SOME CORRELATES OF MUSICAL PREFERENCE

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SOME CORRELATES OF MUSICAL PREFERENCE

By

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CONTENTS

INTRODUCTION

The psychology of music offers a great variety of problems and an equally great variety of methods have been used in studying them. This arises naturally from the wide scope of the field and the complexity of the stimulus and response variables involved. To do experimental work in this area, it is necessary to select a particular problem for study, and simplify the variables sufficiently to permit adequate controls and measurements.

One way of doing this is to break up the stimulus into elements and study them separately. Thus rhythm, pitch, melody, timbre and harmony have all become the subjects of numerous experiments. The following examples are not necessarily the most typical of work done in this area, nor the most applicable to the questions that will be raised by the present experiment, but are meant to illustrate the variety of interests that are embraced in the psychology of music. They are drawn from a large body of experiments that involve auditory stimuli and are thus fundamentally related to music and our responses to music.

Pratt (12), for example, undertook to discover to what extent our description of a pitch as high or low is connected with spatial concepts. Another experimenter, Helmholtz, (7) was an early worker in the area of tone-quality (timbre), showing the effects of wave-form upon tone-quality when pitch and other variables are held constant. Ortmann (11) showed that pitch, intensity and duration are determining factors in tone-quality, since these affect the wave-form.

This approach, which we might characterize as molecular, has contributed much to our knowledge of the elements of music, but there are other questions

that arise in the psychology of music for which it does not provide answers. It hardly needs pointing out that the character of a piece of music may be quite different from that of its parts taken separately, so that if we wish to study responses to music, we are obliged, finally, to use as stimulus material actual selections, unaltered insofar as possible.

This has also been done in numerous studies. For example, an experiment was carried out by Myers (10) from which he developed a typology of listeners on the basis of their reactions to complete selections of music. He used such works as Beethoven's "Overture to Egmont" and Tschaikovski's "Valse des Fleurs", among others. He had 15 subjects give introspective reports while listening to the pieces, on the basis of which he identified the "intra-subjective, associative, objective and character" types of listeners.

Another study that made use of complete musical selections is reported in Schoen "The Psychology of Music" (1). It was carried out under the direction of W. V. Bingham and involved 20,000 persons who reported the effects produced upon their moods by a variety of 290 phonograph records of vocal and instrumental musical compositions. The results indicated that the selections either induced similar moods in most listeners or intensified that mood when it existed prior to hearing the selection.

Thus far we have seen examples in which the stimulus material was given both molecular and molar treatment. The nature of the response, too, can be simplified by breaking it up into elements.

Thus the effects of music upon electrocardiograms and blood pressure have been investigated by Hyde (9) who showed the implications of these effects for musical therapy. Much more frequently used methods of recording responses are verbal and introspective reports.

These examples give some idea of the scope of the problems arising in the psychology of music, and many more illustrations could be drawn from the areas of musical therapy, aptitude, appreciation, and training.

THE PRESENT STUDY

The present study is not related to a specific problem, such as musical training or therapy, but is designed to give information about the correlation existing between several response variables. The stimulus is of the molar type, i.e., is music, essentially unaltered in every respect except length. Brief excerpts of music (20-50 seconds) were drawn from recordings, and placed on a tape recorder. Responses were obtained chiefly through the use of rating scales. They may be regarded as less specific or quantitative than physiological measurements, and still not as "free" or lengthy as the introspective reports that have been gathered by some experimenters.

The nature of the stimulus and response variables will be discussed more fully in the section "Subjects and Material" page 7.

THE PROBLEM

In the present experiment, we have undertaken to discover what degree of correlation exists between the variable of musical preference and three other variables, namely, differences in degree of familiarity, differences in estimates of the length of the selections, and apparent differences in loudness of the selections. We have also undertaken to show what effect musical training has upon the degree of these correlations by employing two groups of subjects, one with musical training and the other without musical training.

The study was not undertaken to throw light upon a preconceived theoretical framework. Nevertheless, out choice of variables indicates the expectation that they, among many other possible variables, would be systematically related to each other.

GENERAL HYPOTHESIS

We take as our general hypothesis that musical preference is correlated with variables of familiarity, apparent differences in length and apparent differences in loudness.

SPECIFIC HYPOTHESES

Preference vs. Familiarity

It is generally accepted that the recognition of familiar objects or stimuli constitutes in itself a pleasant experience. For this reason we hypothesize a positive correlation between familiarity and preference.

Effect of Musical Training Upon the Correlation of Preference vs. Familiarity

Washburn, et al (16), performed a study bearing upon the relationship of familiarity and enjoyment of musical compositions. This study was chiefly concerned with the effects of immediate repetition upon enjoyment. However, since familiarity increases with the number of hearings of a piece, the findings of Washburn do have implications for the present study. She found:

(1) "That repetition may operate either to raise or to lower the pleasantness of a selection."

(2) "That in the case of popular music, repetition tends more strongly to lower than to raise pleasantness."

(3) "That the tendency to lose pleasantness on repetition sets in on the whole sooner for the musical than for the unmusical observers. This is not noticeable in the seriously classical compositions at all: it is shown in the very popular selections only by a steeper dropping off of . . (enjoyment) . . from the first to the fifth performance."

If we can assume that musically trained listeners are more familiar with classical selections than those who are untrained, then the results of Washburn have implications for the present study. They would lead to the hypothesis that the correlation between preference and familiarity would be higher for the musically trained than for the group with no musical training.

Preference vs. Apparent Differences in Length

The relationship between apparent length and "Pleasantness of mental content" has been investigated by Sturt (14). She concluded that "The commonly accepted conception that unpleasantness of mental content increases

the apparent duration of time" had been disproven by her results, and that, instead, "If a space is filled, it appears larger than one which is empty". While these conclusions may be correct, they cannot be regarded as having been demonstrated by her experiment. The number of subjects involved was small - three in all, and in some phases of the study, only one, herself.

Therefore, we do not hesitate to re-examine the question, adopting the commonly accepted conception that the more pleasant of two experiences will seem to "go by faster," will take up less time. We hypothesize a positive correlation between preference and apparent length scores. We can see no reason to expect that this correlation will be different for the musically trained and the musically untrained group.

Preference vs. Apparent Differences in Loudness

The variables of apparent loudness and preference are least likely to yield significant correlation coefficients. If a listener is able to divert his attention from, or ignore, a selection which he does not enjoy, then the preferred pieces will seem louder. On the other hand, if a listener cannot escape entirely from the unpleasant stimulus, and is prohibited from "turning it off" as he might habitually do in similar circumstances, then those selections which he does not enjoy might give the impression of being too loud, louder than the preferred selections. In the face of these mutually contradictory possibilities, we arbitratily chose the latter, i.e., that preference and loudness scores will be inversely related.

As with the variables preference vs. length, we hypothesize no difference between the group with musical training and that with no musical training respecting the correlation of preference with loudness scores.

SUBJECTS AND MATERIAL

Two groups of 50 subjects each were used, 100 in all. One group was made up of those subjects who indicated they had studied a musical instrument or sung for a number of years. This group is referred to as Group No. I, "Musical Training". Group II, "No Musical Training" was made up of 50 subjects who indicated no musical training. All subjects were students in beginning Psychology courses.

In choosing the selections to be used as stimulus material, a number of criteria were considered. One of these was that a wide variety of musical styles and tastes be represented in order to insure that each subject would experience maximum differences in degree of enjoyment and familiarity. In pairing the selections, the greatest possible contrast in styles was attempted.

To maximize the effect of preference upon perceived differences in length, the selections in a pair were equated for length, and the volume level of paired selections was also kept as nearly equal as possible.

Stimulus Material

The stimulus selections used may be divided most conveniently into two types, the popular and classical. Within each of these classes are examples of vocal, orchestral and solo instrumental pieces, exhibiting a wide range of styles. There are ten selections in all, arranged into five pairs, as shown in the following table.

INSERT I

NAME_____
Last, First Middle (Initial)

SEX M F

AGE_____.

CLASS (Underline) Frosh. Soph. Jun. Sen. Grad. Other_____.

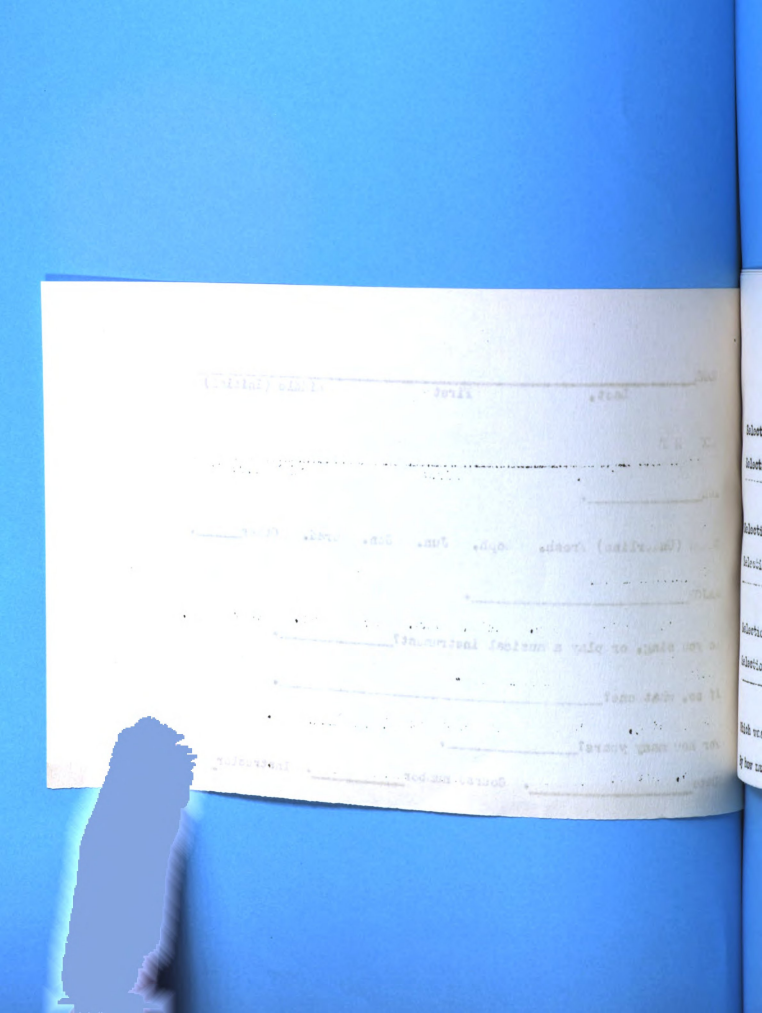
MAJOR_____.

Do you sing, or play a musical instrument?_____.

If so, what one?_____.

For how many years?_____.

Date_____. Course number_____. Instructor_____



PAIR_____.

ENJOYMENT

Selection 1. Very Enjoyable 1 2 3 4 5 6 7 Not at all enjoyable

Selection 2. Very Enjoyable 1 2 3 4 5 6 7 Not at all enjoyable

FAMILIARITY

Selection 1. Very familiar 1 2 3 4 5 6 7 Not at all familiar

Selection 2. Very familiar 1 2 3 4 5 6 7 Not at all familiar

LENGTH (Not the same for both)

Selection 1. _____ Seconds.

Selection 2. _____ Seconds.

LOUDNESS (Not the same for both)

Which was louder? Selection 1. Selection 2.

By how much? Very much 1 2 3 4 5 6 7 Nearly Equal

PAIR_____.

ENJOYMENT

Selection 1. Very Enjoyable 1 2 3 4 5 6 7 Not at all enjoyable

Selection 2. Very Enjoyable 1 2 3 4 5 6 7 Not at all enjoyable

FAMILIARITY

Selection 1. Very familiar 1 2 3 4 5 6 7 Not at all familiar

Selection 2. Very familiar 1 2 3 4 5 6 7 Not at all familiar

LENGTH (Not the same for both)

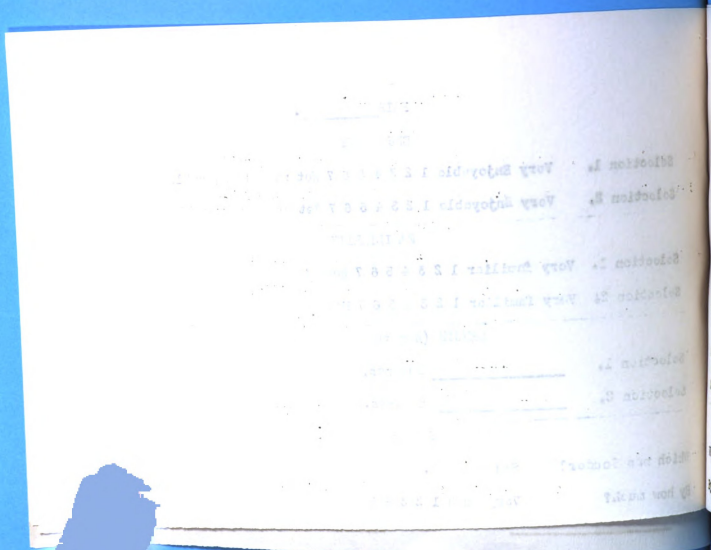
Selection 1. _____ Seconds.

Selection 2. _____ Seconds.

LOUDNESS (Not the same for both)

Which was louder? Selection 1. Selection 2.

By how much? Very much 1 2 3 4 5 6 7 Nearly Equal



PAIR_____.

ENJOYMENT

Selection 1. Very Enjoyable 1 2 3 4 5 6 7 Not at all enjoyable

Selection 2. Very Enjoyable 1 2 3 4 5 6 7 Not at all enjoyable

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FAMILIARITY

Selection 1. Very familiar 1 2 3 4 5 6 7 Not at all familiar

Selection 2. Very familiar 1 2 3 4 5 6 7 Not at all familiar

LENGTH (Not the same for both)

Selection 1. _____ Seconds.

Selection 2. _____ Seconds.

LOUDNESS (Not the same for both)

Which was louder? Selection 1. Selection 2.

By how much? Very much 1 2 3 4 5 6 7 Nearly Equal

PAIR_____.

ENJOYMENT

Selection 1. Very Enjoyable 1 2 3 4 5 6 7 Not at all enjoyable

Selection 2. Very Enjoyable 1 2 3 4 5 6 7 Not at all enjoyable

---

FAMILIARITY

Selection 1. Very familiar 1 2 3 4 5 6 7 Not at all familiar

Selection 2. Very familiar 1 2 3 4 5 6 7 Not at all familiar

LENGTH (Not the same for both)

Selection 1. _____ Seconds.

Selection 2. _____ Seconds.

LOUDNESS (Not the same for both)

Which was louder? Selection 1. Selection 2.

By how much? Very much 1 2 3 4 5 6 7 Nearly Equal

PAIR_____.

ENJOYMENT

Selection 1. Very Enjoyable 1 2 3 4 5 6 7 Not at all enjoyable

Selection 2. Very Enjoyable 1 2 3 4 5 6 7 Not at all enjoyable

---

FAMILIARITY

Selection 1. Very familiar 1 2 3 4 5 6 7 Not at all familiar

Selection 2. Very familiar 1 2 3 4 5 6 7 Not at all familiar

LENGTH (Not the same for both)

Selection 1. _____ Seconds.

Selection 2. _____ Seconds.

LOUDNESS (Not the same for both)

Which was louder? Selection 1. Selection 2.

By how much? Very much 1 2 3 4 5 6 7 Nearly Equal

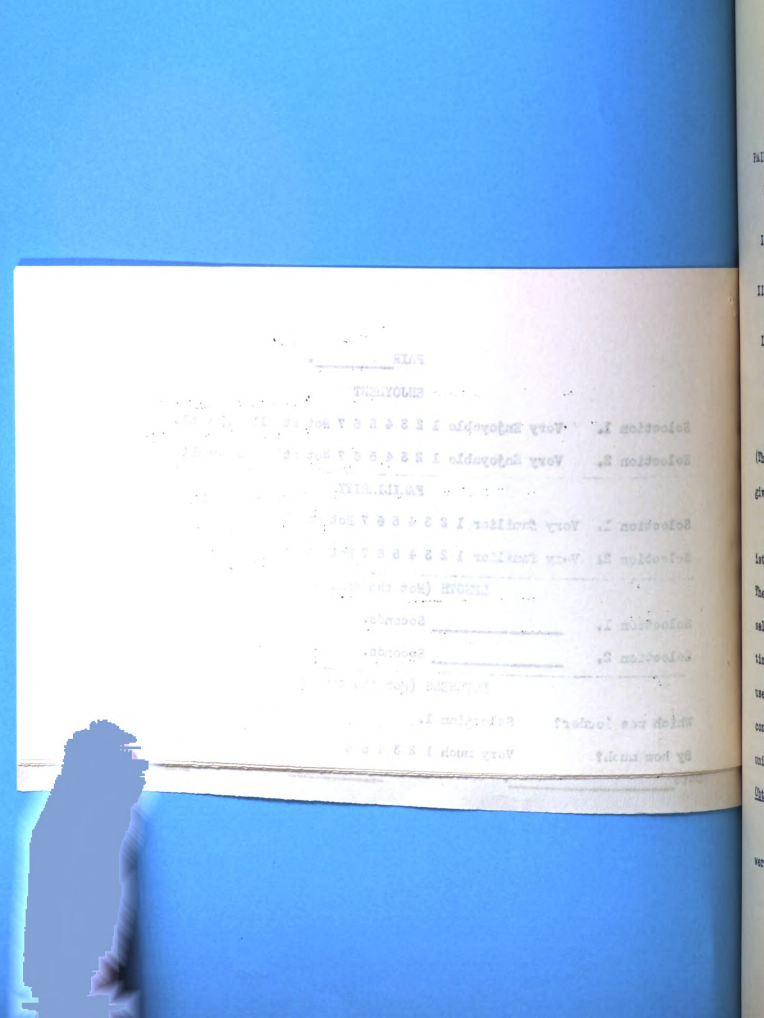

TABLE 1. Showing the Selections Used, And Their Exact Length

PAIR	SELECTION	TITLE	TYPE	LENGTH
I	1.	Piano Concerto #1, Tschaikovski	Classical	49 seconds
	2.	"Star Dust", Stan Kenton record	Popular	48.5 "
II	1.	"Fool, Fool", sung, Kay Starr	Popular	54.75 "
	2.	"Carmen" excerpt, sung, R. Stevens	Classical	54.50 "
III	1.	Symphony #1, Brahms, (4th Mov't)	Classical	43 "
	2.	"Vaya Con Dios", Les Paul & Ford	Popular	43.50 "
IV	1.	"Come on 'a My House", Cluney	Popular	23.25 "
	2.	Sonata in C Maj., Scarlatti	Classical	23.50 "
V	1.	Symphony #2, Bernstein	Classical	56.50 "
	2.	"Begin the Beguine", Cugat	Popular	56.75 "

(The exact title and location of these selections on the recordings is given in the Appendix, page iii).

In general, a theme was chosen from each composition that was characteristic and complete, being broken off only at convenient cadences or pauses. The selections were presented in pairs, with about five seconds between selections and one or two minutes separating the pairs to permit adequate time for indicating responses. The volume control on the tape recorder used to present the stimulus selections was set at the beginning and left constant throughout the experiment. This resulted in producing a fairly uniform tone-quality and level of volume.

Obtaining Responses

Responses were obtained in an answer booklet (See insert 1.). Judgments were made about each selection concerning degree of enjoyment, degree of

familiarity, estimate of length and estimate of loudness. The subjects were instructed as to the manner of indicating responses (See "Instructions to the Subjects", Appendix, page i).

To indicate degree of enjoyment, seven-point scales were used, the subject encircling whatever number best indicated his enjoyment of each selection.

Seven-point scales were also used to indicate how familiar each of the selections was to the subject.

Separate estimates of the length, in seconds, were given for each selection.

To indicate loudness, the subjects were instructed to decide which of the selections in a pair was thought to be the louder, and then indicate the apparent degree of difference in loudness by encircling the appropriate number on a seven-point scale.

The first page of the answer booklet provided space for information concerning the amount of musical training each subject had, on the basis of which his responses were placed in either of the two experimental groups, i.e., that group comprised of those subjects having musical training or that group of subjects having no musical training.

METHODS AND PROCEDURES

Five pairs of selections were presented to all subjects in the same order and under similar conditions. Counter-balancing of the pairs was not carried out because there was no need to eliminate the possible effects of constant errors upon the results. These would have the same effect as merely adding or subtracting numerical constants from one or all variables,

and would not affect the correlations. (If the constant error were one of central tendency, the correlations could only be lowered (by restricting the range of responses), but never raised).

Our method of deriving a single score from the responses made separately to each of the selections in a pair needs to be clarified.

Enjoyment and Familiarity Scores

Scores for the first two variables, Enjoyment and Familiarity, were arrived at by the same method.

A seven-point scale was provided for each of the two selections in the pair, with the low point (No. 1.) being identified as "Very enjoyable" and the high (No. 7.) as "Not at all enjoyable". The subjects encircled the number they felt best reflected their degree of enjoyment for each selection. Since our purpose is to correlate the variable of preference with other variables, it is necessary to obtain a single score from the two judgments given. This is done by subtracting the number encircled for selection 1. of a pair from the number encircled for selection 2. of that pair and adding a constant, 10, to avoid negative numbers. This enables us to express in a single score the degree and direction of difference in enjoyment between the selections, and we call it the "Preference score".

We are now in a position to compare differences in preference with differences in familiarity. (The method for arriving at familiarity scores is exactly like that just explained for enjoyment). It can be seen that if familiarity and enjoyment of musical selections are correlated, our method of scoring will exhibit this relationship. The following example scores would thus demonstrate perfect positive correlation between these variables.

SUBJECT X
PAIR I
Enjoyment

Selection 1. Very enjoyable (1) 2 3 4 5 6 7 Not at all enjoyable

Selection 2. Very enjoyable 1 2 3 4 5 6 (7) Not at all enjoyable

Familiarity

Selection 1. Very familiar (1) 2 3 4 5 6 7 Not at all familiar

Selection 2. Very familiar 1 2 3 4 5 6 (7) Not at all familiar

SUBJECT Y
PAIR I
Enjoyment

Selection 1. Very enjoyable 1 2 3 4 (5) 6 7 Not at all enjoyable

Selection 2. Very enjoyable 1 2 (3) 4 5 6 7 Not at all enjoyable

Familiarity

Selection 1. Very familiar 1 2 3 4 5 6 (7) Not at all familiar

Selection 2. Very familiar 1 2 3 4 (5) 6 7 Not at all familiar

SUBJECT Z
PAIR I
Enjoyment

Selection 1. Very enjoyable 1 (2) 3 4 5 6 7 Not at all enjoyable

Selection 2. Very enjoyable 1 (2) 3 4 5 6 7 Not at all enjoyable

Familiarity

Selection 1. Very familiar 1 2 3 4 5 (6) 7 Not at all familiar

Selection 2. Very familiar 1 2 3 4 5 (6) 7 Not at all familiar

Subtracting selection 1. from selection 2. in each case, and adding 10, we get the following derived scores, indicating the correlation.

SUBJECT	ENJ.	FAM.
X	16	16
Y	8	8
Z	10	10

Length Scores

Essentially the same method was used to obtain length and loudness scores, but there are some differences in detail. Judgments of length were given in seconds for each selection. Here, as in the case of enjoyment and familiarity, the judgment for selection 1. of a pair was subtracted from that for selection 2. and a constant was added to avoid negative numbers.

Loudness Scores

Obtaining estimates of loudness, or, more precisely, of perceived differences in loudness, was done by requiring a choice between the selections in a pair, and then indicating, again on a 7-point scale, the degree of difference. The low point on the scale (No. 1.) was identified as "Very much louder" and the high point (No. 7.) as "Nearly equal".

If the first selection of the pair was felt to be the louder, then the number encircled on the 7-point degree-of-difference scale was entered as the score. If, however, selection 2. was encircled, indicating that it was thought to be the louder, then the number encircled on the degree-of-difference scale was subtracted from 15, and the resultant figure recorded. This procedure gives us a scale for loudness-difference from 1 to 14, with 7-8 being scores that would indicate near-equality.

All of these scores indicate differences between selections within pairs respecting the variables involved, rather than the raw scores obtained for each selection. This enables us to discover to what extent differences in enjoyment between two selections are accompanied by corresponding differences in judgments of familiarity, length, and loudness, (i.e., to what extent these vary concomitantly).

RESULTS

Inspection of the Table of Results, page 14, will indicate that significant correlation coefficients were obtained from Group I, Musical Training, in all five pairs of selections for the variables preference vs. familiarity. Group II, No Musical Training, yielded significant coefficients for these variables in three out of the five pairs.

For all five pairs, the correlation was higher for Group I than for Group II, and the difference between these coefficients is significant beyond the one percent level of confidence for one of the pairs.

The coefficients obtained for the variables Enjoyment vs. Length, and Enjoyment vs. Loudness do not in any instance reach statistical significance, even at the 10 percent level of confidence.

Scattergrams, developed from the data, indicated no consistent curvature for any of the variables. Hence no eta coefficients were computed. These would undoubtedly be higher than the Pearson product moment coefficients, but they would not aid us in interpreting the scattergrams, even if more statistical significance were reached.

TABLE OF RESULTS

Pearson product-moment correlation coefficients for groups I and II.

	GROUP I - MUSICAL TRAINING			GROUP II - NO MUSICAL TRAINING		
PAIR	Enjoyment vs. Familiarity	Enjoyment vs. Length	Enjoyment vs. Loudness	PAIR	Enjoyment vs. Familiarity	Enjoyment vs. Length	Enjoyment vs. Loudness
1.	.329*	-.122	-.193	1.	.216	-.0655	.0149
2.	.743**	.0565	-.126	2.	.387*	-.0466	.164
3.	.484**	-.0344	-.157	3.	.275*	-.136	.0967
4.	.623**	-.126	-.00954	4.	.561**	-.0177	-.151
5.	.310*	.0671	.0359	5.	.259	-.0159	.104

T-ratio scores for test of significance of differences between groups I and II.

PAIR	Enjoyment vs. Familiarity	Enjoyment vs. Length	Enjoyment vs. Loudness
1.	.582	.549	.978
2.	2.62**	.485	1.42
3.	1.12	.636	.808
4.	.485	.558	.490
5.	.243	.413	.340

* Denotes significance at the 5% level of confidence.

** Denotes significance at the 1% level of confidence.

DISCUSSION

Our general hypothesis that Preference is correlated with variables of familiarity, apparent length and apparent loudness is partially substantiated by the coefficients obtained for preference vs. familiarity. It is in part unsubstantiated by the lack of correlation shown for the variables preference vs. length and preference vs. loudness.

Preference vs. Loudness

It is still possible, of course that these variables are related, but that the relationship did not appear under the conditions of the present experiment. It is easy to find examples in everyday life to support the notion that preference and loudness are related. If a piece on the radio is one that a listener enjoys, he is more likely to increase the volume level than decrease it, so that he can hear it better. On the other hand, if a selection comes on the radio that he dislikes, he will probably turn it down or off entirely, rather than increase the volume level. One important difference between everyday life situations and the conditions imposed by the experiment is that in the experiment, the subjects were not permitted to raise or lower the volume level of the stimulus selections. In this situation, where raising the level of preferred pieces and lowering that of non-preferred pieces was prohibited, the subject might receive and report the impression that the selections he liked were too soft (i.e., not turned up), and those he disliked were too loud (i.e., not turned down).

That neither this effect, nor any other consistent relationship appeared in our results may be explained in a number of ways. It could be that the attitude of objectivity toward the listening experience that was developed by the experiment was sufficiently strong to mask entirely more habitual

ways of responding. It is also possible that, since listeners undoubtedly differ in their ability both to ignore the disliked selections and to attend to the preferred selections, these personality factors and others combined in such a way as to cancel any trend that would be produced by a particular factor or mode of responding taken separately.

The effects of individual differences upon judgments made relative to music could be ascertained only by carefully diagnosing the types of people to serve as subjects and then comparing the experimental results of each subject, or group of subjects, with personality profiles.

Preference vs. Length

Our hypothesis that the preferred selections would seem to occupy less time than the non-preferred selections is not confirmed by the results. Yet this notion is widely held. Henrikson (8) discovered that of 75 college students serving as subjects, 95 percent believed that the more afraid a student is, the longer will his speaking time appear to him. In another phase of his experiment, he showed, however, that degree of stage fright does not correlate positively with estimated length of speaking time. Woodrow states in his "Handbook of Experimental Psychology" that "In general, a time filled by pleasant, interesting, well-motivated activities seems shorter than one spent simply in waiting". Since "waiting" is usually an unpleasant experience, this remark may be taken as being in support of our hypothesis. But an alternative interpretation is possible which places it in agreement with the conclusions of Sturt, cited earlier, that "If a space is filled, it appears larger than one which is empty". In discussing the experience of waiting, she points out that while it may appear to be an "empty" interval of time to a casual observer, it is in fact filled by

experiences of anticipation, disappointment, irritation, insecurity, muscular tension and countless other sensations. This, in her view, accounts for the seeming inordinate length of intervals spent in waiting; they are, in fact, more filled than most intervals.

Similar interpretations can bring a number of experimental results into agreement. Gulliksen (6) had 326 subjects estimate upon a period of 200 seconds while engaged in various activities. These were:

		Average estimate (in seconds)
Overestimated	1. Relaxation	241.7
	2. Holding arms extended	228.4
	3. Listening to a slow metronome	223.7
	4. Listening to a rapid metronome	214.1
	5. Holding the palm on a thumb-tack	210.2
Underestimated	6. Reading from reflection in a mirror	181.8
	7. Taking dictation	174.6
	8. Doing long division	168.9

Of these eight conditions, the first five were overestimated and the last three underestimated. Task number one, called "Relaxation", was given the longest average estimate. The instructions to the subjects for this part of the experiment were as follows:

> "Put your arms on the table and lay your head on them, but keep your eyes open and remain attentive. When I say "go" shut your eyes and relax completely. Do not count or mark time, remain perfectly passive, as if trying to sleep. When I say "stop", sit up, estimate the time and record it".*

There is no guarantee here that the subjects in this part of the experiment were, in fact, in a state of rest. Such an imposed restriction of activity as would be produced by these instructions might well be accompanied by a variety of experiences like those described earlier for periods spent in waiting.

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* J. Exp. Psychol., 1927, 10, page 53.

Similarly, we have no idea what may have gone on in the subjects' consciousness during the performance of tasks 2 through 5 in this experiment. It is possible that these tasks were accompanied by numerous and varied inner experiences, thus accounting for their being overestimated. For those tasks that were underestimated, numbers 6 through 8, we can hypothesize that since the attention of the subjects was monopolized by the activity engaged in, these periods were less filled than periods 1-5, and were hence underestimated.

Whitely and Anderson (17) did an experiment involving music from which they concluded that "Intervals filled with music are judged shorter than intervals filled with the non-rhythmical buzzer-tone or intervals in which neither the music nor the buzzer-tone is present". To make this statement consistent with other results, it is necessary to assume that the experiences of the subjects were not regulated by the complexity of the experimental stimuli and that the periods where neither the music nor the buzzer were sounded really contained more experiences (like those associated with waiting) for the subjects.

These studies cannot be taken to show that pleasantness or unpleasantness of experience is not an important factor in determining time-perception because, in every case, it is possible to believe that those tasks or periods whose lengths were underestimated were more pleasant than the overestimated tasks.

For a study that deals more directly with this question we must refer once more to the experiment by Sturt (14). Some of the conditions under which she obtained estimates of time are the following:

Neutral 1. Starting a stop watch and stopping it when a given number of seconds had elapsed.

Unpleasant	2.	Holding a lighted cigarette against the hand.
Pleasant	3.	Being in bed at night, just before going to sleep.
Unpleasant	4.	Waiting for a meal while very hungry.
Unpleasant	5.	The prick of a pin.

The estimates of time elapsed under these conditions did not show any consistent tendency toward overestimation of either the pleasant or unpleasant conditions. But it would be risky to accept her results as final since only 3 subjects were involved in the experiment.

Her results are supported, however, by those of the present experiment which failed likewise to discover significant correlation between the variables preference and length. Instead, the experiences of enjoying a piece of music and not enjoying it, while so different qualitatively, may be equal from a quantitative point of view, and thus have the effect of filling an interval of time to an equal degree.

The present experiment has not demonstrated that estimates of time depend upon how filled or unfilled an interval is, but in yielding negligible correlation coefficients for preference and apparent length scores, our results remain consistent with a large body of experimental work done in this area.

Preference vs. Familiarity

Our hypotheses concerning correlation between variables of preference and familiarity, i.e., that these would be positively correlated and that the group with musical training would yield higher coefficients than the group with no musical training, have been substantiated in this experiment. The correlation between preference and familiarity that was obtained for both groups probably results from the operation of a factor that is effective in many situations besides those that involve listening to music. The experience of recognition or of being familiar with an object or stimulus provides pleasure in and of itself. In social gatherings, the presence of old acquaintances gives a feeling of security and belonging. Similar experiences are felt when one returns to his home town or other familiar surroundings. Likewise in an experiment, the appearance of familiar stimuli reduces anxiety resulting from being in a strange situation and makes the subject feel more "at home", at least for the moment.

The operation of factors more peculiar to situations involving music may be responsible for the difference in degree of correlation of these variables between groups I and II. The source of our hypothesis that the coefficient would be higher for group I, (Musical training), than group II, (No musical training), was an experiment of Washburn (16) on the effects of immediate repetition of musical selections. She used, as we did in the present experiment, a wide variety of selections in both the classical and popular vein, and also employed some subjects with musical training and others without. One of her conclusions was that the tendency for selections to lose enjoyability upon repetition set in sooner for the musically trained than musically untrained subjects. It took fewer repetitions of a selection

to effect a decrease in its enjoyability for the musically trained than the musically untrained subjects. This finding, taken alone, would lead to a hypothesis just the opposite of the one we have chosen, for it would mean that the more familiar selections would tend to be less enjoyed by the musically trained. However there is nothing in her results to indicate that this effect would not set in for the group with no musical training as well: the decrement in enjoyment resulting from repetition sets in sooner for the musically trained subjects, but eventually may occur for all subjects. Taking these facts into consideration leads us to still another hypothesis that we did not adopt, that groups I and II would show equal correlation coefficients for the variables preference and familiarity. Yet another finding of Washburn forms the last step in reaching the hypothesis we did adopt. She found that the tendency for a selection to lose enjoyability upon repetition for the musically trained did not exist for the serious, classical selections. There is, in other words, an exception to the tendency for pieces to lose enjoyability upon repetition, and this is to be found in the enjoyment, not reduced by repetition, of serious classical selections, by the musically trained subjects.

The results of the present experiment also suggest the existence of such a phenomenon, and it could account for the higher correlations obtained for preference vs. familiarity scores for the musically trained group than the group with no musical training.

The present experiment and that of Washburn are not very similar in design. Yet the results are essentially in agreement, and point to the interpretation that classical selections retain their enjoyability, even after many repetitions, or when they are very familiar to the listener. This seems to hold true especially for listeners who have had musical training.

That this problem needs further examination, however, is suggested by the results of another experiment which seem not in agreement with those of the present study, or those of Washburn. This study, cited earlier, (page 2) was carried out by W. V. Bingham (1) for the purpose of ascertaining the mood effects of music. The study also yielded information concerning the relationship of enjoyment and familiarity and led Bingham to conclude the following:

"Familiarity played a more important role in the degree of enjoyment derived from the music for the somewhat musical than for the very musical. In other words, the less musical the person, the more was his enjoyment conditioned upon the degree of familiarity with the selection".[1]

Bingham based this conclusion upon a comparison of two groups of subjects; those who were somewhat musical and those who were very musical. To substantiate his statement more fully would require employing a third group of subjects who were not musical at all. It might then appear that the two groups of subjects who were either "very" or "somewhat" musical would show a closer relationship between enjoyment and familiarity than the unmusical group. Such an outcome could be consistent with our own results, and with the findings of Bingham. But this is a subject for future experimentation.

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[1] "The Psychology of Music" Schoen, page 90.

SUMMARY

Brief selections of music were presented in pairs to two groups of 50 subjects each, one group consisting of subjects who had some musical training, the other group having no musical training. A popular and a classical selection made up each of the five pairs.

Measures were obtained, chiefly through the use of rating scales, of the difference in familiarity, enjoyment, estimated length and loudness between the selections comprising each pair.

The scores thus derived for preference were examined for degree of correlation with scores of familiarity, apparent difference in length and apparent difference in loudness.

Significant correlations were found to exist between the variables preference vs. familiarity. These variables were correlated significantly higher for the group with musical training than for the group with no musical training. Correlations between the variables preference vs. length and preference vs. loudness were not significant.

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APPENDIX

INSTRUCTIONS TO THE SUBJECTS

The purpose of this experiment is to obtain information about some of the effects of music. Selections will be presented in pairs, and after each pair you will answer a number of questions.

These questions appear on the pages of your answer booklet. Turning to page 1, you will notice that the first question concerns the degree of enjoyment you received from each of the selections. If you enjoyed selection 1 of that pair very much, you would put a circle around number 1. If you did not enjoy it at all, circle number 7. If your enjoyment was somewhere between 1 and 7, you would encircle the appropriate number. The same method will be used for indicating your enjoyment of selection 2 of that pair.

The next question concerns the degree to which you are familiar with a selection. If it is very familiar to you, encircle number 1; if it sounds entirely unfamiliar, encircle number 7. If your familiarity with the selection lies somewhere between numbers 1 and 7, encircle the appropriate number.

The next question concerns your estimate of the length of each selection. Write down how many seconds in duration you estimate each selection to be. In no case will the selections be of equal length, so do not write down the same number of seconds for both selections. Do not use your watches to time the selections, but give the best estimate you can without any reference to a watch or clock.

The last question requires a comparison of the loudness of the two selections in the pair. If the first selection was louder, indicate by encircling the 1, if the second, encircle 2. Then indicate the amount of

difference in loudness between the two selections, using the scale provided immediately below. If the selection you chose as louder was much louder than the other, encircle number 1. If the difference was hardly discernible, encircle number 7. In case the degree of difference falls between numbers 1 and 7, encircle the appropriate number. In no case will the selections be of equal loudness, so you must make a choice between them.

Is there any question?

There will be five pairs of selections, and a separate page in the answer booklet will be used for each pair. You should have an answer page for each of the five pairs, and at the top of each of these pages will be the pair number for which it is to be used. Check to see if your booklet is complete.

Remember, you are to answer the questions about each pair <u>after</u> each pair has been presented. Therefore do not record any answers until both selections of the pair have been played.

Is there a question?

Glance over the answer page for pair number 1 and look over the questions you will have to answer about the music. You will be asked about four things:

Your enjoyment of the selections, your familiarity with them, the length of the selections and the loudness of the selections. Enjoyment, Familiarity, Length and Loudness.

We are now ready for pair number 1.

SELECTIONS USED

PAIR	SELECTION	TITLE	TIME FROM BEGINNING	LENGTH
I	1.	Concerto No. 1, Op. 23 by Tschaikowski Victor, LCT, 1012	0 sec.	49.00 sec.
	2.	"Stardust" rec. by Kenton & Orch. Capitol F 2214 Instrumental (45-9886)	0 sec.	48.50 sec.
II	1.	"Fool, Fool, Fool" rec. by Kay Starr w/orch. Capitol F 2151 Vocal (45-9907)	10 sec.	54.75 sec.
	2.	"Carmen", Act II, Gypsy Song by Bizet Sung by Rise Stevens Victor, LRM 7011, Side 2	65 sec.	54.50 sec.
III	1.	Symphony No. 1, 4th Mv't Op. 68 by Brahms Columbia, ML 4016	8 min.	43.00 sec.
	2.	"Vaya Con Dios" rec. by Les Paul & Mary Ford Capitol, F 2486 Vocal (45-11544)	0 sec.	43.50 sec.
IV	1.	"Come On-a My House" rec. by Rosemary Cluney Columbia 45 RPM 4-39467 (ZSP 7410)	45 sec.	23.25 sec.
	2.	Sonata in C Major, Longo 104 by Domenico Scarlatti rec. by Fernando Valenti Westminster WL 5116 Side 1, XTV 16290	0 sec.	23.50 sec

SELECTIONS USED, CONT'D

PAIR	SELECTION	TITLE	TIME FROM BEGINNING	LENGTH
V	1.	Symphony No. 2 "The Age of Anxiety" by Leonard Bernstein Columbia ML 4325 Side 2, XLP 2805	5 min. 16 sec.	56.50 sec.
	2.	"Begin the Beguine" by Cole Porter rec. by Xavier Cugat & Orch. Columbia CL 6021 LP 554	1 min. 41 sec.	56.75 sec.

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