GOAL IDENTIFICATION AND SYSTEMATIC INSTRUCTION IN PRIVATE VOICE LESSONS

Dissertation

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By

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The problem of this study was to measure the effect upon the tone quality of singers resulting from identifying a specific goal, modeling with a cassette tape of the student's own voice, prescribing practice, and giving verbal approval.

This study had one control group and three experimental groups composed of college students taking elementary school music methods for non-music majors. Sixty-four subjects were randomly chosen from seven sections of the course, then randomly assigned to one of the four groups, sixteen subjects per group. Each subject was seen individually for three sessions during three consecutive weeks. The experiment was concluded with forty-two subjects providing the data for analysis.

Treatments following five minutes of instruction were:

1. Prescribing practice of an identified goal;
2. Using a cassette tape model of the subject's voice;
3. Verbal praise in session two.

Group one received all treatments, group two received treatments one and two, group three received treatment one, and group four, control, received no treatments.
Only one vocal exercise on a single tone using a progression of vowels, [æ, i, e, a, o, u] was used. A pretest recording was made of the subject's first attempt at singing the exercise. The posttest was recorded at session three.

These recordings were separated and randomly spliced to create a tape of eighty-four samples for scoring by four trained raters. A behavior rating design instrument was devised to evaluate pitch, vibrato, legato, accuracy of vowels, and resonance using seven numerical gradations. A total score was calculated for each individual sample.

A simple correlation of the raters' scoring showed high correlations from .78 to .88.

A group mean was derived from the scores given each subject by the raters. These data were used in an analysis of variance for repeated measures with an unequal group size using an unweighted means solution. There was no significant difference between groups but there was a significant difference (p < .001) between pretest and posttest scores within groups.

In the interest of generating future hypotheses, the individual progress within groups was assessed by a t-test for correlated means. Group 3 which only received the treatment of prescribing practice of an identified goal, showed the greatest gain (3.36).

Group one receiving all treatments showed the second highest gain (2.80) with group 2 who received prescribed practice of an identified goal with a cassette tape gaining 2.80. The control group only gained 2.14.
Sixty-nine percent of the subjects reported practicing during the first week, 64 percent during the second week. In the control groups, two out of seven reported practice the first week but five out of seven practiced the second week.

Factors influencing the results could include the novelty of experimental effect, the natural reinforcement of music, the particular teaching techniques used in the first session, self-evaluation and self-reinforcement on hearing the tape in session two, and effects of withholding praise.

On the basis of the findings, these conclusions are drawn.

(1) There is no significant difference in prescribing practice of an identified goal, utilizing a model or giving verbal approval.

(2) Higher gain in pretest - posttest scores for the experimental groups while the control group showed the lowest gain suggests these teaching methods may be effective.

(3) A high correlation of raters can be attained by the training method used in this study.
TABLE OF CONTENTS

LIST OF TABLES .............................................. Page V
LIST OF ILLUSTRATIONS ...................................... vi

Chapter

I. PROBLEM AND PURPOSE OF STUDY ...................... 1
   The Purpose
   Hypotheses
   Design of the Study
   Significance of the Study
   Definition of Terms
   Limitations
   Procedure for Remainder of the Study

II. SYNTHESIS OF RELATED LITERATURE .................. 8
   Relevant Aspects of Behavioral Psychology
   Research and Behavioral Psychology in Music Education
   Systematic Instruction
   Modeling in Music Instruction
   Summary

III. PROCEDURES AND METHODS ............................. 25
   Population and Sample Selection
   Procedures for Collection of Data
   Treatments in Study
      Session One
      Session Two
      Session Three
   Location and Equipment
   The Pretest and Posttest
   Training of Raters
      Practice Session
      Final Training of Raters
   Scoring of Tapes
   Statistical Procedures
Table of Contents (Continued)

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV. FINDINGS, DISCUSSION, AND CONCLUSIONS</td>
<td>40</td>
</tr>
<tr>
<td>Findings</td>
<td></td>
</tr>
<tr>
<td>Subjects Under Observation</td>
<td></td>
</tr>
<tr>
<td>Response to the Vocal Exercise</td>
<td></td>
</tr>
<tr>
<td>Response to Being Tape Recorded</td>
<td></td>
</tr>
<tr>
<td>Practice by Subjects</td>
<td></td>
</tr>
<tr>
<td>Self-Evaluation</td>
<td></td>
</tr>
<tr>
<td>Reinforcement</td>
<td></td>
</tr>
<tr>
<td>Reinforcement</td>
<td></td>
</tr>
<tr>
<td>Responses at Final Session</td>
<td></td>
</tr>
<tr>
<td>General Considerations</td>
<td></td>
</tr>
<tr>
<td>Discussion</td>
<td></td>
</tr>
<tr>
<td>Conclusions</td>
<td></td>
</tr>
<tr>
<td>Recommendations</td>
<td></td>
</tr>
<tr>
<td>APPENDICES</td>
<td>52</td>
</tr>
<tr>
<td>A. Exercise Accompaniment</td>
<td></td>
</tr>
<tr>
<td>B. Instructions for Use of Recorders and Practice</td>
<td></td>
</tr>
<tr>
<td>C. Preliminary Rating Instrument</td>
<td></td>
</tr>
<tr>
<td>D. Behavior Rating Instrument</td>
<td></td>
</tr>
<tr>
<td>E. Script for Session One</td>
<td></td>
</tr>
<tr>
<td>F. Script for Session Two</td>
<td></td>
</tr>
<tr>
<td>G. Script for Session Three</td>
<td></td>
</tr>
<tr>
<td>BIBLIOGRAPHY</td>
<td>75</td>
</tr>
</tbody>
</table>
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>Sample Distribution</td>
<td>27</td>
</tr>
<tr>
<td>II.</td>
<td>Treatments in Study</td>
<td>28</td>
</tr>
<tr>
<td>III.</td>
<td>Procedures Involved in Sessions</td>
<td>30</td>
</tr>
<tr>
<td>IV.</td>
<td>Correlation Matrix of Interrater Relationship</td>
<td>40</td>
</tr>
<tr>
<td>V.</td>
<td>Analysis of Variance of Four Teaching Methods in Three Treatment Sessions</td>
<td>41</td>
</tr>
<tr>
<td>VI.</td>
<td>Mean and Standard Deviation by Difference Scores on Raters Mean, Pretest and Posttest, for Three Experimental Groups, and Group 4, the Control</td>
<td>43</td>
</tr>
<tr>
<td>VII.</td>
<td>Frequency of Reported Practice by Groups and Treatment Sessions</td>
<td>42</td>
</tr>
</tbody>
</table>
LIST OF ILLUSTRATIONS

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Vocal Exercise of the Experiment</td>
<td>28</td>
</tr>
</tbody>
</table>
CHAPTER I

PURPOSE AND PROBLEM OF STUDY

Vocal study presents numerous complexities for the aspiring singer including technical development of the voice, learning music through its notation, proper diction for singer, facility in pronunciation of three foreign languages, memorizing foreign language texts with their literal translation in some literature, artistic interpretations, and communicative stage presence in performance. Students may be overwhelmed with the difficulty of trying to achieve multiple goals such as these. More problematical is the fact that as one strives for a more beautiful, correctly produced sound, he is unable to perceive his own voice objectively due to psychological and acoustical factors. It is not uncommon to have a student achieve the desired sound in a lesson but be unable to reproduce it at the next session without repeating the coaching.

Voice instruction often is based upon the experiences of the individual teacher rather than upon theories of learning from research in music or other fields. With the complexity of the subject matter, it would appear that isolation and identification of small goals with reward for attainment would direct the student towards vocal progress utilizing the particular technical or psychological methods of the teacher.
The problem of this study is to measure the effects upon the tone quality of singers resulting from identifying a specific goal, modeling, prescribing practice, and verbal approval.

Hypothesis

1. Subjects receiving 3 treatments, prescribing practice of a specific goal, modeling, and verbal approval, will score significantly higher than subjects receiving fewer treatments.

2. Subjects receiving 2 treatments, prescribing practice of a specific goal and modeling, will score significantly higher than subjects receiving one treatment.

3. Subjects receiving one treatment, prescribing practice of a specific goal, will score significantly higher than subjects receiving no treatments.

Design of the Study

Sixty-four subjects were randomly selected from fundamentals of music classes at a university and randomly assigned to one of four groups, providing 16 subjects for each group. All subjects were seen for three sessions in three consecutive weeks. The number of treatments for each subject was determined by his group assignment. The study was completed by 42 subjects who provided the data for analysis.

One simple vocal exercise using a progression of six vowels was used in all sessions. Treatment (a) was to prescribe independent practice of the exercise. Treatment (b) was a cassette tape recording of the student's own voice for use as a model in his independent practice. Treatment (c) was verbal approval at the second session.

In the first session, the subject was given a copy of the exercise, heard a taped example of a trained singer demonstrating the exercise,
pronounced the vowels after the experimenter, hummed the starting pitch, listened a second time to the taped example, and then sang the exercise alone. This first singing of the exercise by the subject was recorded as a pretest.

Following the pretest, five minutes of instruction was given to each subject with no restriction on the content or approach. At the end of five minutes a cassette tape was made of the subjects singing the exercise again. Subjects in groups 1 and 2 were given one tape, a copy of the exercise and instructed to practice and sing at least as well as recorded on the cassette at the next session. Group 3 was only given the printed exercise and instructions to practice. Group 4, the control, was given no instruction and no aids. One cassette was made and retained by the experimenter for use at session two.

The second session, within a time lapse of one week, involved all students hearing the cassette recording of their own singing model of the exercise followed by the subject singing it again. Only group 1 received any comment after singing: they were given verbal praise. The process was repeated for three playings of the tape and three performances of the exercise. No comment or instruction was given to subjects in groups 2, 3, and 4.

The third session held within a period of one week later, began by playing the subject's singing model tape followed by his singing of the exercise. On the second performance of the exercise, the posttest was recorded and the experiment concluded.

The pretest and posttest recordings were re-recorded to present a repetition of each sample with time lapses. These tests were all separated and randomly spliced to create a tape of 84 samples for evaluation by four trained raters.
The hypotheses were tested by comparing the mean scores of the pretests and posttests.

Significance of the Study

There is little systematic use of theories of learning in vocal instruction and numerous teaching methods prevail as nearly every teacher develops his own approach. Comparatively little research has been done in the field of music, particularly in relation to the teaching of voice.

The complexities of teaching voice are many and it would be advantageous to use methods which facilitate learning more efficiently and expeditiously. As vocal training requires development and integration of mental concepts along with physical coordination, it could benefit greatly from the application of principles of learning in other fields.

Vocal teachers would possibly respond more favorably to using techniques as developed in other disciplines if they were tested and related to the particular concerns of singers. Voice teachers as a group do not respond readily to scientific studies as many teach as they were taught and often believe their own method to be definitive. This may be attributed to the fact that professionally successful singers comprise a great number of the voice teachers. It is still not unusual for a voice teacher at the college level to be an artist-in-residence and not to hold any college degree. It is likely to remain acceptable for college voice teachers to hold only a bachelor's or master's degree. This creates an even greater need for research in vocal teaching methodology by the comparatively small number of
singers who pursue advanced degrees and scientific inquiry. Of great importance is the challenge for these researchers to disseminate their findings in such a manner that voice teachers will examine the data and be receptive to modifying their teaching methods.

The activity of a voice lesson very often begins with general warm-up exercises followed by the performance of songs. The teacher will then make suggestions for some changes and may hear several repetitions of the song.

The student may actually be taught the musical structure of the songs during the lesson rather than developing basic concepts which are applicable to all singing. This is not an efficient use of costly time for teaching on a one-to-one basis.

This study is significant in that it applies education teaching strategies to voice instruction to determine if stating a goal, using a model, prescribing practice and giving verbal approval upon attainment contributes to greater success in achieving a specified goal in tone quality.

Definition of Terms

1. **Feedback** - error-correcting information given to the singer to guide on a course to a tone quality goal.

2. **Goal** - "The aspiration of a student in terms of academic achievement." In this study, the model recorded on a cassette tape was identified as the goal for the subject's practice.

3. Individualized programmed instruction - "the differentiation of instruction according to individual differences in pupils in accordance with their needs." In this study suggestions were made to each subject during session one to improve the quality of the exercise. The comments were determined by the individual subject's manner of singing and the analysis by the experimenter of methods to achieve progress.

4. Model - an example for imitation. In this study, the best tone quality a subject achieved in a given period of time was recorded and used as a guide in independent practice.

5. Standardized Reading - in this study, a script for directions given in treatment sessions.

6. Tone Quality - "that property of a tone which may distinguish it from another tone having the same pitch, loudness and duration. It is the identifying character of a sound determined by the resonance of the vocal chambers uttering it." Properties which compositely form the quality of a vocal tone are vibrato, which adds life or warmth, intensity which lends volume or dynamic properties, a low formant distribution of frequencies lends depth or resonance and a high formant provides brilliance.

7. Traditional Methods - "method of voice instruction used since the age of bel canto (ca. 1700 - 1775) with emphasis on vocal techniques and repertoire mastery without necessarily employing modern aids or latest knowledge of modes of learning."

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4Ibid., p. 132.
8. **Trained Singer** - as used in this study, a person who has taken voice lessons four years and has achieved a level of vocal proficiency of a graduating music education voice concentration as accepted by recognized universities.

9. **Vocal Endowment** - natural endowments in the larynx and pharyngeal tract (the organs of the voice) with the anatomical conformation differing in every individual. The potential of each voice is predetermined by the latent capacities of this structure. In this study, vocal endowment refers to the natural capacity for development of an individual's singing voice.

Limitations

There will not be absolute control of the quality of the tape recorder used in the prescribed independent practice.

Procedure for Remainder of the Study

A review of related literature will be presented in the second chapter followed by a chapter describing the procedures and methods of the study. The final chapter, four, will present the data observations, conclusions, and summary.

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CHAPTER II

SYNTHESIS OF RELATED LITERATURE

Vocal pedagogy is often based on empirical, inexact teaching theories with little scientific explanation. This is due to the history of singing. The bel canto period, called the "Golden Age of Song" in the 18th Century, produced a heritage of teaching techniques based upon psychological approaches as imparted by masters such as Caccini, Mancini and Tosi. Some of these approaches were based upon sensations experienced by singers and have been transmitted to this period through the writings of these pedagogues. The scientific approach was born when the physicist, Hermann Helmholtz, in the late 19th Century, related his findings on acoustics to the voice. The scientific school is striving now to add facts to teaching, but it appears the older bel canto approaches are more prevalent. Teachers infrequently agree on the basic principles, and teaching concepts are vague, resulting in countless teaching methods. Victor Fields in his important book presenting the various concepts used in training the singing voice reports methods used in both the psychological and technical approaches. However, there is little consideration presented in print coordinating methods of teaching singing and theories

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3 Ibid., pp. 18-19.
of learning. In viewing relevant literature, some background on goal identification and motivation will be presented followed by some principles of music education, and the relevance of systematic instruction.

Relevant Aspects of Behavioral Psychology

William James, psychologist of the late 1800's, emphasized will and determination. John Dewey focused on problem solving with goals and foresight of ends giving the direction. Psychologists before 1920 put little credence in motivation but emphasized instincts. The change from instincts to the theory of drive as the motivating force came after World War I. Various theories of learning were developed with some in direct conflict with others. Jean Piaget states that learning is accomplished more expeditiously with materials presented in an order which develops out of the previously existing cognitive structures (schemata). Schemas (similar to concepts) continually undergo changes, assimilating new objects. By repetition it is consolidated and stabilized. Through generalization it is applied to a larger domain, and then by differentiation it again divides into new schemas which may later unite to form a new totality. Robert Gagné believes the structure and nature of the task are more important than behavioristic concepts of reinforcement and practice. The early psychological position of Sigmund Freud viewed motivation in

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7Macmillan, loc. cit.
relation to need reduction while Festinger proposes cognitive incongruities, Harlow supports innate drive of curiosity, and White suggests mastery over one's environment as a source of motivation. It would seem that behaviorism need not be narrow in view if properly practiced, considering behaviorists Whelan and Haring's reference to "intrinsic consequences, feelings of worth, and satisfaction of assuming self responsibility." Robert Magoon suggests the problems may be in the individual practitioner's skill in using behavior modification as a tool.

A. H. Maslow states that "motivation is not synonymous with behavior theory. The motivations are only one class of determinants of behavior. While behavior is almost always motivated it is also almost always biologically, culturally, and situationally determined as well." A person can learn anything he wants to learn with the complexities of environment either hindering or helping. However, only the individual can "generate desire and motivation for his own learning." Clark Moustakas suggests an individual cannot be forced into permanent or creative learning. One will only learn if he wishes.

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8 Ibid., p. 294.


The individual is greatly influenced by the effects of his past experiences. Charles Darwin in his autobiography said, "Most or all sentient beings have developed in such a manner that, through natural selection, pleasurable sensations serve as their habitual guides."

Percival Symonds states, "An act is learned only when it is rewarded." The rewards can extend from primary ones such as food and tactile stimulation, to social-verbal approval, giving or withdrawing of material objects, the individual's manipulation of objects, material tokens, knowledge of results (feedback), and to the highest level: self-evaluation. Topological psychology holds that the establishment of goals with psychological rewards for the student will result in learning.

The desire to have adult approval and love is a significant source of motivation even into college years. Research of Bloom (1964), Jaffe and Adams (1964) and Little (1959) all suggest academic motivation is related to parental influence. Success in college comes from experiences in early family life and early school experiences.

Developing from this, the student seeks the approval and praise of his teacher. At the college level, the student's respect for the teacher determines the importance he places upon the praise and grades the teachers give.

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14 Symonds, op. cit., p. 11.
17 Symonds, op. cit., p. 127.
If the teacher is too easy, there may be little respect for the grades given, thus removing the stimulus. In Ingvar Johanneson's study of praise, many factors concerning the subject must be considered including age, sex, maturity, personality, attitudes, social status, and interaction with the teacher. Praise did seem to be important and effective for "low-achieving and anxious pupils, and for pupils with low appreciation of and only a slightly positive attitude to the teacher." There were no negative effects of teacher praise.

Symonds reports students interpret grades as approval or disapproval rather than as a record of their achievement. Though college teachers tend to deemphasize grades, they are in fact an important tool. Students want passing grades and will do whatever is necessary to get the grade they want from memorizing details to trying to use high cognitive action. Grades may be to please the parents thus allowing the student to stay in college.

Another aspect of motivation, peer acceptance, can work against the desire for good grades. One may be afraid peers will resent his raising the average. "Many students suffer conflict between the need to get good grades and the need to be well-liked."

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21 Ibid., pp. 76-77.
22 Symonds, op. cit., p. 9.
23 Gage, op. cit., p. 1119.
24 Loc. cit.
Positive or negative motivation causes different results. With negative motives, students will only do that work which is necessary, often not developing a real interest in the subject. "The closer the goal or threatened danger, the higher the motivation is." With negative motives such as fear of low grades, scolding, etc., the closeness of the goal is more important than when using positive motives. Threat and anxiety did show significant decrements in concept formation of complex materials but no affect with simple materials as reported by Wright.

The emphasis seems to be upon striving for self-evaluation as the source of self-motivation. Laurence Peter says if one can evaluate himself, and have internal satisfaction, it carries him through periods when external reinforcement is not available. "Develop a positive self-concept, a set of values, which includes the importance of learning, a tolerance for ambiguity, and a curiosity which just will not quit." Thus the teacher should work for personality development and change. "An individual learns significantly only when those things which are involved in the maintenance or enhancement of self...any other type of learning is temporary and inconsistent with the self and will disappear as soon as the teacher stops working for its maintenance or enhancement of self."
as threat is removed." N. L. Gage reports further on developing the ability to think critically and then to engage in critical thinking, "teachers must give them experience in solving problems within their ken." Teachers should choose problems within the student's capability and give praise and encouragement when intellectual activity is used. Kersch (1958) proposes that motivation may be greater when students are allowed to discover principles through their own effort. Symonds states that the goal of all teaching is for the student to set his own standards of attainment and have his own inner rewards.

Research and Behavioral Psychology in Music Education

Questions concerning music education often followed a philosophical inquiry method until the scientific approaches initiated in music therapy research in the fifties. Today one cannot definitively list any universal truisms regarding how music is learned.

A significant pioneering scientific study in the thirties was that of Carl Seashore who wanted to define music talent and developed instruments for measuring talent that are among the most valid today. The prevailing view in philosophical inquiry has been an appeal to authority: that which did not conflict with one's previous beliefs or that which was the most fashionable approach.

30 Gage, op. cit., p. 45.
31 Loc. cit., p. 1122.
33 Symonds, op. cit., p. 21.
34 Glenn, op. cit., p. 77.
35 Ibid., p. 78.
Only now in the seventies does it appear a more systematic approach to such inquiries may be developed as evidenced by B. Reimer (1970) and A. Schwadron (1973). However, "personal experience, authority, and tradition...are still the main determinants of the music curriculum and the instructional methods employed...Universally the most used source of information is the personal experience of the teacher...In fact, few areas of human endeavor cling to their established customs and traditions as tenaciously as does that of the teaching of music." Madsen reports that even though musicians in colleges are showing efforts towards objectivity, a narrow perspective still prevails. These teachers often reject the worth of other teachers, believe only their teaching method is right, and any student unsuccessful in his studio is simply untalented. Even considering the obvious lack of valid experimental studies in the field of applied music, performers tend to reject even the few facts advanced unless it conforms with their personal methods.

While the findings on theories of learning within educational fields apply to music, two research studies, one by Madsen, Wolfe, and Madsen (1969), the other by Greer, Randall, and Timberlake (1971), indicate music has a particular asset in that it produces its own reward and needed no pay-off to obtain improvements from students.

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36 Ibid., p. 93.
In a study by Jere Forsythe, elementary children were found to be more attentive in music classes regardless of the teacher's approval or disapproval which led to the belief that music may be naturally reinforcing. 40

Music teachers who did have training in the use of high approval techniques did have more attentive students as reported by Greer, Dorow, Wachhaus and White. 41

Another study by Terry Kuhn with fifth grade music students produced findings consistent with previous research in the effects of approval. Teachers were more successful in maintaining the desired classroom behavior if 80 percent of their students' interactions were of an approving nature. 42

Linda Bennett and Jane Adams found the use of positive reinforcement to be more efficient than negative or no reinforcement in a musical learning situation. 43

As behavioral psychology developed concern for self-actualization and attainment of goals, education focused more attention on the


effective ways to reach goals. Maslow said that "classification of motivations must be based upon goals rather than upon instigating drives or motivated behavior." Madsen says,

Behavioral research demonstrates that if subject matter can be (1) geared to the student at his own level, (2) presented in logical sequences, with (3) appropriate feedback concerning correct/incorrect responses, and (4) contingent rewards given for successive approximations towards defined goals, then (et. al.) learning will certainly take place.

Systematic Instruction

An outgrowth of behavioral research is a system known by several names: Individually Prescribed Instruction (IPI), Prescriptive Teaching System, Systematic Instruction, Programmed Instruction, or other similar titles as stated by an individual author. These approaches call for specifically defined objectives in a planned sequence. This makes the teacher responsible for diagnosing the student's abilities and weaknesses then prescribing appropriate learning styles and experiences. Furthermore, efficient teaching will utilize varied learning experiences to meet the needs of the individual as demonstrated in testing of their learning styles.

44A. H. Maslow, loc. cit.


48Kapfer, loc. cit.; Dunn, op. cit., pp. 45-47.
Greer states that the teacher is responsible for the curriculum. If a student is not learning, the teacher must exhaust all "possible environmental determinants," arrange the contingencies appropriately, and only after following this procedure should one consider the effect of genetic ability.49

Principles of these sequential steps towards a goal have been applied to music education. The Pestalozzian "object lesson" is a basis for Mary Helen Richards' "experience charts" as she adopted Kodaly's system of teaching music. Programmed instruction music texts were derived from Thorndike's Stimulus-Response psychology. Suzuki's violin method is an outgrowth of the concept of conditioning from behaviorist psychology. Marilyn Pflederer has attempted to apply Piaget's theories to music.50

Fields urged vocal instruction application of the principles of individualized instruction as defined in the field of education. He advocated "predetermined practice procedure in pursuit of predetermined goals."51 As "artistic singing is a product of habit formation," the teacher must identify appropriate, progressive practice procedures leading towards fixed goals using varied methodology.52

In Moore's study of elementary music education classes, the use of contingency-managed instruction produced better learning of concepts


50Glenn, op. cit., p. 79.


52Ibid., pp. 8-10.
and skills. CMI involves: (1) information divided into small bits, (2) individualized pacing, (3) specific behavioral objectives, (4) frequent evaluation of objectives, (5) immediate feedback, and (6) reward.53

Learning in musical performance includes knowledges, skills, and attitudes. The first two are taught; attitudes and values are learned. Knowledge can be taught in the lesson, but development of skills demands actual execution. This requires practice time.54

As music lessons may occur only thirty to sixty minutes per week, the student must "actually teach himself the performance skills and motor patterns needed to execute the concepts learned in his lesson."55 Immediate feedback and reinforcement is necessary for effective learning. This presents a problem if the musician must in fact develop his skills through practice outside of the lesson. Colwell and Lundin state that a great error in music is that performers have to wait too long for evaluations and reinforcement.56 In fact, the practice may be faulty, lead to bad habits, and necessitate remedial work at the next lesson. These bad habits can be hard to overcome.57


55Puopolo, op. cit., p. 342.


57Puopolo, op. cit., pp. 342-343.
Modeling in Music Education

To develop musical skills, a sound source is needed to provide primary stimulus.\(^{58}\) As early as the 1600's, Johann Comenius wrote that art first requires a model or a conception; "an external form from which the artist may examine and then try to imitate.\(^{59}\)

Tape recorders have given musicians a tool for creating a model and also for self-evaluation of one’s performance. Prior to 1971 there were no studies of using cassette tapes at home by beginning instrumentalists.\(^{60}\) Studies now report the use of taped lessons, non-book programmed instruction at least as effective as traditional methods, and in some cases, more effective, all in a shorter time period.\(^{61}\) In Puopolo's study, the experimental group reported for daily, individual practice using a lesson programmed on a cassette. His study showed a highly significant difference in performance achievement between the programmed practice and non-programmed practice groups.\(^{62}\)

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\(^{58}\) Wolfgang Kuhn, "Computer-Assisted Instruction in Music Drill and Practice in Dictation," College Music Symposium, XIV (Fall, 1974), pp. 91-92.


\(^{62}\) Puopola, op. cit., p. 345.
Zurcher used the take-home practice model and found this model-supportive practice to be more effective than traditional practice in increasing the time practicing. Zurcher found the performance level to be increased. The tape gave the student a specific model and goal rather than just undirected repetition of the music.

Deihl felt it was a valuable learning experience for the student to compare his taped version of music with the model performance, thereby developing his abilities in self-evaluation. Ferster told Goldiamond and Pliskoff that after the ear is trained to recognize the sound, one can correct the sounds he produces himself.

Although the review of literature at this time shows no studies of model tapes being used with vocal students, it would appear that the findings in the instrumental field would apply to singers. Even from the time of the bel canto period of great singers, the natural method of singing was based on first training the ear. Cornelius Reid states that in vocal instruction, "Growth into self-awareness, and the means by which it can be attained, is the key to the entire learning process."

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63 Zurcher, op. cit.
64 Ibid.
67 Fields, Training the Singing Voice (1947), pp. 8; 180.
Reid continues explaining how a singer does not hear himself as others do and that objectivity is impossible considering that the vocal self-image which began in infancy has after many years become familiar and fixed to his perception of "his quality."69

There are also acoustical factors which present a unique problem for self-evaluation by singers, as he hears his own singing voice by reflection and refraction as carried through the air to the external ear as well as by bone conduction to the inner ear. The singer hears himself as no one else does.70 He confronts problems of perceiving the tone incorrectly and being directed by a teacher to do what appears to his ear to be the opposite of the desired goal.71 Reid says "self-perception is arrived at through a proper understanding of sensation, either through 'sensual awareness' or 'subjective feelings.'"72 Fields reports that many vocal pedagogues believe "training the singing voice is largely a process of cultivating hearing acuity."73 Teachers have said "no singer can hear his own voice accurately until he has been trained to do so. Hence, he must rely entirely upon his teacher's judgment and hearing while he is studying singing." Harold Seashore, Crystal Waters, and Sergius Kagen stress the importance of preconceiving a tone and first developing inner hearing.74

69 Ibid., pp. 101-102.
71 Ibid., p. 25.
72 Reid, op. cit., p. 189.
74 Ibid., pp. 180-181.
Reid proposes that the stimulus for producing the vocal tone is external, such as directions or feedback from a teacher, while the reaction or response is internal. He says "vocal organs move in reaction to the external forces to which they have responded, sensations are aroused within the functioning mechanism which are telegraphed through the impulses to the mind. In this way mental concepts are formed after the experience, not before, making the singer keenly aware of the precise character of the functional activity taking place throughout the entire respiratory tract...which leads to a very concrete technique of learning."  

Summary

Principles of behavioral psychology appear to be applicable to vocal instruction as it is necessary for the student to maintain motivation and be capable of self-evaluation during the periods between lessons. There was evidence that music itself is rewarding and may contribute to the practice efforts of the student.

There was no specific research applying techniques of systematic instruction specifically to vocal instruction although the concept was supported in discursive writings. As modeling and other aspects of individualized instruction were found to be effective in other music research, it may apply to learning to sing. Furthermore, the acoustical factors which prevent a singer from ever hearing himself as others do would lend further support to the use of modeling. Thus, it would appear...

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75 Ibid., p. 198.
that the application of principles of individualized instruction including small steps, feedback and reinforcement, model-supportive practice, and specifically defined goals would be relevant to individual vocal instruction.
CHAPTER III

PROCEDURES AND METHODS

This experimental study used one control group and three experimental groups composed of college students taking a non-music major elementary school music methods course. In individual sessions, a tape recording was made of each subject singing the same vocal exercise before instruction to provide a pretest. After three sessions, a posttest was recorded, using the same exercise. These samples were randomly spliced to provide eighty-four tests to be evaluated by four trained raters. These ratings were analyzed and appropriate statistical measures were employed to test the hypotheses and lead to the conclusions about the study.

Population and Sample Selection

Four groups each with sixteen subjects were utilized for this study with all subjects being seen individually in three different treatment sessions over a period of three weeks.

Students used in the study were college students of different ages and aptitudes with varying degrees of vocal endowment and musical experiences who had enrolled in one of the six sections of music foundations classes for the elementary school program. The state university used in this study had a total enrollment of 15,723 men and women in the spring semester of 1977 with 1,371 in the School of Music. Using the twelfth day class roles, students were numbered consecutively beginning with the earliest class meeting time in the week. A number
was chosen from a table of random numbers for a starting point to select every third person. From this point all persons were assigned a number for selection and the first sixty were designated as subjects. These lists were presented to the instructors of the classes. Two of the six faculty members insisted that rather than randomize the students in their class, that volunteers be solicited. A brief presentation was made in each class explaining the time required for the study with emphasis on the advantage of a short individual voice lesson which could help in their class work. In the four classes where random selection was permitted, the first ten randomly chosen subjects did not all consent to participate in the study. In two of these classes the next in order were solicited to obtain ten subjects from each class. In the other two classes, it was necessary to proceed through the entire class roll to secure subjects; thus in effect volunteers were taken. As one of the last two classes began with only thirteen, eight were chosen. In the two classes from which volunteers were to be solicited, as prescribed by the instructor, one class produced eleven, and one five. It was evident that at this time more subjects were needed; thus the eleven in one class were accepted to produce fifty-four subjects.

Since it had been stipulated that at least sixty subjects be in the initial sample, a class of students taking the second semester of the course was chosen and ten volunteers were obtained to produce a total of sixty-four. To achieve a stratified randomization of the subjects into four groups, the class rolls were again placed in order with the second semester class placed at the end. Proceeding down the list of subjects who had consented to participate, the first subject
was assigned to group 1, the second to group 2, the third to group 3, the fourth to group 4, and continuing through the initial sample of sixty-four assigning them to the group numbers in this consecutive manner to achieve sixteen subjects per group.

Due to absences, the first session was given to the fifty-seven subjects present in class the first week resulting in a group distribution of fourteen in group 1, fourteen in group 2, sixteen in group 3, and thirteen in group 4. When any subject was absent for a treatment session he was dropped from the study and the previous data on him was deleted. The study was completed with forty-two subjects in the following distribution: group 1, eleven; group 2, ten; group 3, fourteen; group 4, seven. The population distribution is presented in Table I.

TABLE I
SAMPLE DISTRIBUTION

<table>
<thead>
<tr>
<th>SUBJECTS</th>
<th>GROUP</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Number of Subjects</td>
<td>16</td>
<td>64</td>
</tr>
<tr>
<td>Number of Subjects Receiving First Treatment</td>
<td>14</td>
<td>57</td>
</tr>
<tr>
<td>Number of Subjects Completing All Treatments</td>
<td>11</td>
<td>42</td>
</tr>
</tbody>
</table>

Questioning at the first session indicated only three persons had received private voice lessons previously. No one was currently receiving instruction and several years had elapsed since their brief periods of study. The previous musical experiences of the subjects were diverse and no data on this were retained.
Procedures for Collection of Data

One vocal exercise, Figure 1, was used throughout the experiment for all four groups. The exercise was introduced to the subject by playing a cassette tape of a trained voice singing the pattern. This tape was used only in the initial presentation at the first session.

FIGURE 1
Vocal Exercise of the Experiment

Treatments for the four groups are shown in Table II.

TABLE II
TREATMENTS IN STUDY

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presenting exercise, achieving model (goal) in student's voice</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>Prescribe independent practice</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>Sound tape model (student's own voice)</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>Verbal approval at second session</td>
<td>1 2 3 4</td>
</tr>
</tbody>
</table>
Group 1 received all the treatments. The subjects were asked to practice using a cassette tape recording of the singing model they achieved at the end of the five minute instruction period in session one. These subjects were praised at session two.

Group 2 was also given a cassette tape recording of their own voice (model) to use in practice. At session two they were not praised verbally and received no comment.

Group 3 was asked to practice but did not have a taped model of their singing to use, and did not receive verbal praise at session two.

Group 4 was only coached until achieving a model singing sound in session one as a control group. These subjects received no further treatments.

Table III presents the activities involved in each treatment session.

**Session One**

All subjects had their first session within a one week period. When the subject entered the room, the activity was identified using a standardized reading. (See Appendix E, p. 61.)

1. The subject heard the taped demonstration example of the exercise while holding and following a printed copy of the musical notation. After one hearing the student was asked to pronounce the sequence of vowels, repeating each one after the experimenter. Then a tone and chord was played and the subject was asked to hum that tone to locate a starting pitch. The taped demonstration was played again and the subject was
### TABLE III

**PROCEDURES INVOLVED IN SESSIONS**

<table>
<thead>
<tr>
<th>SESSION ONE</th>
<th>GROUP</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Control: Presentation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identify activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Give copy of exercise</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hear taped demonstration of exercise</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pronounce vowels</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hear taped demonstration of exercise</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sing exercise:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tape record for pretest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practice and correct exercise: 5 min. max.</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Identify desired model (singing goal)</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cassette tape record desired model of student's voice for his use</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cassette tape record desired model for use only in sessions 2 and 3</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prescribe independent practice with tape</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prescribe independent practice (no tape)</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SESSION TWO</th>
<th>GROUP</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Inquire if practiced exercise</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Give copy of exercise, play taped practice model of student's own voice; sing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Praise verbally</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Play tape; sing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Praise verbally</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Play tape; sing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Praise verbally</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SESSION THREE</th>
<th>GROUP</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Inquire if practiced exercise</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Give copy of exercise, play student's voice taped as practice model; sing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Play model again</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Sing and tape posttest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
asked to look at his copy of the exercise. The subject was then asked to sing the exercise with the piano playing the music as in Appendix A.

2. This very first attempt at singing was recorded as the control pretest performance for that subject.

3. For a maximum of five minutes, the subject practiced the exercise with the experimenter making corrections and suggestions freely until a desired model was obtained by the subject.

4. A cassette tape was made of the desired model (goal) for the subjects of groups 1 and 2 to use in practice and provide for treatment C. (See Table II, p. 28.) Tapes were made of subjects in groups 3 and 4 for use only by the experimenter during sessions two and three.

The procedure at this point was as follows:

Groups 1 and 2: Using a standardized reading, the experimenter prescribed independent practice with the student using his own model as recorded on cassette tape.

Group 3: Using a standardized reading, the experimenter prescribed independent practice. (No cassette tape.)

Group 4: Using a standardized reading, the experimenter expressed thanks to the subject and dismissed him.

Each subject was given a copy of the exercise to keep. He was not further admonished to retain it or bring it to the next session.
Groups 1 and 2 were given directions for use of practice rooms and cassette recorders as in Appendix B and group 3 was given only the portion concerning practice rooms.

Session Two

Session two was held in a time period no less than seventy-six hours (three and one-half days) and no more than one hundred seventy-two hours (seven and one-half days) after session one.

Using a standardized reading, each subject was greeted and asked if he had practiced the exercise. Another copy of the exercise was given to the subject for him to follow as the taped model of his own singing goal was replayed for him.

The next procedures were as follows:

Group 1: The subject was asked to sing the exercise and the experimenter gave verbal praise extemporaneously for some aspect of accomplishment. The tape was played again, the subject sang and was praised. This was repeated with the third hearing of the tape. No further instruction was given with dismissal. A maximum of five minutes was allowed for this session.

Groups 2, 3, and 4: After hearing his taped practice model, each subject was asked to sing the exercise. Using a script to preclude giving any verbal praise in any form, the listening and singing was repeated for a total of three times followed by dismissal of the subject.
For all groups, no further instruction was made concerning the printed copy of the exercise. The subject could keep it or not, and any questions from him were answered by a standard response delaying all questions until the conclusion of session three.

Session Three

The procedure was the same for all four groups and took place no less than seventy-six hours and no more than one hundred seventy-two hours following session two.

Using a standardized reading, each subject was greeted and asked if he had practiced the exercise. Another copy of the exercise was given to him and his own taped practice model was played for him followed by the subject singing the exercise. The same tape was played again. On the subject's second performance of the exercise the posttest was recorded.

The experimenter then thanked the subjects.

Location and Equipment

The treatment sessions were conducted in a small practice room in the main music building. It was located near the subjects' classrooms which expedited the scheduling of treatment sessions. However, acoustical controls were lacking and faint sounds of other music could be heard during the sessions. The equipment was placed in a manner to present as little distraction as possible and allow an assistant to make tape recordings unobtrusively. As these subjects were inexperienced singers and uncertain about singing alone, the microphones were placed on a
bench to their side rather than utilizing lavalier or microphone stands. The relationship of the singer to the microphone was consistent for all subjects and level settings were held at a constant pre-determined level.

A Sony brand tape recorder, Model TC106A, was used to record the pre- and posttest. A Wollensack tape recorder, Model 6020AV, was used to record all activities while a subject was in the treatment room. The tests were recorded on low print, silicone lubricated Scotch Classic TA 778 magnetic tape with 1.5 mil acetate backing at a speed of 7-1/2 cycles per second. The cassette tape which was given to the subjects in groups 1 and 2 was recorded on a Panasonic cassette recorder, Model RQ 413S. The cassette tapes recorded for replay at sessions two and three were made on a Panasonic cassette recorder, Model RQ-317 S.

An upright practice piano was used and the subject stood at one corner of it and faced the experimentor who was seated at the piano. The Panasonic Model RQ 413 S was on the lower edge of the piano to allow the experimenter to play the taped demonstration and record the cassette tape for subjects of groups 1 and 2. At session three the experimenter played the subject's own taped practice model on this same recorder. All other equipment was to the side of and behind the subject and was operated by an assistant.

The Pretest and Posttest

All pretests and posttests were identified by a code number recorded on a tape followed by a three second pause before taping the
sample. Pretests were given an odd number, posttests an even number, therefore each subject had two consecutive numbers. Tests were recorded in the order of class meetings with subjects generally seen in the order of their group assignment.

Using two recorders, the master test tape was duplicated on a second tape for use in the rating by judges. This was accomplished in the following manner:

1. Following a seven second lead, duplicate the code number, pause, and sample.
2. Advance the rating tape seven seconds, rewind the master tape to the code.
3. Repeat the entire segment to produce a second hearing: the code number, pause, and sample.
4. Advance the rating tape two seconds.
5. Cut the rating tape; attach opaque splicing tape to the end of the second hearing; mark the subject's code number on the splicing tape; stick the length of tape on the wall.

The rating tape was reassembled by randomly choosing a tape segment from the wall and splicing it to the next random choice. A record was then made of the order in which the samples appeared and this data was typed in order on four evaluation forms for use by the raters.

Training of Raters

**Practice Session**

Prior to the initiation of the experiment, a practice session was conducted using three raters, graduate voice teaching assistants at the University. For this purpose a rater training tape was made.
Six singers not used as subjects in the study were recorded singing the tone quality exercise in Figure 1 on page 28. The singers chosen ranged from untrained voices through five years of study, one of each level. The subjects sang the exercise for recording. For the second performance, some were asked to sing the same, some better, and some differently. Three sets of tapes were made with singers' order and instructions being different on each tape.

The meanings of the terms in the graphic scale behavior rating design instrument in Appendix C were discussed. This is a five step scale with a gradation of 1 to 7 within each step, the number 7 representing the highest and best evaluation in that category. The raters were instructed to circle the appropriate number and encouraged to maintain consistency within their assignment of scores.

The first tape was played for rating followed by comparison of scores and discussion. By the playing of the third tape, scoring was consistent and judges were able to agree on rank order of the subjects. The raters made comments upon the order in which they were scoring each step, how a frame of reference could be established for the numbers within each step, and further need for clarification of the terms. This resulted in changes in the appearance of the evaluation instrument, Appendix D, and the preparation of written definitions for use in the actual rating of the experiment data.
Final Training of Raters

Four graduate voice teaching assistants were used for the rating of the final data with two of the raters having participated in the practice training session four and one-half weeks earlier.

The raters were presented with a copy of the printed exercise and then heard the taped demonstration which was used in the experiment. This was followed by reading the definitions of the terms on the evaluation instrument:

**Pitch:** Accuracy of intonation in relation to the accompanying piano. One tone only is used in the exercise. Flatness or sharpness would both be scored low.

**Vibrato:** Regular variation in pitch at a speed pleasing to the ear. Absence of vibrato and irregular, wide, wobbly, or excessively fast vibrato would all receive a low score.

**Legato:** The smoothness in the linking of one vowel sound to the next. In this exercise there should be no stopping between sounds and a regular vibrato should be present in the gliding from one sound to the next.

**Accuracy of Vowels:** The vowels should be clear without dipthongizing or dialect.
Resonance: Resonance will include a combination of the full open-throat sound and brightness or ring. Students were asked to use the openness of [ɔ] as a pattern for an equal resonating space. They were cautioned not to let [i] become too bright and piercing and for [u] to not become thin or dialectical but to maintain more of the [o] quality. A voice that is overly dark or overly bright would both be scored low while even tone-line and balanced resonance would score high.

The three training tapes were played with comparison of scores and discussions following each tape. Following these three tapes, samples of discarded data from the actual experiment were played and discussed to establish a clearer reference for the value of the numbers. This proved beneficial as the singers on the training tapes were generally much more advanced than the actual subjects. The raters agreed upon the rank order of the subjects as to the best and the worst and were in general agreement on the rank order of all subjects. Training was completed in one and a half hours and the raters were given another one and a half hours for a meal and rest.

Scoring of the Tapes

The scoring of the tapes was done using the instrument shown in Appendix D on page 59 with the code number of the subject types in the order in which they would be heard. The raters were told they would hear
eighty-four samples with a fifteen-minute rest period half-way through. This procedure was accomplished in a time period of one hour and twenty minutes.

Statistical Procedures

The total score given by each rater to each sample was recorded on a keypunch worksheet with the other data needed for computer analysis. To test for inter-rater reliability, a simple correlation was made between raters using the mean score given by each judge for each test to produce a correlation coefficient.

To test the hypotheses and ascertain if any of the treatments were of significance, an analysis of variance for repeated measures with an unequal group size was used. Data for this were the group means total of all four raters' scores on five items on two treatments, the pretest and posttest.

More detailed examination of the results for each group was obtained by running a t test for correlated means. In this, a mean for each group on both pretest and posttest by each rater was obtained. This allowed the calculation of the difference in means, a standard deviation, and a t score which could be compared to critical values by referring to the appropriate statistical table.

A simple percentage was reported on the frequency of outside practice before the second and third treatment sessions using the positive or negative response of the subject.
CHAPTER IV
FINDINGS, DISCUSSIONS, AND CONCLUSIONS

Findings

Four groups were formed in this study with subjects randomly assigned to create three levels of experimental groupings and one control group. A pretest on the singing of a vocal exercise was recorded in treatment session one and a posttest in session three. In session two all subjects were seen individually but only members of group 1 received a treatment. Four raters were used to evaluate the randomly-spliced recordings of the pre- and posttest performance of the exercise. These raters were trained as described in Chapter III and then scored the eighty-four samples.

To test the reliability of the scores given by the raters and justify that they were adequately trained, a simple correlation of the scores was made to obtain coefficients for all possible combination of variables. The matrix in Table IV shows a high inter-rater correlation which affirms the reliability of the scores used for the testing of the hypotheses and the conclusions.

TABLE IV
CORRELATION MATRIX OF INTER-RATER RELIABILITY

<table>
<thead>
<tr>
<th>Rater Number</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.00</td>
<td>.84</td>
<td>.78</td>
<td>.79</td>
</tr>
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<td>2</td>
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<td>.80</td>
<td>.78</td>
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<tr>
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<td>1.00</td>
<td>.88</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
</tbody>
</table>
Scores given each subject by the four raters were used to obtain a mean for each subject on both the pretest and posttest. The mean score of each subject within a group was used to provide a group mean, both for pretest and posttest. These data were used in an analysis of variance for repeated measures with an unequal group size, using an unweighted means solution as shown in Table V.

### Table V

**Analysis of Variance of Four Teaching Methods in Three Treatment Sessions**

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>p</th>
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<tbody>
<tr>
<td>Between Subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Between Group</td>
<td>3</td>
<td>86.18</td>
<td>29.72</td>
<td>.89</td>
<td>.45</td>
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<tr>
<td>Error-Between</td>
<td>38</td>
<td>1214.03</td>
<td>31.95</td>
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<tr>
<td>Within Subjects</td>
<td>42</td>
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<td></td>
<td></td>
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<td>Treatments</td>
<td>1</td>
<td>149.87</td>
<td>149.87</td>
<td>19.50</td>
<td>.001*</td>
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<tr>
<td>Interaction</td>
<td>3</td>
<td>3.65</td>
<td>1.22</td>
<td>.16</td>
<td>.92</td>
</tr>
<tr>
<td>Error Within</td>
<td>38</td>
<td>292.11</td>
<td>7.69</td>
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<tr>
<td>Total</td>
<td>83</td>
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</tbody>
</table>

* P < .001

Analysis of these data reveals no significant difference between groups with the four teaching methods of goal identification, modeling with a cassette tape, prescribed practice, and verbal approval. However, a significant difference (p < .001) was found between pretest and post-test scores for subjects indicating progress in all groups.
Although there is no significant finding in the interaction, the individual progress within groups was assessed by a t-test for correlated means in the interest of generating future hypotheses. In Table VI the means of the four judges on both pretest and posttest scores for all four groups may be examined along with the results of the calculation of a t-value. Inspection of the difference in the pre- and posttest means reveals that all three experimental groups showed higher gains in mean scores than the control group. These findings could be useful in future studies.

As one of the treatments was prescribing practice, a record was kept of the subject's report of practice. At session two and three, every subject was asked if he had practiced. There was no attempt to verify his response, and the quality or quantity of practice was not determined. These findings are reported in Table VII.

| TABLE VII |
| FREQUENCY OF REPORTED PRACTICE BY GROUPS AND TREATMENT SESSIONS |

<table>
<thead>
<tr>
<th>Session</th>
<th>Practice</th>
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<th>3</th>
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<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Group 1</td>
<td>9</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Group 2</td>
<td>8</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Group 3</td>
<td>10</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Group 4</td>
<td>2</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Totals</td>
<td>29</td>
<td>13</td>
<td>27</td>
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<tr>
<td>Percent of Totals</td>
<td>69%</td>
<td>31%</td>
<td>64%</td>
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</table>
TABLE VI
MEAN AND STANDARD DEVIATION BY DIFFERENCE SCORES ON RATERS MEAN, PRETEST AND POSTTEST, FOR THREE EXPERIMENTAL GROUPS, AND GROUP 4, THE CONTROL.*

<table>
<thead>
<tr>
<th>Group</th>
<th>Pretest Mean</th>
<th>Standard Deviation</th>
<th>Posttest Mean</th>
<th>Standard Deviation</th>
<th>Difference Mean</th>
<th>Standard Deviation</th>
<th>T</th>
<th>P</th>
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<tbody>
<tr>
<td>1</td>
<td>14.68</td>
<td>2.68</td>
<td>17.48</td>
<td>3.15</td>
<td>-2.80</td>
<td>3.22</td>
<td>-2.88</td>
<td>0.016*</td>
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<tr>
<td>2</td>
<td>14.35</td>
<td>4.29</td>
<td>17.08</td>
<td>5.07</td>
<td>-2.73</td>
<td>3.75</td>
<td>-2.30</td>
<td>0.047*</td>
</tr>
<tr>
<td>3</td>
<td>15.63</td>
<td>4.72</td>
<td>18.98</td>
<td>4.15</td>
<td>-3.36</td>
<td>4.30</td>
<td>-2.92</td>
<td>0.012*</td>
</tr>
<tr>
<td>4</td>
<td>17.29</td>
<td>6.42</td>
<td>19.43</td>
<td>5.43</td>
<td>-2.14</td>
<td>4.35</td>
<td>-1.30</td>
<td>0.240</td>
</tr>
</tbody>
</table>

*Significant at .05
Group 1, the recipient of all treatments, did not practice more as had been anticipated. The verbal approval given them after singing in session two did not have an effect on their frequency of practice. There is an observable difference in the activity of the control group. During session one these subjects were given five minutes of vocal coaching on the experimental exercise. At the close of this task, no assignment was given. At session two when asked if they had practiced, fewer had than had not. No further direction was given for the next week's activity. However, they each heard the tape of their singing of the exercise recorded at session one, and then they performed it three more times during session two. Even though they were not asked to practice, this activity did define to them that their performance of this exercise was an identified goal. It would appear that this resulted in their changed responses at session three when more of the control group 4 had practiced. At the third session, the frequency of practice by group 4 showed a more consistent ratio to the other three groups. This would further lead to the assumption that clear identification of a goal results in more effort directed towards its achievement.

Subjects Under Observation

There were observations made throughout the experiment which may contribute to the interpretation of the data and to the design of any further studies in this subject.
Response to the Vocal Exercise

Many subjects encountered difficulty saying the vowel sounds in sequence as neither the International Phonetic Alphabet or the traditional symbols for denoting the sound were meaningful to them. (See Figure 1, p. 28). This uncertainty could have hindered the subject's ability to perform at his best on either the pretest or posttest. For a few insecure singers, the chord changes in the piano accompaniment influenced them to change pitches which adversely affected their results on the tests. However, examination of the data on those singers having difficulty matching tones showed all progressing greatly in their ability to sing on pitch between the two tests. These factors are of interest but due to the randomization of the population should not have negative effect on the outcomes of the study. It does hold implications for any repetitions of a study of this nature.

Response to Being Tape Recorded

Upon entering the treatment room, some subjects were apprehensive when seeing the recording equipment. The physical arrangement of the room was conducive to redirecting their attention, and the subjects became very attentive to the instructions given by the experimenter who was directly facing them. Efforts were made to have the subject unaware of exactly when the tests were recorded.

Practice by Subjects

Even though sources for using cassette recorders were given, it appeared that persons in groups 1 and 2 only heard their tape outside of the treatment sessions if a recorder was very accessible to them. The personal interests of subjects in all groups may have been a factor...
in the frequency of practice as noted in Table VII. p. 43. A positive response for practice was recorded even if the subject had only tried it once. It was of interest to observe practice by group 4 subjects without any prescription.

**Self-Evaluation**

Subjects in groups 3 and 4 had not been given a chance to hear their own singing model which was recorded in session one and some subjects of groups 1 and 2 had not listened to the cassette tape which was given to them. The subject's reaction to the playing of his practice model at session two was observed by the experimenter. Even with no reinforcement or instruction for groups 2, 3, and 4, these subjects improved the quality of their singing throughout the three successive repetitions of playing and singing the exercise. The precise procedure and script of this session appears in Appendix F, page 74. It seemed the subject knew what to listen for, heard his own model of the previous week, and altered his manner of singing by his own corrective feedback system.

**Reinforcement**

It appeared to be distressing to most subjects of groups 2, 3, and 4 to not receive any verbal approval in his three performances in session two. Some would ask if it was better, some showed by body language that they were anxious for approval. When the experimenter made no comment, some subjects themselves said if they thought it was better or not. Several subjects would discuss their self-evaluation with the schedule assistant as they walked back to the classroom.
Responses at Final Session

Several subjects were disappointed at session three to only sing the same exercise. Many were hoping to learn new techniques and some had become stimulated to pursue more vocal development in formal study or to begin participation in a music ensemble. Subjects were less apprehensive about singing and were pleased to have had a little guidance. This was of importance as they anticipated having to sing elementary music songs alone later in the semester as part of the course in which they were enrolled.

General Considerations

During the experiment a severe influenza epidemic caused high absenteeism. This presented a secondary complication in that this viral strain caused upper respiratory symptoms and affected the vocal quality of some subjects. It was reported that some participants reported to class even though ill as they did not want to miss the experimental session.

To minimize the possibilities of non-verbal praise, the experimenter placed the standardized reading on the spinet piano and read it. Conscious efforts were made to reduce eye contact. There were more tasks in this session for the experimenter, which required hand and eye coordination. The most important factor was that there was only one experimenter in all sessions, thus the individual teaching manner was more consistent throughout.
Discussion

One of the most important findings of the experiment was that all groups progressed during the study. It is not possible to make conclusive observations on the reason for this occurrence as it could have been a result of the novelty of experimental effect, the natural reinforcement of music, the particular teaching techniques used in the first session, or the use of a model. It does suggest that systematic instruction is an effective teaching method.

Several researchers (as cited on page 15) found music to be naturally reinforcing. This could be a factor in the practice patterns as represented in Table VII, p. 42. Further, the activity of session two could have given a definition of a goal to control group 4 (see page 45). In this case it would be compatible with the principles of individualized instruction, pages 17-19, which includes defining a goal.

Progress by all groups could also be attributed to the methodology used in the five minute instruction of each person during session one. Awareness of learning styles and use of diverse methodologies is the responsibility of the teacher, a charge by Dunn (p. 17), Greer (p. 18), and Fields (p. 18).

The use of the cassette tape model during session two provided the sound source as advocated by both Kuhn and Comenius (p. 20). This presented a model for self-evaluation and reinforcement as was reported on pp. 46-67. There is no evaluation to confirm this, but the change in the practice pattern of the control group could be attributed to their hearing the model tape (Table VII, p. 42). The use of taped models has
been reported as producing significant results in applied music by Puopolo, Zurcher, and Deihl (pp. 20-21) and perhaps the use of taped models in individual vocal instruction is a factor in the progress of all groups.

In view of the desire for approval observed during session two (p. 47), the withholding of reinforcement could have maintained the subject's interest and need for approval at session three, thus carrying the mental and/or physical practice of the concepts forward to session three. This would be compatible with the reports of Gage (p. 11), Brown, and Johanneson (p. 12). The data on frequency of practice, Table VII, p. 42, showed 69 percent of the subjects practiced for session two and 64 percent practiced for session three. It is possible to regard the practice for session three as a rather high ratio considering only group 1 subjects received any comment during session two. It is not conclusive what variable was responsible for the activity between sessions two and three, but withholding of approval pending a better result could be responsible along with the previously discussed effects of modeling and the natural reinforcement of music.

The high correlation of raters provided adjunctive importance to the study. It supports the view that raters can be trained and presents a method of training which could be the basis of another study.

Conclusions

Examination of the data resulted in these conclusions concerning the hypotheses.
1. Subjects receiving maximum treatments (three), did not score significantly higher than subjects receiving fewer treatments.

2. Subjects receiving two treatments did not score significantly higher than subjects receiving fewer treatments.

3. Subjects receiving one treatment, prescribing practice of the identified goal, did not score significantly higher than subjects receiving no treatments.

Although all of the hypotheses were rejected, the gains in the pre- and posttest scores within all three experimental groups were higher than within the control group. The treatments for the experimental groups included goal identification, modeling with a cassette tape, prescribed practice, and verbal approval. The higher gains within the experimental groups suggests that the treatments are more successful in achieving progress for individuals than not using any of these techniques. There is no basis for declaring any one treatment to be more effective than another.

The high correlation in rater reliability indicates the method of training was effective and that individuals can be taught to be consistent raters.

Recommendations

The fact that the experimental groups showed greater gains in scores suggests that systematic instruction is relevant to the teaching of voice. It would be more convincing if significant findings could be achieved. These suggestions for future research could be beneficial
in achieving this goal.

1. Administer all of the treatments of this study to one experimental group and have one control group which received no treatment but takes the test at the beginning and ending of the study.

2. Consider using all of the treatments with one experimental group with a second group taught by another teacher using another methodology. A third group could again be used as a strict control group.

3. Provide more accessible resources for practice.

4. Consider using voice class students, possibly from more than one college.

5. Use subjects for whom the attainment of vocal progress is more directly related to their personal goals.

Judges are essential in the evaluation of music performance. In this highly subjective activity, it is important to learn that reliability can be achieved. The methodology used in this study to train the raters could be replicated in a comparative study or a new study using the same procedures of training could be used with more than one set of raters.
APPENDIX A

VOCAL EXERCISE FOR THE EXPERIMENT
WITH PIANO ACCOMPANIMENT
VOCAL EXERCISE FOR THE EXPERIMENT
WITH PIANO ACCOMPANIMENT
APPENDIX B

VOCAL PRACTICE RESOURCES
VOCAL PRACTICE RESOURCES

CASSETTE RECORDERS

1. Music Education Library - MU 204
   If no other student is in the room, you may play your tape AND sing.

2. Main Library Room 437 or 441
   (Media Library: Special Collections)
   A. Check-out recorder, take it to "Audio Room."
      There is a special booth with a piano. You may sing there.
   B. Check-out recorder for use away from the library.
      (Just like book check-out.)

VOCAL PRACTICE

MU 234, 235, 236, and 237 are available for use in 15 or 30 minute blocks. These rooms should be unlocked. A piano is in 237. In the other rooms, you may sing and use your cassette recorder.

Electrical outlets are with the light switch.

MU 232 is available but is kept locked.

Keys are available for these rooms, if locked, from the Asst. Deans' office, MU 115.
APPENDIX C

PRELIMINARY DESIGN OF RATING INSTRUMENT
### Preliminary Design of Rating Instrument

<table>
<thead>
<tr>
<th>Number</th>
<th>Resonance: Depth</th>
<th>Resonance: Brilliance</th>
<th>Accuracy of Vowels</th>
<th>Rater's Name</th>
<th>Vibrato</th>
<th>Pitch</th>
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* 25% reduction
APPENDIX D

BEHAVIOR RATING DESIGN INSTRUMENT
## Behavior Rating Design Instrument

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<th>Resonance</th>
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</table>

* 25% reduction
APPENDIX E

SCRIPT AND PROCEDURES FOR
SESSION ONE
SCRIPT AND PROCEDURES FOR SESSION ONE

Groups 1 & 2

Experimenter's Procedures

"Hi, __________. I sure appreciate your helping in this study. We are interested in how well you can sing the vowels you see on this sheet. First I'd like you to just hear someone singing this exercise while you look at it. --- OK, now. Do you see the two ways to show you how to say the vowels? On the top line are the traditional phonetic symbols which are just a sounding-out method. On the second line are the International Phonetic Alphabet symbols you might have learned if you studied a foreign language. First, let's just try saying the vowels. I'll say each one and then you say it after me, OK?

Good! In a minute we'll play the example again and then immediately after it I'd like for you to

Assistant's Procedures

Auxil. reel on
sing it. But first, let's just find your starting pitch: Here's the tone--use the higher or lower one, whichever you prefer, and just hum it.------
That's right. Now, follow the exercise as we hear the example again. Then right after that I'll play your pitch. Then you try it while I play chords with you. OK, now listen first.

Great. Now, let's see if I can help you sing this exercise even better. (Comment at will.)

Very good. Now let's do it just once more.

Now, that really sounds much better. I'd like to see if you can do this exercise just this well when I see you next week. So, practice it using the printed exercise and also take along this cassette tape so you can hear how you did it today. It's yours to keep. Do you have a cassette recorder you
Experimentor's Procedures

(Give form on sources)

...can use? (Negative response, give ck. out directions)

Thanks a lot for coming, and I'll be anxious to see

how you sound next week. Bye now.

Assistant's Procedures

...Stop aux. reel
write no. on next
S's. card

After next S is
present Record
(tape) next S's
no., name, & 3
sec. pause.

Test tape prep.
Write counter no.
on next S's card
Record (tape)
next S's no. only
& 3 sec. pause

2 cassettes
Name on each - one
to mea.

one second - say:
"one thousand one"

RESPONSE TO ANY QUESTIONS

Because of what we're doing, I have to wait and explain

anything at the end of our third session, OK?
Hi, ______. I sure appreciate your helping in this study. We are interested in how well you can sing the vowels you see on this sheet. First I'd like you to just hear someone singing this exercise while you look at it. OK, now. Do you see the two ways to show you how to say the vowels? On the top line are the traditional phonetic symbols which are just a sounding-out method. On the second line are the International Phonetic Alphabet symbols that you might have learned if you studied a foreign language. First, let's just try saying the vowels. I'll say each one and then you say it after me, OK?

Good! In a minute we'll play the example again and then immediately after it I'd like for you to sing it. But first, let's just find your starting pitch:

Here's the tone-- use the higher or lower one, whichever you prefer, and just hum it. ------
Experimentor's Procedures

Play model
Eye contact - Asst.
Piano - tone chord play

Assistant's Procedures

That's right. Now, follow the exercise as we hear the example again. Then right after that I'll play your pitch then you try it while I play chords with you. OK, now listen first.

Great. Now, let's see if I can help you sing this exercise even better. (Comment at will.)

Very good. Now let's do it just once more.

Now, that really sounds much better. I'd like to see if you can do this exercise just this well when I see you next week.

So, take along the printed exercise and let's see if by practicing you can sing it as well as you just did by the time I see you next week.

(Give practice room sources only)
Thanks a lot for coming. I'll look forward to seeing you next week.

Model cassette ready
Verify S's group: script ready

RESPONSE TO ANY QUESTIONS
Because of what we're doing, I have to wait and explain anything at the end of our third session, OK?

Group 4

"Hi, ___________. I sure appreciate your help- ing in this study. We are interested in how well you can sing the vowels you see on this sheet. First I'd like you to just hear someone singing this exercise while you look at it. --- OK, now. Do you
see the two ways to show you how to say the vowels? On the top line are the traditional phonetic symbols which are just a sounding-out method. On the second line are the International Phonetic Alphabet symbols you might have learned if you studied a foreign language. First, let's just try saying the vowels. I'll say each one and then you say it after me, OK?

Good! In a minute we'll play the example again and then immediately after it I'd like for you to sing it. But first, let's just find your starting pitch: Here's the tone---use the higher or lower one, whichever you prefer, and just hum it.---- That's right. Now, follow the exercise as we hear the example again. Then right after that I'll play your pitch then you try it while I play chords with you. OK., now listen first.
Stop model/rewind

Great. Now, let's see if I can help you sing this exercise even better. (Comment at will.)

Very good. Now let's do it just once more.

Thanks a lot for coming. I'll look forward to seeing you next week.
SCRIPT AND PROCEDURES FOR SESSION TWO

Group One

Experimentor's Procedures

"Hi. It's good to see you. You doing OK? Well, did you practice that exercise we did last week? (Great!)

OK. Here's another copy of the exercise. I'd like for you to follow it again as I play a tape we recorded of YOU singing it last time.

Now, I'd like for you to sing it again as I play for you. (Praise)

OK. Let's hear the tape again and give it another try. (Praise)

OK. Now, one last try. Listen to yourself on tape and then sing it once more. (Praise)

Assistant's Procedures

Red Light
Auxil. Reel on
Announce S's 1st no.
Write response on S's card

Play tape (cassette) of S. stop/rewind

(Repeat)

(Repeat)
Fantastic. I really am pleased with what you've done.

That's all for today. Thanks a lot for coming. So, I'll see you next week.

Groups 2, 3 and 4

Hi. It's good to see you. You doing OK? Well, did you practice that exercise we did last week?

OK. Here's another copy of the exercise. I'd like for you to follow it again as I play a tape we recorded of YOU singing it last time.

Now, I'd like for you to sing it again as I play for you.

OK. Let's hear the tape again and give it another try.
OK. Now, one last try. Listen to yourself on tape and then sing it once more.

That's all for today. Thanks a lot for coming. So, I'll see you next week.

(prepeat)

Prepare next S's cassette

Aux. Reel off
Write counter nos.
on next S's card.
APPENDIX G

SCRIPT AND PROCEDURES FOR
SESSION THREE
SCRIPT AND PROCEDURES FOR SESSION THREE*  

Experimentor's  
Procedures  

Group 2, 3, and 4  

"Hi. Well, here we are again! Did you practice that  
exercise this week? OK. Here's a copy of the  
exercise. Let me play that first tape we made of  
you singing and then I'll play for you and you  
sing it again, OK?  

All right. Now, for the VERY LAST time---listen  
first, then sing.  

(Thank freely.)  

Hand S. copy of  
Exercise  

Play S's cassette  
Stop/rewind. Play  

Play S's cassette  
Stop - Play  

Groups 3 & 4 - give  
them my copy of cassette  

Assistant's  
Procedures  

Watch red lights  
Auxil. reel on  
(Write down  
responses)  

After 2nd playing  
of cassette,  
record on test  
tape S's 2nd  
singing of  
exercise  

Stop auxil. reel  
Write no. on next  
S's card  
Tape record next  
S's 2nd no. & a  
3 sec. pause  

Prepare test tape  
Write counter no.  
on next S's card  
Advance tape 3 sec.  
Tape record next  
S's 2nd no. - &  
3 sec. pause  

*Group One - if response to practice is affirmative,  
say "great."
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