THE UNIVERSITY OF DETROIT

THE CONSISTENCY WITH WHICH OBSERVERS IDENTIFY THE VOCAL EXPRESSION OF EMOTION

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CHAPTER I

INTRODUCTION AND REVIEW OF RELATED STUDIES

There seems to be no question that emotional states of mind manifest themselves in behavior. The posture, gestures, facial expression, and voice, all contribute to the pattern which is called emotional behavior. Aside from the usual manifestations of emotional behavior in everyday life, various forms of realistic art, such as sculpture, painting, and music, do a successful job of reproducing emotions in an expressive manner.

But, in the investigation of emotional behavior, it is necessary to know the extent to which each of the above-mentioned factors, the posture, gestures, facial expression and voice, contribute to emotional behavior, and the extent to which each of these factors taken separately may indicate the presence of a specific emotional state of mind. It is the purpose of this investigation to attempt to determine the extent to which the voice may convey specific emotions. If it is possible to express feeling and emotion in the voice, then auditors should be able to recognize the emotion being expressed, and with some level of consistency. As Woodworth states:

> If there are several distinct emotions, there should be as many behavior patterns distinguishable in the face, voice and gestures . . . . . .
> . . . . . .
> Questions of heredity and environment present

themselves. Is the motor pattern built up in experience or is it unlearned and hereditary? Related questions are whether the visible or audible behavior pattern is really understood by other persons, . . .[1]

This investigation was, in part, suggested by a similar study, recently completed, on the facial expression of emotion.[2] A review of the literature indicates that the scientific study of the mechanics of tonal expression, of the relation between personality and vocal expression and of the emotional significance of tonal expression, have been carried out in the past.

A compilation of studies on the mechanics of tone production in speech and music and its measurement has been made by Seashore[3]. In addition, Merry[4], Gray[5], Lynch[6], Skinner[7], Fairbanks and Pronovost[8], and Bonner[9], deserve mention. Other

1. Robert S. Woodworth, Experimental Psychology, p. 242.
2. Rex R. Pulford, "An Attempt to Determine the Scale Shape of Woodworth's Condensed Scale of Facial Expressions Through a Measure of the Reliability of Subjects' Judgments." (Unpublished M.A. Thesis, University of Detroit, 1950)
3. C. E. Seashore, Psychology of Music.
4. C. N. Merry, "The Study of Voice Inflection in Speech," Psychological Monographs, XXXI (1922), 205-29.
5. G. W. Gray, "An Experimental Study of the Vibrato in Speech," Quarterly Journal of Speech Education, XII (1926), 296-333.
6. G. Lynch, "A Phonophotographic Study of Trained and Untrained Voices Reading Factual and Dramatic Material," Archives of Speech, I (1934), 9-25.
7. E. R. Skinner, "A Calibrated Recording of the Pitch, Force and Quality of Vocal Tones, etc.," Speech Monograph, II (1935), 81-137.
8. G. Fairbanks and W. Pronovost, "Vocal Pitch During Simulated Emotion," Science, XXCVIII (1938), 382-83.
9. M. R. Bonner, "Changes in the Speech Pattern Under Emotional Tension," American Journal of Psychology, LVI (1943), 262-73.

investigators have analyzed the relationship between vocal expression and certain personality factors: Allport and Cantril[10], Vernon[11], Fay and Middleton[12]. Some experimental literature on the feeling effects of music deals with its influence on moods, the feeling value of melody, harmony, pitch, tempo, and major and minor modes[13].

In direct relation to the problem at hand, a number of studies concerned with the understanding and interpretation of the emotions as expressed in music and in the speaking voice have been reported. A brief review of these studies might aid in understanding the various procedures used, as well as the results and conclusions obtained in these investigations.

In 1928, Sherman[14] reported a study which was designed to discover the extent to which an observer is able to discern emotional characteristics in the adult voice when the characteristics of sung tones are kept constant and visual clues are eliminated. An accomplished singer was asked to denote a given emotion by presenting a single note sung on

10. G. W. Allport and H. Cantril, "Judging Personality from Voice," Journal of Social Psychology, V (1934), 37-55.
11. P. E. Vernon, "The Matching Method Applied to the Investigation of Personality," Psychological Bulletin, XXXIII (1936), 149-77.
12. P. J. Fay and W. C. Middleton, "Judgment of Emotional Balance from the Transmitted Voice," Character and Personality, X (1941), 109-13.
13. M. Schoen, The Psychology of Music, Pp. 89-103.
14. M. Sherman, "The Emotional Character of the Singing Voice," Journal of Experimental Psychology, XI (1928), 495-97.

the fundamental "E" with the syllable "Ah" at intervals of one second between five repetitions. The emotions which the vocalist intended to convey were surprise, fear-pain, sorrow, and anger-hate. About a minute was allowed for the observer to write the name of the emotion which the note seemed to him to express. The observers were told beforehand that the vocalist would attempt to convey four different and distinct emotions, but these were not named.

In order to determine the influence of pitch, the series of notes was repeated on the fundamental "A." In order to ascertain whether a melodic sequence of notes is emotionally significant the notes were combined into a melody in the following sequence: "abcbabcdedbca." The melody was first presented as a whole in the key of A-major and then repeated in the key of A-minor. Finally, the first five notes of the melody were presented, first in A-major and then in A-minor. The observers were thirty graduate students in psychology.

Sherman concluded that the emotional character of the adult singing voice can sometimes be apprehended from the qualitative character of the voice, without the aid of outside clues. The results of this study indicated a close correspondence between the reports of the observers and the emotions which the vocalist intended to convey when sorrow and anger-hate were in question. Fear-pain was less well conveyed and there was little agreement in surprise. Eighteen emotions were named from the notes sung upon the

fundamental "E" and fourteen from "A," where the vocalist intended but four. The reports were not materially altered by the change in pitch. A sequence of notes, therefore, whether in the form of melody or the repetition of a single note may convey emotional significance to the listeners.

In 1937, Rigg[15] reviewed the following investigation: Twenty phrases of instrumental music were played to about one hundred auditors, who recorded the emotions suggested, first without any check list, then with a list of possible answers. Phrases suggesting joy and lamentation were consistently interpreted without a check list; phrases suggesting sorrowful longing, hopeful longing, and love were consistently interpreted only when these terms appeared in a check list. Six musical phrases written for the experiment produced clearer results than those taken from musical classics.

In 1940, the same investigator[16] reported the results of a study on the expression of meanings and emotions in music. He found that fast tempo, high register, and the major mode tend to suggest joy, and their opposites to suggest sorrow. Staccato notes indicate gaiety or agitation, as the passage is otherwise joyful or sorrowful.

In 1938, Fairbanks and Pronovost[17] presented the results

15. M. Rigg, "What Features of a Musical Phrase have Emotional Suggestiveness?" Psychological Bulletin, XXXIV (1937), 756 (A).

16. M. Rigg, "The Expression of Meanings and Emotions in Music," Psychological Bulletin, XXXVII (1940), 556 (A).

17. G. Fairbanks and W. Pronovost, "Vocal Pitch During Simulated Emotion," Science, XXCVIII (1938), 382-83.

of a study of vocal pitch during simulated emotion in which the effectiveness of the simulations was measured. Identical reading material was presented by six competent amateur male actors to portray each of the following emotional states: Contempt, Anger, Fear, Grief, and Indifference. Phonograph records of the readings were made. These recordings were played before a group of sixty-four observers in whose hands had been placed a check list of twelve emotional states, among which appeared the five being studied. This list included: Amusement, Anger, Astonishment, Contempt, Doubt, Elation, Embarrassment, Fear, Grief, Indifference, Jealousy, and Love. The observers were asked to select from the list the terms which named most accurately the emotion being simulated as each recording was played. A random order of presentation was used. The results in terms of the percentage of the observers able to identify the simulated emotions are contained in Table I.

In 1939, Dusenbury and Knower[18] measured the extent to which the human voice can communicate meaning in the expression of various emotional states. The procedure is indicated as follows:

> Twenty-two records were made on which students and instructors in the department of speech attempted to record a vocal quality and pattern indicative of

18. D. Dusenbury and F. H. Knower, "A Study of the Specificity of Meaning in Abstract Tonal Symbols," Quarterly Journal of Speech, XXV (1939), 67-75.

TABLE I*

PERCENTAGE OF CORRECT IDENTIFICATIONS BY OBSERVERS OF EMOTIONS SIMULATED BY THE SIX SUBJECTS

	Subjects						
	I	II	III	IV	V	VI	A.M.
Contempt	73	80	94	92	78	89	84
Anger	73	68	78	76	77	98	78
Fear	33	52	89	92	37	95	66
Grief	73	53	94	91	84	72	78
Indifference	91	94	86	88	80	89	88
A.M.	69	69	88	88	71	89	79

* G. Fairbanks and W. Pronovost, "Vocal Pitch During Simulated Emotion," Science, XXCVIII (1938), p. 383.

> eleven emotional conditions. They repeated letters of the alphabet from "A" to "K" in each vocal expression. No specific instructions were given for formulating these expressions. The performers were asked only to try to feel the designated emotional state and to use a tonal pattern which would indicate their feelings while articulating letters of the alphabet. Expressions varied in time length from five to ten seconds.
>
> A small group of subjects judged these twenty-two records and on the basis of these preliminary judgments, eight of the best records were selected for the major investigation. Four were records of men and four were made by women . . .19

The recorded material was presented to four groups of subjects. We will consider, here, only the first two groups. Group I consisted of 294 students in the department of speech; Group II consisted of ninety-four students in the department of psychology.

The observers were presented with a score sheet containing eleven groups of terms, each group containing three somewhat similar terms.[20] Before each presentation of recordings, a number was announced for each expression. The observers were then directed to listen to the repetition of the alphabet, to decide what emotion the reader intended to express, and to indicate the choice by putting the number of the emotion opposite the appropriate group of feelings or emotional names. The combined results of Groups I and II indicate that men's judgments of male voices were 81 per cent accurate; of female voices 80 per cent accurate. Women's judgments of male voices

19. D. Dusenbury and F. H. Knower, "A Study of the Specificity of Meaning in Abstract Tonal Symbols," Quarterly Journal of Speech, XXV (1939), 67-75.

20. Appendix A.

were 86 per cent accurate; of female voices 84 per cent accurate.

In 1941, Knower[21] made additional experimental variations of the study just reviewed. The present study was undertaken to determine some of the effects on specificity of recognition of such emotional expressions when inflection patterns and fundamental frequencies are modified or obliterated. A male and female voice respectively were used for each of the following recordings:

> Eight records were made of the tonal expression of the simulated emotional states studied by Dusenbury and Knower . . .
>
> In making the first two records, the performers were requested to look at the cue sheet, call out a number between one and eleven to designate the emotion to be expressed, and then express the emotion as they might in responding to a cue line in a play . . .
>
> The third and fourth records were made in the same manner except for the fact that the performers were instructed not to permit any phonation, but to depend entirely for the communication upon a whispered expression of the indicated emotions . . .
>
> The fifth and sixth records for the project were made directly from the first two by a process of re-recording in which the tonal patterns as portrayed on the first record were reversed . . . The numbers which designated the various expressions on the first records were eliminated, and new numbers spotted in on the new records to provide intelligible cues for identification in judging . . .
>
> The same type of reversal was carried out on the third and fourth records in making the seventh and eighth records . . .

21. F. H. Knower, "Analysis of Some Experimental Variations of Simulated Vocal Expressions of the Emotions," Journal of Social Psychology, XIV (1941), 369-72.

> In order to provide a check on the constancy of the data obtained in the comparative identification of the expressions under these conditions, six additional records were made. The same performers who made the first four records were used to make another set as nearly like the first set as possible. The tonal expressions of the second set were also reversed in the manner of the fifth and sixth records . . .[22]

All these records were presented to 297 observers, and the results are expressed in Table II.[23]

TABLE II

PERCENTAGES OF RECOGNIZED SPECIFICITY IN VOCAL EXPRESSION OF THE EMOTIONS

Types of Expressions	First Performance			Second Performance		
	Female	Male	Av.	Female	Male	Av.
Voices Forward	91	87	89	80	79	79
Whispered Forward	43	71	57	44	63	54
Voices Reversed	41	45	43	35	48	42
Whispered Reversed	26	19	23			

Knower concludes that both tonal elements and sequential pattern contribute to the identification of emotional expressions. Of the two factors under consideration, sequential pattern appears to contribute more to communicative effectiveness than do the tonal elements of the voice as such.

22. F. H. Knower, "Analysis of Some Experimental Variations of Simulated Vocal Expressions of the Emotions," Journal of Social Psychology, XIV (1941), 369-72.

23. F. H. Knower, "Analysis of Some Experimental Variations of Simulated Vocal Expressions of the Emotions," Journal of Social Psychology, XIV (1941), p. 371.

Nevertheless, the fact that reversed whispered expressions were recognized with greater than chance frequency suggests that physical attributes other than characteristic sequential patterns, frequencies, and qualities made significant contributions to the effectiveness of communication in the expressions studied.

In 1942, Campbell[24] investigated basal emotional patterns as expressed in music. Seven emotional categories were selected: Gayety, Joy, Yearning, Sorrow, Calm, Assertion, and Tenderness. Then musical compositions were selected to illustrate or express the emotional categories. The selection of compositions was based upon the opinions of musical critics and the opinion of the investigator. Some of the compositions chosen were vocal selections. This material was then grouped into three series. Series A consisted of folk songs from Scotland, Russia, Austria, France, the Ukraine, Norway, and Germany. Series B consisted of folk songs from Esthonia, Norway, Ireland, the Netherlands, the Ukraine, Russia, and Belgium. Series C consisted of various classical compositions.[25]

24. Ivy G. Campbell, "Basal Emotional Patterns Expressible in Music," American Journal of Psychology, LV (1942), 1-17.

25. A list of these compositions may be found in Appendix B.

The method of presentation was as follows:

Forty Os -- 20 seniors and 20 freshmen of Well's College -- served in these experiments. The two groups of folk songs (with which the Os were unfamiliar) were given at one sitting, the group of classical compositions at a later one. The selections were played each time before a group of 10 Os in the music room at the home of the writer . . . . After the Os were comfortably seated out of sight of the player (pianist), they were told that seven musical selections would be played, each one of which was supposed to have a definite emotional expressiveness. This expressiveness would in each case be one from a list of seven emotions represented by the key terms on the visible part of a folded paper. They were instructed to check, after the playing of each piece, the term which they thought best represented what the music expressed. They were told that there would be one piece for each class, and that although they were to check after the playing of each piece, they could at any time during or immediately after the series change their checkings. In order to make the meanings of the seven terms as nearly identical as possible . . . definitions were read aloud twice . . . before the playing began.

When the Os felt sure they understood the terms, several preliminary pieces were played without discussion as to what they expressed, to acquaint them with the nature of the experiment. After this the experiment proper began. In the case of the folk songs, first the melody was played without accompaniment, then with accompaniment. The checking was made after the second playing of each piece. When the playing and checking of Series A - called, at this first presentation, Series A_1 - had been completed, the Os were asked to unfold their papers and to notice the further printed classification (a list of synonyms for each of the seven terms used).

The pieces were then played twice again in the same manner and order as in the first part of the experiment, the Os having been told that this time they were to check that one of the adjectives which best described the particular kind of gayety, etc., which they had judged the piece expressed.

> Series B was then presented in the same manner as the first series, this time the Os checking both the key terms and the adjectives under them at the same playing. After Series B had been completed Series A was given again - this time called Series A_2 - only the key terms being checked. The order of the pieces was changed . . . .
>
> The series of piano selections, Series C - called at its first presentation C, was given on another day, the method being the same as that for the series of folk songs except that here the two playings were of the music as written and only the key terms were checked. The series was repeated - called Series C_2 - after a rest period of 5 minutes, the order of the pieces was changed . . . .[26]

The results of this study[27] show that the average agreement for Series A_1 and A_2 was above 58 per cent for every emotional category with the exception of Yearning - the range being from 58.7 per cent to 98.7 per cent. In Series B three categories - Yearning, Sorrow, and Calm - are considerably below 55 per cent agreement; all the others range from 55 per cent to 95 per cent agreement. The averages of the two presentations in Series C gave, for every category except Yearning and Sorrow, agreement of over 53 per cent, ranging from 53.4 per cent to 93.1 per cent. Though the agreement among the Os for Yearning and Sorrow improved in the second presentation (Series C_2) the percentages were still too low to be regarded as significant.

26. Ivy G. Campbell, "Basal Emotional Patterns Expressible in Music," American Journal of Psychology, LV (1942), 1-17.

27. Because of its extreme length the table of results for this study may be found in Appendix C.

Campbell draws the following significant conclusions:

1. Certain categories - Yearning, Tenderness, Calm - showed considerable confusion. This confusion seemed to be due to the failure of certain selections clearly to express the category intended, and to the difficulty of differentiating these three categories as compared to the other four categories.

2. On sub-divisions within each category there were no agreements by a substantial majority. This seemed to substantiate the investigator's suggestion that music expresses much more clearly broad fundamental emotional patterns than it does distinction of emotional aspects within these patterns.

3. Training, as interpreted in the experiment, gave no advantage to its possessors in accuracy of judgment.

4. Seniors proved slightly superior to freshmen, a superiority which may be due to greater experience rather than to mere age.

5. The differentiation of certain categories may call for greater musical sensitiveness than does that of others.

6. It is better to classify the emotions expressible in the music into a small number of categories rather than a long list of adjectives[28].

28. Campbell's suggested categories of emotional expression may be found in Appendix D.

CHAPTER II

NATURE OF THE PRESENT STUDY

The basic purpose of this study is to determine the consistency with which a group of observers identify various vocal expressions of emotion[1]. This investigation is similar to the studies reviewed in the previous chapter in being a study of reliability, that is, in attempting to determine the amount of agreement among a group of subjects, as well as the individuals' agreement with themselves in identifying emotions expressed by the human voice. But, it differs from previous studies in that all the experimental material used herein combines the singing voice and instrumental music. Some of the previous studies used single tones or combinations of simple tones, spoken and sung[2]; some used a total pattern of speech[3]; one used instrumental music[4]; and one used musical selections, some of which contained vocal passages[5]. Since these methods have produced significant results, a study which emphasizes the singing voice with instrumental accompaniment should also produce significant results.

Description of the Subjects

The group cooperating in this study was composed of

1. Emotional expression, or the expression of emotion, is taken to mean any affective tonal expression which flows from simple or complex feeling states, the basic emotions, or emotional complexes.
2. Sherman, p. 3 ff., Dusenbury and Knower, p. 6 ff., in this thesis.
3. Fairbanks and Pronovost, p. 5 ff., in this thesis.
4. Rigg, p. 5 in this thesis.
5. Campbell, p. 10 ff., in this thesis.

thirteen graduate students, thirty-one seniors, twenty juniors, eight sophmores and three freshmen attending the University of Detroit, making a total of seventy-five subjects. Sixty of the group were men and fifteen were women. The age range of the group was thirty-two years, the oldest subject was fifty, the youngest eighteen, and the mean age was twenty-seven. All but one of the subjects had taken courses in psychology prior to this study. The average number of hours in psychology was eight, with a range from three hours to fifty-six hours. Twenty-eight students had no appreciable knowledge of a foreign language, but the rest were familiar with one or more of the following foreign languages: French, German, Italian, Latin, Polish and Spanish. Twenty-one had musical training and/or a course in music appreciation. The subjects were tested in the music room of the University in four unselected groups and had no previous knowledge of the purpose of the investigation.

Materials

The materials used in the study consisted of: 1) a one-page questionnaire of musical preference, musical knowledge, and general information (Appendix E); 2) a four-page experimental form containing directions, emotional terms, and pertinent questions (Appendix F); 3) five operatic arias[6]

6. Translations of the librettos may be found in Appendix G.

on wire recorder, including:

a) Sigmund's Love Song -- Act I -- Die Walkyre -- Wagner
b) Clock Scene -- Act II -- Boris Godounoff -- Moussorgsky
c) Othello's Vow -- Act II -- Othello -- Verdi
d) Iago's Credo -- Act II -- Othello -- Verdi
e) Una Furtiva Lagrima -- Act II -- Elixir of Love -- Donizetti

Procedure

The subjects were instructed to fill in the pre-experiment questionnaires. When these were completed, they were collected and the check list forms were distributed. The investigator reviewed the directions with each group, and explained the purpose of the check list, thus:

> You are about to hear, on recording, a number of vocal selections with musical accompaniment that are supposed to express various emotions or feelings. Each vocal selection will be identified on the recording by a letter of the alphabet, A, B, C, D, etc. Immediately following these directions you will notice a series of terms indicating various emotions or feelings grouped under various letters of the alphabet[7]. You are to listen to the vocal selection identified as "selection A" on the recording. Then place a check-mark after the term in Group "A" on the check list which you feel identifies the emotion or feeling being expressed in selection "A." N.B.: Check only one term. You are then to listen to the vocal selection identified as "selection B" on the recording, and place a check-mark after the term in Group "B" on the check list, which you feel identifies the emotion or feeling being expressed in selection "B," and so forth until all are completed. Ample time will be allowed between the presentations of vocal selections for you to answer the questions following each group of emotional terms.

7. The terms used in each group of the check list were: Love, Happiness, Surprise, Fear, Anger, Suffering, Determination, Disgust, and Contempt. If the subjects felt that none of the terms in the check list clearly indicated the emotion being expressed, they were asked to select a term on the check list which at least approximated the emotion being expressed.

Selection "A," "Sigmund's Love Song," intended to express Love, and lasting two minutes and fifty seconds, was presented and time was allowed for answering the questions in group "A." The same procedure was followed for selection "B," "The Clock Scene," intended to express Fear and lasting one minute and thirty-five seconds; for selection "C," "Iago's Credo," intended to express Contempt and lasting two minutes and twenty-five seconds; for selection "D," "Una Furtiva Lagrima," intended to express Suffering and lasting one minute and twenty-five seconds; and for selection "E," "Othello's Vow," intended to express Anger and lasting one minute and seventeen seconds.

These five arias were presented again immediately as selections "F," "G," "H," "I," and "J," but the order of the intended emotions was changed to Fear, Love, Anger, Contempt, and Suffering, respectively. In order to prevent possible referral to an earlier choice by the subjects, the check lists for the first playing of the five arias were collected before the second playing began.

CHAPTER III

RESULTS AND CONCLUSIONS

Group Results

When the entire group of subjects had completed the check lists, the individual judgments were recorded by number for the two playings of the five intended emotions. Then data were collected into two tables, the first of which indicated the frequency with which the subjects placed the five emotional expressions in any one of the nine possible categories, during the first and second playings (Table III); the second of which indicated the average frequency with which the subjects placed the five emotional expressions in any one category (Table IV).

A rapid inspection of Table III indicates a certain consistency in the judgments of emotional expressions. There is also a noticeable shift in agreement for certain categories when the first playing and the second playing are compared. The significance of agreement and the reasons for it, as well as the possible reasons for the shift in agreement will be considered shortly. But, in order to get an accurate idea of the degree of consistency evidenced by the group, an investigation and interpretation of Table IV must be made first.

An inspection of Table IV shows that the average frequency with which the vocal selections were classified tends to fall mainly into one or two categories rather than

TABLE III*

DISTRIBUTION OF JUDGMENTS
FOR VOCAL SELECTIONS

Emotional Terms	Frequency of Emotional Terms Selected ** First Playing					Second Playing				
	1	4	5	6	9	1	4	5	6	9
1. Love	19	0	1	35	3	39	0	0	35	5
2. Happiness	3	0	4	4	12	17	0	6	5	2
3. Surprise	0	2	4	0	5	3	6	6	0	3
4. Fear	1	36	2	3	1	0	36	1	0	2
5. Anger	3	11	32	0	9	0	2	21	0	11
6. Suffering	20	8	3	31	5	5	10	6	35	16
7. Determination	28	10	16	0	21	8	6	22	0	13
8. Disgust	0	3	3	2	8	3	9	5	0	11
9. Contempt	1	5	10	0	11	0	6	8	0	12
	75	75	75	75	75	75	75	75	75	75

* The following are the minimum frequencies required for significance:

at .1% - 17
at 1% - 15
at 2% - 14
at 5% - 13

** 1. Love
4. Fear
5. Anger
6. Suffering
9. Contempt

TABLE IV*

AVERAGE DISTRIBUTION OF JUDGMENTS
FOR VOCAL SELECTIONS

Emotional Categories	Average Frequency Of Emotional Terms Selected				
	1**	4	5	6	9
1**	29.5	0	.5	35	4
2	9.5	0	5	4.5	7
3	1.5	4	5	0	4
4	.5	36	1.5	1.5	1.5
5	1.5	6.5	26.5	0	10.
6	12.5	9	4.5	33	10.5
7	18	8	19	0	17
8	1.5	6	4	1	9.5
9	.5	5.5	9	0	11.5
	75	75	75	75	75

* The following are the minimum frequencies required for significance:

at .1% - 17
at 1% - 15
at 2% - 14
at 5% - 13

** These numbers symbolize the terms used in Table III. Cf. p. 20.

being evenly distributed over many categories, with the exception of the frequencies for Contempt. The subjects do not always agree that the selection chosen by the investigator expresses a certain emotion, but the fact that a certain number placed their judgments mainly in the same category or categories suggests that the selections may express a certain emotion. In order to evaluate properly the results, it is necessary, first of all to establish the extent to which these frequencies or agreements occur above chance, and then to consider the possible reasons for agreement in the various categories selected by the subjects.

Since for each subject in each selection there are nine categories from which to choose, the chances of his selecting a certain category are 1/9. Hence, for the whole group of subjects the theoretical frequency is 1/9 of 75 for each category or approximately eight. This is the frequency to be expected on the basis of chance. In addition, since the theoretical frequency is the same for each category, we may compute once and for all the figures which the obtained frequencies must equal or exceed if they are to be significant at the five per cent level, the two per cent level and so forth[1]. These frequencies are indicated below Tables III and IV.

In analyzing the average frequencies occurring for each

1. John T. Peatman, Descriptive and Sampling Statistics, p. 375.

intended emotion it can be seen that, in the column marked Fear, category four with an observed frequency of thirty-six is significant beyond the one tenth per cent level; that, in the column marked Suffering, category one with a frequency of thirty-five, and category six with a frequency of thirty-three, are significant beyond the one tenth per cent level; that, in the column marked Love, category one with a frequency of more than twenty-nine (29.5), and category seven with a frequency of eighteen, are significant beyond the one tenth per cent level; that, in the column marked Anger, category one with a frequency of more than twenty-six (26.5), and category seven with a frequency of nineteen, are significant beyond the one tenth per cent level; that, in the column marked Contempt, category seven with a frequency of seventeen is significant at the one tenth per cent level. The chances, then, that these obtained frequencies might be expected to occur on the basis of chance is one in one thousand.

Further evaluation of Table III, however, must be made in order to understand the way in which the frequencies and average frequencies were obtained for the various categories. The changes in frequency which occurred from the first to the second playing of each vocal selection suggest not only that some subjects disagreed with each other on the second playing, but also that many subjects may not have agreed with themselves in the second playing. Analysis of the data from which

Tables III and IV were formulated indicates the following consistencies and shifts in the judgments of the subjects for each vocal selection:

First Selection

1. Thirteen subjects consistently and correctly identified the first selection as Love for both playings.

2. Five subjects were consistent in identifying the selection as Determination and four subjects in identifying it as Suffering.

3. Thirteen subjects changed from Determination to Love, seven from Suffering to Love, three from Happiness to Love, two from Anger to Love, and one from Fear to Love.

4. Four subjects changed from Love to Happiness, one from Love to Surprise and one from Love to Determination.

5. The remainder of the group did not agree with the investigator's identification nor did they agree with themselves, but twelve of these changed from Suffering or Determination to Happiness.

Second Selection

1. Twenty-one subjects were correct and consistent in identifying this selection as Fear.

2. Four subjects were consistent in calling the selection Determination, two in calling it Suffering, one each in calling it Anger, Disgust, and Contempt.

3. Four subjects changed from Anger to Fear, four from

Suffering to Fear, three from Determination to Fear, two each from Disgust, Surprise, and Contempt to Fear.

4. Five subjects changed from Fear to Suffering, three each from Fear to Surprise, Disgust, and Contempt, and one to Anger.

5. The remaining subjects tended to select the lower third of the categories, but inconsistently.

Third Selection

1. Six subjects were consistent and correct in identifying this selection as Contempt.

2. Four subjects each were consistent in calling the selection Determination and Disgust, two each in calling it Suffering and Anger and one in calling it Happiness.

3. Three subjects changed from Determination to Contempt, and one each from Happiness, Surprise, and Suffering to Contempt.

4. One each changed from Contempt to Love, Surprise, Suffering, and Disgust, respectively.

5. Six subjects changed from Determination to Anger, five from Determination to Suffering, and three from Disgust to Suffering.

6. The remaining subjects placed the selection in every other category but Contempt, and with a frequency, in the majority of instances, of no more than one.

Fourth Selection

1. Twenty-one subjects were consistent and correct in identifying the selection as Suffering.

2. Twenty-four subjects were consistent in identifying the selection as Love, and two in identifying it as Happiness.

3. Nine subjects changed from Love to Suffering, and two each changed from Happiness and Anger to Suffering.

4. Seven subjects changed from Suffering to Love, and three changed to Happiness.

5. The remaining subjects changed to Love, two from Disgust and one from Anger.

Fifth Selection

1. Five subjects were consistent and correct in calling this selection Anger.

2. Eight subjects were consistent in calling the selection Determination, three in calling it Contempt, and one each in calling it Fear and Happiness, respectively.

3. Three subjects changed from Determination to Anger, two each from Surprise and Contempt, and one each from Love, Happiness, and Suffering to Anger.

4. Eight subjects changed from Anger to Determination, five to Contempt, four to Surprise, two to Suffering and one each to Happiness and Disgust.

5. Determination was strengthened by the change of three from Happiness, two from Suffering, two from Contempt and

one from Disgust. Happiness, however, gained three from Determination and one from Surprise. The remaining few showed no definite trend toward a specific area of the emotional categories.

Finally, since the category Love was identified quite frequently in response to two separate intended emotions, it might be noted that eight subjects who were consistent in calling the first selection Love, were consistent in calling the fourth selection Suffering. Two who were consistent in calling the first Love, were consistent in calling the fourth Love, and two who were consistent in calling the first Suffering, were consistent in calling the fourth Love.

Subjects' Consistency with Themselves

In addition to determining group agreement in judging the vocal selections, it is necessary to establish the consistency with which each subject identified the vocal selections. Since a number of subjects could place a selection in category one after the first playing and in category two after the second playing, and yet another group could place a selection in category two after the first playing and in category one after the second playing, a relatively high level of group agreement could be obtained for each vocal selection without obtaining a comparable level of individual consistency. Each subject was required to identify five vocal selections twice, and the total number of times he placed each selection

in the same category twice is a measure of his consistency.

Table V indicates the consistency of the subjects with themselves in identifying the vocal selections. An analysis of this table shows that one subject was consistent with himself five times, six subjects were consistent with themselves four times, nineteen subjects were consistent three times, twenty subjects were consistent twice, and eighteen subjects were consistent once.

Eleven subjects showed no consistency with themselves in identifying the vocal selections. A total of twenty-six subjects or one third of the group agree with themselves at least three out of five times. The totals in Table V show that the subjects as a group agreed with themselves 142 times and disagreed 233 times. In order to interpret these data more accurately, it is necessary, first of all, to determine the degree of probability that the consistency evidenced here could have happened by chance. This was done by determining the consistencies which should have occurred had the judgments been made on the basis of chance and by applying chi-square to the distributions.

In the present study the subjects were provided with a check list of nine categories. With respect to the first playing of the vocal selections, it makes no difference what category is chosen by the subject. In as far as subsequent agreement is concerned the chances are one in one that his choice will permit subsequent agreement. In the second play-

TABLE V

FREQUENCY OF AGREEMENT AND DISAGREEMENT
CLASSIFIED ACCORDING TO SUBJECTS

Os		Agree	Disagree	Os		Agree	Disagree
1	***	1	4	39		1	4
2	***	2	3	40		1	4
3		2	3	41		2	3
4	**	0	5	42		2	3
5		0	5	43		0	5
6	**	4	1	44	***	0	5
7		4	1	45		2	3
8		2	3	46	*	4	1
9		1	4	47		2	3
10	**	0	5	48		1	4
11		2	3	49		2	3
12		3	2	50		3	2
13		3	2	51	**	1	4
14		4	1	52		3	2
15		2	3	53		1	4
16		2	3	54		2	3
17		1	4	55	**	0	5
18		2	3	56		3	2
19		0	5	57	*	0	5
20		3	2	58		3	2
21	**	2	3	59		5	0
22		2	3	60		3	2
23	**	1	4	61	***	1	4
24		3	2	62		1	4
25		3	2	63	**	2	3
26	***	3	2	64		1	4
27		2	3	65	*	1	4
28		1	4	66		0	5
29	***	1	4	67		1	4
30	**	3	2	68		0	5
31		4	1	69		3	2
32		2	3	70		3	2
33		3	2	71		4	1
34		3	2	72		2	3
35		3	2	73	***	3	2
36	**	3	2	74		0	5
37		2	3	75		1	4
38	***	1	4				
Total		Agree:	142		Disagree:		233

* Indicates at least 1 year of music appreciation.
** Indicates at least 2 years of musical training.
*** Indicates at least 1 year of music appreciation and two years of musical training.

ing, there is only one chance in nine of agreement, since the selection has already been put in one of the nine categories. Hence, for any one selection the probability of agreement is 1/9. But there are five selections, thus five opportunities of realizing this one chance in nine. Therefore, the probability of agreement for the entire playing of five selections twice for any one subject is 5/9. Since there are seventy-five subjects, each of whom has five chances in nine of agreement, the chance expectancy for all subjects is 5/9 x 75 or forty-two. On the basis of chance alone, therefore, there should be forty-two agreements for all the selections by all the subjects. Chi-square for the totals of agreement and disagreement is 268.13, and is significant at the one tenth per cent level.

It should be noted that Table V does not show how con-

TABLE VI

THE FREQUENCY OF AGREEMENT AND DISAGREEMENT CLASSIFIED AS TO INTENDED EMOTIONS

Intended Emotions	Agree	Disagree
Suffering	47	28
Fear	30	45
Anger	24	51
Love	22	53
Contempt	19	56
	142	233

sistent the subjects were in regard to each vocal selection. Table VI presents a grouping according to the intended emotions and lists the number of subjects who agreed with themselves in both placements while judging each vocal selection.

It should be emphasized further that Table VI does not signify, for example, that forty-seven subjects agreed with themselves in identifying selection number six as Suffering; rather it means that forty-seven subjects, however they identified the selection, assigned it to the same category on the second playing, to which they had assigned it on the first playing. A review of the data already developed shows that twenty-one subjects agreed with themselves in naming the selection Suffering, twenty-four subjects agreed with themselves in naming the selection Love, and two subjects agreed with themselves in naming the selection Happiness[2].

Table VI reveals that the number of subjects showing consistency in the designated categories is lower than the number showing inconsistency in the designated categories, with the exception of the category called Suffering. This does not mean however that the consistencies obtained have no significance. To interpret these data properly it is necessary to determine the degree of probability that the consistency found could have happened by chance. This was done by determining the consistencies which should have occurred

2. The categories designated for the remaining intended emotions can be found on p. 24 ff.

had the judgments been made on the basis of chance, and applying chi-square to the distribution.

For each subject in each selection there are nine categories from which to choose. With respect to the first playing it makes no difference what category is chosen by the subject. With respect to subsequent agreement, the chances are one in one that his choice will permit subsequent agreement. In the second playing, there is only one chance in nine of agreement. Hence, for any one selection the probability of agreement is 1/9, and for the whole group of subjects the theoretical frequency is 1/9 of 75 for each category or approximately eight.

Table VII shows the observed and theoretical frequencies for each intended emotion. Column four of this table lists the chi-square values for each emotion. Each of these values is significant beyond the one tenth per cent level, which means that by chance alone such values would not occur with greater frequency than one in a thousand in random sampling.

Finally, musical education does not seem to give an advantage in identifying these selections. Of the twenty-one subjects having had courses in music appreciation or musical training or both, only four agreed with themselves more frequently than they disagreed in identifying the selections (Table V).

With regard to recognition of the selections used: on the first playing, eight subjects recognized the first

TABLE VII

THE SIGNIFICANCE OF FREQUENCY OF AGREEMENT AND DISAGREEMENT IN JUDGMENT OF INTENDED EMOTIONS

Intended Emotions	Agreement	Disagreement	χ^2	Percent Level of Significance
Love (1)				
fo*	22	53		
ft**	8	67	27.4	.1%
Fear (4)				
fo	30	45		
ft	8	67	67.52	.1%
Anger (5)				
fo	24	51		
ft	8	67	35.08	.1%
Suffering (6)				
fo	47	28		
ft	8	67	234.2	.1%
Contempt (9)				
fo	19	56		
ft	8	67	16.18	.1%

* fo Indicates the frequency of the sample or the observed frequency.

** ft Indicates the theoretical frequency or the expected frequency.

selection, one the second, three the third, twenty the fourth, and four the fifth; in the second playing, thirty recognized the first selection, twenty-three the second, twenty-two the third, thirty-five the fourth, and twenty-two the fifth selection.

Conclusions

The basic purpose of this study was to measure the consistency with which observers could identify the vocal expression of emotions. The results show that the vocal expressions of emotion used in this study were placed in certain emotional categories with a consistency that is significant beyond the one tenth per cent level. The results also show that the subjects placed the vocal selections in certain emotional categories with a frequency that is significant at or beyond the one tenth per cent level. With respect to the consistency of the subjects in placing the selections in certain emotional categories, and the frequency with which certain categories were selected, what more specific conclusions can be drawn?

The selection called Love was judged by more than twenty-nine subjects on the average (thirty-nine per cent) to express Love, and judged by eighteen on the average (twenty-four per cent) to suggest Determination. Thirteen subjects were consistent in calling the selection Love, five in calling it Determination, and four in calling it Suffering.

Thirteen subjects changed from Determination to Love and seven from Suffering to Love. Seven subjects changed from Suffering to Happiness and five from Determination to Happiness. A comparison of the results in Table III for the two playings of this selection shows a definite shift of frequency in the second playing from Suffering and Determination to Love and Happiness. The change in frequency is more noticeable in response to this selection than to any other and may have been caused by the fact that this was the first selection played. For all other selections the subjects had some practice in identifying at least one previous selection, and when this selection called Love was presented in the second playing the subjects had a greater opportunity for comparative judgment, that is they had heard selections intended to express Love, Fear, Contempt, Suffering, Anger and a second playing of the Fear selection. Since the directions suggested that the vocal selections were supposed to express various emotions, the previous judgments might have had some influence on the frequencies obtained in the second playing of the Love selection.

In this regard, it might be noted that another selection, intended to express Suffering, was frequently identified as Love. A comparison of the responses to the selection called Love and the selection called Suffering, reveals that eight subjects who identified the Love selection as Love in both playings identified the selection called Suffering as

Suffering, and only two who consistently called the Love selection Love called the Suffering selection Love.

It may be, therefore, that a true indication of what the first selection expressed may be found in the second playing (Table III) instead of in the average of the two playings (Table IV). Considering the shift in frequency from Determination and Suffering to Love, and from Determination and Suffering to Happiness, this selection might more properly be designated Love-Happiness rather than Love alone. The nature of the dramatic situation from which this selection was taken (Appendix G) seems to support the above conclusion.

In response to the selection called Fear, thirty-six subjects, on the average, (forty-eight per cent) identified the selection as Fear, and twenty-one subjects were consistent in this identification. No other emotional category was selected for this selection with a frequency having significance at even the five per cent level. It might be noted, further, that the majority of remaining frequencies for this selection are distributed in the lower half of the column in Table III and in Table IV. Does this signify that these categories may have a pattern of vocal expression that is similar to Fear? This study does not provide the answer, since none of the lower categories has a significant frequency. Yet a small number of subjects consistently selected categories six, seven, eight or nine in response to this

selection. If the subject population were larger the results might favor these categories as well as Fear. In any event, more individuals judged the vocal selection to express Fear, rather than any other emotion.

The selection called Suffering, by contrast, was identified as Love with an average frequency of thirty-five (forty-six per cent), and as Suffering with an average frequency of thirty-three (forty-four per cent). Twenty-four subjects consistently called the selection Love and twenty-one consistently called it Suffering. Nine subjects changed from Love to Suffering and seven from Suffering to Love. Four subjects knew the name of this selection or the author's name during the first playing and twenty subjects indicated that they had heard the selection before, but this recognition did not seem to influence the results to any great extent.

The factors of consistency and shift in the categories of Love and Suffering suggest that this selection may express two emotions, rather than one; or it may mean that Love and Suffering when expressed vocally have a common pattern in certain situations. The libretto (Appendix G) seems to suggest unrequited love or a love situation involving suffering. It has also been suggested that the style of many popular love songs might influence the response to this selection. But the vocal selection chosen seems to indicate both Love and Suffering, and might better be designated as such.

The selection called Anger was judged by more than twenty-six subjects, on the average (thirty-five per cent)

to express Anger, and judged by nineteen, on the average (twenty-five per cent), to express Determination. Only five subjects were consistent in calling it Anger, eight were consistent in calling it Determination, three in calling it Contempt, and one each in calling it Fear and Happiness, respectively. Three subjects changed from Determination to Anger, and two each changed from Surprise and Contempt, respectively. Eight subjects changed from Anger to Determination, five from Anger to Contempt, and four from Anger to Surprise. Table III clearly shows that the second playing of the selection favored Determination rather than Anger. Here, again, the libretto suggests that the intended emotion might more correctly be called Anger-Determination rather than Anger alone. A slightly higher level of consistency favors Determination, and more subjects changed from Anger to Determination than changed from Determination to Anger.

In the last selection, called Contempt, seventeen subjects, on the average (twenty-three per cent), called it Determination. This was the only frequency that was significant (Table IV). However, a frequency occurring in the second playing (Table III) indicates that this selection may express Suffering as well as Determination (beyond the one per cent level). The spread of obtained frequencies and the low degree of consistency suggest that Contempt may be a difficult emotion to express vocally, and to identify, when it is expressed. A cautious interpretation would seem to be,

that the selection does not express a definite emotion.

The spread of the frequencies in Table III and IV as well as the consistencies indicated in Table VI suggest, that for this group of subjects Love, Anger, and Contempt were not clearly identified: 1) because the selections chosen expressed more than one emotion; or 2) because the selections do not adequately express the intended emotions; or 3) because the identification of certain selections may require a greater tonal sensitivity.

Finally, though the frequencies obtained in this study are not nearly as high as the results reported in related studies (Chapter I), the vocal selections used were identified by the group of subjects with a consistency significant beyond the one tenth per cent level. The total agreements in Table V and the agreements in the categories selected by the investigator in Table VII show that the subjects were consistent with themselves and as a group in identifying the emotions used. The subjects were consistent in identifying the selection called Suffering forty-seven times, the selection called Anger twenty-four times, the selection called Love twenty-two times, and the selection called Contempt nineteen times. In responding to each of the selections the subjects were consistent, therefore, in identifying the various vocal selections presented to them with a significance beyond the one tenth per cent level.

CHAPTER IV

SUMMARY

1. The purpose of this study was to determine the consistency with which observers could identify vocal expressions of emotion.

2. Previous studies of emotional expression using musical tones, instrumental music, and the speaking voice alone or in combination with music had produced significant results, hence a further study using the singing voice with instrumental accompaniment should also produce significant results.

3. The subjects, seventy-five students of the University of Detroit, were requested to complete a musical questionnaire concerning musical education and training, musical preference, and other pertinent information.

4. The subjects were then presented with a check list of nine emotional terms: Love, Happiness, Surprise, Fear, Anger, Suffering, Determination, Disgust, and Contempt.

5. Five operatic arias intended to express Love, Fear, Anger, Suffering, and Contempt were presented on recording to the subjects.

6. The vocal selections were presented twice in different order to the same group of subjects.

7. Analysis of the subject population revealed that:

a. The subjects, consisting of Freshmen, Sophmores, Juniors, Seniors and Graduate students, ranged in age from eighteen to fifty with a mean age of twenty-seven. Sixty of the group were men and fifteen were women.

b. Twenty-one subjects had more than a year of musical training or musical appreciation or both.

c. The group had an average of eight hours in psychology with a range from none to fifty-six hours.

d. Twenty-eight students had no appreciable knowledge of a foreign language, but the rest were familiar with one or more foreign languages, especially French, German, Italian, Polish, and Spanish.

8. Analysis of the results indicated that:

a. The five vocal selections of emotion were identified with an average frequency, which though not extremely high, was significant at or beyond the one tenth per cent level.

b. In establishing the average frequencies, however, the subjects did not always agree with the investigator in identifying each selection. The first selection, Love, was identified as Love and Happiness by the subjects with significant frequency;

the second selection, Fear, was identified as Fear with significant frequency; the third selection, Anger, was identified as Anger and Determination with significant frequency; the fourth selection, Suffering, was identified as Suffering and Love with significant frequency; the fifth selection Contempt, was identified as Determination with significant frequency.

c. The entire group of vocal selections was identified by the subjects with a consistency from one playing to the next which was significant beyond the one tenth per cent level.

d. Each vocal selection was identified by the subjects with a consistency from one playing to the next which was significant beyond the one tenth per cent level.

e. The rank order of the selections in terms of consistency was as follows: Suffering, Fear, Anger, Love, and Contempt.

f. Certain vocal expressions may have indicated two emotions rather than one; Suffering: Suffering-Love; Anger: Anger-Determination; Love: Love-Happiness.

g. Musical knowledge did not serve as an advantage in the identification of the vocal selections.

9. In conclusion, this study indicates that the singing voice conveys specific emotions. The observers cooperating in this investigation did not unanimously place each vocal selection in the desired emotional category, nor in any specific emotional category, but in general the subjects did place each selection in one or two emotional categories with a consistency well above chance. Although the level of agreement, from individual to individual, from selection to selection, and for the group as a whole, was not as high as that obtained in some related studies of vocal expression, the subjects showed a consistency that was significant beyond the one tenth per cent level.

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APPENDIX A

The Groups of Emotional Terms Used by Dusenbury and Knower

1. Religious Love
   Reverence
   Awe

2. Anger
   Hate
   Rage

3. Laughter
   Glee
   Merriment

4. Amazement
   Astonishment
   Surprise

5. Torture
   Great Pain
   Suffering

6. Sneering
   Contempt
   Scorn

7. Sadness
   Grief
   Crying

8. Fear
   Terror
   Horror

9. Determination
   Stubbornness
   Firmness

10. Doubt
    Hesitation
    Questioning

11. Pity
    Sympathy
    Kind
      Helpfulness

APPENDIX B

Musical Compositions Selected by Campbell To Illustrate Emotional Categories

Series A (Folk Songs)

1. Assertion, Down the Volga - Russian
2. Yearning, Hebrides Love Lilt - Scottish
3. Joy, What Wonders Fill the Sky - Austrian
4. Calm, Les Commandements de Dieu - French
5. Sorrow, Cossack's Lament - Ukranian
6. Gayety, Pool Paa Hangje - Norwegian
7. Tenderness, On the Mountain - German

Series B (Folk Songs)

1. Sorrow, Moan to the Moon - Esthonian
2. Tenderness, Baadn-Laatt - Norwegian
3. Assertion, Avenging and Bright - Irish
4. Calm, The Simple Birth - Netherlands
5. Gayety, Red-Headed Family - Ukranian
6. Yearning, A High Mountain Stands - Russian
7. Joy, Excelsis! Gloria! - Belgian

Series C (Classical Compositions)

1. Gayety, Haydn, Presto, Finale of Quartet Opus 33, No. 2, Piano arrangement by H. Bauer, first 36 measures.
2. Sorrow, Beethoven, First 30 measures from Adagio, Opus 31, No. 2.
3. Calm, Handel, First 15 measures from Largo, arrangement anonymous.
4. Joy, Beethoven, First 24 measures from Allegro, Opus 7.
5. Yearning, Scriabien, Etude, Opus 2, No. 1.
6. Assertion, C. Franck, Measures 27-42 of Prelude, Aria and Finale.
7. Tenderness, Beethoven, First 16 measures from Andante Molto Cantabile, Opus 109.

APPENDIX C

TABLE I*

Average Percentage of Agreement Among the O's As to the Expressiveness of Musical Selections

E's Characterization of the Music	O's Characterization	Average Percentage of Agreement in Different Series A_1 & A_2	A_1A_2 & B	C_1 & C_2	A_1A_2B C_1 & C_2
Gayety	Gayety	98.8	97.5	86.2	91.8
	Joy	1.3	2.5	10.3	6.4
	Assertion	.0	.0	1.7	.9
	Tenderness	.0	.0	1.7	.9
Joy	Joy	96.3	90.8	79.3	85.1
	Gayety	1.3	.8	13.8	7.3
	Assertion	1.3	6.7	1.7	4.2
	Tenderness	.0	.8	5.2	3.0
	Yearning	.0	.8	.0	.4
Yearning	Yearning	40.0	36.7	41.4	39.0
	Sorrow	12.5	25.0	46.5	35.8
	Calm	21.3	17.5	8.6	13.1
	Tenderness	26.3	20.8	1.7	11.3
	Joy	.0	.0	1.7	.8
Sorrow	Sorrow	72.5	61.7	25.9	43.8
	Yearning	23.8	30.8	44.8	37.8
	Calm	2.5	6.7	13.8	10.2
	Tenderness	1.3	.8	12.1	6.4
	Assertion	.0	.0	3.4	1.7
Calm	Calm	58.8	52.5	53.4	53.0
	Tenderness	8.8	16.7	15.5	16.1
	Yearning	18.8	20.0	10.3	15.2
	Sorrow	12.5	10.0	15.5	12.8
	Joy	1.3	.8	3.4	2.1
	Assertion	.0	.0	1.7	.9
Assertion	Assertion	98.8	93.3	93.1	93.2
	Joy	.0	4.2	5.2	4.7
	Sorrow	.0	.0	1.7	.9
	Gayety	.0	1.7	.0	.8
	Yearning	1.3	.8	.0	.4

* Ivy G. Campbell, "Basal Emotional Patterns Expressible in Music," American Journal of Psychology, LV (1942), p.4.

TABLE I (Con't)

E's Characterization of the Music	O's Characterization	Average Percentage of Agreement in Different Series A_1 & A_2	A_1A_2 & B	C_1 & C_2	A_1A_2B C_1 & C_2
Tenderness	Tenderness	63.8	60.8	62.1	61.4
	Calm	17.5	23.3	24.1	23.7
	Yearning	15.0	10.8	3.4	7.1
	Sorrow	2.5	3.3	10.3	6.8
	Joy	1.3	1.7	.0	.8

APPENDIX D*

Campbell's Tentative Classification of Basal Emotional Patterns Expressible in Music

Gayety	Joy	Assertion	Sorrow
Merry	Glad	Vigorous	Dejected
Carefree	Happy	Determined	Melancholy
Jolly	Rejoicing	Resolute	Mournful
Frolicking	Exultant	Bold	Grieved
Boisterous	Rapturous	Martial	Despairing
Humorous	Ecstatic	Victorious	Desolate
Exuberant	Blissful	Heroic	Woeful
Hilarious	Seraphic	Triumphant	Anguished

Yearning	Calm	Tenderness	Rage
Wistful	Quiet	Gentle	Wrathful
Pensive	Tranquil	Sweet	Infuriated
Lonely	Placid	Soothing	Mad
Longing	Peaceful	Compassionate	Raving
Nostalgic	Pastoral	Comforting	Frenzied
Pining	Meditative	Solacing	Demoniacal
Hoping	Detached	Kindly	Ruthless
Aspiring	Serene	Benevolent	Implacable

Wonder	Solemnity	Cruelty	Eroticism
Eerie	Dignified	Searing	Amorous
Mysterious	Majestic	Satiric	Seductive
Awesome	Reverent	Derisive	Voluptuous
Foreboding	Holy	Vengeful	Lascivious
Portentous	Benedictory	Malevolent	Passionate
Ominous	Blessed	Pitiless	Ardent
Horrible	Sanctified	Fiendish	Abandoned
	Sublime	Relentless	Orgiastic

* Ivy G. Campbell, "Basal Emotional Patterns Expressible in Music," American Journal of Psychology, LV (1942), p. 11.

APPENDIX E

Musical Interest Questionnaire

(1) Name _____

(2) Sex_____ (3) Age_____ (4) Race_____

(5) College Classification, i.e., Fres., Soph., etc._____

(6) Do you have a dislike for music_____?

(7) Have you had any musical training_____? How much_____?

(8) In what instrument(s) (voice included)_____?

(9) Have you had any education in music appreciation (in school or outside of school)_____?

(10) How extensive has your education in music appreciation been (estimate if necessary)_____?

(11) Please rank the following forms of musical expression in terms of your preference (Rank in descending numerical order 1, 2, 3, 4, 5, etc., i.e., using (1) to indicate most preferred; (2) to indicate next preferred, etc.; if any forms are equally preferred use the same number for both.

a) Popular music. . . _____

b) Band music . . . . _____

c) Symphonic music . _____

d) Opera . . . . . _____

e) Light opera . . . _____

f) Choral music . . . _____

(List others below if necessary)

g) _____

h) _____

APPENDIX F

Check List

Name_____

Directions: You are about to hear, on recording, a number of vocal selections with musical accompaniment that are supposed to express various emotions or feelings. Each vocal selection will be identified on the recording by a letter of the alphabet, A, B, C, D, etc.

Immediately following these directions you will notice a series of terms indicating various emotions or feelings grouped under various letters of the alphabet.

You are to listen to the vocal selection identified as "selection A" on the recording. Then place a check-mark after the term in Group "A" on the check list which you feel identifies the emotion or feeling being expressed in selection "A." N.B.: Check only one term.

You are then to listen to the vocal selection identified as "selection B" on the recording, and place a check-mark after the term in Group "B" on the check list, which you feel identifies the emotion or feeling being expressed in selection "B," and so forth until all are completed.

Ample time will be allowed between the presentations of vocal selections for you to answer the questions following each group of emotional terms.

Group A* (Check only one term)

Love_____	Fear_____	Determination_____
Happiness_____	Anger_____	Disgust_____
Surprise_____	Suffering_____	Contempt_____

1. Have you heard this vocal selection before_____?
2. Do you know the name of this selection_____? What is the name_____?
3. Do you know the author of this selection_____? What is his or her name_____?
4. Do you know the author's purpose in writing this selection__? _____.

* Group B, C, D, E, F, G, H, I, and J are the same as Group A.

APPENDIX G

Translations of the Five Operatic Arias
Used in this Study

1. Selection A - Sigmund's Love Song - Act I - Die Walkyre - Wagner - Artist - Melchior

Winter's storming's stilled
By the love - lit May;
In tender beauty
Beameth the Spring.
On balmy breezes,
Light and Lovely,
Weaving Wonders,
See, he sways;
O'er wood and meadow
Softly breathing,
Wide he opes
His Laughing eyes:
And happy birds are singing
Songs he taught,
Sweetest perfumes
Scent his train.
As he warms them, lo, the branches
Break into blossom;
Bud and bough
Submit to his sway.
In beauty's armor dight,
He witches the world.
Winter and storm vainly
Had said him nay: -
And even the surly portals
Obey his will, with the mortals
They fain would have barred
From - rapture and day.
To greet his sister,
Fast he has fared-
'Twas love that longed for the Spring
In both our bosoms
Buried, lay Love:
But now she laughs in the light.
The bride who was sister
Is freed by the brother;
And shattered now
Lie barriers and chains.
Joyous greeting
Their lips exchange:
For love has wed with the Spring.

Selection B (Con't)

2. Selection B - The Clock Scene - Act II - Boris Godounoff-
Moussorgsky - Artist - Kipnis

Auf! I need air . . . scarce can I draw a breath . . .
I feel that all my blood is rushing to my head
And painfully descends again.
O Conscience, thou art cruel, merciless thy vengeance!
And if on thee a spot . . . a single spot . . .
One single spot perchance establishes itself
The soul is consumed,
The heart is filled with poison.
So weighty, weighty it grows:
With a hammer beating in the ears,
It reproaches and curses
And strangles somehow . . . and chokes . . .
And one's head spins around . . .
I see the ghastly, bloody child
There! Look then! What's that?
There in the corner!
He is shuddering, gets bigger, comes closer . . .
Quivers and moans . . . Hence! Hence!
Not I . . . not I thy murderer!
Hence! Child, hence! The people . . . not I . . .
'Twas the people's will! Hence, child.

3. Selection C - Iago's Credo - Act II - Othello - Verdi
Artist - Tibbett

Cruel is he the God who in his image
Hath fashioned me and whom in wrath I worship,
From some vile germ of nature, some paltry atom
I took mine issue;
Vile is my tissue,
For I am human.
I feel the primal mud flow of my breed.
This is my creed.
As firmly I believe, as e'er did woman
Who prays before the alter,
Of every ill, whether I think or do it,
'Tis fate that drives me to it.
Thou honest man art but a wretched player,
Thy life is but a part,
A lie each word thou says't, thy tear, thy kiss
thy prayer,
Are as false as thou art.
Man's Fortune's fool even from his earliest breath.
The germ of life is fashioned
To feed the worm of death.
Yea, after all this folly all must die.

Selection D (Con't)

4. Selection D - Una Furtiva Lagrima - Act II - Elixir of Love - Donizetti - Artist - Gigli

In her dark eye embathed there stood
Trembling, the furtive tear;
While each gay smile that others wear
Seemed parent to a fear.
What can this heart wish more?
She loves me! What joy in store.
Oh! for a moment but to feel
The throbbing of that heart!
While glance to glance, sigh echoes sign
As though we ne'er could part.
Death were a price too poor - I'd give
Eternity such bliss to share.

5. Selection E - Othello's Vow - Act II - Othello - Verdi Artist - Martinelli

Oh, that the slave had forty thousand lives!
One is too weak and poor for my revenge.
Listen Iago:
All my fond love thus do I blow to heav'n,
Arise, black vengeance, from thy hollow all!
Look upon me, it is gone!
Yield up, oh love, thy crown to tyrannous hate!
Oh blood! blood! blood!
Witness yon marble heaven,
Witness ye eternal lights above,
Ye elements that clip us round about!
Never shall cease my hatred, never ebb
My wrath, until this hand hath wrought my vengeance!

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EXCERPT from the GRADUATE BULLETIN, 1935 - 1937

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