

## A Study of the Effect of Music Distraction on Reading Efficiency

Mack T. Henderson, Anne Crews, and Joan Barlow

*Grinnell College, Iowa*

Very often college students claim that they can study effectively with the radio on, that music does not "bother" them. This suggested the following study which attempts to determine whether or not reading efficiency is influenced when music is used as distraction, and whether there is any difference in the influence of popular and classical music upon reading efficiency. In a similar study Paul Fendrick<sup>1</sup> found that semi-classical music tended to reduce efficiency, but since he did not equate his groups and because he used only one type of distraction, it was decided to supplement his results through this experiment.

### Procedure

Fifty freshman women helped us with this experiment. These women were divided into three equally matched groups on the basis of their psychological examination scores (American Council on Education Psychological Examination, 1942 edition) and reading test scores (Nelson-Denny Reading Test) obtained in September, 1943. The A C E means for the No Distraction, Classical, and Popular groups were  $107.7 \pm 22.6$ ,  $102.5 \pm 30.3$ ,  $103.6 \pm 23.8$ . The means for the vocabulary section of the reading test were  $43.1 \pm 16.1$ ,  $42.6 \pm 16.7$ ,  $43.8 \pm 13.5$ , and for the paragraph section of the reading test  $45.3 \pm 11.5$ ,  $47.3 \pm 11.7$ ,  $48.0 \pm 13.9$ . The differences in these means were found to be statistically insignificant as measured by Fisher *t*.

First of all, the subjects filled out a questionnaire which was constructed primarily for the purpose of determining whether or not the subjects were accustomed to studying with the radio on; whether or not they thought that the radio reduced their study efficiency; the amount of studying done with the radio on; and the type of program they usually listened to when studying.

The Nelson-Denny Reading Test was used in this study to measure the reading efficiency of the three groups. This test was chosen for four reasons: (1) it has two forms which made possible the use of one form as

<sup>1</sup> Fendrick, P. The influence of music distraction upon reading efficiency. *J educ Res.*, 1937, 31, 264-271.

a pre-test and the other as a final test, (2) Form A had been given to the freshmen when they entered college, September, 1943, making pre-test scores immediately available; (3) the test has two sections, a vocabulary section and a paragraph comprehension section, making it possible to determine the influence of distraction upon these subdivisions as well as upon the total scores; (4) the test required only 30 minutes to complete, 10 minutes for vocabulary and 20 for paragraph comprehension

Form B of the Nelson-Denny Reading Test was administered, as the final test, to a group of 14 freshman women with popular music as distraction and to a group of 17 with classical music as distraction, while a third group of 19, a control group, took the reading examination without any distraction. Hereafter, these groups will be referred to as Popular, Classical, and No Distraction groups. Popular and classical music were the two types of music chosen for this study, because the questionnaire results showed that they were the two types to which most of the subjects usually listened. Typical, familiar recordings of both types of music were carefully selected to be played during the tests. The recordings used in this experiment are as follows:

*Musical Recordings: Popular music* (order of presentation): 1 Two O'clock Jump (Harry James); 2 That's What You Think (Krupa); 3 Sunday, Monday, or Always (Frank Sinatra); 4 Mr. Five by Five (Harry James); 5 Prince Charming (Harry James); 6. Tuxedo Junction (Glenn Miller); 7 Idaho (Benny Goodman); 8 Crosstown (Glenn Miller); and 9. Close to You (Frank Sinatra), and *Classical music*: Symphony in D Minor by César Franck (Philadelphia Symphony Orchestra, Victor Recording, 6726-6730)

The conditions under which the tests were given were regulated as carefully as possible. The tests were administered on three successive afternoons at hours when the greatest number of the subjects would be free. However, it was impossible to find times when they were all free; hence, the rather small number of subjects. During the test, the subjects were asked to assume that they were in their own rooms studying with the radio on. The volume of the phonograph was predetermined by a group of judges, including students, and regulated to approximately the same loudness which the subjects ordinarily maintained when studying with the radio as background. These judges, who were stationed at various places in the room in which the tests were to be given, agreed upon the loudness desired. In order to assure some measure of similarity of volume, the position of the volume control was noted and used throughout the experiment. This method was resorted to, because a physical device for determining volume in decibels was not practical, since the volume within each record varied noticeably.

The significance of the differences in the means was determined by the Fisher *t* test.

### Results

In Table 1 are recorded the averages of the No Distraction, Classical, and Popular groups, the differences between the averages of the pre-test scores and the final test scores of each group, and the significance of these differences in averages. It will be observed that the only score influenced by the distraction more than could be accounted for by chance is the

Table 1  
Nelson-Denny Averages and *t* Scores

	N	Pre-Test (Form A)	Final Test (Form B)	Difference	<i>t</i> (Fisher)	P
No Distraction	19					
vocabulary		43.1	50.0	+6.9	1.260	.20
paragraph		45.3	49.2	+3.9	.923	.35
Classical	17					
vocabulary		42.6	48.4	+5.8	.906	.35
paragraph		47.3	46.1	-1.2	.266	.80
Popular	14					
vocabulary		43.8	47.8	+4.0	.605	.55
paragraph		48.0	22.9	-25.1	6.160	<.001

paragraph score of the Popular group. This score was reduced 25.1 score points, on the average, below the pre-test score. It is interesting to note that the vocabulary scores of all three groups showed an increase even though the increases are not statistically significant as measured by Fisher *t*.

In order to determine whether or not differences exist between those who are accustomed to studying with the radio and those who are unaccustomed to studying with the radio, the data of Tables 2 and 3 are presented. These data show that, regardless of the students' study habits, the groups function alike. The paragraph scores of the Popular group showed a significant decrease in the final test score whether students were accustomed to studying with the radio or not; all other test score changes were within the range expected by chance.

In trying to account for the lack of influence or distraction of classical music upon the test results and the lack of influence of popular music upon the vocabulary scores, one can only suggest explanations. A reasonable explanation for the lack of distraction of classical music is that the rhythms and melodies of classical music are usually more complex and less obvious

Table 2

Nelson-Denny Averages and *t* Scores of Those Who Use the Radio When Studying

	N	Pre-Test (Form A)	Final Test (Form B)	Difference	<i>t</i> (Fisher)	P
No Distraction	14					
vocabulary		42.3	49.8	+7.5	1.089	.30
paragraph		44.1	48.9	+4.8	1.062	.30
Classical	9					
vocabulary		41.4	50.4	+9.0	1.341	.20
paragraph		47.8	46.9	- .9	.134	.85
Popular	8					
vocabulary		45.5	50.5	+5.0	.670	.50
paragraph		53.8	25.1	-28.6	5.485	<.001

Table 3

Nelson-Denny Averages and *t* Scores of Those Who Do Not Use the Radio When Studying

	N	Pre-Test (Form A)	Final Test (Form B)	Difference	<i>t</i> (Fisher)	P
No Distraction	5					
vocabulary		36.8	40.6	+3.8	.531	.60
paragraph		39.6	40.0	+ .4	.042	.95
Classical	8					
vocabulary		43.3	46.1	+2.8	.245	.80
paragraph		46.8	45.3	-1.5	.201	.85
Popular	6					
vocabulary		41.5	44.2	+2.7	.244	.80
paragraph		40.3	20.0	-19.7	3.849	<.001

than those of popular music. The simpler and obvious rhythms and melodies of popular music are easily grasped by a group of subjects and are therefore listened to by the subjects. Naturally, while they listen to the music their attention is diverted from the task at hand. Classical music with its subtle rhythms and hidden melodies is apt to be vague and is therefore not "listened to." It becomes a background against which the assigned task is accomplished without interference, and under these conditions it does not divert the subject's attention from his work. Just what a group of persons highly trained in the understanding of classical music would do under the conditions of this experiment remains to be determined.

A likely explanation for the fact that popular music influences the paragraph scores and not the vocabulary scores seems to lie in the nature of the test materials. The paragraph materials are meaningfully related and require sustained effort on the part of the subject. In contrast to this, the vocabulary materials are intermittent and unrelated. This suggests that popular music interfered with the more complex of the two test sections.

The suggested explanations might be summarized by saying that whether or not music is a real distraction depends upon the complexity of the music and upon the complexity of the test materials. In this experiment, the subtler music (classical) did not influence the test results, and the obvious music (popular) influenced only the paragraph section of the test.

### Conclusions

1. Popular music distracted a group of subjects significantly on the paragraph section of the Nelson-Denny Reading Test. Classical music showed no evidence of distraction in either the vocabulary or paragraph sections of the test, nor did the popular music show evidence of distraction upon vocabulary.

2. Students accustomed to studying with the radio were influenced as much or as little as students unaccustomed to studying with the radio.

3. It is suggested that whether or not music serves as a distraction depends upon the complexity of the music and upon the complexity of the test materials.

*Received June 2, 1944.*