

AN EXPERIMENT IN THE USE OF MUSIC IN AN ARCHITECTURAL DRAFTING ROOM

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This study undertakes to investigate the use of music in a specific situation, namely in an architectural drafting room, when the men are at work. Is the use of music of any value or significance in such a situation?

Many old legends relate stories of the effects of music upon the feelings and actions of the listener. More recent literature, with some historical authority, reports similar instances. Recently, experimental studies have been undertaken to scientifically prove or disprove these beliefs. Practically all of the reports and most of the experimental work have dealt with the passive listener, from the standpoint of enjoyment, of musical pleasure.¹ The effect of music upon work produced or upon people at work has not been systematically studied, although occasional references to its possible effect have been made.

A few scattered unregulated observations have been made on the use of music in learning typewriting, and certain other mechanical processes. These have, however, never been done under laboratory conditions, where the situation is controlled. No objective measurements have been made, nor have there been organized introspective reports. The technique and the reliability of the results are open to question. Attempts to obtain definite details from those who are reported to have made such experiments have resulted in the receipt of letters proclaiming the "wonderful effects," "greatly stimulating effect," "the unbelievable aid," etc., but giving no quantitative data.

For several months, my office was located, by chance, near the large drafting room of the department of Architecture of the Carnegie Institute of Technology. The work of the

¹ Gehring, Albert. *The Basis of Musical Pleasure*. 1910, New York.
Gilman, B. J. Report of Experimental Test of Musical Expressiveness. *Am Jour. Psych.*, 1891, 1892, vols. 4, 5.

Downey, June. A Musical Experiment. *Am. Jour. Psych.*, 1899, v. 9.
Weld, H. P. An Experimental Study of Musical Enjoyment. *Am. Jour. Psych.*, 1912, vol. 23.

Mohler, Louis. *Music Moods*, 1916 Columbia Graphophone Co., N. Y.

students in this department is so arranged that each is given a big problem every six weeks. Most of this time they spend studying out the various parts of their respective problems. All the details are carefully planned and tried out before actual work on the drawing is begun. About a week before the finished sheet is due, they start to work.

Toward the end of the period, the men work early and late. The last four or five days, the students are "on charette."² The last few nights of the charette period, they work until very late, two A. M. being the closing time of the longest evening allowed.

Several times, when students were "on charette" some of the men had asked me for the use of the phonograph and a few records. Two of the men usually picked out a group of selections, which they used. The exact content of these groups, I do not know, except that a large proportion of it was late popular music, much of it jazz.

There was no question as to the enthusiasm of the men over having music occasionally. I was told frequently by various ones how much they had enjoyed it and how much it had helped them. However, from such remarks and testimonials, it is both unwise and unsafe to draw conclusions. That is exactly the unreliable basis for much of the popular literature on the influence of music. The fact that a few liked it was no evidence that others did, nor was there any certainty that the selections which these men chose represented the type of music others would like. Nor could one conclude that the selections which were chosen were the best for this particular purpose. Their reports were suggestive, but not conclusive, and I undertook to study these questions:

(1) Is music of any help in this particular situation, namely, the actual work of completing plans and drawings in an architectural drafting room?

(2) Is music, on the contrary, an unfavorable distraction to the worker?

(3) What type of music is most preferred under such circumstances?

(4) If music is desirable, in what way does the worker feel that the music helps?

² The term, "on charette" is brought over from the French. When plans and charts were due, a little cart used to go about through the streets to gather them in. Draftsmen were often seen running along behind the cart putting on the finishing touches. The term is now used to indicate the period of intense work, when finishing architectural plans or drawings.

(5) If music were constantly available, in what time units would it be used to the best advantage?

The situation in the drafting room made an ideal one for experimentation. Arrangements were made for one of the assistants to have the instrument brought into the drafting room just as on the previous occasions when they had borrowed it. They kept the instrument going in the usual manner, except that the re-creations used were those which I had selected for the occasion. The experimenter was merely a visitor with some of the students and none of them knew until afterwards that the music was being played with a purpose on this occasion. Many of the men expressed surprise when they realized why the writer had been there. The music was therefore introduced in a manner which caused no disruption to the work, and none of the antagonism to experimentation, which is so often felt, was aroused. The conditions were carefully controlled and at the same time, were perfectly normal so far as the students were concerned.

The data sheet, like the accompanying form, was prepared. This was so planned that it was unnecessary for one to write lengthy answers to any of the questions; a check mark or figure sufficed. This was done for two reasons. First, it made the answers comparable. Too often results of such experiments are given in terms of the remarks of the observers, and there is no satisfactory means of converting the opinion of one into the same terms as the opinion of another. Second, it required as little time as possible from the men at work, and their serious coöperation was thus obtained, whereas, with a lengthy questionnaire which required much of their time, they would have been unwilling observers. These report sheets were passed out at the end of two hours. Only then did the men suspect that the music had been given to them for a purpose. They were much interested and serious in their reports.

An Edison "laboratory model" phonograph, the same which had been loaned to them on previous occasions was used. A set of re-creations (the Edison trade name for their phonographic records) was purposefully selected so that it included various types of music, of instrument and rendition. The entire group contained forty-five selections, several each of band, orchestra, chorus, instrumental solos and vocal solos, rhythmic waltzes, one vocal quartet and many jazz or popular dance numbers. Some of the jazz selections were not used, so that the number was somewhat reduced. The instrumental solos included violin, piano, flute and cello; the vocal solos,

In answer to the third question, on the various types of music most suitable, the preferences are expressed in the following table, which is arranged to show the contrasting types:

instrumental.	37	vocal	3
loud	19	soft...	19
slow	15	fast	12
non-jazz	15	jazz	22
familiar	30	unfamiliar	2

Not only do the figures show that instrumental selections are very much preferred to vocal numbers, but also the comments made whenever vocal selections were played, showed that they were irritating. According to a questionnaire sent out to a large number of phonograph owners, many more people express a liking for vocal music in general than for instrumental. In this sort of a circumstance, however, when the individuals are working, and the music is merely an incidental feature, instrumental music is greatly preferred. Either voice quality, or what is more likely, the presence of words, proved to be an irritation as well as a distraction. The effect is very like that which one experiences when he is trying to prepare a lesson or write a theme, and some one in the room talks to himself or to some one else. There is usually an effort to listen to at least a part of the words, and the attention of the worker shifts back and forth from the song to his work. This interruption is not evident with instrumental music.

Vocal music compels the attention, whether willing or unwilling, of the audience. It forces itself upon its hearers. This fact is evident in a drawing-room party. If some one renders a vocal solo, the audience usually gives attention whether the performance be good or bad. On the other hand, if some one gives a piano solo, oft-times in spite of the fact that it is unusually well done, the music is interpreted as a signal for conversation. Certainly, if the audience is given to conversation, the presence of instrumental music is not the distraction that vocal music is.

There was an almost equal division of opinion on the question of tempo and volume. Usually slow tempo and soft were preferred by the same individual and fast tempo and loud by the same individual. It is difficult to determine just how much of this is indicative of the individual's own personal preferences, and his preference for this particular kind of music when working. Special pains were taken however to have the comparison on the basis of the selections just heard, and

I do feel that the judgments rendered are reliable. One can readily understand why loud and fast, and soft and slow are linked up together. Loud slow music forces itself upon the listener, in accented punctuated measure that distracts, and also causes the movement to lag. Slow soft music, on the other hand, is very soothing and rarely annoys or even distracts the hearer.

More scored jazz than scored non-jazz, and several did not score either. Those who did not score either gave answers to some of the other questions which would make a scoring on jazz very unlikely, so that the division between the two is approximately equal.

Familiar music is greatly preferred to unfamiliar music. Several men explained that if the selection were a new one, they wanted to listen to the melody, and if it were a song, they listened to the words. In a selection that is already familiar, little or no attention is consciously given to the words, and the music is merely a pleasant accompaniment to the work, and in no way a distraction.

The selections used for the experiment included several of each of the following types: standard orchestral, instrumental solos, vocal solos, jazzy dance numbers, rhythmic waltzes, and some lively chorus numbers. In question four, the men were asked to indicate the order in which they preferred the several types. The relative order of the various types proved to be the following:

1. Jazzy dance
2. Standard orchestral
3. Rhythmic waltz
4. Instrumental solo
5. Lively chorus
6. Vocal solo

This rank order is based on the number of first, second and third rank votes given each type by the entire group of men. From whatever angle the data are studied, solo numbers are less desirable than ensemble, and vocal music less desirable than instrumental. It is evident that vocal music is not suitable for such a purpose as we are investigating. Those who gave the most careful consideration to the whole questionnaire, ranked instrumental solos and orchestral numbers higher than they did the two dance types. This however may be an indication of the more serious type of individual and his preference for music other than the dance.

One other argument, from an objective viewpoint, lends favor to the use of standard orchestral selections in preference

to the jazz type. The room is noticeably noisier when loud jazzy numbers are played and more talking goes on. Some of the energy of the worker goes out in a form that does not show in his drawings. When quieter, more standard selections are played, there is less confusion in the room and one worker does not disturb another. It is possible that some individuals may work better in short periods between jazz numbers, and so in the end accomplish as much as those who work continuously using a different type of music. This is not likely of the group as a whole, although a certain amount of the livelier sort of music is doubtless useful.

Determination of the causes of the beneficial results from using music during the charetting period is more difficult. A comparison of the introspective judgments of the entire group brought out some interesting facts. Only three explanations were suggested on the data sheet, no others having at any time been offered. Asking on the data sheet for other reasons, and questioning some of the men informally afterwards brought out no further explanations.

Twenty-two (22) of the men felt that the music actually speeded their work, that fast rhythmic selections quickened their movements. Some explained that they felt a tendency to keep the rhythm of the music as they drew, as for example, in shading. However, with most of them, the music seemed to be rather a nervous stimulation, which brought out increased activity in the work. This speeding the movements is in keeping with the preference on the part of many for the quick jazz music, and the livelier orchestral selections.

Forty-one (41) of the draftsmen asserted that music keeps them happier, and that they can do more work and better work when they are in good spirits. Twenty (20) of them explained that the music furnished a rest period between working periods. This function may not be unlike that of keeping the men happy, although the temporal use is different. To those who prefer it as rest, at intervals, there arises the difficulty of determining the proper intervals, and indeed this element is apt to vary with individuals to such an extent that with a large group it would be extremely difficult. However, what seems to be the explanation is that the listener is able to ignore the music and consider only his problem when he is working and really notice the music only when he pauses to rest or to think over the next step in his work.

Not a few of the men indicated more than one of the above replies. Many of them suggested that the music helped keep them in good spirits, and also that it served either as an actual

accelerator to their work, or as a rest. There is certainly no doubt in the minds of the men who have tried it that either by actually speeding the movements of the worker or by mentally stimulating him, music does increase the ease with which this work is done.

As a result of the last question, concerning the most satisfactory time distribution, the desirability of the music was further substantiated. Twenty-one (21) replied that if they could choose the time, they would have the music often and for short periods, nine (9) often and for long periods. Twenty-eight (28) answered that they would like it most of the time. Some few stated explicitly that they would like it most of the time, but in short periods, some others that their preference would vary with the circumstances. Only one (1) asserted that he would want it "not at all," none "rarely and for short periods." No exact definition was given of the length of a long period or a short period. A long period was taken to mean continuous playing for approximately half an hour, while a short period was taken to mean the playing of three or four records, followed by a period without music. Many of the men expressed the opinion that they would prefer it frequently and for short periods, while an equal number prefer it most of the time. There seems to be no doubt in the minds of these men at least that music is a highly desirable accompaniment to their work.

CONCLUSIONS

- (1) The use of music, rendered by means of the phonograph, was felt by the workers in an architectural drafting room to be of decided advantage.
- (2) Only a small percentage of the workers reported that they found the music a distraction or a hindrance to their work.
- (3) Instrumental music is much preferred to vocal music for this purpose.
- (4) Music unfamiliar to the listener is not as desirable as familiar music. It becomes more or less of a distraction.
- (5) According to the reports of the workers, the aid of music is of two sorts. Many feel that it actually speeds movement, and practically all the workers find that it has a beneficial effect on the mood or spirits, which in turn is reflected in the work. It is not unlikely that it performs both of these functions.
- (6) Music is not a feature to be used rarely as a sort of diversion or intermission, but instead may be used to advan-

tage along with the work, a large part of the time. To have music frequently and for short periods appears to be most desirable and beneficial.

So many unfounded statements have been made on the advantages or values of music in industrial situations, that the natural result has been a tendency to consider all such reports the mere opinion of some sentimental enthusiast. It is, therefore, of peculiar significance that the results of such an experiment, unbiased by any popular enthusiasm, should be positive, and that the workers themselves should be so definitely convinced of the desirability of the use of music. It is not safe to generalize from this particular performance to other industrial situations, but it is not unlikely that experiments in many other fields may show similar results. However, we can safely say that the introduction of certain kinds of music proves to be both desirable and beneficial in the drafting room.