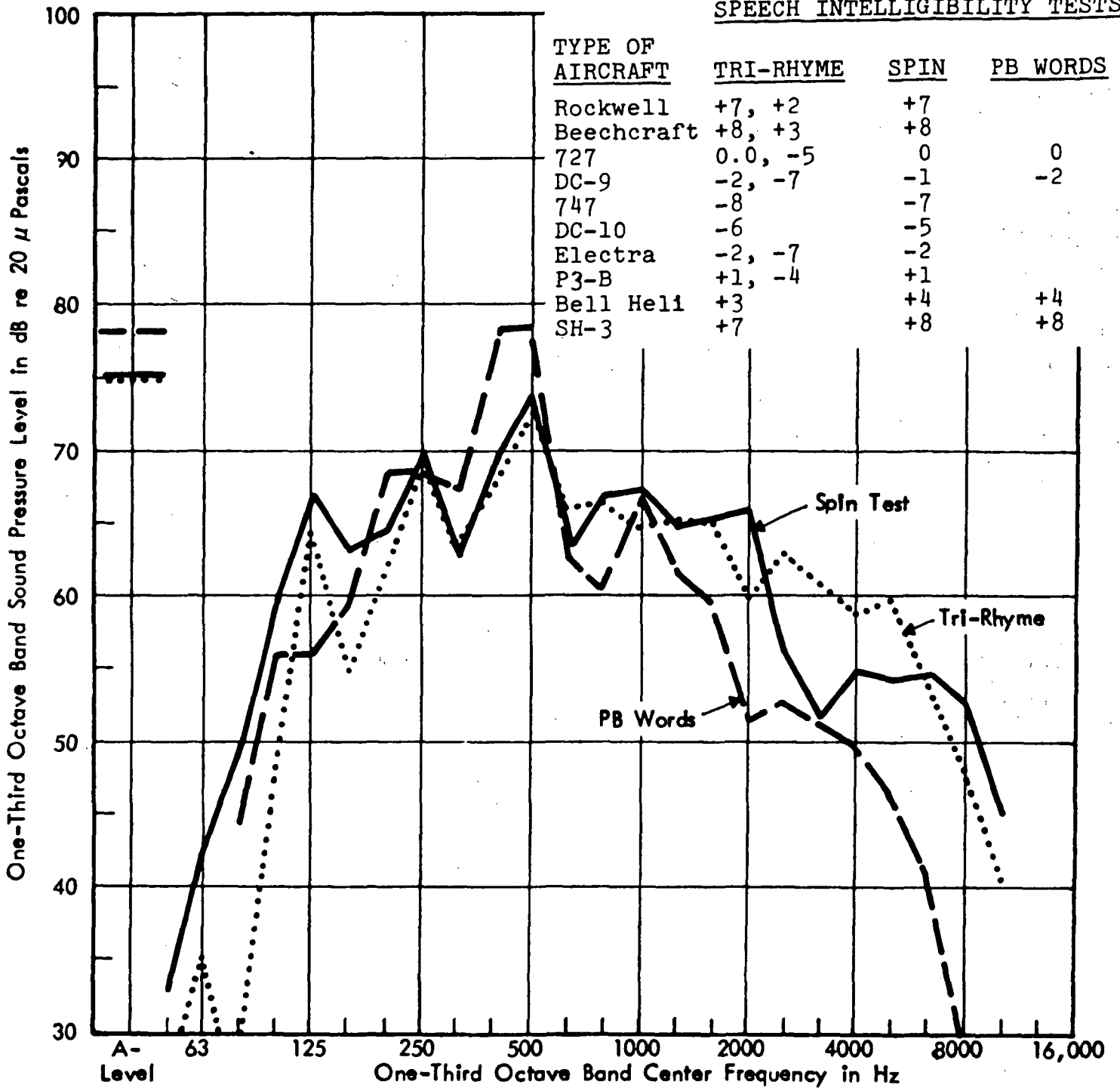
FIGURE 7.   SPEECH SPECTRA FOR SPEECH INTELLIGIBILITY TESTS
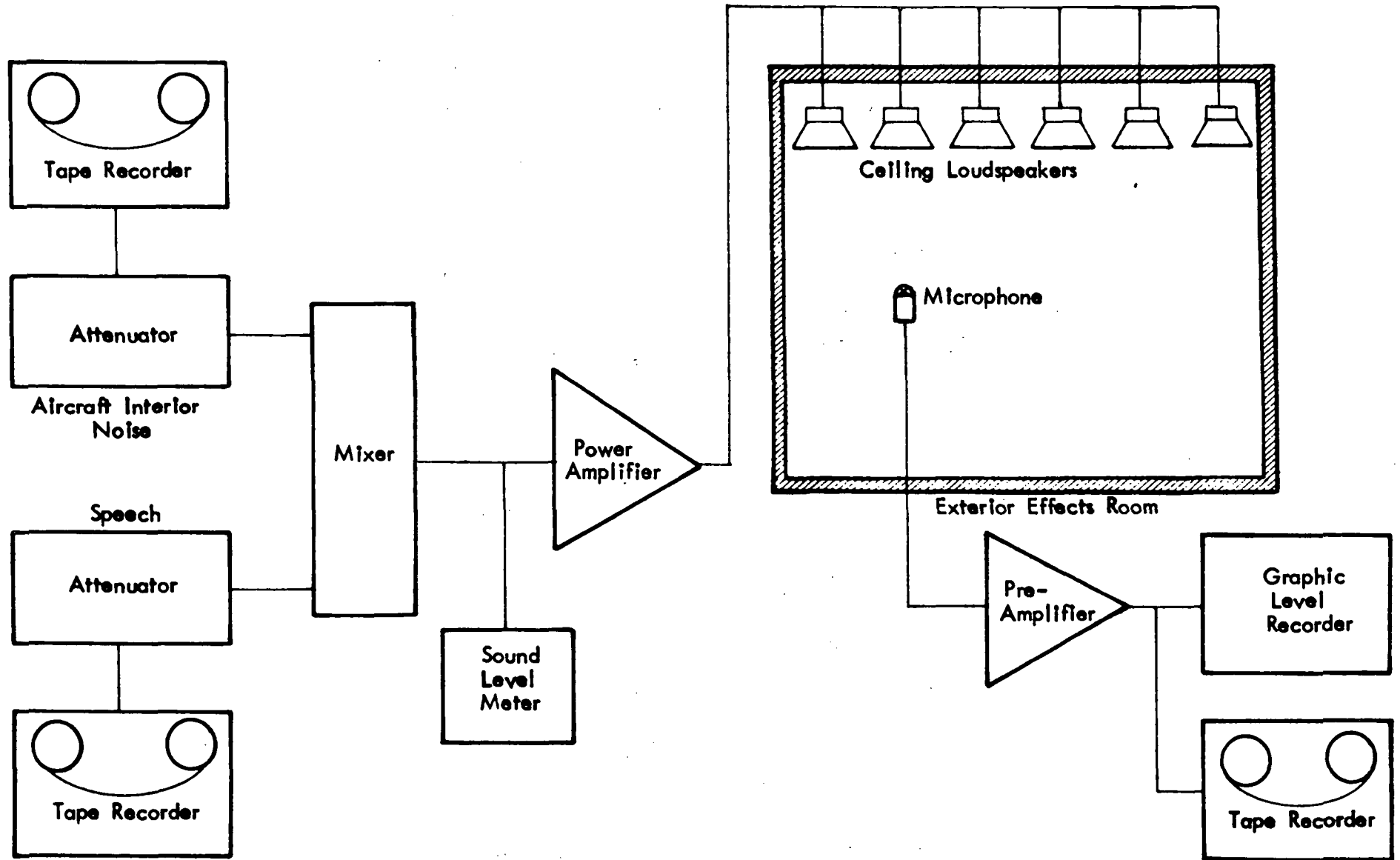
FIGURE 8. BLOCK DIAGRAM OF EQUIPMENT FOR AIRCRAFT
INTERIOR NOISE ASSESSMENT

FIGURE 9. SUBJECTS SEATED IN EXTERIOR EFFECTS ROOM
NASA, LANGLEY
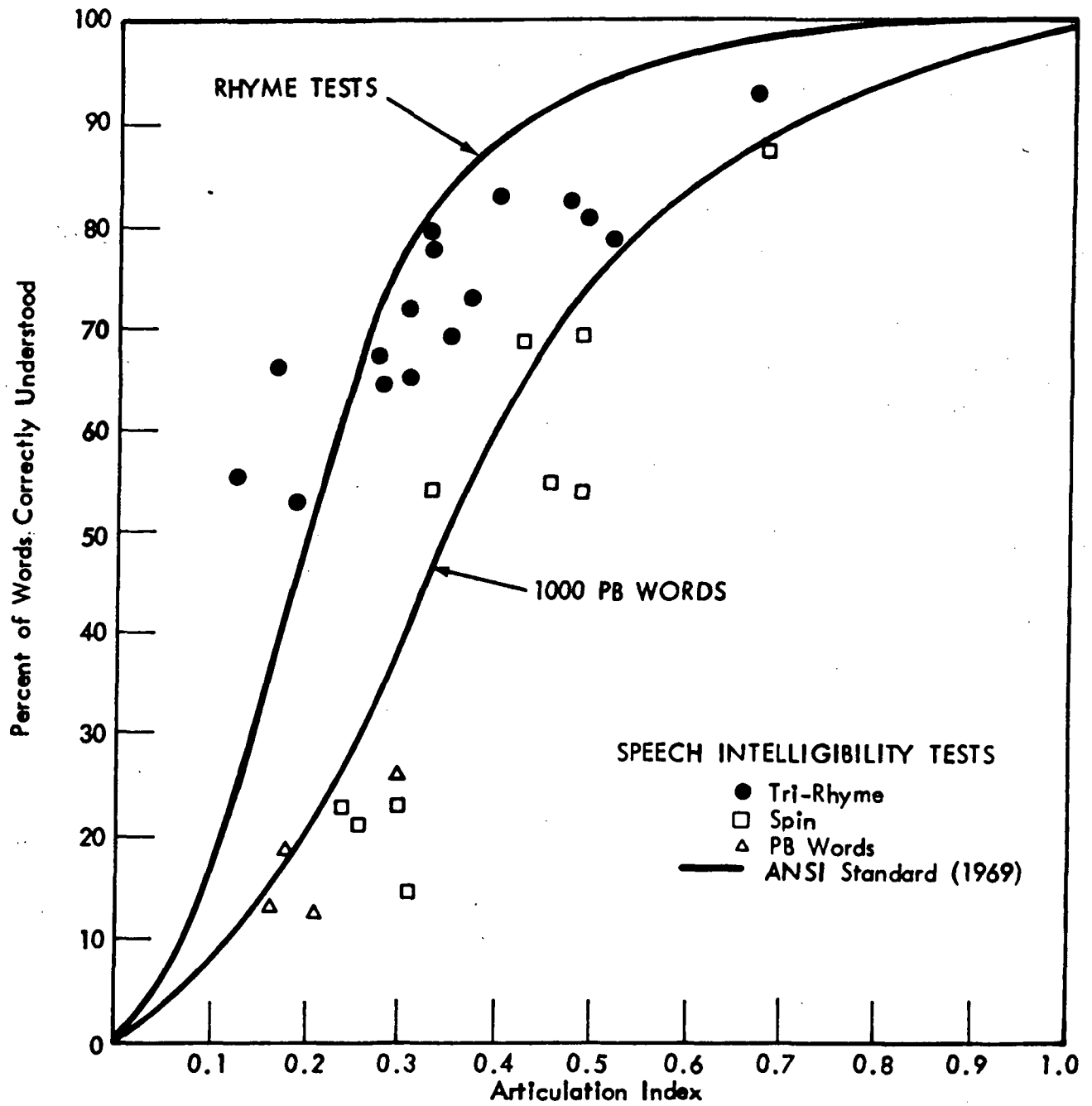
FIGURE 10. RESULTS OF SPEECH INTELLIGIBILITY TESTS WITH AIRCRAFT INTERIOR NOISE
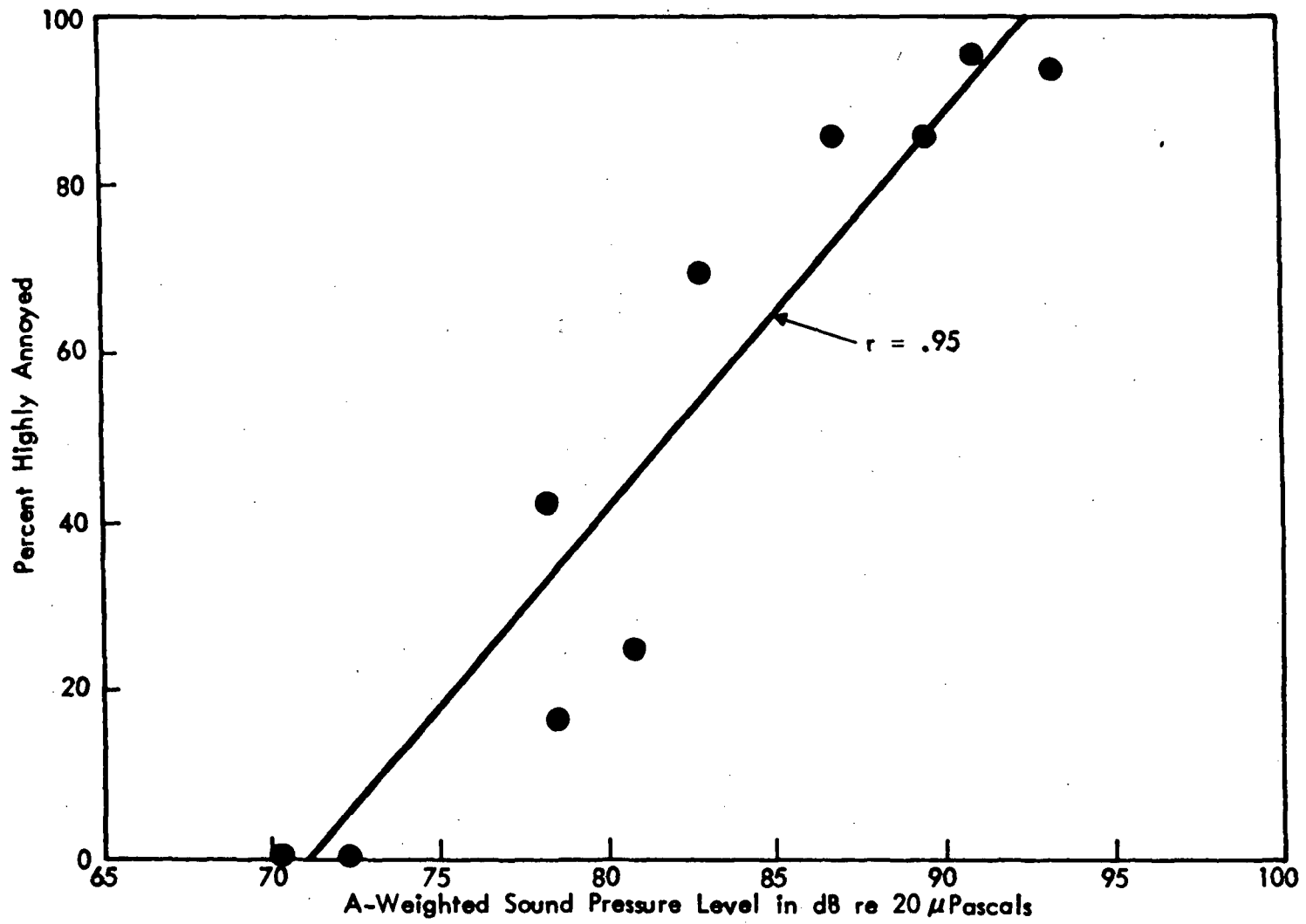
FIGURE 11.   GENERAL ANNOYANCE FOR VARIOUS AIRCRAFT INTERIOR NOISES
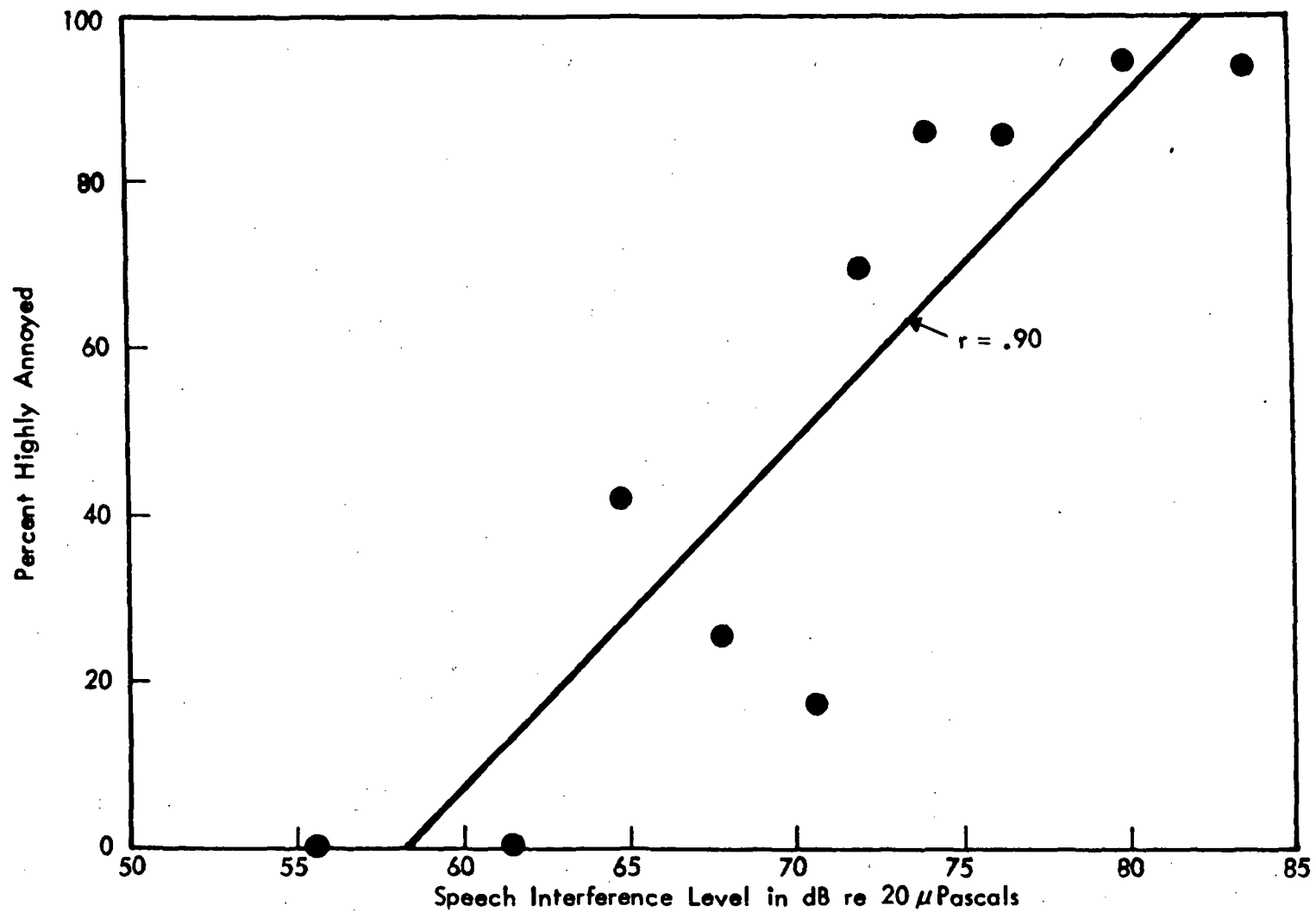
FIGURE 12. GENERAL ANNOYANCE FOR SPEECH INTERFERENCE
LEVELS OF VARIOUS AIRCRAFT INTERIOR NOISES
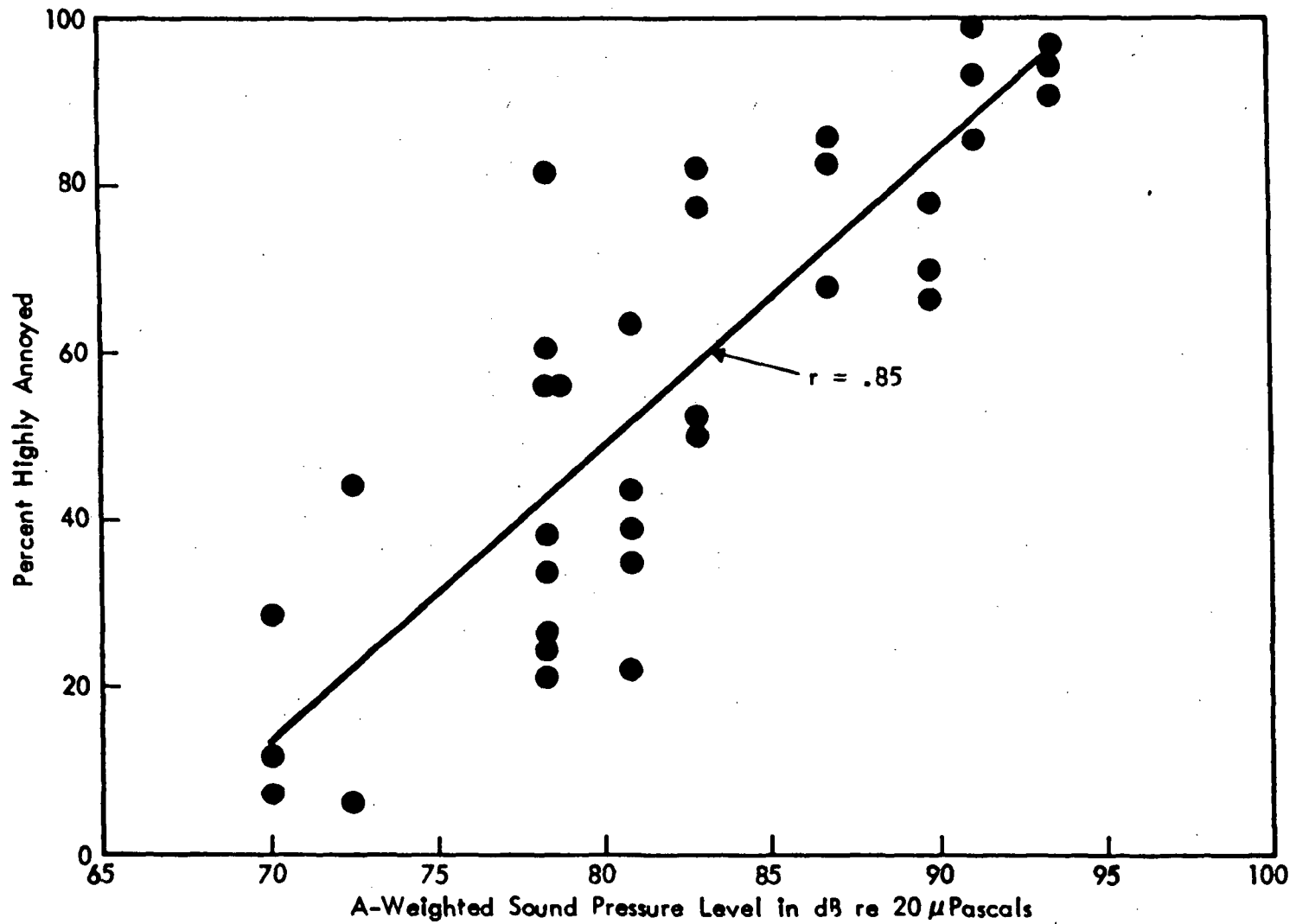
FIGURE 13.   GENERAL ANNOYANCE FOR VARIOUS AIRCRAFT INTERIOR
NOISES PRESENTED WITH SPEECH
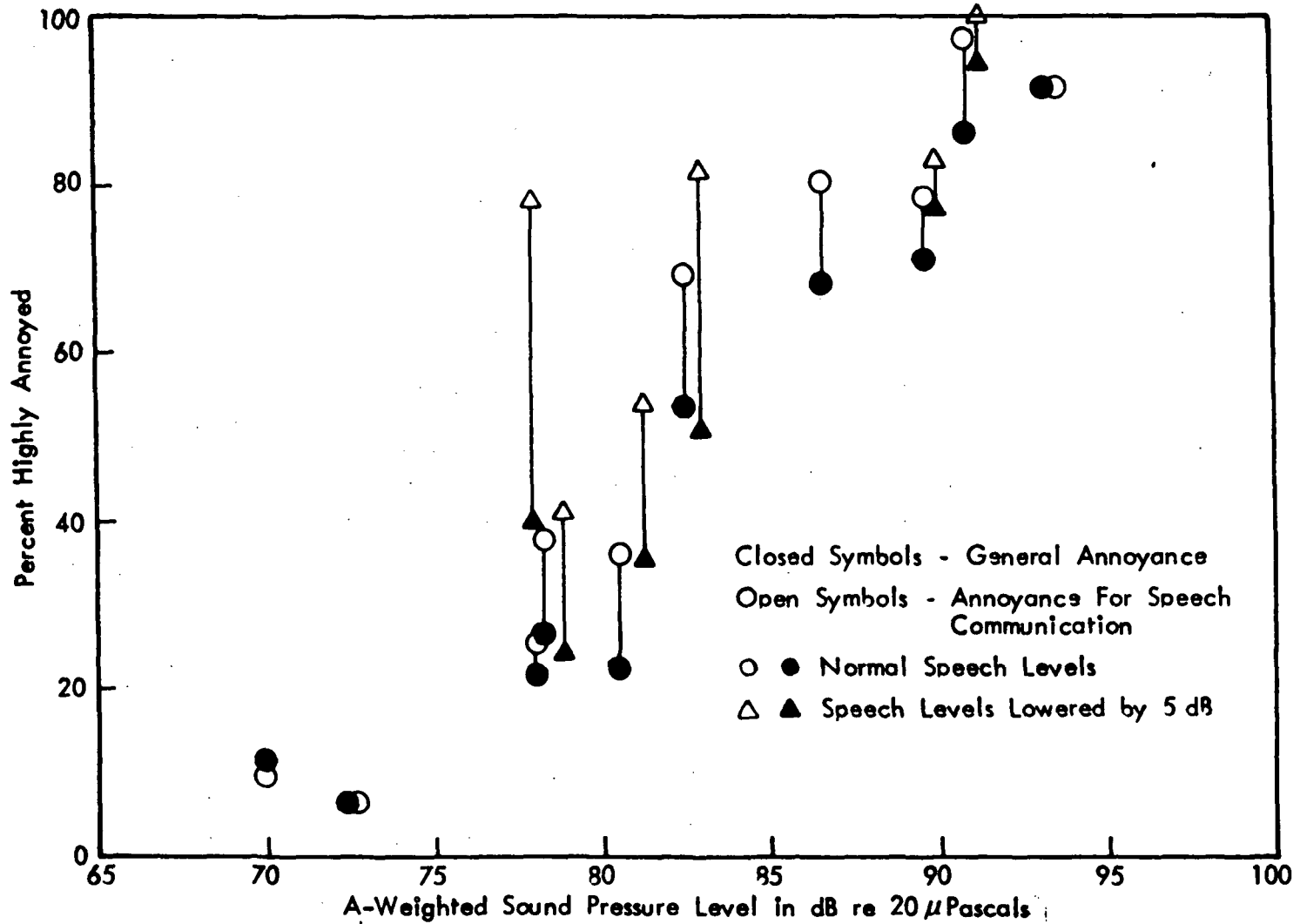
FIGURE 14. GENERAL ANNOYANCE AND COMMUNICATION ANNOYANCE FOR VARIOUS BACKGROUNDS DURING PRESENTATION OF TRI-RHYME INTELLIGIBILITY TESTS
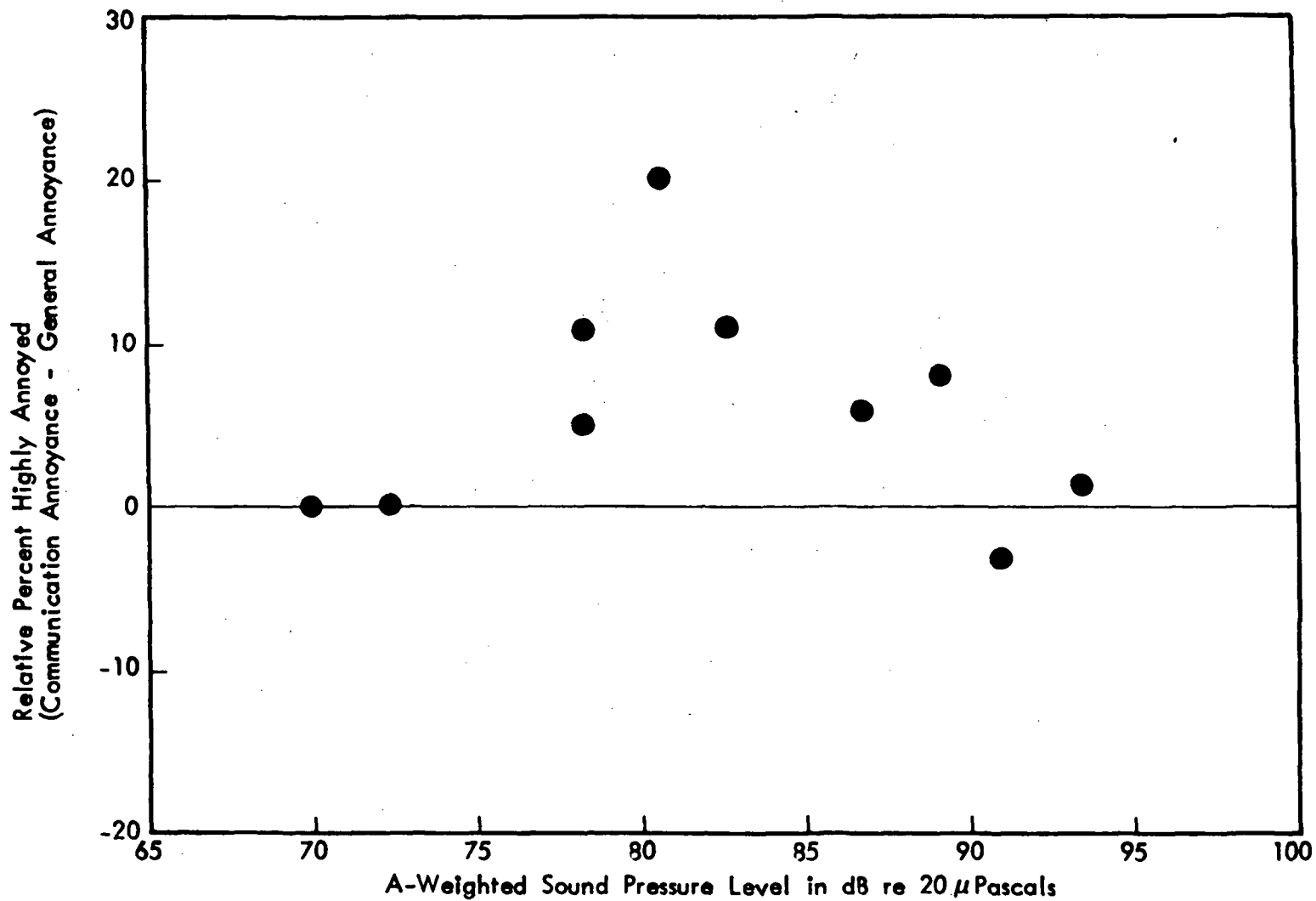
FIGURE 15. INCREASED ANNOYANCE ASSUMING A COMMUNICATION
ENVIRONMENT FOR VARIOUS AIRCRAFT INTERIOR NOISES
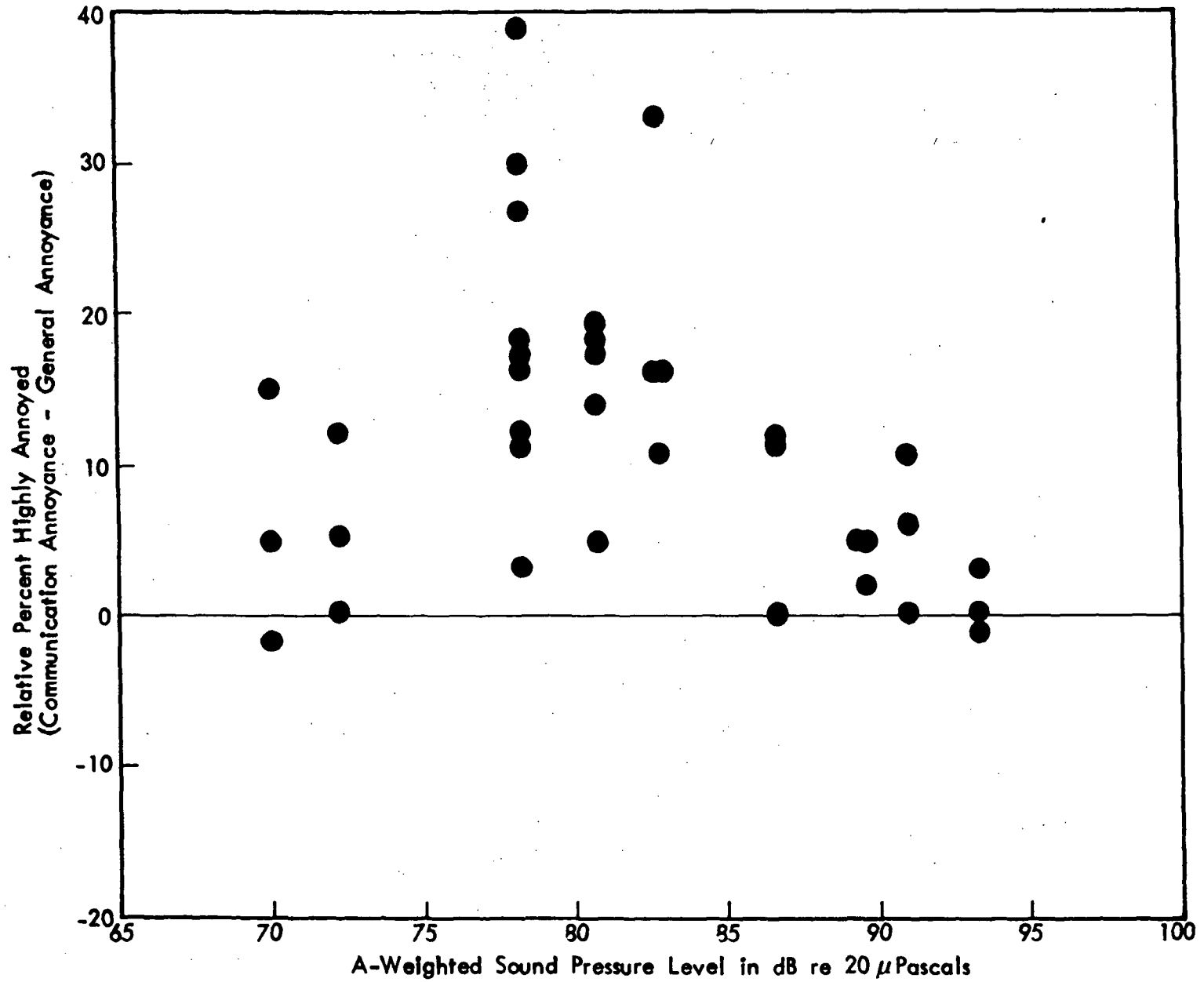
FIGURE 16. INCREASED ANNOYANCE ASSUMING A COMMUNICATION ENVIRONMENT FOR VARIOUS AIRCRAFT INTERIOR NOISES PRESENTED WITH SPEECH
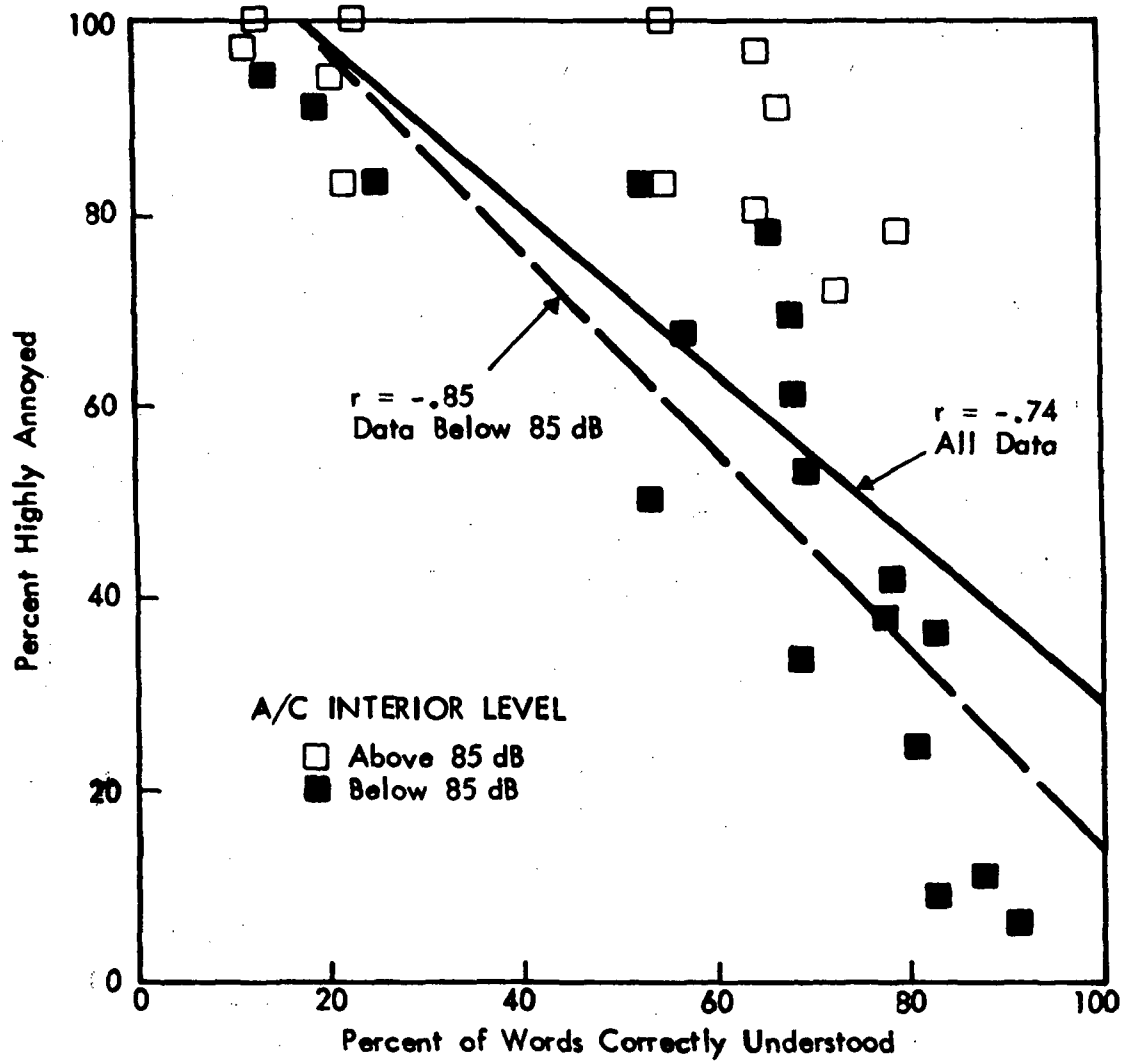
FIGURE 17. COMMUNICATION ANNOYANCE RESULTS OF
VARIOUS SPEECH INTELLIGIBILITY TESTS
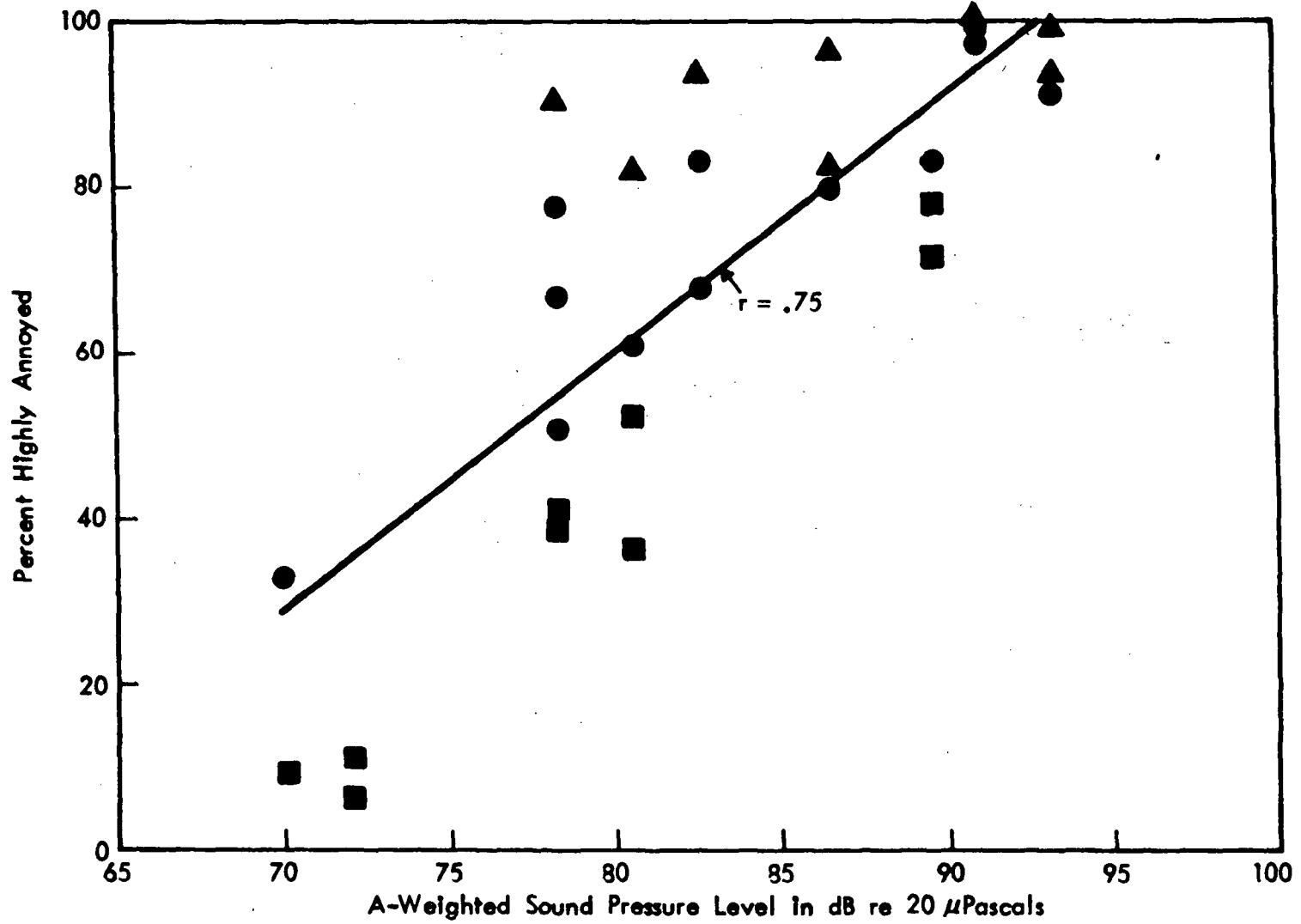
FIGURE 18. COMMUNICATION ANNOYANCE FOR VARIOUS AIRCRAFT INTERIOR NOISES PRESENTED WITH SPEECH
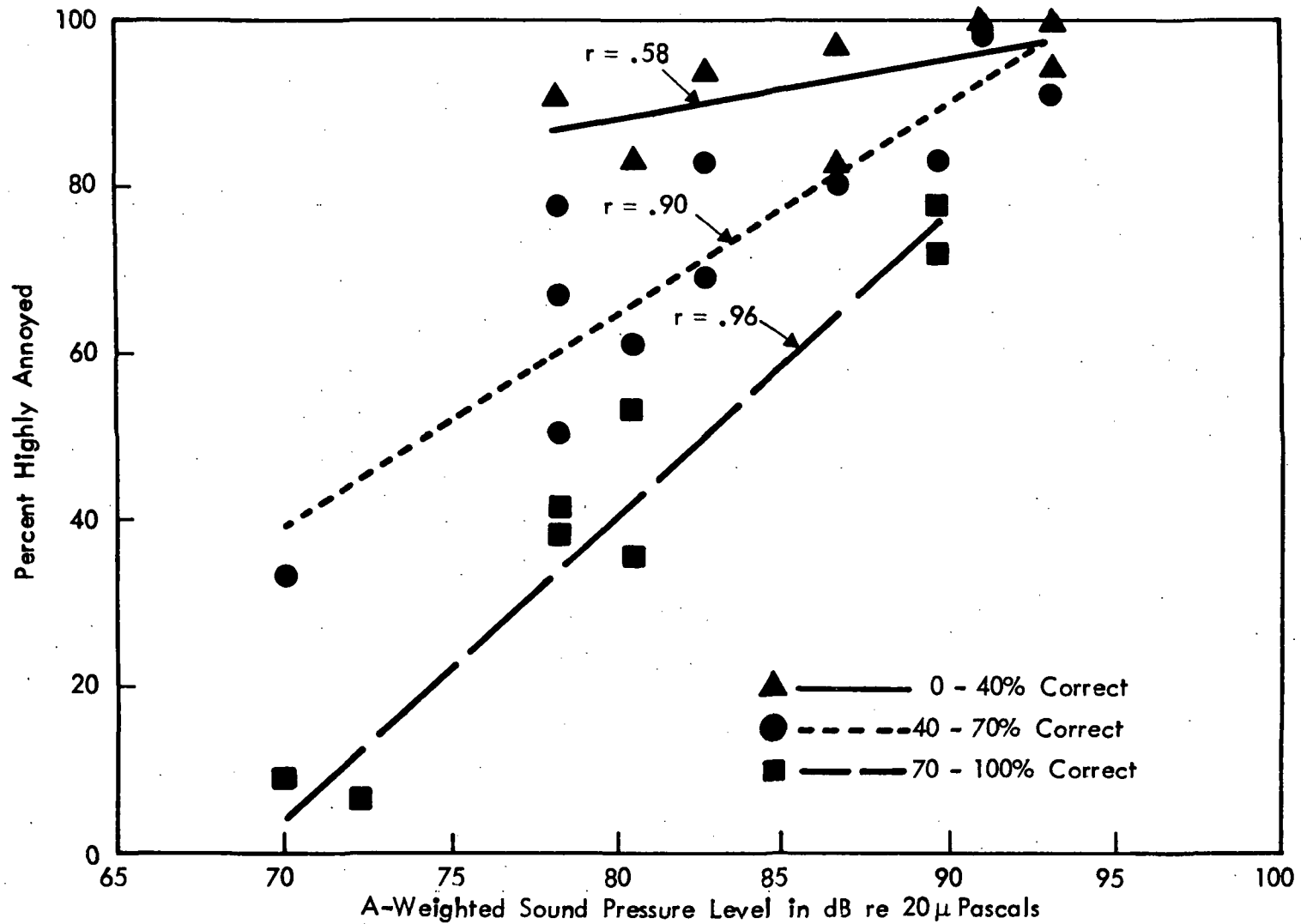
FIGURE 19. COMMUNICATION ANNOYANCE FOR VARIOUS AIRCRAFT INTERIOR NOISES PRESENTED WITH SPEECH AT VARIOUS INTELLIGIBILITIES
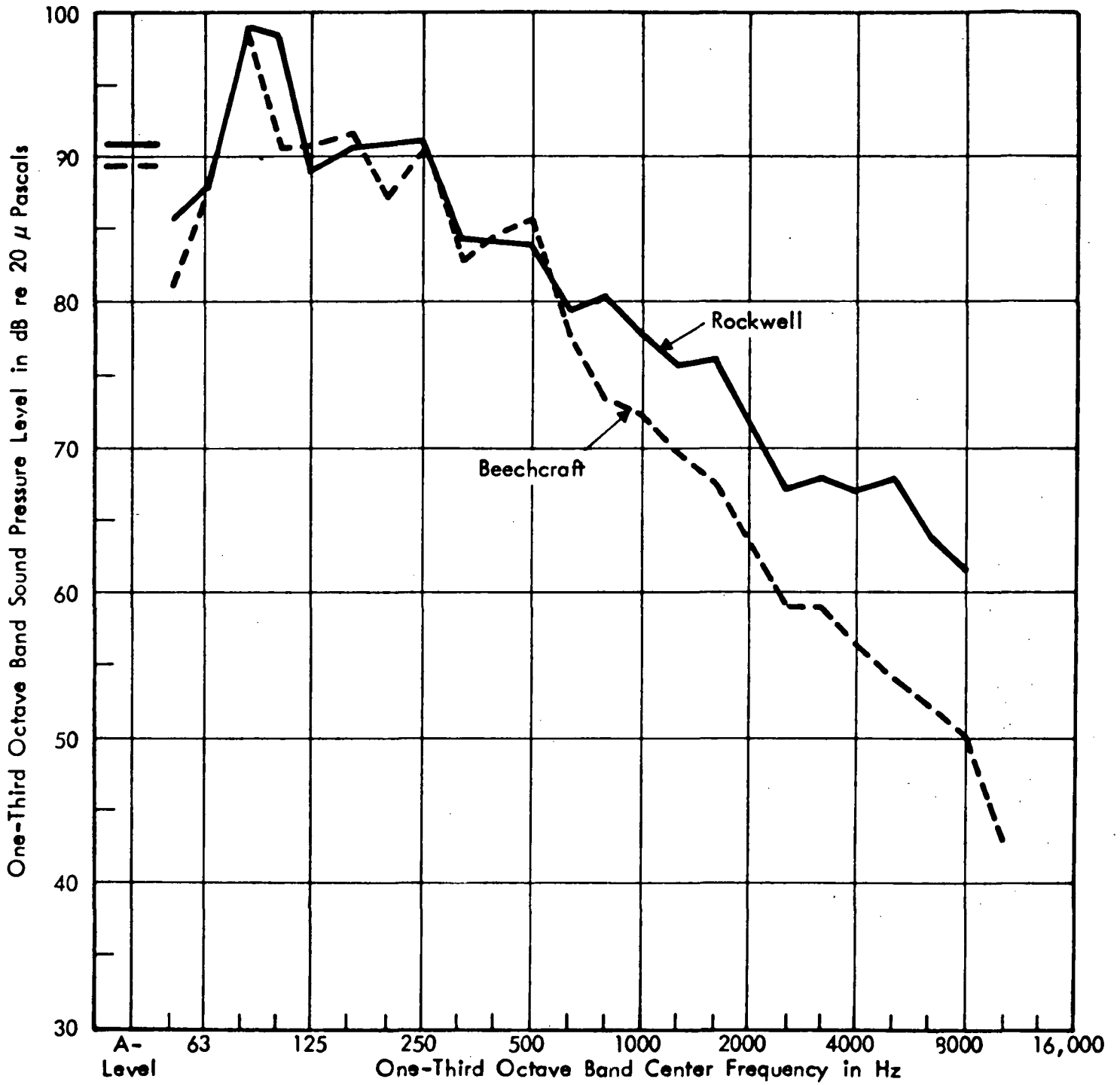
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APPENDIX

TEST INSTRUCTIONS

SPEECH INTELLIGIBILITY TESTS

Subject No. _____ Group No. _____ Noise No. _____

Name _____ (S) _____ (N) _____

I. RATING RESPONSE SHEET

After you hear each noise, please rate its *quality* on the scale below. Remember to imagine that you are hearing this background noise while on an airplane when you make your rating.

The background noise was

Not at all Annoying	0
Slightly Annoying	1
Moderately Annoying	2
Very Annoying	3
Extremely Annoying	4

(Circle the number that best corresponds to how you feel)

II. RATING RESPONSE SHEET

Now rate the annoyance of the *level* of the background noise. Remember to imagine that you are hearing this background noise while on an airplane. You should base your evaluation on whether you could communicate comfortably with the passenger sitting next to you while aboard an aircraft.

This background *level* for communicating with someone is

Not at all Annoying	0
Slightly Annoying	1
Moderately Annoying	2
Very Annoying	3
Extremely Annoying	4

(Circle the number that best corresponds to how you feel)

INSTRUCTIONS

You are about to listen to some words that you will hear
in a background noise. The words will be presented in
groups of 50; one word spoken every two seconds. The
background noise will be heard continuously throughout each
presentation. The words that you are listening for will
not always be of identical loudness each time you hear them.
Thus, sometimes you will be quite sure which word was spoken,
but at other times you may have considerable difficulty. You
should therefore listen carefully throughout the experimental
session, which will last approximately one-half hour.

Your TASK will be to write down the word that you thought you
heard. The answer sheet in front of you is divided into two
columns, each column corresponding to a word list. Start each
word list at the top of a new column. If you cannot immediately
identify the word when it is presented, draw a line through the
corresponding line number and go on. However, if you recall
the correct word later you may go back and write it in the
appropriate space. When the word list is finished the last
word presented should correspond with line number 50.

After you have completed the task, follow the instructions
on the Rating Response sheet in front of you and evaluate
whether you think the background noise was *annoying*.

LIST __1A__   LIST __2A__

	LIST 1A		LIST 2A
1	an	1	your (yore)
2	yard	2	been (bin)
3	carve	3	way (weigh)
4	us	4	chest
5	day	5	then
6	toe	6	ease
7	felt	7	smart
8	stove	8	gave
9	hunt	9	pew
10	ran	10	ice
11	knees	11	odd
12	not (knot)	12	knee
13	mew	13	move
14	low	14	new
15	owl	15	jaw
16	it	16	one (won)
17	she	17	hit
18	high	18	send
19	there (their)	19	else
20	earn (urn)	20	tear (tare)
21	twins	21	does
22	could	22	too (two, to)
23	what	23	cap
24	bathe	24	with
25	ace	25	air (heir)
26	you (ewe)	26	and
27	as	27	young
28	wet	28	cars
29	chew	29	tree
30	see (sea)	30	dumb
31	deaf	31	that
32	them	32	die (dye)
33	give	33	show
34	true	34	hurt
35	isle (aisle)	35	own
36	or (oar)	36	key
37	law	37	oak
38	me	38	new (knew)
39	none (nun)	39	live
40	jam	40	off
41	poor	41	ill
42	him	42	rooms
43	skin	43	ham
44	east	44	star
45	thing	45	eat
46	dad	46	thin
47	up	47	flat
48	bells	48	well
49	wire	49	by (buy)
50	ache	50	ail (ale)

Percent Correct _____   Percent Correct _____

LIST __3A__   LIST __4A__

#	List 3A		#	List 4A	
1	bill		1	all	(awl)
2	add	(ad)	2	wood	(would)
3	west		3	at	
4	cute		4	where	
5	start		5	chin	
6	ears		6	they	
7	tan		7	dolls	
8	nest		8	so	(sew)
9	say		9	nuts	
10	is		10	ought	(aught)
11	out		11	in	(inn)
12	lie	(lye)	12	net	
13	three		13	my	
14	oil		14	leave	
15	king		15	of	
16	pie		16	hang	
17	he		17	save	
18	smooth		18	ear	
19	farm		19	tea	(tee)
20	this		20	cook	
21	done	(dun)	21	tin	
22	use	(yews)	22	bread	(bred)
23	camp		23	why	
24	wool		24	arm	
25	are		25	yet	
26	aim		26	darn	
27	when		27	art	
28	book		28	will	
29	tie		29	dust	
30	do		30	toy	
31	hand		31	aid	
32	end		32	than	
33	shove		33	eyes	(ayes)
34	have		34	shoe	
35	owes		35	his	
36	jar		36	our	
37	no	(know)	37	men	
38	may		38	near	
39	knit		39	few	
40	on		40	jump	
41	if		41	pale	(pail)
42	raw		42	go	
43	glove		43	stiff	
44	ten		44	can	
45	dull		45	through	(thru)
46	though		46	clothes	
47	chair		47	who	
48	we		48	bee	(be)
49	ate	(eight)	49	yes	
50	year		50	am	

Percent Correct _____   Percent Correct _____

INSTRUCTIONS

You will hear a set of English sentences. Your job is to listen carefully to each sentence and to write down just the last word of each one. Your answer sheet has numbered blank spaces, one for each of the sentences. Before each sentence you will hear the number of the answer blank you should use for your answer. Pay close attention to this number because if you put your answer in the wrong blank you will not get credit for it. You will have plenty of time to write in the last word of one sentence before the next sentence starts, so write legibly, check your spelling, and don't rush. The last word of each sentence will be a common word that you have heard many times. You will probably find it easier to understand the last words of some sentences than of others. We encourage you to guess. There is nothing at all wrong with putting in a word that you are not sure of. Please write down any word that you think has a chance of being right. Before we start the real test you will have a chance to ask any questions you wish. Do you have any questions before the practice?

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282H>	1. THE WATCHDOG GAVE A WARNING GROWL.	1.	GROWL
464H>	2. SHE MADE THE BED WITH CLEAN SHEETS.	2.	SHEETS
202L>	3. THE OLD MAN DISCUSSED THE DIVE.	3.	DIVE
519L>	4. BOB HEARD PAUL CALLED ABOUT THE STRIPS.	4.	STRIPS
349L>	5. I SHOULD HAVE CONSIDERED THE MAP.	5.	MAP
508H>	6. THE OLD TRAIN WAS POWERED BY STEAM.	6.	STEAM
373H>	7. HE CAUGHT THE FISH IN HIS NET.	7.	NET
441L>	8. MISS BROWN SHOULDN'T DISCUSS THE SAND.	8.	SAND
206H>	9. CLOSE THE WINDOW TO STOP THE DRAFT.	9.	DRAFT
456H>	10. MY T.V. HAS A TWELVE-INCH SCREEN.	10.	SCREEN
297L>	11. THEY MIGHT HAVE CONSIDERED THE HIVE.	11.	HIVE
193L>	12. DAVID HAS DISCUSSED THE DENT.	12.	DENT
513H>	13. THE SANDAL HAS A BROKEN STRAP.	13.	STRAP
142H>	14. THE BOAT SAILED ALONG THE COAST.	14.	COAST
520H>	15. CROCODILES LIVE IN MUDDY SWAMPS.	15.	SWAMPS
167L>	16. HE CAN'T CONSIDER THE CRIB.	16.	CRIB
170H>	17. THE FARMER HARVESTED HIS CROP.	17.	CROP
58H>	18. ALL THE FLOWERS WERE IN BLOOM.	18.	BLOOM
324L>	19. I AM THINKING ABOUT THE KNIFE.	19.	KNIFE
305L>	20. DAVID DOES NOT DISCUSS THE HUG.	20.	HUG
108H>	21. SHE WORE A FEATHER IN HER CAP.	21.	CAP
164L>	22. WE'VE BEEN DISCUSSING THE CRATES.	22.	CRATES
204L>	23. MISS BLACK KNEW ABOUT THE DOLL.	23.	DOLL
231H>	24. THE ADMIRAL COMMANDS THE FLEET.	24.	FLEET
396L>	25. SHE COULDN'T DISCUSS THE PINE.	25.	PINE
331L>	26. MISS BLACK THOUGHT ABOUT THE LAP.	26.	LAP
369H>	27. THE BEER DRINKERS RAISED THEIR MUGS.	27.	MUGS
185H>	28. HE WAS HIT BY A POISONED DART.	28.	DART
564H>	29. THE BREAD WAS MADE FROM WHOLE WHEAT.	29.	WHEAT
381L>	30. MR. BLACK KNEW ABOUT THE PAD.	30.	PAD
558L>	31. YOU HEARD JANE CALLED ABOUT THE VAN.	31.	VAN
69H>	32. I MADE THE PHONE CALL FROM A BOOTH.	32.	BOOTH
103L>	33. TOM WANTS TO KNOW ABOUT THE CAKE.	33.	CAKE
65L>	34. SHE'S SPOKEN ABOUT THE BOMB.	34.	BOMB
444H>	35. THE CUT ON HIS KNEE FORMED A SCAB.	35.	SCAB
339L>	36. WE HEAR YOU CALLED ABOUT THE LOCK.	36.	LOCK
573L>	37. THE OLD MAN DISCUSSED THE YELL.	37.	YELL
478H>	38. HIS BOSS MADE HIM WORK LIKE A SLAVE.	38.	SLAVE
290H>	39. THE FARMER BALED THE HAY.	39.	HAY
550L>	40. THEY'RE GLAD WE HEARD ABOUT THE TRACK.	40.	TRACK
10H>	41. A TERMITE LOOKS LIKE AN ANT.	41.	ANT
506H>	42. AIR MAIL REQUIRES A SPECIAL STAMP.	42.	STAMP
500H>	43. FOOTBALL IS A DANGEROUS SPORT.	43.	SPORT
92L>	44. SUE WAS INTERESTED IN THE BRUISE.	44.	BRUISE
293L>	45. RUTH WILL CONSIDER THE HERD.	45.	HERD
258H>	46. WE SAW A FLOCK OF WILD GEESE.	46.	GEESE
263L>	47. THE GIRL TALKED ABOUT THE GIN.	47.	GIN
563L>	48. PAUL CAN'T DISCUSS THE WAX.	48.	WAX
484H>	49. DROP THE COIN THROUGH THE SLOT.	49.	SLOT
355L>	50. I HOPE PAUL ASKED ABOUT THE MATE.	50.	MATE

478L>	1.	YOU'RE GLAD THEY HEARD ABOUT THE SLAVE.	1.	SLAVE
520L>	2.	THE GIRL KNOWS ABOUT THE SWAMPS.	2.	SWAMPS
331H>	3.	HOLD THE BABY ON YOUR LAP.	3.	LAP
103H>	4.	FOR YOUR BIRTHDAY I BAKED A CAKE.	4.	CAKE
550H>	5.	THE RAILROAD TRAIN RAN OFF THE TRACK.	5.	TRACK
456L>	6.	THEY DID NOT DISCUSS THE SCREEN.	6.	SCREEN
513L>	7.	THEY WERE INTERESTED IN THE STRAP.	7.	STRAP
381H>	8.	TEAR OFF SOME PAPER FROM THE PAD.	8.	PAD
58L>	9.	I HAD A PROBLEM WITH THE BLOOM.	9.	BLOOM
369L>	10.	PETER SHOULD SPEAK ABOUT THE MUGS.	10.	MUGS
164H>	11.	THE FRUIT WAS SHIPPED IN WOODEN CRATES.	11.	CRATES
293H>	12.	THE RANCHER ROUNDED UP HIS HERD.	12.	HERD
10L>	13.	SHE WANTS TO SPEAK ABOUT THE ANT.	13.	ANT
464L>	14.	WE'RE DISCUSSING THE SHEETS.	14.	SHEETS
444L>	15.	THE BOY WOULD DISCUSS THE SCAB.	15.	SCAB
355H>	16.	THE LONELY BIRD SEARCHED FOR ITS MATE.	16.	MATE
500L>	17.	TOM COULD HAVE THOUGHT ABOUT THE SPORT.	17.	SPORT
258L>	18.	YOU'D BEEN CONSIDERING THE GEESE.	18.	GEESE
263H>	19.	THEY DRANK A WHOLE BOTTLE OF GIN.	19.	GIN
441H>	20.	ON THE BEACH WE PLAY IN THE SAND.	20.	SAND
231L>	21.	MR. BLACK CONSIDERED THE FLEET.	21.	FLEET
202H>	22.	THE AIRPLANE WENT INTO A DIVE.	22.	DIVE
349H>	23.	WE'RE LOST SO LET'S LOOK AT THE MAP.	23.	MAP
170L>	24.	I WANT TO KNOW ABOUT THE CROP.	24.	CROP
558H>	25.	HOUSEHOLD GOODS ARE MOVED IN A VAN.	25.	VAN
297H>	26.	THE HONEY BEES SWARMED ROUND THE HIVE.	26.	HIVE
206L>	27.	BETTY HAS TALKED ABOUT THE DRAFT.	27.	DRAFT
290L>	28.	TOM DISCUSSED THE HAY.	28.	HAY
506L>	29.	JANE WAS INTERESTED IN THE STAMP.	29.	STAMP
65H>	30.	THE AIRPLANE DROPPED A BOMB.	30.	BOMB
519H>	31.	CUT THE BACON INTO STRIPS.	31.	STRIPS
282L>	32.	I HAD NOT THOUGHT ABOUT THE GROWL.	32.	GROWL
573H>	33.	THE DROWNING MAN LET OUT A YELL.	33.	YELL
305H>	34.	I GAVE HER A KISS AND A HUG.	34.	HUG
373L>	35.	PAUL SHOULD KNOW ABOUT THE NET.	35.	NET
324H>	36.	I CUT MY FINGER WITH A KNIFE.	36.	KNIFE
563H>	37.	THE CANDLE FLAME MELTED THE WAX.	37.	WAX
69L>	38.	TOM HEARD JANE CALLED ABOUT THE BOOTH.	38.	BOOTH
564L>	39.	WE CAN'T CONSIDER THE WHEAT.	39.	WHEAT
339H>	40.	THIS KEY WON'T FIT IN THE LOCK.	40.	LOCK
508L>	41.	WE HAVE NOT DISCUSSED THE STEAM.	41.	STEAM
142L>	42.	MISS BROWN MIGHT CONSIDER THE COAST.	42.	COAST
484L>	43.	MR. BROWN CAN'T DISCUSS THE SLOT.	43.	SLOT
204H>	44.	THE LITTLE GIRL CUDDLED HER DOLL.	44.	DOLL
92H>	45.	TOM FELL DOWN AND GOT A BAD BRUISE.	45.	BRUISE
185L>	46.	HE HASN'T CONSIDERED THE DART.	46.	DART
396H>	47.	THE FURNITURE WAS MADE OF PINE.	47.	PINE
193H>	48.	HOW DID YOUR CAR GET THAT DENT?	48.	DENT
108L>	49.	MR. SMITH THINKS ABOUT THE CAP.	49.	CAP
167H>	50.	THE BABY SLEPT IN HIS CRIB.	50.	CRIB

162L>	1.	I WANT TO SPEAK ABOUT THE CRASH.	1.	CRASH
153H>	2.	HARRY SLEPT ON THE FOLDING COT.	2.	COT
207L>	3.	SHE'S GLAD JANE ASKED ABOUT THE DRAIN.	3.	DRAIN
222H>	4.	THE DOCTOR CHARGED A LOW FEE.	4.	FEE
432L>	5.	HE HAD CONSIDERED THE ROBE.	5.	ROBE
496L>	6.	I HAVEN'T DISCUSSED THE SPONGE.	6.	SPONGE
53H>	7.	THE GUILTY ONE SHOULD TAKE THE BLAME.	7.	BLAME
275L>	8.	YOU CANNOT HAVE DISCUSSED THE GREASE.	8.	GREASE
313H>	9.	THE COOKIES WERE KEPT IN A JAR.	9.	JAR
255H>	10.	LET'S INVITE THE WHOLE GANG.	10.	GANG
174L>	11.	MR. WHITE DISCUSSED THE CRUISE.	11.	CRUISE
481H>	12.	THE SPORT SHIRT HAS SHORT SLEEVES.	12.	SLEEVES
254L>	13.	THEY KNEW ABOUT THE FUR.	13.	FUR
556L>	14.	WE'VE SPOKEN ABOUT THE TRUCK.	14.	TRUCK
238H>	15.	THE CUSHION WAS FILLED WITH FOAM.	15.	FOAM
84H>	16.	HOW LONG CAN YOU HOLD YOUR BREATH?	16.	BREATH
166L>	17.	SHE WANTS TO TALK ABOUT THE CREW.	17.	CREW
23H>	18.	THE COW WAS MILKED IN THE BARN.	18.	BARN
447H>	19.	THAT ACCIDENT GAVE ME A SCARE.	19.	SCARE
336H>	20.	THE KITTEN CLIMBED OUT ON A LIMB.	20.	LIMB
76L>	21.	YOU'RE GLAD SHE CALLED ABOUT THE BOWL.	21.	BOWL
367L>	22.	THE MAN COULD NOT DISCUSS THE MOUSE.	22.	MOUSE
433H>	23.	HE TOSSED THE DROWNING MAN A ROPE.	23.	ROPE
560L>	24.	YOU HOPE THEY ASKED ABOUT THE VEST.	24.	VEST
200L>	25.	YOU WANT TO TALK ABOUT THE DITCH.	25.	DITCH
498H>	26.	STIR YOUR COFFEE WITH A SPOON.	26.	SPOON
210L>	27.	WE HEAR SHE CALLED ABOUT THE DRUM.	27.	DRUM
296H>	28.	BOB STOOD WITH HIS HANDS ON HIS HIPS.	28.	HIPS
526H>	29.	THE TEACHER SAT ON A SHARP TACK.	29.	TACK
12L>	30.	SHE MIGHT HAVE DISCUSSED THE APE.	30.	APE
353H>	31.	THE STORM BROKE THE SAILBOAT'S MAST.	31.	MAST
318H>	32.	AT BREAKFAST HE DRANK SOME JUICE.	32.	JUICE
227H>	33.	HE HIT ME WITH A CLENCHED FIST.	33.	FIST
415L>	34.	PETER KNOWS ABOUT THE RAFT.	34.	RAFT
321L>	35.	THE OLD MAN CONSIDERED THE KICK.	35.	KICK
295L>	36.	WE HAVE NOT THOUGHT ABOUT THE HINT.	36.	HINT
140H>	37.	THE TEAM WAS TRAINED BY THEIR COACH.	37.	COACH
360L>	38.	BILL HOPES PAUL HEARD ABOUT THE MIST.	38.	MIST
171H>	39.	THE KING WORE A GOLDEN CROWN.	39.	CROWN
393H>	40.	THE SAND WAS HEAPED IN A PILE.	40.	PILE
537L>	41.	THE BOY CAN'T TALK ABOUT THE THORNS.	41.	THORNS
279L>	42.	MISS BROWN WILL SPEAK ABOUT THE GRIN.	42.	GRIN
521H>	43.	THE DUCK SWAM WITH THE WHITE SWAN.	43.	SWAN
144H>	44.	LET'S DECIDE BY TOSSING A COIN.	44.	COIN
268L>	45.	SHE HAS A PROBLEM WITH THE GOAL.	45.	GOAL
88L>	46.	JANE DIDN'T THINK ABOUT THE BROOK.	46.	BROOK
189L>	47.	HE HEARS SHE ASKED ABOUT THE DECK.	47.	DECK
18H>	48.	HE GOT DRUNK IN THE LOCAL BAR.	48.	BAR
89H>	49.	THE GIRL SWEPT THE FLOOR WITH A BROOM.	49.	BROOM
54L>	50.	THE CLASS WILL CONSIDER THE BLAST.	50.	BLAST

362L>	1.	MISS WHITE WOULD CONSIDER THE MOLD.	1.	MOLD
316L>	2.	RUTH HAS A PROBLEM WITH THE JOINTS.	2.	JOINTS
554L>	3.	THE BOY MIGHT CONSIDER THE TRAP.	3.	TRAP
461H>	4.	TO STORE HIS WOOD HE BUILT A SHED.	4.	SHED
430H>	5.	THE LION GAVE AN ANGRY ROAR.	5.	ROAR
539L>	6.	HE IS CONSIDERING THE THROAT.	6.	THROAT
424L>	7.	THEY HOPE HE HEARD ABOUT THE RENT.	7.	RENT
179H>	8.	THE CAR WAS PARKED AT THE CURB.	8.	CURB
74L>	9.	PETER SHOULD CONSIDER THE BOW. (AS IN "NO")	9.	BOW
536L>	10.	THE OLD WOMAN DISCUSSED THE THIEF.	10.	THIEF
385H>	11.	A ROUND HOLE WON'T TAKE A SQUARE PEG.	11.	PEG
402L>	12.	YOU'RE DISCUSSING THE PLOT.	12.	PLOT
335L>	13.	THE WOMAN KNEW ABOUT THE LID.	13.	LID
119H>	14.	PETER DROPPED IN FOR A BRIEF CHAT.	14.	CHAT
454L>	15.	YOU WERE INTERESTED IN THE SCREAM.	15.	SCREAM
46H>	16.	THE GAMBLER LOST THE BET.	16.	BET
342H>	17.	THE BURGLAR ESCAPED WITH THE LOOT.	17.	LOOT
83L>	18.	HE COULD DISCUSS THE BREAD.	18.	BREAD
568H>	19.	HE WAS SCARED OUT OF HIS WITS.	19.	WITS
364L>	20.	HE DOESN'T DISCUSS THE MOP.	20.	MOP
425H>	21.	EVE WAS MADE FROM ADAM'S RIB.	21.	RIB
482H>	22.	GET THE BREAD AND CUT ME A SLICE.	22.	SLICE
80L>	23.	BILL WON'T CONSIDER THE BRAT.	23.	BRAT
136H>	24.	WE HEARD THE TICKING OF THE CLOCK.	24.	CLOCK
121H>	25.	GREET THE HEROES WITH LOUD CHEERS.	25.	CHEERS
224H>	26.	THIS CAMERA IS OUT OF FILM.	26.	FILM
483L>	27.	RUTH WANTS TO SPEAK ABOUT THE SLING.	27.	SLING
285H>	28.	MY JAW ACHES WHEN I CHEW GUM.	28.	GUM
497L>	29.	THE MAN COULD CONSIDER THE SPOOL.	29.	SPOOL
552H>	30.	THE BLOODHOUND FOLLOWED THE TRAIL.	30.	TRAIL
209H>	31.	THE DOCTOR PRESCRIBED THE DRUG.	31.	DRUG
214H>	32.	HE RODE OFF IN A CLOUD OF DUST.	32.	DUST
291L>	33.	HE WAS INTERESTED IN THE HEDGE.	33.	HEDGE
319L>	34.	RUTH HOPES SHE CALLED ABOUT THE JUNK.	34.	JUNK
251H>	35.	PLAYING CHECKERS CAN BE FUN.	35.	FUN
250L>	36.	WE'RE GLAD ANN ASKED ABOUT THE FUDGE.	36.	FUDGE
330H>	37.	THE SUPER HIGHWAY HAS SIX LANES.	37.	LANES
326H>	38.	UNLOCK THE DOOR AND TURN THE KNOB.	38.	KNOB
356L>	39.	RUTH IS SPEAKING ABOUT THE MEAL.	39.	MEAL
442H>	40.	MAPLE SYRUP IS MADE FROM SAP.	40.	SAP
192L>	41.	BILL CANNOT CONSIDER THE DEN.	41.	DEN
413L>	42.	WE ARE SPEAKING ABOUT THE PRIZE.	42.	PRIZE
134H>	43.	THE CAR DROVE OFF THE STEEP CLIFF.	43.	CLIFF
435L>	44.	MISS SMITH COULDN'T DISCUSS THE ROW. ("NO")	44.	ROW
428H>	45.	THE GLASS HAD A CHIP ON THE RIM.	45.	RIM
542H>	46.	OLD METAL CANS WERE MADE WITH TIN.	46.	TIN
531L>	47.	MISS WHITE THINKS ABOUT THE TEA.	47.	TEA
160L>	48.	MISS WHITE DOESN'T DISCUSS THE CRAMP.	48.	CRAMP
530H>	49.	THAT JOB WAS AN EASY TASK.	49.	TASK
226L>	50.	MR. WHITE SPOKE ABOUT THE FIRM.	50.	FIRM

319H>	1.	THROW OUT ALL THIS USELESS JUNK.	1.	JUNK
356H>	2.	SHE COOKED HIM A HEARTY MEAL.	2.	MEAL
413H>	3.	HER ENTRY SHOULD WIN FIRST PRIZE.	3.	PRIZE
568L>	4.	RUTH COULD HAVE DISCUSSED THE WITS.	4.	WITS
214L>	5.	WE COULD DISCUSS THE DUST.	5.	DUST
362H>	6.	THE STALE BREAD WAS COVERED WITH MOLD.	6.	MOLD
454H>	7.	THE FIREMEN HEARD HER FRIGHTENED SCREAM.	7.	SCREAM
326L>	8.	WE SPOKE ABOUT THE KNOB.	8.	KNOB
316H>	9.	YOUR KNEES AND YOUR ELBOWS ARE JOINTS.	9.	JOINTS
250H>	10.	I ATE A PIECE OF CHOCOLATE FUDGE.	10.	FUDGE
342L>	11.	PAUL HOPES WE HEARD ABOUT THE LOOT.	11.	LOOT
291H>	12.	INSTEAD OF A FENCE, PLANT A HEDGE.	12.	HEDGE
402H>	13.	THE STORY HAD A CLEVER PLOT.	13.	PLOT
251L>	14.	DAVID MIGHT CONSIDER THE FUN.	14.	FUN
424H>	15.	THE LANDLORD RAISED THE RENT.	15.	RENT
428L>	16.	PAUL COULD NOT CONSIDER THE RIM.	16.	RIM
330L>	17.	HE HEARD THEY CALLED ABOUT THE LANES.	17.	LANES
74H>	18.	HER HAIR WAS TIED WITH A BLUE BOW.(AS IN "NO")	18.	BOW
134L>	19.	THEY HAD A PROBLEM WITH THE CLIFF.	19.	CLIFF
226H>	20.	HE'S EMPLOYED BY A LARGE FIRM.	20.	FIRM
552L>	21.	HARRY WILL CONSIDER THE TRAIL.	21.	TRAIL
121L>	22.	WE ARE CONSIDERING THE CHEERS.	22.	CHEERS
335H>	23.	TO OPEN THE JAR, TWIST THE LID.	23.	LID
209L>	24.	SHE HAS KNOWN ABOUT THE DRUG.	24.	DRUG
119L>	25.	BILL HAD A PROBLEM WITH THE CHAT.	25.	CHAT
461L>	26.	WE HEAR THEY ASKED ABOUT THE SHED.	26.	SHED
160H>	27.	THE SWIMMER'S LEG GOT A BAD CRAMP.	27.	CRAMP
224L>	28.	JANE HAD NOT CONSIDERED THE FILM.	28.	FILM
435H>	29.	OUR SEATS WERE IN THE SECOND ROW.(AS IN "NO")	29.	ROW
482L>	30.	JANE DID NOT SPEAK ABOUT THE SLICE.	30.	SLICE
442L>	31.	PAUL WAS INTERESTED IN THE SAP.	31.	SAP
530L>	32.	I AM DISCUSSING THE TASK.	32.	TASK
497H>	33.	THE THREAD WAS WOUND ON A SPOOL.	33.	SPOOL
192H>	34.	THEY TRACKED THE LION TO HIS DEN.	34.	DEN
385L>	35.	RUTH HAS DISCUSSED THE PEG.	35.	PEG
83H>	36.	SPREAD SOME BUTTER ON YOUR BREAD.	36.	BREAD
136L>	37.	TOM IS CONSIDERING THE CLOCK.	37.	CLOCK
430L>	38.	HE'S THINKING ABOUT THE ROAR.	38.	ROAR
80H>	39.	A SPOILED CHILD IS A BRAT.	39.	BRAT
285L>	40.	I SHOULD HAVE KNOWN ABOUT THE GUM.	40.	GUM
483H>	41.	KEEP YOUR BROKEN ARM IN A SLING.	41.	SLING
554H>	42.	THE MOUSE WAS CAUGHT IN THE TRAP.	42.	TRAP
46L>	43.	THEY HEARD I ASKED ABOUT THE BET.	43.	BET
539H>	44.	I'VE GOT A COLD AND A SORE THROAT.	44.	THROAT
179L>	45.	BETTY DOESN'T DISCUSS THE CURB.	45.	CURB
542L>	46.	HE HAD A PROBLEM WITH THE TIN.	46.	TIN
531H>	47.	RUTH POURED HERSELF A CUP OF TEA.	47.	TEA
536H>	48.	THE HOUSE WAS ROBBED BY A THIEF.	48.	THIEF
425L>	49.	HE WANTS TO KNOW ABOUT THE RIB.	49.	RIB
364H>	50.	WASH THE FLOOR WITH A MOP.	50.	MOP

INSTRUCTIONS

For this speech test, you will be listening to the speaker
say three words sequentially in a background of aircraft
noise. Listen carefully as the speaker first says the number
of the trial; then a standard phrase which will include the
three target words. He will indicate he has finished the
sample by saying the word 'over'. The example at the top
of your answer sheet shows exactly what he will say.

Your TASK is to circle the one word you think you hear in
each group of six words. If for a given trial you are not
sure what word the speaker has said, make a best estimate.
There is no penalty for guessing.

After you have completed this task, follow the instructions
on the Rating Response Sheet in front of you and evaluate
whether you think the background noise was annoying.

Subject No. ____   Group No. ____   Noise No. ____   Form AX   Test No. _____

Score ____ (S) ____ (N) ____ Name _____ Date _____

EXAMPLE:

Zero, do you read saw, safe, hold Over.

0	(saw)	thaw	jaw		sale	sane	same		told	fold	cold
	raw	paw	law		(safe)	save	sake		gold	(hold)	sold
1	went	sent	bent		dug	dung	duck		puff	puck	pub
	dent	tent	rent		dud	dub	dun		pus	pup	pun
2	not	tot	got		back	bath	bad		din	dill	dim
	pot	hot	lot		bass	bat	ban		dig	dip	did
3	pale	pace	page		fit	fib	fizz		heave	hear	heat
	pane	pay	pave		fill	fig	fin		heal	heap	heath
4	thaw	law	raw		save	same	sale		hold	cold	told
	paw	jaw	saw		sane	sake	safe		fold	sold	gold
5	fill	kill	will		cup	cut	cud		cane	case	cape
	hill	till	bill		cuff	cuss	cub		cake	came	cave
6	hang	sang	bang		wick	sick	kick		dip	sip	hip
	rang	fang	gang		lick	pick	tick		tip	lip	rip
7	tan	tang	tap		pig	big	dig		bean	beach	beat
	tack	tam	tab		wig	rig	fig		beak	bead	beam
8	sag	sat	sass		sum	sun	sung		pat	pad	pan
	sack	sad	sap		sup	sub	sud		path	pack	pass
9	lane	lay	late		peel	reel	feel		bed	led	fed
	lake	lace	lame		eel	keel	heel		red	wed	shed
10	hark	dark	mark		must	bust	gust		sill	sick	sip
	bark	park	lark		rust	dust	just		sing	sit	sin
11	shop	mop	cop		vest	test	rest		ray	raze	rate
	top	hop	pop		best	west	nest		rave	rake	race
12	bale	gale	sale		pig	pill	pin		bun	bus	but
	tale	pale	male		pip	pit	pick		bug	buck	buff
13	pen	hen	men		took	cook	look		coil	oil	soil
	then	den	ten		hook	shook	book		toil	boil	foil
14	kit	bit	fit		fun	sun	bun		kill	kin	kit
	hit	wit	sit		gun	run	nun		kick	king	kid
15	same	name	game		pin	sin	tin		peace	peas	peak
	tame	came	fame		fin	din	win		peach	peat	peal
16	seep	seen	seethe		mass	math	map		teak	team	teal
	seek	seem	seed		mat	man	mad		teach	tear	tease
17	way	may	say		heat	neat	feat		tin	win	din
	pay	day	gay		seat	meat	beat		pin	fin	sin

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Subject No. _____ Group No. _____ Noise No. ____ Form BX   Test No. _____

Score ____ (S) ____ (N) ____ Name _____ Date _____

EXAMPLE:

Zero, do you read <u>saw</u>, <u>safe</u>, <u>hold</u> Over.

(saw)	thaw	jaw		sale	sane	same		told	fold	cold
raw	paw	law		(safe)	save	sake		gold	(hold)	sold

0

gold	hold	sold		sip	rip	tip		hen	ten	then
told	fold	cold		lip	hip	dip		den	men	pen

1

safe	save	sake		map	mat	math		paw	jaw	saw
sale	sane	same		mad	mass	man		thaw	law	raw

2

fizz	fill	fib		gang	hang	fang		wig	rig	fig
fin	fit	fig		bang	rang	sang		pig	big	dig

3

bit	sit	hit		test	nest	best		park	mark	hark
wit	fit	kit		west	rest	vest		dark	lark	bark

4

race	ray	rake		seen	seed	seek		sin	win	fin
rate	rave	raze		seem	seethe	seep		din	tin	pin

5

pill	pick	pip		came	cape	cane		sun	nun	gun
pit	pin	pig		case	cave	cake		run	bun	fun

6

ban	back	bat		bust	just	rust		did	din	dip
bad	bass	bath		dust	gust	must		dim	dig	dill

7

keel	feel	peel		beach	beam	beak		pop	shop	hop
reel	heel	eel		bead	beat	bean		cop	top	mop

8

kit	kick	kin		gale	male	tale		dun	dug	dub
kid	kill	king		pale	sale	bale		duck	dud	dung

9

pad	pass	path		cuff	cuss	cub		tease	teak	tear
pack	pan	pat		cup	cut	cud		teal	teach	team

10

heal	heap	heath		sin	sill	sit		rent	went	tent
heave	hear	heat		sip	sing	sick		bent	dent	sent

11

peas	peal	peach		pave	pale	pay		bed	shed	red
peat	peak	peace		page	pane	pace		wed	fed	bed

12

meat	feat	heat		bill	fill	till		sun	sud	sup
neat	beat	seat		will	hill	kill		sub	sung	sum

13

may	gay	pay		soil	toil	oil		pub	pus	puck
day	say	way		foil	coil	boil		pun	puff	pup

14

sap	sag	sad		lame	lane	lace		bus	buff	bug
sass	sack	sat		late	lake	lay		buck	but	bun

15

tang	tab	tack		name	fame	tame		cook	book	hook
tam	tap	tan		came	game	same		shook	look	took

16

tick	wick	pick		lot	not	hot		duck	dub	dug
kick	lick	sick		got	pot	tot		dud	dun	dung

17

Subject No. _____ Group No. _____ Noise No. _____ Form <u>CX</u>   Test No. _____

Score ____ (S) ____ (N) ____ Name _____ Date _____

EXAMPLE:

Zero, do you read <u>saw</u>, <u>safe</u>, <u>hold</u>   Over.

0	(saw)	thaw	jaw		sale	sane	same		told	fold	cold
	raw	paw	law		(safe)	save	sake		gold	(hold)	sold
1	seen	seed	seek		cook	book	hook		map	mat	math
	seem	seethe	seep		shook	look	took		mad	mass	man
2	keel	feel	peel		dun	dug	dub		lame	lane	lace
	reel	heel	eel		duck	dud	dung		late	lake	lay
3	sun	nun	gun		did	din	dip		beach	beam	beak
	run	bun	fun		dim	dig	dill		bead	beat	bean
4	sin	win	fin		pop	shop	hop		bit	sit	hit
	din	tin	pin		cop	top	mop		wit	fit	kit
5	gang	hang	fang		tang	tab	tack		peas	peal	peach
	bang	rang	sang		tam	tap	tan		peal	peak	peace
6	tease	teak	tear		soil	toil	oil		ban	back	bat
	teal	teach	team		foil	coil	boil		bad	bass	bath
7	pad	pass	path		pave	pale	pay		test	nest	best
	pack	pan	pat		page	pane	pace		west	rest	vest
8	sun	sud	sup		rent	went	tent		hen	ten	then
	sub	sang	sum		bent	dent	sent		den	men	pen
9	gale	male	tale		pill	pick	pip		paw	jaw	saw
	pale	sale	bale		pit	pin	pig		thaw	law	raw
10	bus	buff	bug		may	gay	pay		gold	hold	sold
	buck	but	bun		day	say	way		told	fold	cold
11	pub	pus	puck		bust	just	rust		heal	heap	heath
	pun	puff	pup		dust	gust	must		heave	hear	heat
12	bill	fill	till		safe	save	sake		park	mark	hark
	will	hill	kill		sale	sane	same		dark	lark	bark
13	came	cape	cane		sin	sill	sit		led	shed	red
	case	cave	cake		sip	sing	sick		wed	fed	bed
14	name	fame	tame		tick	wick	pick		kit	kick	kin
	came	game	same		kick	lick	sick		kid	kill	king
15	cuff	cuss	cub		sap	sag	sad		meat	feat	heat
	cup	cut	cud		sass	sack	sat		neat	beat	seat
16	fizz	fill	fib		race	ray	rake		sip	rip	tip
	fin	fit	fig		rate	rave	raze		lip	hip	dip
17	lot	not	hot		wig	rig	fig		fill	will	till
	got	pot	tot		pig	big	dig		hill	kill	bill

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INSTRUCTIONS

In this part of the experiment you will be listening to
speech in an aircraft background noise. Listen carefully,
because you will be asked questions about the subject
matter at the end of the presentation.

Your TASK is to answer the questions about the speech material
on your response sheet in front of you. You will have the
questions in front of you at all times. You may answer these
questions at any time while listening to the speech.

After you have completed the task, follow the instructions
on the Rating Response sheet in front of you and evaluate
whether you think the background noise was *annoying*.

Subject No. _____ Group No. _____ Noise No. _____

Name _____ (S) ___1___ (N) _____

Please answer the brief questions concerning the content the speech message just presented.

1. What hobby has a new found popularity with the horsey set?

    _____

2. What is the primary prerequisite for starting a collection with this hobby?

    _____

3. What is livery? _____

Subject No. _____ Group No. _____ Noise No. _____

Name _____ (S) __2__ (N) _____

Please answer the brief questions concerning the content the speech message just presented.

1. How long have they been friends?   _____

2. What is the dying man's name?   _____

3. What does the other man (the priest)
    notice in the room?

    _____

Subject No. _____ Group No. _____ Noise No. _____

Name _____ (S) __4__ (N) _____

Please answer the brief questions concerning the content the speech message just presented.

1. What did the doctor say was the cause of the old lady's death?

    _____

2. What is suspicious about the lady's bank book?

    _____

3. Why does the man feel that he has special expertise about the behavior of old people?

    _____

Subject No. _____   Group No. _____   Noise No. _____

Name _____·_____   (S) __5__   (N) _____

Please answer the brief questions concerning the content the
speech message just presented.

1. Whose life is discussed?   _____

2. Name one of his earlier jobs?   _____

3. How is the man's style of delivery
    unique from his rivals?
                                    _____

EXAMPLE OF CONTINUOUS DISCOURSE
FOR ANNOYANCE TEST

ARTICLE #1

Wall Street Journal

It's 7 a.m. on a dewy morning, and the ground fog of auto emission is just beginning to collect over the nearby Garden State Parkway. All at once, the outline of a 19th Century carriage drawn by two horses emerges on the horizon with a bulky coachman at the reins.

Relax, bleary-eyed commuters, it isn't an apparition. It's just the board chairman of Johnson & Johnson out for his morning carriage ride. The jaunt is an essential part of Philip Hofmann's morning routine as he describes it:

"Up at a quarter-to-seven, out to the barn. Ride horseback from seven to seven-thirty. Then I've got either two or four horses hitched and ready to go, and I'm off. Drive around the grounds, back to the house, breakfast on the table. Shower at eight-fifteen, in the car and on the way to the office by eight-thirty."

Mr. Hofmann, head man of a $1.14 billion-a-year Band-Aid empire, owns 17 carriages. He is registered with the Carriage Association of America, a Staten Island-based organization whose 2,000 members spend a fair-sized hunk of their time and furtunes hunting down old carriages, fixing them up and driving them no particular place at all. Just 10 years ago, the fledgling association had 200 members. Part of the reason for its astoun ding growth can be found in the answer to this question: What do you do with an aging horseman?

The 64-year-old Mr. Hofmann's story is typical. "I found that in fox hunting I'd lost my timing at a fence, and it was getting too dangerous," he says. "I was a bit like a baseball player losing his eye at batting, so I decided to shift to driving."

What that shift means for those who make it is an investment of up to $5,000 for a restored coach that grandpa may have paid $50 for in 1890. To really get rolling, carriage buffs also need a few coach-trained horses, which can run up to $1,500 apiece. Mr. Hofmann, whose wife sometimes takes a carriage and footman to the theater, even traveled to Germany to buy six registered Holstein horses for a total of $30,000. "I'm not fooling," he says, "They're Holstein horses, not cows."

Why such a big fuss just to take yourself for a ride?   "To sit up on a coach and drive four horses is the ultimate in authority," explains Tom Ryder, a retired British cavalryman and author of a standard reference work on carriage driving.   Mr. Ryder, with his wife, manages the stables of IU International Corp.

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