

# Effect of Background Music On Student Performance

By H. E. SCHLICHTING, JR., and R. V. BROWN

Because of larger classes in freshman botany and the lack of interest shown by some of the students while attending lectures, it seemed likely that the use of background music during the lectures might be beneficial. Music has always been one of man's basic needs and has improved his abilities—inspiring him to greater accomplishments in athletic contests, preparing him psychologically for combat in war, serving as an aid in acquiring new ideas in science (Clark, 1961), and setting the mood for dinner conversation, romance, and many other aspects of life. Music has even been found to increase the growth rate of some plants (Nainan, 1957; Singh and Ponniah, 1953).

## Evidence from Industry and Elsewhere

Many studies have been conducted on the effect of music on man's emotions and behavior (Diserens, 1926; Schoen, 1927; Seashore, 1938; Trotter, 1924). However, much remains to be learned. According to Benson (1945) the first factual report on the effect of music on productivity in industry was by Wyatt and Langdon in Great Britain in 1938. The effect of music on industrial production and office personnel has been more recently studied by the Muzak Corp. (1958, 1964) and almost without exception was shown to be beneficial in setting production records.

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The experiment described in this paper was undertaken in the biology department of North Texas State University in 1965-67 and was reported verbally in 1967 to the teaching section of the Botanical Society of America. Publication in *American Biology Teacher* has been delayed through no fault of the authors. Their present addresses:

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Konz (1962) found that college students performed much better in comparing nonsense letters or doing manual assembly tasks if they were listening to background music. However, Kirkpatrick (1943) reported that music hindered work demanding mental concentration, and Freeburne and Fleischer (1952) found no difference in students' comprehension of Russian history with or without background music.

Little is known about the physiologic effect of background music on student emotions; but it is known that music has a marked effect on pulse, respiration, external blood pressure, and delay in the onset of muscular fatigue. In one study (Mursell, 1937) the same physiologic responses occurred whether the music was fast or slow, exciting or soothing, instrumental or vocal, classical or jazz. It is generally acknowledged that music arouses expectations—some conscious, others unconscious—which may produce improved performance; or perhaps the musical stimulus functions as a "catalytic agent." There seems to be a response to certain elements in musical organization: tempo, range, level, and instrumentation (Meyer, 1956). According to Gatewood (1921), workers in an architectural drafting room found that music made their work easier. They preferred instrumental music to vocal music and familiar music to unfamiliar music. Frequent short periods of music seemed most desirable and beneficial.

In industry the actual effects of music were to some extent conditioned by what the employees thought music would do for them (Kerr, 1944). In education, experiments by Baker (1937) gave similar results. Two groups of students worked arithmetic problems with background music. One group had been shown a chart, beforehand, indicating that student perfor-

mance was better with background music; the other group had been shown a chart indicating opposite results. Those students who believed music to be beneficial worked more problems correctly when music was played; the second group did less well with music than without it.

### Experiment in Biology Classrooms

Our own research, begun in September 1965, consisted of alternating a series of 12 lectures and a one-hour examination—all with background music—with a similar series in which background music was lacking. Three classes, totaling 225 students, were involved. A comparison of grades with and without music was then made. Seventy-two students in another class were given only one series of 12 lectures and one examination with background music; afterward they filled out a questionnaire (table 1).

*Reader's Digest* stereo high-fidelity records were used in the fall of 1965, Seeburg programmed music in the fall of 1966, and ADT taped music in the spring of 1967.

The results—here compared, when appropriate, with findings by others—were as follows:

In a study by Angus (1966) showing that background music aided student response during a three-month test in an elementary school, the comments of the pupils were nearly the same as those expressed by the university students in our study; for example, "My grades have improved since the music started" and "I was more attentive in class."

An analysis of variance showed the effect of music or no music on student grades to be significant at the 0.05 level. The mean grade for all of the students when receiving music was 80.2, and for all of the same students when not receiving music it was 77.3. This difference was significant by the t-test at the 0.001 level.

Wokoum (1963) found a great difference between monotonous or unorganized sounds and organized sounds or music, in relation to performance. Our study, too, indicated that the quality of music is of the utmost importance in assessing student performance. When one class listened to distracting and monotonous music, the students' performance on the

examination was approximately 2% lower than it was when no music was used; and fewer students indicated that music was helpful to them (table 1). When music pleasing to the lecturer and the students was used, student examination grades improved 6.1%. Burriss-Meyer's research (1943) confirmed the importance of the kind of music played and the "tailoring" of music to a particular time of day. Kerr (1944) also stressed the importance of the proper selection of music. He noted the background-music preferences of workers at five industrial plants: they listed "Hit Parade" tunes first and spirituals and humorous novelties last. In our study, students preferred soft jazz, semiclassical, slow popular, and instrumental music, in that order. Slow soft music with a steady beat and no great inflection was definitely preferred (table 2).

**Table 2. Music preferences of the 1965 class.**

Jazz (Herby Mann)	30.0%
Semiclassical	26.6
Slow popular	15.5
Instrumentals	13.3
Movie themes	8.0
Strings	2.2
Bossa nova	2.2
Beatles	2.2

According to Konz (1962), productivity in industry improved—poor workers improved more than good workers did—when background music was used. The same assumption was made in the present study: that background music would improve the performance (grades) of poor students more than that of good students. However, the assumption proved to be false, on the basis of grades received from 62% of the students who took the natural science examination of the American College Testing Program, which is administered by the guidance office of North Texas State University to freshmen each year. The mean score on the examination was 22.9. The students were divided into two groups: a low-aptitude group, with scores below 23, and a high-aptitude group, with scores above 23. The high-aptitude group was about 7% better than the low group, both with and without music. The difference between music and no music in the low group was 4.6% and in the high group 4.7%. Both groups showed improved scores when music was used (table 3).

### Conclusions

Because music may excite emotion in one person but not in another, and because the same person may respond differently at different times, it should not be expected that all students will enjoy the music and give a better performance all the time. However, the data presented here do suggest that music was

**Table 1. Student responses to questionnaire.**

	Unpleasant music		Pleasant music	
	% yes	% no	% yes	% no
Background music—helped me to enjoy the lectures	87.5	12.5	98.75	1.25
made me more attentive at lectures	61.1	38.9	85.0	15.0
helped me relax during examinations	75.0	25.0	95.3	4.7

**Table 3. Effect of background music on students' examination scores.** "Low" and "high" refer to scores above and below 23 on the ACT natural science examination.

	Low group	High group	Difference
Music	75.3	82.3	7.0
No music	70.7	77.6	6.9
Difference	4.6	4.7	

beneficial for the majority of students, in that it improved their grades by approximately 4.6%. It also relaxed the students and made them more attentive in class, as evidenced by their specific questions during lectures.

The authors themselves found the pleasant background music enjoyable, and they believe it helped them to present more enthusiastic lectures. Because lecturers are not equally gifted, some will find background music more beneficial than others. Even a gifted lecturer may be surprised at the improved performance of his students—although the lectures seem unchanged.

Education at any level is concerned with communication, and any technique that will aid communication between teacher and student should be used. We hope that this preliminary study will encourage others to conduct educational and psychology research to elucidate further the role of background music in the improvement of teaching and learning.

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#### A Question of Priorities

The nation's efforts to control cancer in the 1970s are threatened by diminishing federal support and rising costs, the American Cancer Society said recently. Federal appropriations for cancer research were "inadequate for maintaining existing research and even more inadequate to meet the needs of the American people," according to Jonathan E. Rhoads, M.D., president, and William B. Lewis, chairman of the board. They added, "There is something wrong about our national priorities when 20 times as much is spent on space as on cancer research," and "the actual cost of the war in Vietnam is 150 times greater than our annual expenditures for cancer research."

#### Youth Revolt "Prefigurative"

We are on the verge of developing a world-wide prefigurative culture. There are three kinds of culture, according to Margaret Mead: postfigurative, in which children learn primarily from their forebears; cofigurative, in which both children and adults learn from their peers; and prefigurative, in which adults also learn from their children. Youth throughout the world today are directing their revolt against the confinement of the postfigurative and cofigurative cultures. In cofigurational cultures, the elders were gradually cut off from limiting the future of their children. Today's youth say the future is now.

—From a review, in *Saturday Review*, of Margaret Mead's book *Youth Revolt: the Future Is Now*