DIFFERENTIAL APPROACHES
TO REHEARSING AND CONDUCTING
AN INSTRUMENTAL ENSEMBLE

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

By

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* * * * *

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ACKNOWLEDGEMENTS

The author wishes to express his appreciation to the members of his dissertation committee, to the University Band at The Ohio State University, and to John Taylor, David Leppla, and David Woike for their invaluable assistance in the completion of this project.

Sincere thanks is extended to all of the author's teachers, at both the secondary and university levels, particularly those whom have provided guidance in teaching and in music.

The author would like to give special thanks to his family, for their patience and support throughout his graduate study. Special appreciation is extended to Dr. Jere Forsythe, adviser, colleague, and friend, for his continual support and expert guidance.

The author particularly wishes to express most sincere gratitude to his wife, Nancy, for her unfailing love, encouragement, and support throughout this, and every endeavor.
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CHAPTER I

INTRODUCTION

Teaching and rehearsing a music ensemble is a complex task which involves appropriate synthesis of the cognitive, affective, and psychomotor domains of learning. Price (1981) states, "The art of teaching and rehearsing involves many diverse and complex behaviors, which may include thousands of variables in operation when describing an effective teacher" (p. 1). In the rehearsal, as well as in the performance setting, communication is one of the primary functions of the teacher/conductor. In the rehearsal, the teacher/conductor must communicate, both verbally and nonverbally, a wide variety of information to the ensemble. He/she must be able to assess the performance quality of the ensemble and employ effective verbal and visual teaching techniques in order to improve the level of performance. The conductor must also coordinate physical gestures with score reading and listening in order to convey musical ideas.

In both educational and professional settings, the conductor must detect, analyze, and offer solutions to problems ranging from obvious flaws, such as poor attacks, incorrect notes, or rhythmic and intonation problems, to more subtle aspects of music such as phrasing, expressiveness and interpretation. The teacher/conductor must draw upon previous knowledge of instrumental pedagogy, theory, ear-training, interpretive and stylistic practices, and
rehearsal techniques in order to teach musical concepts and performance specifics to the performers.

An effective teacher/conductor provides a visual representation of the sound of the music, which when combined with verbal communication skills during rehearsals, assists the performers in the preparation of music. Eugene Ormandy stated,

The art of conducting, one of the most complex and demanding activities in the realm of music, comprises both the visual public performance and the constant application of technique. Although they are inseparable in performance, they can be analyzed in the light of the unique problems which each presents (cited in Green, 1969).

Both verbal and nonverbal communication are important aspects in the teaching and rehearsing of a music ensemble. Surprisingly, little research has been conducted which addresses these important variables as they pertain to educational or professional settings. The performance ensemble is clearly a major component of music education in American schools, and the rehearsal process is critical to the success of these ensembles. It is important to music education that researchers analyze the numerous variables included in this aspect of the profession.

Need for the Study

Research pertaining to the processes involved in music rehearsals has been varied, though limited. Studies have examined types of behaviors, both verbal and nonverbal, used by conductors (Berz, 1983; Carpenter, 1986; Erbes, 1972; Ervin, 1975; Reynolds, 1974; Roshong, 1978; Sherrill, 1986); time spent on
various activities and musical elements (Carpenter, 1986; Papke, 1972; Pontious, 1982; Reynolds, 1974; Thurman, 1977; Witt, 1986); and the relationship of rehearsal behaviors to overall rehearsal/performance quality (Carpenter, 1986; Garofalo & Whaley, 1979; Grechesky, 1985; Price, 1981; Sagen, 1978; Witt, 1986; Yarbrough, 1975). Researchers appear to have been reluctant to investigate the effects of various rehearsal strategies and specific techniques, as the complexity of the issue seems to be problematic. In fact, little research has been conducted to determine the types of rehearsal approaches that are most effective and efficient, or that are best suited for solving specific musical and pedagogical problems. Since rehearsal time in public school, as well as in college/university settings, is inevitably limited, research that might determine what methods of rehearsing can produce the most positive results in the least amount of time is clearly warranted. Grechesky (1985) states,

The kinds of behaviors that a conductor exhibits during a rehearsal are critical to the successful communication of his musical ideas to the ensemble . . . If certain conducting behaviors achieve more musical results than others, an understanding and command of those behaviors would be a great help to those involved in conducting and the teaching of conducting (p. 4).

If certain methods of rehearsing can produce positive results in less time, it is important to determine what comprises these methods. The study of these methods would clearly be of benefit to the training of effective and efficient teachers.
The curriculum in music teacher education must be designed to prepare prospective teachers to teach effectively and efficiently in the rehearsal setting. Rehearsal skills are usually addressed through conducting classes and methods courses, or some combination of the two. In college conducting classes, a wide variety of skills must be taught in a limited amount of time. As prospective teacher/conductors, students must be proficient in theory, history, ear-training, and rehearsal techniques, in addition to baton technique. Conducting courses are often designed to train students in baton technique, frequently with little time being devoted to many other skills necessary to the rehearsal process.

There is sometimes confusion as to how and when conducting techniques and rehearsal techniques should be combined in the training of future teacher/conductors. Rehearsal techniques are often addressed only minimally through conducting classes. Students often find themselves unable to combine the musical, teaching, and conducting skills involved in rehearsing during student teaching or first year teaching situations. Though college conducting classes involve an understandable emphasis on training students to have appropriate and coordinated arm movements and musical gestures, all conductors, and school music educators in particular, are required not only to conduct, but also to rehearse their ensembles. Through research, important data could be obtained to assist in structuring balanced programs that will prepare future music teachers to be successful at the total rehearsal process.

The process of conducting is, of course, nonverbal in nature, whereas the process of rehearsing involves both verbal and nonverbal behaviors.
Carpenter (1986) states, "Despite its advantages, relying exclusively upon the nonverbal seems unrealistic in view of all that is involved in rehearsing music. The most apparent weakness of this type of communication is the inability to communicate specific technical information regarding performance" (p. 3). Rudolph (1980) states,

Similar to the conductor's baton technique, which may be defined as a highly individualized craft to evoke specific responses on the part of the players with the most effective gestures, his verbal communication in rehearsal must be equally specific, easily understandable, and congruous with his musical intentions (p. 382). He further states, [the orchestra] . . . expect authority and efficiency from their leader when he finds it necessary to discuss passages whose rendition needs verbal explanation. The ability to express himself plainly and concisely is an important part of the conductor's craft (p. 387).

It remains to be determined how much of each element is needed to achieve the musical objectives desired. It may be that certain types of musical problems can be addressed through nonverbal techniques alone, while some may require a verbal approach to reach the objective. These two aspects need not be isolated; rather, they should serve to complement one another. As an extension of the musical decisions of the teacher/conductor, they combine to form what is generally referred to as "rehearsal techniques."

Conducting, in its most basic sense, is a nonverbal form of communication that involves pairing musical sounds together with a visual representation of that sound. It serves an aesthetic purpose, but also a practical one, as it is used to assist musicians in playing together with unified
beat, style, dynamics, and so forth. Beyond the fundamentals of conducting, teacher/conductors inevitably develop their own unique conducting style. Although conducting styles are often individualized and varied, it is important for conductors to maintain a clear, musical conducting technique. Hunsberger and Ernst (1983) state "a clear, fluent conducting technique is essential. A secure technique enables a conductor to concentrate entirely on the needs of the performers and the music" (p.1). Many conductors who employ a fundamentally clear and expressive baton technique, even with highly individual styles, have achieved successful musical results. The performance level of the ensemble can be of high quality and musically satisfying, regardless of an individual's unique conducting style, as evidenced by the wide variety of styles exhibited by conductors of many types of successful music organizations. Ervin (1975) states "... it is possible for one conductor to be effective while using poor baton technique and another conductor to be ineffective while using excellent baton technique. It must be recognized that good baton technique could only contribute to conductor effectiveness, but, at the same time, [sic] not the sole criterion for effectiveness" (p. 9). Green (1969) states that a conductor must possess "a secure and readable conductorial technique, with the hands and baton adequately interpreting the score" (p. 213). It is a synthesis of many factors, of course, that make a truly outstanding teacher/conductor, and much research is needed to analyze the variables involved in being successful.
Statement of the Problem

The rehearsal process is important to the success of performing ensembles in any setting. It is perhaps especially critical in educational ensembles, where few assumptions regarding the performance potential of the ensemble can be made. Rehearsing a school music ensemble requires an appropriate blend of musicianship, conducting skills, rehearsal techniques, and motivational strategies. Currently, there is a lack of adequate understanding of the numerous factors involved in music ensemble preparation. The study of different approaches to rehearsing has been particularly neglected in the research literature. The relative importance of effective rehearsal and baton technique has not been systematically examined. More data could reveal both strengths and weaknesses in methods of rehearsing and conducting, thus providing important knowledge for the profession. Research pertaining to the effectiveness and efficiency of rehearsing music ensembles is needed in order to provide for informed recommendations for future teachers, as well as to assist those already in the field.

Purpose

The review of literature in the area of rehearsal techniques indicated a need for research regarding the effects of various types of rehearsal approaches as they relate to rehearsal effectiveness. This study, exploratory in nature, was an attempt to examine rehearsal techniques in an applied setting. Specifically, the purpose of the study was to explore four approaches to rehearsing an instrumental ensemble. The study examined the effects of four rehearsal approaches on the number of repeated attempts (trials) used to
improve critical passages prior to the conductor's decision to move on to other passages. The conductor could leave the problem either satisfied or unsatisfied for the moment. The conditions of rehearsing were as follows: Condition I--use of standard rehearsal techniques (e.g., modeling, verbal imagery, verbal-technical instruction) paired with appropriate conducting (i.e., expressive), Condition II--use of standard rehearsal techniques paired with inappropriate conducting (i.e., time-beating), Condition III--non-rehearsed repetition of critical passages paired with appropriate conducting, and Condition IV--non-rehearsed repetition of critical passages paired with inappropriate conducting.

Through comparing the number of trials resulting under the four conditions, the study investigated the effects of the rehearsal methods on the number of trials used to solve common types of problems in instrumental music rehearsals. The study also provided for the descriptive comparison of these methods with respect to the specific musical elements of rhythm, tempo, ensemble clarity, tone, pitch/intonation, note accuracy, dynamics/balance, style/articulation, and musicality/expressiveness. The independent variables were (1) rehearsal condition (rehearsal techniques vs. repetition), and (2) conducting condition (appropriate vs. inappropriate). The dependent variable was the number of trials used by the conductor before leaving the problem addressed in the critical passage. Whether the conductor left a passage satisfied or unsatisfied for the moment was also examined.

Specifically, the study was designed to address the following research questions:
(1) Is there a significant difference in the average number of rehearsal trials used at each rehearsal stop, when comparing the use of standard rehearsal techniques with mere repetition of critical passages?

(2) Is there a significant difference in the average number of rehearsal trials used at each rehearsal stop, when comparing the use of appropriate conducting with inappropriate conducting of critical passages?

(3) Is there a significant interaction between the variables of rehearsal conditions (use of rehearsal techniques versus repetition only) and conducting conditions (appropriate versus inappropriate)?

(4) Is there a significant difference between the average number of trials used when the conductor left a problem satisfied and when he left a problem unsatisfied?

(5) Is there a significant interaction between the rehearsal conditions and whether the conductor left the problem satisfied or unsatisfied for the moment?

(6) Is there a significant interaction between the conducting conditions and whether the conductor left the problem satisfied or unsatisfied for the moment?

(7) Is there a significant interaction among the variables of rehearsal conditions, (rehearsal techniques and repetition only), conducting conditions (appropriate and inappropriate), and conductor satisfaction (conductor satisfied or unsatisfied) when leaving the problem?
Additionally, the study addressed the following sub-problems:

(1) Are there notable differences in the mean number of rehearsal trials used with respect to the musical elements of rhythm, tempo, ensemble clarity, tone, pitch/intonation, note accuracy, dynamics/balance, style/articulation, and musicality/expressiveness under the four experimental conditions?

(2) In what percentage of the rehearsal stops is the conductor addressing the musical elements of rhythm, tempo, ensemble clarity, tone, pitch/intonation, note accuracy, dynamics/balance, style/articulation, and musicality/expressiveness?

(3) Under the conditions during which the conductor was allowed to use standard rehearsal techniques (Conditions I and II), what percentage of the techniques used were modeling, verbal imagery, verbal-technical instruction, a combination of modeling and verbal-technical instruction, or other.

(4) What percentage of rehearsal stops concluded with the conductor being satisfied and unsatisfied under each of the four experimental conditions?

(5) In what percentage of rehearsal stops did the conductor leave the problem satisfied, when using appropriate conducting versus inappropriate conducting?

(6) In what percentage of rehearsal stops did the conductor leave the problem satisfied when using rehearsal techniques versus mere repetition of critical passages?
(7) What was the level of agreement by the expert observer for each of the four experimental conditions when the conductor left the problem satisfied compared to when he left the problem unsatisfied?

(8) What was the level of agreement by the expert observer under conditions when the conductor used rehearsal techniques (I and II)? When the conductor used repetition only (III and IV)?

(9) What was the level of agreement by the expert observer under conditions when the conductor used appropriate conducting (I and III)? When the conductor used inappropriate conducting (II and IV)?

Assumptions

The exploratory nature of this investigation required that several assumptions be made in order to proceed with the study. The following are the more pertinent assumptions:

(1) Although the experimenter served as a subject, it was assumed that experimenter bias would be mitigated by the procedures. Data were analyzed following the last recorded rehearsal. The experimenter/conductor, therefore, was unaware of any results until the experimental period was completed. The presence of an expert observer was an additional measure taken to assure that there would not be experimenter bias.
(2) Due to random distribution of types of conditions, various types of musical problems would be randomly spread throughout the four conditions.

(3) The observations were made over a period of 4 1/2 weeks, incorporating nine rehearsals. This was assumed to be a sufficient amount of rehearsal time to obtain meaningful data under each experimental condition.

(4) Data collected for this study were the number of rehearsal trials following which the conductor left the problem (either satisfied or unsatisfied for the moment). It was assumed, at the outset, that the number of trials used prior to the conductor leaving the problem either satisfied or unsatisfied would be an indication of rehearsal efficiency, and perhaps effectiveness. Therefore, fewer trials used to achieve satisfaction when leaving the problem would indicate greater efficiency, and therefore greater effectiveness of the technique.

(5) In order to obtain a second opinion concerning the decision of the experimenter/conductor to conclude work on a critical passage, an expert observer was asked to observe all rehearsals. The proximity of the expert observer to the ensemble was important so that his decision could be based upon hearing the ensemble from a perspective similar to that of the experimenter/conductor. Since it was not practical to have this individual stand on the podium with the experimenter/conductor, it was assumed that his placement,
maintained throughout the study, was appropriate for rendering a valid professional judgment.

Limitations

(1) It was the intention of the experimenter to explore a natural rehearsal setting while incorporating experimental conditions that would be unobtrusive. Employing experimental rehearsal and conducting conditions within a natural setting created certain limitations, because of the experimenter's desire not to interrupt the normal course of the rehearsal procedure.

(2) The University Band at The Ohio State University used for this study is comprised primarily of non-music majors. Generalization of the results of this study to other types of ensembles, or ensembles that perform music of a different level of difficulty, would be limited.

(3) This study was limited to the examination of teacher/conductor communication as it pertains to rehearsal techniques and conducting of musical examples. Teaching that addresses social behaviors was not included in this study.

(4) The selections used for data collection in the rehearsals were indicative of the normal level of music prepared by this ensemble.

Definitions

(1) University Band--A full symphonic band at The Ohio State University, comprised of 92% non-music majors and 8% music
majors. The band has two evening rehearsals, one 80 minutes and one 90 minutes in length, weekly throughout autumn, winter and spring quarters.

(2) Rehearsal Techniques--The use of verbal communication (i.e., modeling, verbal imagery, questioning, verbal-technical instruction) as a means of changing musical behavior in the rehearsal setting.

Modeling. Demonstrating desired responses and/or providing contrast by demonstrating undesirable ones. This can include, but is not limited to clapping, singing, and chanting of any musical element addressed during a rehearsal techniques condition.

Verbal-Technical Instruction. Giving clear and precise verbal directions which describe the desired student response.

Verbal Imagery. Using verbal analogies or metaphors to produce a desired musical behavior.

Questioning. Asking pertinent questions which lead to the desired musical response.

(3) Repetition Only--Merely repeating the critical musical passage, using no rehearsal techniques (e.g., "Let's try this passage again").

(4) Appropriate Conducting--The use of clear, musical, and expressive gestures to assist the ensemble in performing music.

(5) Inappropriate Conducting--The use of clear, but non-expressive (time-beating) gestures to maintain the pulse of the ensemble while performing.
(6) Rehearsal Stop--When the conductor stops the ensemble to correct a problem. If the conductor addressed more than one musical problem during a single stop, an additional stop was recorded for each problem addressed.

(7) Critical Passage--A portion of the music that the conductor wishes to improve during a rehearsal stop, using one of the four experimental conditions.

(8) Rehearsal Trial--One attempt to improve a critical passage of music during a rehearsal stop. It consists of starting and stopping the ensemble one time.

(9) Definition of Problem--A verbal explanation of a musical problem, stated by the conductor immediately following a rehearsal stop.

(10) Musical Elements--The various elements of a musical performance that are typically addressed by teacher/conductors through the process of rehearsal techniques.

Tone. The quality of a musical sound.

Pitch/Intonation. The degree to which an instrument is being played in tune.

Dynamics/Balance. The volume level of the ensemble, and the relative volume level of players and sections within the ensemble.

Rhythm. The orderly distribution of notes within a temporal framework.
Musicality/Expressiveness. The emotional and expressive qualities inherent in the shape of the musical lines and phrases.

Note Accuracy. Whether or not notes used in the musical passage are correct.

Style/Articulation. The manner in which notes and phrases are started and stopped.

Tempo. The pace or speed at which the music moves.

Ensemble Clarity. The rhythmic and stylistic precision of the total ensemble.
Although a great deal of research exists concerning numerous aspects of music education, there are relatively few studies that focus specifically on the area of rehearsal techniques. Most literature concerned with rehearsal techniques is found in articles by authors whose views are usually based on their personal experiences and expertise. Research studies pertaining specifically to the processes involved in music rehearsals have been varied, though limited. This review of literature focuses on various areas important to acquiring the skills necessary to rehearse effectively. The review has been divided into the following five categories: (1) Training of Teacher/Conductors, (2) Observation Instruments, (3) Use of Rehearsal Time/Rehearsal Effectiveness, (4) Verbal-Nonverbal Communication, and (5) Textbooks.

Training of Teacher/Conductors

Several important studies have addressed general aspects of music teacher/conductor preparation. An early study by Getchell (1957) surveyed colleges to determine course organization, content, and approach to teaching beginning conducting classes. Getchell also sought to determine the most common problems encountered by beginning conducting students, and to
develop a progressive course outline for college level conducting classes. Findings indicate that the large majority of conducting classes are not integrated with other music areas. Emphasis is upon baton technique and directly related areas (e.g., musical terms and rehearsal techniques).

Labuta (1965) developed a theoretical basis upon which collegiate level instrumental conducting courses might be structured. Behavioral objectives were constructed to facilitate the learning experiences and to provide a means for evaluation. The objectives were categorized as: objectives pertaining to attitudes and appreciations, objectives pertaining to knowledge and understanding, objectives pertaining to skills, and objectives pertaining to habits. The study provided a valid basis upon which college conducting classes could be structured, incorporating the nature of musical expression, the principles of musical learning, and the musical and societal needs of the person conducting.

Liles (1978) prepared drill materials depicting varying degrees of conducting rhythmic problems, and evaluated the effectiveness of these materials as part of the preparation of student conductor/teachers. The investigator developed a Conducting Workbook containing full score examples of: (1) simple meter, (2) compound meter, (3) irregular meter, (4) fermati, (5) syncopation, (6) divided meter, (7) changing meter, and (8) changing tempos. In studying an advanced conducting class at The Ohio State University, he found: (1) drill materials effectively stressed baton technical problems of a rhythmical nature, (2) student conductor/teacher conducting from a full score was an effective means for developing and improving baton technique, (3) having a live ensemble provided student conductor/teachers
with an effective performance medium, and (4) videotape equipment was a valuable teaching aid and an effective means of recording pre/post-test performance.

Clark (1973) developed many musical examples for use in teaching baton technique to college conducting classes. The purpose of the study was to provide musical examples which were selected or composed for aid in teaching specific, identifiable instrumental conducting techniques. Grunow (1980) investigated certain aspects of score study relating to improving aural-visual discrimination. The methods of score preparation included: (1) study of the score only, (2) study of the score with recorded examples, (3) study with recorded examples only, and (4) no preparation. He found no significant difference in the achievement level among the four types of preparation.

Yarbrough, Walpnick, and Kelly (1979) compared the effect of instructor feedback versus systematic self-observation on beginning conducting students' performance, attitude, and verbalization, and found no significant difference except in verbal content analysis of students' self-critiques.

An important aspect of preparing teachers in rehearsal techniques is that of error detection skills. Several studies have addressed programmed instruction and error detection skills. Sidnell (1968) found that programmed materials in error detection may be more beneficial than non-programmed materials. Ramsey (1978) developed a system of programmed instruction utilizing full score band literature to train college music students in the skill of pitch and rhythm error detection. Results indicated that programmed instruction may be an effective means in development of error detection ability, and that a podium-based format is feasible in conducting and methods
classes. The program developed by Ramsey proved an effective means of training college music students in pitch and error detection skills. Collings (1973) evaluated the effect of specific training techniques designed to improve skill in identifying errors of pitch while reading five and six-part brass scores. Significant improvement was found in college junior subjects involved in the training, as measured by a score reading test.

Error detection training and in-class conducting may increase error detection ability. Stuart (1978) found that participants in an error detection training skills class evidenced significantly greater usage of skills measured than did the participants in a class without error detection skills. Stuart recommended that the training of teacher/conductors in error detection skills be approached as a two-fold process incorporating aural-visual stimuli in conjunction with participation as a teacher/conductor of ensembles.

Doane (1988) created an experimental instructional program in aural error detection and tested its effectiveness in the development of this skill for student conductors. This program, consisting of music selected from a variety of styles and periods of wind literature, was compared to an existing error detection program (MLR Instrumental Score Reading Program). Both methods produced results over a two semester period, and the study concluded that conductor aural error detection skills seem to be developed independently of skills taught in traditional aural skills courses. Pitch errors were the easiest type to identify, followed by mistakes in balance/dynamics, precision, and rhythm.

DeCarbo (1982) found that training in error detection skills using programmed instruction did not transfer to a conducting situation as well as
training in the same skills using live, podium-based instruction. This study also suggested that training in error detection skills using a podium-based instructional format may transfer to non-conducting situations, such as score reading and score study, as well as training using a programmed format. He also generalized several points regarding the importance of podium-based programs in instruction: they should be used to reinforce the aural-visual skills developed in theory, sight-singing, ear training, and other courses in the music curriculum, and the error detection skills needed to efficiently and effectively correct errors may improve as a result of podium-based training.

Brand and Burnsed (1981) studied the predictive validity of music education students' previous music abilities and experiences as they relate to their skill in music error detection. They found no significant relationship between each of the predictor variables and the students' skill in music error detection. The authors suggest that ability to detect errors in music may exist independently of other music abilities, and therefore suggest that one should design instruction specifically towards the goal of development of error detection skills.

Forsythe and Woods (1983) found that listening skills were partially inhibited by the very act of conducting. Their study also indicated that the skill of combining these tasks can be improved over time.

The use of videotape feedback has been found to be useful in teaching beginning conductors (Keller, 1979; Liles, 1978; Yarbrough, 1978). Yarbrough (1978) found that students can effectively change their conducting behavior by (1) observing themselves via videotape, (2) taking data through systematic observation, (3) selecting behavioral categories in which to establish
competency levels (pinpointing), and (4) monitoring their behavioral changes in those categories through constant repetition of the pinpoint - observe - record - evaluate cycle.

In a later study, Yarbrough (1987) suggested that students can effectively change their conducting behavior by studying operational definitions, participating in practical conducting experiences, observing themselves on videotape, taking data through systematic observation, and writing their own critiques. She also suggested that separating the many skills involved might be the most efficient way to teach the behaviors.

Jordan (1980) evaluated the effectiveness of videotape instruction when used as a supplement to classroom instruction in beginning conducting classes. He found that the videotape supplementary instructional materials used had a significant and positive effect upon the effectiveness of gestures for conducting both fermati and cues. In a post-test only control group design, the lowest of the reliability coefficients for the conducting post-test was .83. A questionnaire revealed that time spent in conducting practice outside of class was considered less well spent than either time spent in the conducting classroom or time spent working with the videotapes.

Additional studies have utilized videotaped instruction in other ways. A series of videotapes demonstrating the principles of teaching employed in rehearsal settings of choral groups was developed by Gonzo and Forsythe (1976). The tapes were produced with the belief that videotapes, as a source of vicarious learning, may facilitate the gap between teaching theory and teaching practice.
**Observation Instruments**

A few studies have investigated the use of observation instruments for the study of both nonverbal and verbal rehearsal behaviors.

Roshong (1978) developed an observational instrument that would inventory the nonverbal communication of conductors to see if relationships exist between the observed nonverbal behavior and the nature of the task being performed. Commonalities of nonverbal behaviors observed during specific rehearsal events were: facial approval and forward movement during starting, stopping, and sustaining events; facial disapproval; eye contact with the group; and movement away during instruction.

Another instrument designed to classify observed nonverbal communication behaviors demonstrated by conductors of musical ensembles was conducted by Berz (1983). A two-part instrument accounting for both non-static and static behaviors was constructed (Music Conductor Observation Instrument MCOI). The study found that the MCOI was a viable, practical means of classifying nonverbal communication behaviors of conductors of musical ensembles, and was recommended for use in research investigating the nature of conductors' nonverbal communication.

Erbes (1972) developed an observation system (Rehearsal Interaction Observation System) to analyze, categorize, and report the verbal interaction between conductors and students during rehearsals of large ensembles. Twelve categories were designed for use as a training technique for use with university conducting students, student teachers, and experienced teachers. These categories were: conductor uses; conductor encourages; conductor questions; conductor informs; conductor verbally or nonverbally
demonstrates; conductor verbally directs; conductor criticizes; conductor corrects; student verbally responds; student verbally initiates; periods of silence or confusion; and periods of student or group performances.

Reynolds (1974) analyzed information regarding small instrumental performance classes through the use of a modified form of the Observational System for Instructional Analysis (OSIA). She found the instrument useful in measuring the full range of teacher and student behaviors common to small instrumental music performance classes.

Another method of observation designed to evaluate conductor effectiveness was developed and assessed by Ervin (1975). Conductor effectiveness was defined as "behaviors of a conductor which result in a relatively short term goal of improvement of performance" (p. 5). Thirty-seven junior high, senior high, and college level conductors were videotaped and rated as to their ability to produce short-term improvements in performance. Eleven variables were selected as important: eye contact; expressive conducting gestures; pitch theme units; time theme units; volume theme units; other musical theme units; reinforcement theme units; discipline/punishment theme units; being on task theme units; nonmusical direction theme units; and teaching function theme units.

Use of Rehearsal Time/Rehearsal Effectiveness

Many studies have concentrated on the rehearsal technique concerns of music educators, investigating the effects of types of instruction in public school and university music rehearsal settings.
Using Erbes' Rehearsal Interaction Observation System, Pontious (1982) studied videotapes of five outstanding high school band directors. In a time and frequency analysis of the musical elements addressed by the band directors, he found the following percentages of comments used: phrasing/dynamics, approximately 25%; rhythm, slightly less than 25%; pitch, 15%; articulation, 10%; and style, balance, tone quality, and tone production, 21 to 24%. Conductor talk occupied 42% of the active rehearsal time, with the remaining 58% expended on rehearsal trials.

Carpenter (1986) analyzed specific verbal behaviors of teacher/conductors, identifying what types of verbalizations were most common in rehearsal. He found that teacher/conductors make few comments concerning theory, tone, intonation, and blend/balance, and more comments directed to rhythm, tempo, dynamics/expression, style/articulation, and instrumental fundamentals.

Thurman (1977) analyzed the rehearsal behaviors of five choral conductors to determine time spent on and frequency of various behaviors. He found that: approximately 35% to 40% of rehearsal time was spent on verbal behaviors; 50-60% of verbal comments were related to elements of choral performance; all but one of the conductors used demonstration more often than verbal explanation or verbal imagery; and all conductors used disapproval feedback more than approval feedback. Thurman found that the focus of rehearsals seemed to be affected by factors such as amount of rehearsal time available, level of musical competence of performers, and difficulty of music in relation to competence of performers. He suggests as a
next step establishing a relationship between conductor behavior and success in rehearsals.

Witt (1986) investigated secondary instrumental rehearsals with respect to the use of class time by teachers and attentiveness of students in performance and non-performance settings. Student attentiveness was intervallically observed and recorded. Student attentiveness was found to be a function of activity. Results also indicated that the largest percentage of class time (43.3%) was devoted to student performance, while 38.19% was occupied by teaching episodes. Preparation, or "getting ready" activities occupied 17.8% of the class time. She also found significant differences in time use between band and orchestra classes.

Yarbrough (1975) investigated the effect of magnitude of conductor behavior on performance, attentiveness, and attitude of students in mixed choruses. Four mixed choruses were rehearsed under three conditions: (1) with regular conductor, (2) with high magnitude conductor, and (3) with low magnitude conductor. Results indicated no significant differences in musical performance, attentiveness or attitude of the students in the mixed choruses. However, the off-task behavior was higher, and the performance evaluations lower, when a low magnitude conductor was rehearsing.

Sherrill (1986) analyzed the rehearsal and conducting techniques of eight school band directors by a systematic analysis of nearly seven hours of rehearsal video tapes from normal school environments. He surveyed five criteria of visual techniques used by each conductor, and indicated the frequency of several conducting techniques: eye contact; staccato beat; subdivided beat; transitions; legato beat; hand cuing; eye cuing; change in beat
size; contrast in beat styles; independence of hands; and releases/fermati. He found minimal examples of facial expression, eye contact, and expressive beat patterns in his study.

Papke (1972) investigated the rehearsal behavior of instrumental music directors utilizing an instrument which he designed. He collected data based on rehearsal climate, rehearsal effectiveness in instrumental techniques and music education, and the director's general rehearsal attitude. Director verbalization was categorized regarding primarily instrumental skills, material related to instrumental skills and music education, and primarily music education materials. He found a significant difference in the percentage scores of primarily instrumental skills and primarily music education materials among the music educators studied. He found a significant amount of rehearsal time taken up by director verbal time, specifically for directions. The cause for the higher percentage of verbal time for directions appeared to be repetition. He also found a significant amount of director verbal time spent for dynamics and rhythm in the primary instrumental skills area and for style in the primary music education materials area.

Yarbrough and Price (1981) examined teacher and performer behavior during high school ensemble rehearsals to determine the predictability of frequency of off-task behavior. This was done by studying the carrier variables of: performance time; non-performance time; frequency of social and academic approvals and disapprovals; stops; complete and incomplete teaching units; errors; and teacher eye contact. The results indicate a strong relationship between off-task behavior and individual teachers, non-
performance activity, and teacher eye contact. There were minimal relationships between off-task behavior and disapprovals, errors, stops, complete teaching units, and incomplete teaching units.

Price (1981) investigated academic task presentation, direction, reinforcement, and student performance on the attentiveness, achievement and attitude of students in a university symphonic band. The band rehearsed five times under three treatments: (1) directions followed by ensemble performance, (2) academic task presentations followed by directions and performance, and (3) academic task presentations, directions, and ensemble performance, followed by conductor reinforcements. Two conductors and six compositions were used. Findings indicated that attentiveness is a function of both performance time and treatment. A balance of time spent on presentation of academic tasks, instructional comments, teacher reinforcement and ensemble performance was important in producing consistent, positive results.

Garofalo and Whaley (1979) compared two different methods of teaching music concepts and skills through high school band performance. Two secondary school bands were used in a parallel-group design. The control group was taught with an emphasis upon developing short-range performance goals with a focus primarily upon developing skills to perform music for their next program. The experimental group was taught using the Unit Study Composition module, which emphasized a broader learning concept including concepts related to the structural elements of music, as well as historical styles. A pre-test, post-test, and post post-test were given to students in each band. Students taught with the experimental approach were
found to acquire conceptual knowledge, aural skills, and performance proficiency at a greater level than students taught with a traditional approach.

Spradling (1985) studied the effect of duration and frequency of timeout (with instruction) from performance on attentiveness and student attitude in a university band setting. He found a significantly higher off-task rate during timeout periods (equivalent to a "stop" in the present study) than performance periods. Off-task rates increased slightly as timeout frequency increased.

Sagen (1978) explored the use of verbal explanation alone and the use of verbal instruction with aural modes in studying the performance level of band ensembles, and found that both methods achieved improvement.

Verbal/Nonverbal Communication

Little research has been conducted on the effectiveness of conducting gestures and the process of musical communication through nonverbal means. Several studies have focused upon nonverbal conducting behaviors. An early study by Ostling (1977) presented a summary of available research on nonverbal communication which has implications for conductors of musical ensembles. He suggests that scientific research in the area of nonverbal communication might well be applied to the analysis and teaching of conducting skills. His review covers five areas: facial and hand expressions; eye contact; body motion; posture; and the expression of emotions.

Grechesky (1985) examined verbal and nonverbal behaviors exhibited by randomly selected high school band directors in Indiana. These behaviors were observed, categorized, and analyzed in order to determine how they
affected the performance of the bands. Eleven bands were audio-taped and ranked. He found that: (1) some verbal explanation is necessary in rehearsal, but verbal imagery had a much stronger impact on ranking, (2) minimal time should be spent on talk or instructions about non-musical matters, (3) the conductors of the more musical groups displayed significantly more body movement, (4) approving facial expressions had a positive effect on performance, whereas disapproving facial expressions had a negative effect, (5) conductors who demonstrated more use of the left hand, and coordination of the right and left hands had better results, and (6) emblems and illustrators (iconic behaviors) had the most powerful effect of any of the variables. His findings indicated that conductors who sharpen their nonverbal communications skills can have a very positive effect on their groups' musical performance.

Bartee (1978) developed a theoretical position on expressive body movement in conducting, and noted three deficiencies in conducting theory and practice: (1) lack of principles of body movement in textbooks, (2) failure to teach principles of movement in conducting classes, and (3) conductors' limited knowledge of the possibilities of expressive movement. Specific implications, including efficiency in rehearsal, were addressed. He concluded that body movement is a significant component in the transmission phase of conducting, and that one can improve the ability to use expressive gestures by studying movement as it is practiced in the movement arts.

Sousa (1988) studied the interpretation of conducting gestures by various groups of instrumental performers. He found 19 commonly used
instrumental conducting gestures to be recognizable by the total sample population of junior high school, senior high school, and university subjects.

Textbooks

Of the conducting texts reviewed, very few devote more than a small portion to the subject of rehearsal techniques. Most focus entirely on baton technique and the conducting of various beat patterns and styles.

Elizabeth Green (1969), in *The Modern Conductor*, devotes Chapter Sixteen to the preparation of the performance. Included in the text are chapters on score preparation, interpretation, and expressivity. She refers to the act of rehearsing as a performance for the conductor--while at the same time being a rehearsal for the musician. Beyond the basic knowledge of the music, the conductor owes the musicians: (1) clarity of time-beating gestures, (2) confidence and definiteness in leadership, based on thorough knowledge, (3) honesty in error, (4) the giving of cues for certain difficult and dangerous entrances, (5) the recognition of technical difficulties in the parts for the various instruments and a readiness to help in any way he can, and (6) an understanding of what is possible on the several instruments at diverse tempos and dynamic degrees (p. 205). Green also acknowledges the importance of knowing the score, and offers a 14 step approach to its preparation. She details "danger signals" of (1) rhythmic difficulties, (2) problems of intonation, and (3) ensemble factors (p. 207). In summation, she lists three items that emerge as necessities: (1) a thorough knowledge of the music to be played, (2) a secure and readable conductorial technique, with the
hands and baton adequately interpreting the score, and (3) an intelligently and thoroughly rehearsed performing group (p. 213-214).

Kohut (1973), in Instrumental Music Pedagogy, offers a thorough section on rehearsal technique. In Chapter Eight, Ensemble Rehearsal Procedures, he thoroughly addresses the following:

A. Preliminary Considerations

1) Basic Purpose of the Large Ensemble Rehearsal
2) Selection of Music for Large Ensembles
3) Sectional Rehearsals
4) Technique Classes
5) Small Ensembles

B. Tuning and Warm-up

1) General Outline
2) Specific Procedures

C. The Rehearsal Proper

1) General Outline
2) Specific Procedures

D. Wind-Percussion Tone Color

E. Learning About Music In Rehearsal

F. Miscellaneous Considerations

Hunsberger and Ernst (1983), in The Art of Conducting, emphasize conducting technique, score reading, score analysis, and general rehearsal procedure. The authors request that more detailed information on rehearsal procedures be covered in subsequent courses beyond this text. In Chapter 21, the authors address rehearsal philosophy and procedures, and rehearsal
evaluation. The authors briefly address 14 specific planning aids, including long-term rehearsal plans, introduction of new works, realistic goals, rehearsal tension and release, tuning, varying rehearsal format, rehearsal style, and instruction suggestions. Suggestions are made for utilization of video and recording equipment for rehearsal evaluation, and the following points are offered for analysis (p. 319-320):

1) Are your verbal instructions clear and concise?
2) Are there any distracting speech mannerisms?
3) Is too much time spent talking?
4) Are you giving verbal explanations that you should be communicating visually?
5) Are you ignoring any aspects of the performance, such as intonation, balance, or phrasing?
6) Are you ignoring any of the performers? Some conductors, for example, rarely make any musically discriminating comments to the basses or percussion—a poor condition for the morale and musicianship of the performers.
7) Does the rehearsal progress in a logical manner and at a quick pace? Do you build and maintain a high level of concentration?
8) Are you giving instructions without personally degrading performers?
9) Are you giving honest and sincere praise when it is warranted?

Included in Chapter Six is a brief section entitled "Conducting the Ensemble", where 12 important points for conducting a successful rehearsal are stated. These points address projection of the voice, eye contact, readiness, and communication.

In Chapter Thirty-Six of The Grammar of Conducting, Rudolph (1980) offers suggestions for the rehearsal on planning, efficiency, technical advice and its application, the psychology of the conductor-orchestra relationship,
and the conductor-soloist relationship. Though offered with a professional orchestra in mind, Rudolph's comments could be applied in educational situations.

Neilson (1962), in *Rehearsal Techniques*, writes specific information devoted entirely to concerns of rehearsal technique of the band director. He thoroughly covers aspects of dynamics, balance and sonority, attacks and releases, phrasing and cadence, intonation, tempo and rhythm, and tonal color. In a concise manner, Neilson offers valuable suggestions on how the teacher trainee (in band directing) might solve problems pertaining to these areas. This pamphlet serves two purposes in that it discusses potential and common problems, and gives straightforward, practical solutions on how one might address them.

Kahn (1976), in *Conducting Guide to Selected Scores*, presents actual excerpts of full conductor scores, providing suggestions of what to look for within the music when preparing for rehearsal. Included are suggestions referencing particular entries, musical lines, and practicing tips.

Long (1971), in *The Conductors Workshop: A Workbook on Instrumental Conducting*, provides chapters on tone, intonation, rhythmic ensemble, orchestral balance, and articulations and bowings in one major section, and baton technique and its application (with conducting examples) in another. A student's rehearsal technique can be observed through the use of ensemble excerpts presented in this text.

Labuta (1982), in *Basic Conducting Techniques*, offers suggestions on how to rehearse efficiently and effectively. Describing the conductor as a teacher, he suggests an A-B-A format to the rehearsal process: (1) a synthesis stage
when the composition is read through, (2) an analysis stage to correct errors, demonstrate solutions to technical and interpretive problems, and to explain, drill and evaluate, and (3) a second synthesis stage to play through and confirm corrections. His text gives competencies and practical procedures and materials for a college course in conducting.

Linton (1982), in Conducting Fundamentals, suggests that beginning conductors are not able to practice all the techniques or attend every musical need that eventually will be applied in rehearsing and conducting. Conductors should attempt the task in three stages, logically starting with the most basic factors, progressing towards others as skills are learned. His three stage model calls for: (1) setting the tempo, and with the beat pattern, applying style, adjusting length and weight of beat to match dynamics, (2) giving cues, giving releases, preparing attacks other than phrases, adjusting beat as necessary in changes, and (3) depicting shapes of phrases, dealing with special effects, responding to the music as an entity (p. 14).

Grosbayne (1956) includes a chapter on the rehearsal in Techniques of Modern Orchestral Conducting. He discusses rehearsal procedures, handling players’ errors, gaging the caliber of the ensemble, and attitude of the conductor towards the players.

Kohut (1983), in Performance: Learning Theory and Pedagogy, advocates a three-part strategy to music teaching consisting of synthesis, analysis, and synthesis. For the actual rehearsal, however, he focuses on the analysis stage as the main core. He describes the analysis process as follows:
ANALYSIS

Rehearsal-Class Teaching Priorities

1) Rhythmic Accuracy
2) Correct Notes
3) Tone Quality and Intonation
4) Articulation
5) Precision
6) Interpretation
7) Dynamics
8) Balance and Blend

The review of literature clearly indicates a need for further research regarding various aspects of rehearsal techniques. Such research can be of value to teacher training programs at universities, as well as to professionals who are currently in the field. It is important that college music education courses be designed with appropriate emphasis on the types of teaching strategies that will be most successful when applied to school settings. Research can help to determine those teacher/conductor skills that are necessary for future teachers.
CHAPTER III
METHODS AND PROCEDURES

The purpose of the study was to examine the effects of four approaches to rehearsing an instrumental ensemble on the number of repeated attempts (trials) used to improve critical passages prior to the conductor's decision to move on to other passages (either satisfied for the moment or not). The conditions of rehearsing were as follows: (1) use of standard rehearsal techniques paired with appropriate conducting, (2) use of standard rehearsal techniques paired with inappropriate conducting, (3) repetition of critical passages paired with appropriate conducting, and (4) repetition of critical passages paired with inappropriate conducting. The study was designed to examine the effects of appropriate and inappropriate conducting gestures, when these gestures were paired with conditions of rehearsal techniques or mere repetition of critical passages. Through examination of the number of trials used under the four experimental conditions, the study was designed to explore what types of rehearsal methods might be best suited for solving common types of problems in instrumental music rehearsals. In addition, an informal analysis was made concerning potential effects upon the teaching of rhythm, tempo, ensemble clarity, tone, pitch/intonation, note accuracy, dynamics/balance, style/articulation, and musicality/expressiveness, based upon the number of trials used to assist players correct problems in these areas.
Independent and Dependent Variables

The experimental design for the study involved two independent variables, each having two levels. The two independent variables were rehearsal conditions and conducting conditions. The two levels of the rehearsal conditions were the use of rehearsal techniques versus mere repetition of critical passages, and the two levels of the conducting conditions were appropriate versus inappropriate conducting. The dependent variable was the number of trials used by the conductor before leaving the problem addressed in the critical passage. The conductor could conclude the rehearsal stop by leaving either satisfied or unsatisfied for the moment.

Environment

In order to explore the experimental conditions, the rehearsal environment for this study required a reasonable experimental control within the context of a natural instrumental rehearsal setting. The University Band at The Ohio State University, a university-wide ensemble comprised mainly of non-music majors, was chosen for this experiment. The ability level of this group could best be characterized as that of a fine high school band or that of a young college band. This ensemble was used since it was hoped that the nature of problems encountered by a group of this performance level might be generalized to other ensembles of similar capabilities at the public school and university levels.

It was felt that changes in various rehearsal techniques for experimental purposes would not disrupt the normal flow of the rehearsal process, or in
any way adversely affect the level of the performance of this ensemble. The experimenter allowed for rehearsals before and after the experimental period in which the experimental treatment was not used, even though it became clear through the course of the experimental period that the overall performance level of the ensemble was not being adversely affected by the treatment.

Rehearsals were held on the stage of a recital auditorium on campus during nine regularly scheduled consecutive Tuesday and Thursday rehearsal times during autumn quarter, 1988. The Tuesday rehearsals began at 6:40 pm, and concluded at 8:00 pm. The Thursday rehearsals began at 6:30 pm, concluding at 8:00 pm. Due to a scheduling conflict, one experimental rehearsal was held in a concert hall on campus.

**Personnel**

The study involved three essential personnel who carried out the project. The experimenter/conductor was the primary conductor, and was, to some extent, the principal subject of the experiment. The experimenter/conductor had twelve years of conducting experience at the high school and college levels. He presented the four experimental conditions while rehearsing the band in a normal manner.

The research assistant was an experienced teacher with four years of secondary instrumental school teaching experience. The research assistant served in two capacities during the study. In order to analyze various aspects of the experiment, all rehearsals were videotaped. The research assistant served as camera operator, while also providing hand signals to the
conductors to indicate the condition to be used at each stop. The research assistant held up fingers (1, 2, 3, or 4) corresponding to the experimental condition to be used by the conductor. The hand signals given were random numerical assignments derived from permutations of the numbers one through four. For confirmation of which signal was given during each stop, the observer made notes beside each number indicating why the conductor stopped. This information was used during the analysis of the videotapes to insure that the data collected were synchronized to the condition given by the research assistant.

A second conductor rehearsed the same ensemble approximately 20% of the total rehearsals. This conductor also served as the expert observer while the experimenter/conductor was rehearsing, and, therefore, was present for each rehearsal. The expert observer was an experienced conductor with nine years of secondary and college level teaching experience. The experimenter/conductor served as an observer while the second conductor (expert observer) was rehearsing the ensemble. Both conductors were originally intended to be included in the primary experiment, however, the data for the second conductor were not analyzed, as there were an insufficient number of stops per condition to make meaningful comparisons.

Rehearsal Observation Form

A rehearsal observation form was developed for use in this study (See Appendix A). This form was informally tested prior to the experimental period, and included areas for notating six types of information:
(1) Stop # -- A stop was defined as any time the conductor stopped the ensemble in order to identify and correct a problem. Rehearsal stops were numbered consecutively for each selection rehearsed, beginning with the first stop of the baseline and continuing throughout the experimental conditions for each rehearsal. If the conductor addressed more than one problem during a single stop, an additional stop was recorded, using the same condition.

(2) Comments -- A space was provided for the observer to notate what the conductor said at each stop, for use in identifying and coordinating stops during the later study of the videotapes (e.g., "At letter A, more low brass").

(3) Condition -- A space was provided to indicate which of the four experimental conditions was being used. This section was completed during later study of the videotapes.

(4) Trials -- The number of trials used until the conductor left the problem either satisfied or unsatisfied for the moment. These were counted by the expert observer, and verified through study of the videotapes. The first trial was recorded following the conductor's explanation of the problem.

(5) Agree/Disagree -- A space was provided for the expert observer to indicate whether he agreed or disagreed with the decision of the conductor to leave the rehearsal stop when he did.

(6) Satisfied/Unsatisfied -- A space was provided to indicate whether the conductor was satisfied or unsatisfied when he left the rehearsal problem. This was determined by verbal feedback from the
conductor to the ensemble or by pre-determined nonverbal signals
given to the observer, and recorded by the videotape.

The above form was altered slightly to take data from the videotaped
rehearsals. The inclusion of the following two items were used when taking
data from the videotapes:

(1) Type of Rehearsal Technique used (During Conditions I and II
only) -- During the analysis of the videotapes, the conductor's use of
modeling, verbal-technical instruction, combination of modeling
and verbal-technical instruction, or other as rehearsal techniques
were recorded.

(2) Musical Element -- The musical element addressed by the conductor
was recorded (rhythm, tempo, ensemble clarity, tone,
pitch/intonation, note accuracy, dynamics/balance,
style/articulation, and musicality/expressiveness).

Procedures

A normal rehearsal routine was maintained throughout the experiment.
At each rehearsal, the band began with warm-up and tuning procedures. The
remainder of the time was spent in regular rehearsal in preparation for an
autumn quarter concert. The experimental sessions began after the warm-
up/tuning period when the conductor began work on the first piece of music.
Data collection, therefore, began with the rehearsal of the first music
selection, and did not include any of the warm-up or tuning procedures. The
average amount of rehearsal time recorded per rehearsal was one hour.
The music used throughout the pilot and experimental period consisted of nine pieces. Not all of the selections were rehearsed during each rehearsal, but all music was rehearsed frequently over the course of the nine rehearsals comprising the experiment. The selections used during the rehearsals were: Puenteareas, Pasodoble, by R. Soutullo; Overture in B-Flat, by Caesar Giovannini; Ye Banks and Braes O' Bonnie Doon, by Percy Grainger; Prelude, Siciliano and Rondo, by Malcolm Arnold; Greensleeves, arranged by Alfred Reed; His Honor, by Henry Fillmore; and From Tropic to Tropic March, by Russell Alexander. From Tropic to Tropic March was deleted from the concert program prior to the end of the study, but prior to this, experimental data from this piece were used in the study. The experimenter/conductor rehearsed all of the selections except Overture in B-flat and Ye Banks and Braes O' Bonnie Doon, which were conducted by the second conductor.

The investigation included three pilot rehearsals followed by an experimental period of nine regular rehearsals. During the pilot rehearsals, the experimenter/conductor, the expert observer, and the research assistant tested the observation form, the use of hand signals to convey the conditions of rehearsing, the placement of the video camera, and the placement of the expert observer and research assistant. The observation form was found to be functional and easy to use. From the podium, the conductors could easily see the visual condition signals provided by the research assistant. A convenient location for the video camera was also determined. The videotape equipment was inconspicuously placed, in clear recording distance from the podium. It could easily record the conductor's upper torso. The microphone
on the videotape equipment clearly recorded the band and the conductors' verbal comments.

The pilot rehearsals were found to be necessary, not only to test the signals, videotape, and observation form, but also to allow the experimenter/conductor and the expert observer rehearsal time in which to put the experimental conditions into practice in a natural way. The conductors quickly learned to look for the hand signal indicating the condition for rehearsal when stopping the ensemble, and prior to stating the problem. After stating the reason for stopping to the ensemble, the conductors then had to quickly carry out the condition assigned. This took practice, but soon became very natural for both the experimenter/conductor and the second conductor.

Each rehearsal session included a regular warm-up and tune-up period, which was not recorded for use in the study. The data collection for each rehearsal began with the rehearsing of the first selection of music to be prepared for the performance. Selections to be rehearsed varied in order, according to the goals and expectations for the individual rehearsal. Every attempt was made to insure that the rehearsal setting was as normal as possible.

The first five stops for each conductor were recorded as baseline. During the baseline, the conductor rehearsed the ensemble using his choice of experimental condition. The assumption was that Condition I would be chosen during the baseline, since it appeared to offer the most advantages. Beginning with the sixth stop, the conductor was given a number by the research assistant, indicating which one of four conditions he would be
required to use for the stop. The number was indicated at the moment the conductor stopped the ensemble to correct a problem. Permutations of the numerical sequence one through four were randomized to provide an order for the rehearsal conditions used in the study. The four conditions were distributed randomly over the remainder of the rehearsal for each conductor.

At each rehearsal stop, the experimenter stated the problem to the ensemble (i.e., why he stopped). He then rehearsed under one of the four experimental conditions. During the first condition, the conductor provided a clear description of how to correct the problem using specific rehearsal techniques, such as modeling, verbal imagery, or verbal-technical instruction. The conductor used any rehearsal technique (or combination thereof) he thought appropriate. He also used appropriate conducting during this condition. During the second condition, the conductor again used what he judged to be effective rehearsal techniques, however, he paired these with inappropriate conducting during each of the trials used to correct the problem. During the third condition, the conductor stated the problem and repeated the passage as necessary, using no rehearsal techniques but with appropriate conducting gestures. He was not allowed to tell the ensemble "how" to solve the musical problem. He was, however, allowed to give them feedback on their progress during these conditions (e.g., "That's almost it; let's try it once more"). During the fourth condition, the conductor again stated the problem and repeated the passage as necessary, using no rehearsal techniques, but with inappropriate conducting. The two types of conducting techniques were used in both rehearsal conditions in order to test the effects of conducting gestures as an aid to problem solving.
A rehearsal stop was defined as any time the conductor stopped the ensemble in order to identify and correct a problem. If the conductor addressed more than one problem during a stop, each problem presented retained the same condition number, but was recorded under an additional stop in the collection of the data. It was possible, therefore, to acquire an uneven number of stops under each condition at the conclusion of the study. Once a problem was defined, the first attempt by the ensemble to improve the passage was recorded as the first trial.

The expert observer's primary function was to record an immediate opinion regarding the conductor's decision to leave the problem, based upon hearing the ensemble from a perspective as near to that of the conductor as reasonably possible. Undoubtedly, this opinion was based, at least to some extent, upon how long the expert observer would have worked on the problem were he in the conductor's position. The personal judgment of the expert observer was inevitable, but necessary to provide an immediate second opinion for the data collected in the study. The expert observer also recorded the number of trials used prior to the conductor's decision to leave the problem, which was used as an additional reliability check.

The following instructions pertaining to the four experimental conditions were given to the conductors:

(1) During Condition I, use clear, expressive and musical conducting gestures and any rehearsal technique (i.e., modeling, verbal-technical instruction, verbal imagery) that you would normally use to solve the problem.
(2) During Condition II, use time-beating only gestures combined with any rehearsal technique that you would normally use to solve the problem.

(3) During Condition III, use only clear, expressive and musical conducting gestures. Following the initial explanation of why you stopped, you may repeat the passage (as often as needed to your satisfaction), without the assistance of rehearsal techniques. You may provide reinforcement, such as "That's about it; let's try again," but you may not give specific rehearsal techniques or solutions.

(4) During Condition IV, use time-beating only gestures. Following the initial explanation of why you stopped, you may only repeat the passage without the assistance of rehearsal techniques. As in Condition III, you may provide reinforcement, but you may not give specific rehearsal techniques or solutions.

The conductors were also provided the following instructions:

(1) When you stop the ensemble, look for the signal from the research assistant which will indicate which rehearsal condition you should work under.

(2) Always clearly explain to the ensemble why you stopped (i.e., what needs to be corrected).

(3) Always conclude each stop by giving appropriate feedback to indicate your satisfaction level. If satisfied with the ensemble progress, indicate so by giving positive feedback. If unsatisfied, indicate by saying something like, "That's not quite it, but we'll
come back to it during the next rehearsal." There may be instances where you wish to continue the flow of the music without stopping to give feedback. In these instances, please visually indicate, while conducting, that you are satisfied by giving an "o.k." signal with your left hand to the section of the ensemble rehearsed. If unsatisfied under such circumstances, indicate this by scratching your chin so that it can be recorded by the videocamera.

For each of the four experimental conditions, the conductor repeated the critical passage until he was satisfied or unsatisfied for the moment. Satisfaction for the moment meant that the conductor elected to move on to other passages, and that either momentary success had been achieved (conductor was satisfied), or that additional attempts (trials) would be unproductive (conductor was unsatisfied). If not stated verbally, he indicated his decision to the research assistant and expert observer by giving the appropriate visual signal. The conductor's use of the experimental conditions was monitored by the research assistant.

**Equipment**

Two of the pilot studies, and all of the experimental studies were recorded on a Panasonic A F Piezo VHS recorder, using Scotch Videocassette tape EG + High Grade T120 tape. The videotape recorder was placed approximately 30 feet from the conductor. The camera was focused upon the conductor, and clearly recorded all conducting gestures. While visible to some members of
the ensemble, the recording equipment, research assistant and expert observer were unobtrusive throughout each rehearsal.

Measurement Procedures

Following the experiment, the experimenter and the research assistant viewed all of the videotapes. During this viewing, they: (1) recorded the number of trials used at each stop, which provided reliability on the information taken by the expert observer, (2) confirmed that the conductor was rehearsing under the condition he was assigned, (3) recorded the type of rehearsal techniques used (during Conditions I and II), (4) recorded what musical elements were being addressed, and (5) recorded whether the conductor was satisfied or unsatisfied for the moment when leaving the problem, which provided reliability on the information taken by the expert observer. A form was designed for the collection of data under each of the four experimental conditions being used by the conductor. This form included space for recording the condition being used, the satisfaction response of the conductor, the agreement level of the expert observer, the rehearsal technique being used, and the musical element being addressed (See Appendix B). A more detailed form was designed for the collection of data under each musical element addressed. This form included space for recording the musical element being addressed, the rehearsal when the data was recorded, which of the four conditions were being used, the conductor satisfaction response, and the expert observer agreement level (See Appendix C).
Reliability Observers

Five of the nine rehearsal videotapes used were randomly selected to determine the degree to which two observers agreed that the conductor's gestures were appropriate or inappropriate (as defined for use in this study). The observers were both instrumental conductors enrolled in the doctoral program in music education at The Ohio State University. They were asked to rate on a scale of one to five (one being mostly inappropriate and five being mostly appropriate) the degree to which the conductor was using appropriate and inappropriate conducting as defined for use in this study. A videotape observation form was devised for this (See Appendix D). The observers were asked to rate the conducting of each rehearsal trial used within an individual condition given to the conductor. A total of 84 rehearsal trials were rated.

An additional form of reliability was taken regarding the conductor's decision to leave the problem addressed. This reliability was, of course, a personal judgement taken by the expert observer, immediately following the conductor's decision to leave the problem addressed. To determine this reliability, the expert observer simply recorded on the observation form whether or not he agreed with the conductor's decision to leave the problem when he did. If he felt that the conductor had sufficiently rehearsed the problem, he indicated so by marking the appropriate place on the observation form. However, if he felt that the conductor should have stayed with the problem longer (i.e., used more trials), or left the problem sooner (i.e., used fewer trials), he would indicate so by marking the appropriate place on the observation form.
CHAPTER IV

RESULTS

The purpose of the study was to explore various rehearsal strategies in an instrumental music ensemble, and specifically, to examine the effects of four approaches of rehearsing on the number of repeated attempts (trials) to improve critical passages prior to the conductor's decision to move on to other passages. The conductor could leave a problem either satisfied or unsatisfied for the moment. The conditions of rehearsing were as follows: (1) use of standard rehearsal techniques (e.g., modeling, verbal imagery, verbal-technical instruction) paired with appropriate conducting, (2) use of standard rehearsal techniques paired with inappropriate conducting (i.e., time-beating), (3) mere repetition of critical passages paired with appropriate conducting, and (4) mere repetition of critical passages paired with inappropriate conducting.

A total of nine rehearsals comprised the experimental period. Each of the nine rehearsals were videotaped, resulting in a total of approximately eight hours of data collection used for the analysis. All recordings were of regular rehearsals of the University Band at The Ohio State University, each containing a random distribution of the four conditions of rehearsing.

The videotapes were analyzed to determine: (1) the number of trials used prior to the conductor leaving the problem, (2) whether the conductor was satisfied or unsatisfied for the moment when leaving the problem, (3) what
musical elements were being addressed during the stops, (4) the rehearsal technique(s) being used, (5) whether the conductor was employing the assigned condition at each stop, and (6) the reliability of whether or not the conductor was using appropriate or inappropriate conducting.

Fourteen of the 85 cells recorded during the baseline period, and 31 of the 156 cells recorded during the experimental period were not included in the data collection. The non-recorded cells included such events as the conductor going to the beginning of the piece without giving any additional instructions, or those in which the expert observer did not record whether or not he agreed with the conductor's decision to leave the problem. In verifying the treatment conditions, the experimenter/conductor and the research assistant agreement level was 100%. The inter-observer agreement level on the number of trials used was 93.47%. Inadvertent conductor errors in conditions occurred in 10 of the total cells recorded beyond the baseline (e.g., conducting appropriately rather than inappropriately for several beats). The baseline was not compared to the experimental data in the study. It was recorded simply as a means for each conductor to have the opportunity to begin each rehearsal in his own manner, prior to the implementation of the experimental conditions.

A sample of five of the nine rehearsal tapes was chosen for establishing an agreement level on the conditions of appropriate and inappropriate conducting. Two inter-observer agreement figures were determined, one for appropriate conducting, another for inappropriate conducting. Two observers viewed each of the five tapes, indicating the degree to which they felt the conducting was appropriate or inappropriate on a five-point scale (See
Appendix D). The five rehearsal tapes were viewed in their entirety, and the observers rated the conductor at each individual trial under all conditions. The agreement figure was determined as follows: a perfect agreement received two points (e.g., both observers rated a 5); a deviation of one received one agreement point (e.g., one observer rated a 5, the other a 4); a deviation of two agreement points received one disagreement point (e.g. one observer rated a 5, the other a 3); and any deviation beyond two received two disagreement points. The agreement points were divided by the total number of agreement points plus disagreement points to determine the inter-observer agreement level. This procedure yielded an agreement level of 90% for appropriate conducting examples, and 88% for inappropriate conducting examples.

A three-way analysis of variance was computed on the trial data for the following variables: (1) rehearsal conditions (use of rehearsal techniques versus use of repetition only), (2) conducting conditions (use of appropriate versus inappropriate conducting), and (3) the exit decision of the conductor when he left the problem (satisfied versus unsatisfied for the moment).

Results

The results of the data analysis are presented in response to the research questions presented in Chapter One.

(1) Is there a significant difference in the average number of rehearsal trials used at each rehearsal stop, when comparing the use of standard rehearsal techniques with mere repetition of critical passages?
No significant difference was found between the average number of rehearsal trials used at each rehearsal stop when comparing rehearsal conditions of standard rehearsal techniques (I and II), and mere repetition of critical passages only (III and IV). While the f-test revealed no significant difference on this variable, it can be seen that under rehearsal conditions of repetition only, the mean score of trials used was slightly less than when rehearsal techniques were used.

Table 1

*Comparison of Trials Under Rehearsal Conditions*

<table>
<thead>
<tr>
<th></th>
<th>df</th>
<th>Σ squares</th>
<th>M square</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rehearsal Condition</td>
<td>1</td>
<td>.394</td>
<td>.394</td>
<td>.332</td>
<td>.57  n.s.</td>
</tr>
<tr>
<td>Rehearsal Techniques</td>
<td>n</td>
<td>2.44</td>
<td>2.44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repetition Only</td>
<td>59</td>
<td>2.39</td>
<td>2.39</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

During the rehearsal conditions (I and II) when the conductor was required to use standard rehearsal techniques (while employing both appropriate and inappropriate conducting styles), there were a total of 66 stops. There were 161 trials used during these conditions, for an average of 2.439 trials per stop. During the rehearsal conditions (III and IV) when the
conductor was required to merely repeat the critical passage using no rehearsal techniques, (while employing conducting conditions of both appropriate and inappropriate conducting styles), there were a total of 59 stops. There were 141 trials used during these conditions, for an average of 2.39 trials per stop. While the conductor suspended further attempts with fewer trials when he was unable to rehearse the critical passages, the difference in trials was not significant (See Table 1).

(2) Is there a significant difference in the average number of rehearsal trials used at each rehearsal stop, when comparing the use of appropriate conducting with inappropriate conducting of critical passages?

No significant difference was found between the average number of rehearsal trials used at each rehearsal stop when comparing conditions of appropriate conducting (I and III) and inappropriate conducting (II and IV). While the $f$-test revealed no significant difference on this variable, it can be seen that during conditions when the conductor was allowed to use appropriate conducting, a slightly larger average number of trials was used.
Table 2

Comparison of Trials Under Conducting Conditions

<table>
<thead>
<tr>
<th>Conducting Condition</th>
<th>df</th>
<th>Σ squares</th>
<th>M square</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>1.878</td>
<td>1.878</td>
<td>1.58</td>
<td>.21 n.s.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Appropriate Conducting</th>
<th>n</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inappropriate Conducting</td>
<td>69</td>
<td>2.55</td>
</tr>
<tr>
<td></td>
<td>56</td>
<td>2.25</td>
</tr>
</tbody>
</table>

During the conducting conditions (I and III) when the conductor was required to use appropriate conducting only, while employing rehearsal conditions of both rehearsal techniques and repetition only, there were a total of 69 stops. There were 176 trials used during these conditions, for an average of 2.551 trials per stop. During the conducting conditions (II and IV), when the conductor was required to use inappropriate conducting gestures only, while employing rehearsal conditions of both rehearsal techniques and repetition only, there were a total of 56 stops. There were 126 trials used during these conditions, with an average of 2.25 trials per stop. When not provided with the presumed advantage of appropriate conducting gestures, the conductor tended to use fewer trials.

(3) Is there a significant interaction between the variables of rehearsal conditions (use of rehearsal techniques versus repetition only) and conducting conditions (appropriate versus inappropriate)?
While it can be seen from the analysis that no significant interaction occurred between the variables of rehearsal conditions and conducting conditions, it should be noted that the findings do approach a significant interaction, suggesting that these factors are not totally independent of one another.

Table 3

Rehearsal Conditions by Conducting Conditions

<table>
<thead>
<tr>
<th></th>
<th>( df )</th>
<th>( \Sigma \text{ squares} )</th>
<th>( M \text{ square} )</th>
<th>( E )</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rehearsal/</td>
<td>1</td>
<td>4.133</td>
<td>4.133</td>
<td>3.48</td>
<td>.07 n.s.</td>
</tr>
<tr>
<td>Conducting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Conducting

<table>
<thead>
<tr>
<th>Conducting</th>
<th>Appropriate</th>
<th>Inappropriate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rehearsal</td>
<td>35</td>
<td>31</td>
<td>66</td>
</tr>
<tr>
<td>Techniques</td>
<td>2.486</td>
<td>2.387</td>
<td>2.439</td>
</tr>
<tr>
<td>Repetition Only</td>
<td>34</td>
<td>25</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>2.618</td>
<td>2.08</td>
<td>2.39</td>
</tr>
<tr>
<td>Total</td>
<td>69</td>
<td>56</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td>2.551</td>
<td>2.25</td>
<td>2.416</td>
</tr>
</tbody>
</table>

One hundred twenty-five rehearsal stops were analyzed. Of these stops, there were 35 in which the conductor used Condition I, 31 in which the conductor used Condition II, 34 in which the conductor used Condition III,
and 25 in which the conductor used Condition IV. During the 35 stops used under Condition I, the conductor used 87 trials, for an average of 2.486 trials for each stop. During the 31 stops used under Condition II, the conductor used 74 trials, for an average of 2.387 trials for each stop. During the 34 stops used under Condition III, the conductor used 89 trials, for an average of 2.618 trials for each stop. During the 25 stops used under Condition IV, the conductor used 52 trials, for an average of 2.08 trials used for each stop.

(4) Is there a significant difference between the average number of trials used when the conductor left a problem satisfied and when he left a problem unsatisfied?

A significant difference was found between the average number of rehearsal trials used when comparing the stops when the conductor left the problem satisfied, with the average number of rehearsal trials used in stops when he left the problem unsatisfied. The conductor left the problem unsatisfied during less than one-third of the stops under each condition except Condition IV, where he left unsatisfied during slightly more than half of the stops.
### Table 4

**Comparison of Trials: Conductor Satisfied versus Unsatisfied**

<table>
<thead>
<tr>
<th></th>
<th>df</th>
<th>Σ squares</th>
<th>M square</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conductor Satisfaction</td>
<td>1</td>
<td>26.141</td>
<td>26.141</td>
<td>22.032</td>
<td>.0001</td>
</tr>
<tr>
<td>Conductor Satisfied</td>
<td>n</td>
<td></td>
<td>M</td>
<td>2.194</td>
<td></td>
</tr>
<tr>
<td>Conductor Unsatisfied</td>
<td>27</td>
<td></td>
<td></td>
<td>3.222</td>
<td></td>
</tr>
</tbody>
</table>

The total number of stops for all rehearsal conditions was 125. There were 302 trials used during these conditions, for an average of 2.416 trials per stop. The conductor was satisfied during 98 stops, in which 215 trials were employed (Mean = 2.194). The conductor was unsatisfied during 27 stops, in which 87 trials were employed (Mean = 3.222).

(5) Is there a significant interaction between the rehearsal conditions and whether the conductor left the problem satisfied or unsatisfied for the moment?

No significant interaction was found between the average number of trials used when comparing the number of stops when the conductor left the problem satisfied, with the average number of trials when he left the problem unsatisfied under conditions of both rehearsal techniques and repetition only. The data indicate that when the conductor left the problem unsatisfied, he
made more attempts to solve the problem prior to moving on. Prior to leaving a problem unsatisfied, an extra effort was given to solving the problem, regardless of whether the conductor was using rehearsal techniques or mere repetition.

Table 5

*Rehearsal Condition by Conductor Satisfaction*

<table>
<thead>
<tr>
<th></th>
<th>df</th>
<th>Σ squares</th>
<th>$M$ square</th>
<th>$F$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rehearsal/Satisfaction</td>
<td>1</td>
<td>.225</td>
<td>.225</td>
<td>.19</td>
<td>.6638</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Satisfaction</th>
<th>Satisfied</th>
<th>Unsatisfied</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rehearsal Techniques</td>
<td>n= 54</td>
<td>12</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>M= 2.259</td>
<td>3.25</td>
<td>2.439</td>
</tr>
<tr>
<td>Repetition Only</td>
<td>n= 44</td>
<td>15</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>M= 2.144</td>
<td>3.2</td>
<td>2.39</td>
</tr>
<tr>
<td>Total</td>
<td>n= 98</td>
<td>27</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td>M= 2.194</td>
<td>3.222</td>
<td>2.416</td>
</tr>
</tbody>
</table>

During rehearsal conditions of rehearsal techniques (I and II), the conductor left the problem satisfied during 54 stops, with an average of 2.259 trials used per stop. He left the problem unsatisfied during 12 stops, with an average of 3.25 trials used per stop.
During rehearsal conditions of mere repetition only (III and IV), the conductor left the problem satisfied during 44 stops, with an average of 2.114 trials used per stop. He left the problem unsatisfied during 15 stops, with an average of 3.2 trials used per stop.

(6) Is there a significant interaction between the conducting conditions and whether the conductor left the problem satisfied or unsatisfied for the moment?

No significant interaction was found between the average number of trials used when comparing the average number of trials when the conductor left the problem satisfied, with the average number of trials when he left the problem unsatisfied under conditions of both appropriate and inappropriate conducting. As in the previous research question, it can be seen that when the conductor left the problem unsatisfied, he made more attempts to solve the problem before deciding to move on. This was evident regardless of whether the conductor was using appropriate or inappropriate conducting.
Table 6

**Conducting Condition by Conductor Satisfaction**

<table>
<thead>
<tr>
<th>Conducting/Satisfaction</th>
<th>df</th>
<th>$\sum$ squares</th>
<th>$M$ square</th>
<th>$F$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conducting/Satisfaction</td>
<td>1</td>
<td>.234</td>
<td>.234</td>
<td>.197</td>
<td>.658</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Satisfaction</th>
<th>Satisfied</th>
<th>Unsatisfied</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appropriate</td>
<td>55</td>
<td>14</td>
<td>69</td>
</tr>
<tr>
<td>Conducting</td>
<td>2.345</td>
<td>3.357</td>
<td>2.551</td>
</tr>
<tr>
<td>Inappropriate</td>
<td>43</td>
<td>13</td>
<td>56</td>
</tr>
<tr>
<td>Conducting</td>
<td>2</td>
<td>3.007</td>
<td>2.25</td>
</tr>
<tr>
<td>Total</td>
<td>98</td>
<td>27</td>
<td>125</td>
</tr>
<tr>
<td>$M$</td>
<td>2.194</td>
<td>3.222</td>
<td>2.416</td>
</tr>
</tbody>
</table>

During conducting conditions of appropriate conducting (I and III), the conductor left the problem satisfied during 55 stops, with an average of 2.345 trials used per stop. He left the problem unsatisfied during 14 stops, with an average of 3.357 trials used per stop.

During the conducting conditions of inappropriate conducting (II and IV), the conductor left the problem satisfied during 43 stops, with an average of 2 trials used per stop. He left the problem unsatisfied during 13 stops, with an average of 3.077 trials used per stop.
(7) Is there a significant interaction among the variables of rehearsal conditions, conducting conditions, and conductor satisfaction when leaving the problem?

No significant interaction was found among the variables of rehearsal conditions, conducting conditions, and conductor satisfaction.

Table 7

<table>
<thead>
<tr>
<th>Rehearsal Condition by Conducting Condition by Conductor Satisfaction</th>
<th>df</th>
<th>(\Sigma) squares</th>
<th>(M) square</th>
<th>(F)</th>
<th>(p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rehearsal/Conducting/Satisfaction</td>
<td>1</td>
<td>.225</td>
<td>.225</td>
<td>.215</td>
<td>.6436</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conducting Satisfaction</th>
<th>Appropriate</th>
<th>Inappropriate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfied</td>
<td>Unsatisfied</td>
<td>Satisfied</td>
</tr>
<tr>
<td>Rehearsal Techniques</td>
<td>27</td>
<td>8</td>
</tr>
<tr>
<td>(M=) 2.296</td>
<td>3.125</td>
<td>2.222</td>
</tr>
<tr>
<td>Repetition Only</td>
<td>28</td>
<td>6</td>
</tr>
<tr>
<td>(M=) 2.393</td>
<td>3.667</td>
<td>1.625</td>
</tr>
<tr>
<td>Totals</td>
<td>55</td>
<td>14</td>
</tr>
<tr>
<td>(M=) 2.345</td>
<td>3.357</td>
<td>2</td>
</tr>
</tbody>
</table>
Additionally, the study addressed the following sub-problems:

(1) Are there notable differences in the mean number of rehearsal trials used with respect to the musical elements of rhythm, tempo, ensemble clarity, tone, pitch/intonation, note accuracy, dynamics/balance, style/articulation, and musicality/expressiveness under the four experimental conditions?

Table 8 shows the percent of stops used for each musical element, the average number of trials used while rehearsing each musical element under the four experimental conditions, and the number of stops in which the conductor was satisfied and unsatisfied under each condition for each musical element.
Table 8

Percent of Stops and Mean Trials Per Condition for Musical Elements

<table>
<thead>
<tr>
<th>Musical Element</th>
<th>% of stops</th>
<th>Mean Trials</th>
<th># Stops Satisfied</th>
<th># Stops Unsatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Style/Articulation</td>
<td>25%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition I</td>
<td>2.22</td>
<td>10</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Condition II</td>
<td>2</td>
<td>5</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Condition III</td>
<td>2.36</td>
<td>10</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Condition IV</td>
<td>1.83</td>
<td>4</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Note Accuracy</td>
<td>16%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>2.8</td>
<td>6</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>3.8</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Rhythm</td>
<td>14%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>3.2</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>1.5</td>
<td>4</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>1.8</td>
<td>5</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>2.25</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Pitch/Intonation</td>
<td>12%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>2.25</td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>4.2</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>3.2</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>
Table 8 (Cont.)

Percent of Stops and Mean Trials Per Condition for Musical Elements

<table>
<thead>
<tr>
<th>Musical Element</th>
<th>% of stops</th>
<th>Mean Trials</th>
<th># Stops Satisfied</th>
<th># Stops Unsatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamics/Balance</td>
<td>11%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>2.5</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>1.83</td>
<td>4</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Ensemble Clarity</td>
<td>7%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>2.33</td>
<td>3</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>3.66</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Tempo</td>
<td>6%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Musicality/Expressiveness</td>
<td>5%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Tone</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$n= 125$ stops
For most elements rehearsed, there tended to be more average trials used when rehearsal techniques were employed, as opposed to mere repetition of critical passages. The same result occurred during conditions of appropriate conducting as opposed to inappropriate conducting.

During Condition I, the average number of trials used were similar for all musical elements with the exception of rhythm and ensemble clarity (more average trials used), and musicality/expressiveness (less average trials used). During Condition II, the average number of trials used were similar for all musical elements with the exception of rhythm (less average trials used), and pitch/intonation (more average trials used). Note accuracy, pitch/intonation, and ensemble clarity accumulated notably more average trials during Condition III, while the element of dynamics/balance received no trials under this condition. Generally, fewer average trials can be seen under Condition IV, with the exception of pitch/intonation. No trials were used during Condition IV in the area of tempo. The conductor tended to leave the problem unsatisfied more often than satisfied (under rehearsal conditions of repetition only) when rehearsing the elements of style/articulation and pitch/intonation. During conditions of appropriate conducting, he tended to leave the problem unsatisfied more often than satisfied while rehearsing the musical element of note accuracy. During conditions of inappropriate conducting, he left the problem unsatisfied more often than satisfied while rehearsing the elements of pitch/intonation and dynamics/balance.
(2) In what percentage of the rehearsal stops is the conductor addressing the musical elements of rhythm, tempo, ensemble clarity, tone, pitch/intonation, note accuracy, dynamics/balance, style/articulation, and musicality/expressiveness?

Table 8 indicates the musical elements, the number of stops during which the conductor addressed each element, and the percentage of stops that each element was addressed.

The greatest amount of rehearsal stops involved style/articulation and note accuracy. High percentages of rehearsal stops were also devoted to rhythm, pitch/intonation, and dynamics/balance. Little or no rehearsal time was spent in the areas of tempo, ensemble clarity, tone, and musicality/expressiveness. It appears that the areas of style/articulation, note accuracy, rhythm, pitch/intonation, and dynamics/balance were the most obvious areas in which the conductor could achieve immediate results through the experimental conditions. Given the nature of this particular ensemble, it is perhaps understandable that the areas of ensemble clarity, tempo, and tone could not be altered as readily through the rehearsal process. Ensemble clarity was difficult to achieve because of the size of the ensemble. Tempo variations were limited due to the ability level and size of the group (n=111). Musicality/expressiveness was also addressed less perhaps due to the conductor’s desire to get the obvious problems corrected, leaving only little remaining time to address musical subtleties.
(3) Under the conditions during which the conductor was allowed to use standard rehearsal techniques, what percentage of the techniques used were modeling, verbal-technical instruction, a combination of modeling and verbal-technical instruction, or other.

The conductor used modeling as a rehearsal technique during 9% of the rehearsal stops, with the majority of these stops being under Condition I. He used verbal-technical instruction during 53% of the stops, with slightly more stops being under Condition II than Condition I. He used a combination of modeling and verbal-technical instruction during 37% of the stops, with slightly more stops being under Condition I than Condition II.

Table 9

<table>
<thead>
<tr>
<th>Percent of Stops Per Rehearsal Techniques</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
</tr>
<tr>
<td>Verbal-Technical</td>
</tr>
<tr>
<td>Modeling/Verbal-Technical</td>
</tr>
<tr>
<td>Modeling</td>
</tr>
<tr>
<td>Verbal Imagery</td>
</tr>
</tbody>
</table>
It is evident that for the large majority of stops the conductor used verbal-technical methods of rehearsal techniques when rehearsing under Conditions I and II. A combination of modeling and verbal-technical instruction was frequently chosen, while modeling alone was used less frequently.

(4) What percentage of rehearsal stops concluded with the conductor being satisfied and unsatisfied under each of the four experimental conditions?

During Condition I, when the conductor used expressive conducting paired with rehearsal techniques, he left the problem satisfied 27 of the 35 stops, thus he left the problem satisfied 77% of the stops, while leaving the problem unsatisfied 23%. During Condition II, when the conductor used expressive conducting paired with repetition only, he left the problem satisfied 27 of the 31 stops, thus he left the problem satisfied 87% of the stops, while leaving the problem unsatisfied 13%.

During Condition III, when the conductor used time-beating conducting paired with rehearsal techniques, he left the problem satisfied 28 of the 34 stops. He left the problem satisfied 82% of the stops, while leaving the problem unsatisfied 18%. During Condition IV, when the conductor used time-beating conducting paired with repetition only, he left the problem satisfied 16 of the 25 stops. He left the problem satisfied 64% of the stops, while leaving the problem unsatisfied 36%.
Table 10

Percent of Stops Per Condition: Conductor Satisfied versus Unsatisfied

<table>
<thead>
<tr>
<th>Condition</th>
<th>Conductor Satisfied</th>
<th>Conductor Unsatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>77%</td>
<td>23%</td>
</tr>
<tr>
<td>II</td>
<td>87%</td>
<td>13%</td>
</tr>
<tr>
<td>III</td>
<td>82%</td>
<td>18%</td>
</tr>
<tr>
<td>IV</td>
<td>64%</td>
<td>36%</td>
</tr>
</tbody>
</table>

As might be expected, the conductor left the problem satisfied the least during Condition IV, when using inappropriate conducting paired with repetition only. It is interesting to note that the conductor left the problem satisfied more often under Conditions II and III, than under Condition I.

(5) In what percentage of rehearsal stops does the conductor leave the problem satisfied, when using appropriate conducting versus inappropriate conducting?

During conditions of appropriate conducting (Conditions I and III) the conductor left the problem satisfied 80% of the stops, while leaving the problem unsatisfied 20%. During the conditions of inappropriate conducting (Conditions II and IV), the conductor left the problem satisfied 77% of the stops, while leaving the problem unsatisfied 23%.
Table 11

Percent of Stops Per Conducting Condition: Appropriate Conducting versus Inappropriate Conducting

<table>
<thead>
<tr>
<th>Conducting Condition</th>
<th>Satisfied</th>
<th>Unsatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appropriate Conducting (I &amp; III)</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td>Inappropriate Conducting (II &amp; IV)</td>
<td>77%</td>
<td>23%</td>
</tr>
</tbody>
</table>

As table 11 shows, the conductor was satisfied more often when deciding to leave a problem while using appropriate conducting, though the difference is small.

(6) In what percentage of rehearsal stops does the conductor leave the problem satisfied when using rehearsal techniques versus mere repetition of critical passages?

During the conditions when the conductor was allowed to use rehearsal techniques (Conditions I and II) he left the problem satisfied 82% of the stops, while leaving the problem unsatisfied 18% of the stops. During the conditions when the conductor was allowed to use repetition only (Conditions III and IV), he left the problem satisfied 75% of the stops, while leaving the problem unsatisfied 25%.
Table 12

Percent of Stops for Rehearsal Condition: Rehearsal Techniques versus Repetition Only

<table>
<thead>
<tr>
<th></th>
<th>Satisfied</th>
<th>Unsatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rehearsal Techniques (I &amp; III)</td>
<td>82%</td>
<td>18%</td>
</tr>
<tr>
<td>Repetition Only (II &amp; IV)</td>
<td>75%</td>
<td>25%</td>
</tr>
</tbody>
</table>

As Table 12 shows, the conductor was satisfied more often when deciding to leave a problem while using rehearsal techniques, though the difference is small.

(7) What was the level of agreement by the expert observer for each of the four experimental conditions when the conductor left the problem satisfied compared to when he left the problem unsatisfied?

Observer agreement was determined by dividing the total number of stops in which the observer agreed with the conductor's decision to leave the problem by the total number of rehearsal stops.
Table 13

*Expert Observer Agreement Level Per Condition: Conductor Satisfied versus Conductor Unsatisfied*

<table>
<thead>
<tr>
<th>Condition</th>
<th>Conductor Satisfied</th>
<th>Conductor Unsatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>81%</td>
<td>75%</td>
</tr>
<tr>
<td>II</td>
<td>81%</td>
<td>50%</td>
</tr>
<tr>
<td>III</td>
<td>75%</td>
<td>33%</td>
</tr>
<tr>
<td>IV</td>
<td>75%</td>
<td>33%</td>
</tr>
</tbody>
</table>

Under Condition I, the conductor was satisfied 27 of the 35 stops. The observer agreed with the decision of the conductor when he left the problem satisfied 22 of the 27 stops, for an agreement level of 81%. During Condition I, the conductor was unsatisfied 8 of the 35 stops. The observer agreed with the decision of the conductor when he left the problem unsatisfied 6 of the 8 stops, for an agreement level of 75%.

Under Condition II, the conductor was satisfied 27 of the 31 stops. The observer agreed with the decision of the conductor when he left the problem satisfied 22 of the 27 stops, for an agreement level of 81%. During Condition II, the conductor was unsatisfied 4 of the 31 stops. The observer agreed with the decision of the conductor when he left the problem unsatisfied 2 of the 4 stops, for an agreement level of 50%.
Under Condition III, the conductor was satisfied 28 of the 34 stops. The observer agreed with the decision of the conductor when he left the problem satisfied 21 of the 28 stops, for an agreement level of 75%. During Condition III, the conductor was unsatisfied 6 of the 34 stops. The observer agreed with the decision of the conductor when he left the problem unsatisfied 2 of the 6 stops, for an agreement level of 33%.

Under Condition IV, the conductor was satisfied 16 of the 25 stops. The observer agreed with the decision of the conductor when he left the problem satisfied 12 of the 16 stops, for an agreement level of 75%. During Condition IV, the conductor was unsatisfied 9 of the 25 stops. The observer agreed with the decision of the conductor when he left the problem unsatisfied 3 of the 9 stops, for an agreement level of 33%.

There was less agreement when the conductor left the problem unsatisfied. From this, it could be assumed that the observer felt that the conductor should have continued working on the problem before leaving, particularly during conditions of repetition only (III and IV). When the conductor was allowed to use rehearsal techniques with appropriate conducting (when leaving the problem unsatisfied), the observer agreement level was highest (75%). It is clear that when more trials were used, under all conditions, the observer was more in agreement with the conductor's decision to move on.

(8) What was the level of agreement by the expert observer under conditions when the conductor was allowed to use rehearsal techniques (I and II)? Mere repetition of critical passages only (III and IV)?
Table 14

*Expert Observer Agreement Level Per Condition: Rehearsal Condition*

<table>
<thead>
<tr>
<th></th>
<th>Agree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rehearsal Techniques</td>
<td>52 stops (78%)</td>
<td>14 stops (22%)</td>
</tr>
<tr>
<td>Repetition Only</td>
<td>38 stops (64%)</td>
<td>21 stops (36%)</td>
</tr>
</tbody>
</table>

During the conditions in which the conductor used rehearsal techniques (Conditions I and II) the observer agreed with the decision of the conductor to leave the problem during 52 of the 66 stops, for an agreement level of 78%. Of these 66 stops, the conductor left the problem satisfied 54 times, and the observer agreed with this decision 44 times for an agreement level of 81%. The conductor left the problem unsatisfied 12 times, and the observer agreed with this decision 8 times for an agreement level of 66%.

During the conditions in which the conductor used repetition only (Conditions III and IV) the observer agreed with the decision of the conductor to leave the problem during 38 of the 59 stops, for an agreement level of 64%. Of these 59 stops, the conductor left the problem satisfied 44 times, and the observer agreed with this decision 33 times for an agreement level of 75%. The conductor left the problem unsatisfied 15 times, and the observer agreed with this decision 5 times for an agreement level of 33%.
(9) What was the level of agreement by the expert observer under conditions when the conductor was allowed to use appropriate conducting (I and III)? Inappropriate conducting (II and IV)?

Table 15

*Expert Observer Agreement Level Per Condition: Conducting Condition*

<table>
<thead>
<tr>
<th></th>
<th>Agree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appropriate Conducting</td>
<td>51 stops (86%)</td>
<td>18 stops (14%)</td>
</tr>
<tr>
<td>Inappropriate Conducting</td>
<td>39 stops (69.6%)</td>
<td>17 stops (30%)</td>
</tr>
</tbody>
</table>

During the conditions in which the conductor used appropriate conducting (Conditions I and III), the observer agreed with the decision of the conductor to leave the problem during 51 of the 69 stops, for an agreement level of 86%. Of these 69 stops, the conductor left the problem satisfied 55 times, and the observer agreed with this decision 43 times for an agreement level of 78%. The conductor left the problem unsatisfied 14 times, and the observer agreed with this decision 8 times for an agreement level of 57%.

During the conditions in which the conductor used inappropriate conducting only (Conditions II and IV) the observer agreed with the decision of the conductor to leave the problem during 39 of the 56 stops, for an agreement level of 69.6%. Of these 56 stops, the conductor left the problem
satisfied 43 times, and the observer agreed with this decision 34 times for an agreement level of 79%. The conductor left the problem unsatisfied 13 times, and the observer agreed with this decision 5 times for an agreement level of 38%. 
CHAPTER V
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary of the Study

Purpose
The purpose of this study was to explore various rehearsal strategies in an instrumental music ensemble, and specifically, to examine the effects of four approaches on the number of repeated attempts (trials) used to improve critical passages prior to the conductor's decision to move on to other passages. The conductor could leave a problem either satisfied or unsatisfied for the moment. The four approaches were: (1) use of standard rehearsal techniques paired with appropriate conducting, (2) use of standard rehearsal techniques paired with inappropriate conducting (i.e., mere time-beating), (3) repetition of critical passages paired with appropriate conducting, and (4) repetition of critical passages paired with inappropriate conducting. The study was designed to examine the effects of appropriate and inappropriate conducting gestures, when these gestures were paired with conditions of rehearsal techniques or mere repetition of critical passages.

Through examination of the number of trials used under the four experimental conditions, the study explored what types of rehearsal methods are best suited for solving common types of problems in instrumental music.
rehearsals. In addition, an informal analysis was made concerning potential effects upon the teaching of rhythm, tempo, ensemble clarity, tone, pitch/intonation, note accuracy, dynamics/balance, style/articulation, and musicality/expressiveness.

**Procedures**

The ensemble used in this study was the University Band at The Ohio State University. The University Band is a full symphonic band, meeting twice weekly, comprised mainly of non-music majors. The experimenter and the expert observer served as conductors. The investigation included three pilot rehearsals followed by an experimental period of nine regular rehearsals. Each rehearsal session included a regular warm-up and tune-up period, which was not recorded for use in the study. The data collection for each rehearsal began with the rehearsing of the first selection. Selections to be rehearsed varied in order, according to the goals and expectations for the rehearsal period.

The first five stops for each conductor were recorded as baseline. Beginning with the sixth stop, the conductor was given a number by the research assistant, indicating which one of four conditions he would be required to use during the stop. The number was indicated at the moment the conductor stopped the ensemble to correct a problem. The four experimental conditions were distributed randomly over the remainder of the rehearsal for each conductor.

An observation form was developed for use in this study (See Appendix A). This form was informally tested prior to the experimental period, and
included areas for notating the rehearsal stop number, the expert observer's comments, the condition used, the number of trials, whether the expert observer agreed or disagreed with the conductor's decision to leave the problem, and whether the conductor was satisfied or unsatisfied when leaving the stop. The rehearsal technique used in Conditions I and II, and the musical element addressed were added to this form during the data collection procedure which followed the experiment.

At each rehearsal stop, the conductor stated the problem to the ensemble. He then rehearsed under one of four experimental conditions. A rehearsal stop was defined as any time the conductor stopped the ensemble in order to identify and correct a problem. If the conductor addressed more than one problem during a stop, each problem presented retained the same condition number, but was recorded under an additional stop in the collection of the data.

Following the experiment, the experimenter and the research assistant viewed all of the videotapes and obtained the following: (1) the number of trials used during each stop, (2) whether the conductor was rehearsing under the condition he was assigned, (3) the type of rehearsal technique that was being used (during Conditions I and II), (4) which musical elements were being addressed, and (5) whether the conductor was satisfied or unsatisfied when leaving the problem.
Summary of Results

The results are discussed in response to each of the research questions.

(1) Is there a significant difference in the average number of rehearsal trials used at each rehearsal stop, when comparing the use of standard rehearsal techniques with mere repetition of critical passages?

No significant difference was found between the average number of trials used when comparing the use of standard rehearsal techniques with mere repetition of critical passages. However, fewer trials were used during conditions of repetition than during rehearsal techniques. During the conditions which required the use of standard rehearsal techniques, there were a total of 161 trials used during 66 stops, for an average of 2.439 trials per stop. During conditions which required the use of repetition only, there were a total of 141 trials used during 59 stops, for an average of 2.39 trials per stop.

(2) Is there a significant difference in the average number of rehearsal trials used at each rehearsal stop, when comparing the use of appropriate conducting with inappropriate conducting of critical passages?

The conductor used more average trials when provided with the presumed advantage of appropriate conducting. The difference between these two variables, however, was not significant. During conditions which required the use of appropriate conducting, there were 176 trials used during 69 stops for an average of 2.551 trials per stop. During conditions which
required the use of inappropriate conducting, there were 126 trials used during 56 stops, for an average of 2.25 trials per stop.

(3) Is there a significant interaction between the variables of rehearsal conditions (use of rehearsal techniques versus repetition only) and conducting conditions (appropriate versus inappropriate)?

No significant interaction was found between the variables of rehearsal conditions and conducting conditions, though the analysis does approach significance ($p < .0645$). The conductor used 87 trials (average of 2.486 per stop) during the 35 stops under Condition I. The conductor used 74 trials (average of 2.387 trials per stop) during the 31 stops under Condition II. During Condition III, 89 trials were used during 34 stops, for an average of 2.618 trials per stop. During Condition IV, 52 trials were used during 25 stops, for an average of 2.08 trials per stop.

(4) Is there a significant difference between the average number of trials used when the conductor left a problem satisfied and when he left a problem unsatisfied?

A significant difference was found between the average number of trials used when comparing the stops when the conductor left the problem satisfied, with the average number of stops when he left it unsatisfied. The total number of stops for all rehearsal conditions was 125. There were 302 trials used during these conditions, for an average of 2.416 trials per stop. The
conductor was satisfied during 98 stops, in which 215 trials were employed (Mean = 2.194). The conductor was unsatisfied during 27 stops, in which 87 trials were employed (Mean = 3.222).

(5) Is there a significant interaction between the rehearsal conditions and whether the conductor left the problem satisfied or unsatisfied for the moment?

No significant interaction was found between rehearsal conditions and whether the conductor left the problem satisfied or unsatisfied for the moment. In fact, he used slightly more average trials prior to leaving satisfied while having the presumed advantage of rehearsal techniques. When leaving unsatisfied, the average number of trials were similar under both rehearsal conditions. During conditions of rehearsal techniques, the conductor left the problem satisfied during 54 stops (average trials 2.259), while leaving unsatisfied during 12 stops (average trials 3.25). During conditions of repetition only, the conductor left the problem satisfied during 44 stops (average trials 2.114), while leaving unsatisfied during 15 stops (average trials 3.2).

(6) Is there a significant interaction between the conducting conditions and whether the conductor left the problem satisfied or unsatisfied for the moment?
No significant interaction was found between the conducting conditions and whether the conductor left the problem satisfied or unsatisfied for the moment. Slightly more average trials were used prior to the conductor leaving satisfied during conditions of appropriate conducting. Slightly more average trials were used prior to the conductor leaving unsatisfied during conditions of appropriate conducting. During conditions of appropriate conducting, the conductor left the problem satisfied during 55 stops (average trials 2.345), while leaving unsatisfied during 14 stops (average trials 3.357). During conditions of inappropriate conducting, the conductor left the problem satisfied 43 stops (average trials 2) while leaving unsatisfied 13 stops (average trials 3.077).

(7) Is there a significant interaction among the variables of rehearsal conditions, (rehearsal techniques and repetition only), conducting conditions (appropriate and inappropriate), and conductor satisfaction (conductor satisfied or unsatisfied) when leaving the problem?

No significant interaction was found among the variables of rehearsal conditions, conducting conditions, and conductor satisfaction.

Sub-problems

(1) Are there notable differences in the mean number of rehearsal trials used with respect to the musical elements of rhythm, tempo, ensemble clarity, tone, pitch/intonation, note accuracy, dynamics/balance,
style/articulation, and musicality/expressiveness under the four experimental conditions?

For most elements rehearsed, there tended to be more average trials used when rehearsal techniques were employed, as opposed to mere repetition of critical passages. The same result occurred during conditions of appropriate conducting as opposed to inappropriate conducting.

During Condition I, the average number of trials used are similar for all musical elements with the exception of rhythm and ensemble clarity (more average trials used), and musicality/expressiveness (less average trials used). During Condition II, the average number of trials used is similar for all musical elements with the exception of rhythm (less average trials used), and pitch/intonation (more average trials used). Note accuracy, pitch/intonation, and ensemble clarity accumulated notably more average trials during Condition III, while the element of dynamics/balance received no trials under this condition. Generally, fewer average trials can be seen under Condition IV, with the exception of pitch/intonation. No trials were used during Condition IV in the area of tempo.

(2) In what percentage of the rehearsal stops is the conductor addressing the musical elements of rhythm, tempo, ensemble clarity, tone, pitch/intonation, note accuracy, dynamics/balance, style/articulation, and musicality/expressiveness?
The highest percentage of rehearsal stops was spent in the areas of style/articulation (25%), and note accuracy (16%). Notable percentages of rehearsal stops were also devoted to the elements of rhythm (14%), pitch/intonation (12%), and balance (11%). The percentage of stops spent on tempo, ensemble clarity, tone, and musicality/expressiveness was negligible.

(3) Under the conditions during which the conductor was allowed to use standard rehearsal techniques, what percentage of the techniques used were modeling, verbal-technical instruction, a combination of modeling and verbal-technical instruction, or other.

The rehearsal technique used most frequently by the conductor was verbal-technical instruction (53%). Modeling combined with verbal-technical instruction as rehearsal technique was also used frequently (37%). Modeling alone was used less (9%).

(4) What percentage of rehearsal stops concluded with the conductor being satisfied and unsatisfied under each of the four experimental conditions?

The conductor was satisfied most frequently when leaving the problem while he was required to use Condition II (87%). He was satisfied during 82% of the stops under Condition III, 77% under Condition I, and 64% under Condition IV.

The conductor left the problem unsatisfied during less than one-third of the stops under each condition except Condition IV, where he left unsatisfied
during slightly more than half of the stops. Conditions I, II, and III achieved conductor satisfaction of at least 70%. The percentage of conductor satisfaction was highest during Condition II. During Condition II, the conductor was satisfied 27 stops (87%) and unsatisfied 4 stops (13%). The next highest percentage of conductor satisfaction was obtained under Condition III. The conductor indicated satisfaction during 28 stops (82%) during Condition III, while indicating that he was unsatisfied during 6 stops (18%). During Condition I, the conductor was satisfied 27 stops (77%) and unsatisfied 8 stops (23%). During Condition IV, when the conductor was not allowed to use appropriate conducting or rehearsal techniques, the conductor satisfaction level was lowest at 16 stops (64%). The conductor was unsatisfied 9 stops (36%) during Condition IV.

(5) In what percentage of rehearsal stops does the conductor leave the problem satisfied, when using appropriate conducting versus inappropriate conducting?

The satisfaction levels of the conductor were similar under conditions of both appropriate and inappropriate conducting. While using appropriate conducting, he left satisfied during 80% of the stops. While using inappropriate conducting, he left satisfied during 77% of the stops.

(6) In what percentage of rehearsal stops does the conductor leave the problem satisfied when using rehearsal techniques versus mere repetition of critical passages?
The conductor was satisfied slightly more often when allowed to use rehearsal techniques (82%) than when allowed to use repetition only (75%).

(7) What was the level of agreement by the expert observer for each of the four experimental conditions when the conductor left the problem satisfied compared to when he left the problem unsatisfied?

There are notable differences in the opinion of the expert observer, particularly when the conductor left the problem unsatisfied. When the conductor left the problem satisfied under Condition I, the agreement level was 81%, while it was 75% when he left unsatisfied under this condition. When the conductor left the problem satisfied under Condition II, the agreement level was 81%, while it was only 50% when he left unsatisfied under this condition. The agreement level was 75% when the conductor left the problem satisfied under Condition III, and 33% when he left unsatisfied under this condition. When the conductor left the problem satisfied under Condition IV, the agreement level was 75%, and 33% when he left unsatisfied under this condition. It is clear that the observer disagreed with the decision of the conductor to leave more frequently when the conductor was unsatisfied.

(8) What was the level of agreement by the expert observer under conditions when the conductor was allowed to use rehearsal techniques (I and II)? Mere repetition of critical passages only (III and IV)?
The expert observer agreed with the conductor when leaving the problem during 78% of the stops while using rehearsal techniques, and notably less, 64%, when using repetition only.

(9) What was the level of agreement by the expert observer under conditions when the conductor was allowed to use appropriate conducting (I and III)? Inappropriate conducting (II and IV)?

The expert observer agreed with the conductor when leaving the problem during 86% of the stops when appropriate conducting was used. This agreement level was notably less, 69.6%, when the conductor used repetition only.

Discussion

The design of this study was exploratory in nature, employing four conditions of rehearsing an ensemble in a natural instrumental rehearsal setting. The conductor was restricted to using the four conditions which were randomly spread over several hours of rehearsals. This design was used because it seemed a reasonable and unobtrusive means of exploring the rehearsal conditions while at the same time not interrupting the natural flow of the rehearsal. Other methods considered, such as subjecting the ensemble to a single one of these treatments for an extended period of time, seemed impractical and, perhaps, counterproductive to the growth of the ensemble.

Several observations can be made from the data obtained in this study. Initially, it might appear that the conductor could affect the data through
personal bias. This was clearly not the case, as was shown when the data were examined. The conductor was restricted to use the conditions as indicated at each stop. The conditions were monitored by the expert observer and research assistant throughout the project, and the data collected were not analyzed until the completion of the experiment. The researcher, therefore, was unaware of the results as they were occurring. In fact, one major finding in the study was unexpected. The nature of the study was such that assumptions had to be made regarding the treatments tested. It was assumed at the outset that the number of trials used to achieve conductor satisfaction for the moment would be an indication of rehearsal efficiency and effectiveness. It was assumed that, as measured by the number of trials used, fewer trials would indicate greater efficiency and, therefore, in the long run, greater effectiveness. Perhaps the most unexpected result of the study was that more average trials were used during the conditions of standard rehearsal techniques than during conditions of repetition only.

While having the presumed advantage of rehearsal techniques, more trials were accumulated, taking an assumed greater amount of rehearsal time. While this may have been more effective, it was not necessarily a more efficient means of rehearsing, if one interprets efficiency as using the least amount of time. However, what may be more effective in the long run may not be most efficient in the short run. The most likely explanation for this is that when the conductor was able to verbalize goals more clearly and use appropriate rehearsal techniques, he was more inclined to keep progressing towards the goals, thus using more trials.
While one could assume that rehearsal effectiveness would be synonymous with time saved, this might not always be the case. From the standpoint of rehearsal efficiency, as it relates to the use of rehearsal time, utilizing rehearsal techniques (vs. mere repetition of critical passages) could conceivably take more time, but may, in the end, prove more effective because the conductor is consistently approaching the goal.

It should be noted that an uneven number of stops were used in the analysis. There were 66 stops recorded for the conditions of rehearsal techniques, and only 59 recorded for the conditions of repetition only. One explanation for the accumulation of stops during the conditions of rehearsal techniques could be that the conductor was more apt to address more than one problem when he knew he had the advantage of verbally providing a rehearsal technique. When he addressed more than one problem during a stop, an additional stop was recorded in the data collection procedure. It should also be noted that several recorded stops had to be discarded when the data were analyzed for various reasons such as: the observer inadvertently did not indicate whether he agreed or disagreed with the conductor's decision to leave the problem, or the conductor worked on tasks that were not applicable to music performance goals. Therefore, it was unlikely that an even amount of stops under each condition could be collected for the analysis.

Another issue raised by this information is whether an ensemble can make reasonable progress by merely repeating passages with little or no feedback. While the repetition only conditions were no more than "guided
practice" in this study, there is evidence that this type of practice does, in fact, help an ensemble progress towards a performance goal.

One could argue that technical errors could, in time, be self-corrected by normal repetition that occurs in regular ensemble rehearsals, particularly with more advanced players who are musically aware of their mistakes. Less advanced players may not be as adept at this skill, and may often need to be told, when errors don't "self-correct." Other musical areas, such as expressiveness, may not be as self-correcting, and therefore require either verbal or nonverbal intervention from the teacher/conductor more often. It would appear evident, however, that many ensembles could improve to some degree with little or no feedback, (i.e., "Let's do it again."), though this rehearsal method as a treatment for an extended period of time would seem of questionable value. How much verbal input is necessary from the teacher/conductor, and at what points during the ensemble's progress this feedback is necessary, remain questions for future research.

Research is also needed regarding the effect of baton technique as it relates to performance progress during rehearsals. An important variable could be the performance level of the ensemble. It is interesting to note that the conductor used slightly more trials per stop when using appropriate conducting than when using inappropriate conducting (mere time-beating of critical passages). One should not necessarily conclude from this that appropriate conducting results in more time being spent to correct problems. It appears, rather, that the conductor was aware that further attempts with weak conducting could yield no further progress, thus he exited with fewer trials under these conditions. The reason the conductor used more trials
while under conditions of appropriate conducting is probably similar to that of why he used more trials when comparing rehearsal techniques to mere repetition. When given the opportunity to use appropriate conducting, the conductor may have taken advantage of the opportunity by using more trials because progress was being made. It is therefore possible that he observed progress being made and continued working towards the goal, thereby accumulating more trials. This might indicate that appropriate conducting gestures were making an impact, and that the ensemble was responding positively to these gestures. Obviously, the teacher/conductor must possess a variety of skills in addition to those of a gestural nature learned in conducting classes in order to effectively rehearse and teach an ensemble. Further research is needed to determine the degree to which mere time-beating, as well as gestural conducting, affects rehearsal progress and overall performance quality. Research is needed to investigate various levels of performance ensembles to determine when, and to what degree, emphasis solely upon nonverbal communication makes a difference in rehearsal progress.

As expected, the conductor left the problem satisfied least often during Condition IV (64%). This is most likely attributable to the fact that he was deprived of both the elements of appropriate conducting and rehearsal techniques. It does seem surprising that of the remaining three conditions, the conductor left satisfied least often during Condition I (77%), when having the advantage of being able to use rehearsal techniques and appropriate conducting. While understandably not as low as Condition IV, it could be questioned why, with the presumed advantage of rehearsal techniques and
appropriate conducting, the conductor was not satisfied more often. One explanation could be, that knowing he had the assumed best of conditions, he was frustrated that progress was not being made quickly enough, therefore he left unsatisfied more often than during Conditions II and III. The conductor could have unknowingly striven for a higher standard and was frustrated more easily when this standard could not be achieved. In other words, he expected results to occur more readily when provided the advantage of Condition I, and was less satisfied when not able to achieve the goals under this condition.

During Condition III, the conductor satisfaction level was 82%. This could be the result of progress being made (with more average trials) and the conductor sensing that appropriate conducting was making a difference, even when the ensemble was merely repeating the passage. The use of appropriate conducting, in fact, could have deceived the conductor into thinking that the performance level was better than it was. It could also be possible that appropriate conducting was simply more reinforcing to the conductor, and therefore led him to engage in more trials. The 87% satisfaction level in Condition II is likely attributable simply to the conductor's belief in rehearsal techniques as an aid to rehearsal problem solving. It may, in fact, have created a false impression of progress because of this belief, particularly when deprived of appropriate conducting.

The mean number of trials, when the conductor left the problem satisfied, was similar for each condition except IV (I=2.296, II=2.222, III=2.393, IV=1.625). It would appear from this that the conductor was able to solve musical problems to his own level of satisfaction in an average of just over
two trials per stop under Conditions I, II and III. The results indicate that, except when required to use Condition IV, the conductor could provide sufficient teaching to insure some level of progress resulting in satisfaction for the moment. It is clear from the average number of trials used when the conductor left the problem unsatisfied (I=3.125, II=3.5, III=3.667, IV=2.889) that the conductor made an effort (during all experimental conditions) to solve the problem with additional trials prior to moving on.

Prior to leaving satisfied, the conductor used slightly more trials during the conditions of rehearsal techniques than during conditions of repetition only. This is similar to the results found when comparing conductor satisfaction as it pertains to conditions of appropriate and inappropriate conducting, with more trials occurring under conditions of appropriate conducting. As speculated earlier, it is possible that the conductor strove for a higher standard in these instances, and accumulated more trials in order to achieve the objective. As would be expected, when the conductor left the problem unsatisfied, when comparing both conducting and rehearsing conditions, he made an additional effort to solve the problem with more trials prior to leaving.

This study supports previous research concerning the degree of emphasis placed upon various musical elements during rehearsals. High percentages of stops were dedicated to style/articulation, note accuracy, rhythm, and pitch/intonation. Areas such as tone and musicality/expressiveness appear to receive less attention when there are an abundance of other technical problems that must be addressed, in order to insure accurate notes, rhythms, and balances.
Verbal-technical instruction and modeling were dominant teacher behaviors, as previous research has shown. Teachers of large ensembles tend to use questioning and verbal imagery rarely. The large percentages of verbal-technical instruction combined with modeling used by the conductor would indicate that these techniques are judged to be most effective. The effects of other types of rehearsal techniques have received little attention in research.

The percentage of conductor satisfaction was very similar during conditions of appropriate conducting (80%) and inappropriate conducting (77%). It would appear from this that the variable of conducting did not alter the overall satisfaction of the conductor when deciding to leave a problem. While using rehearsal techniques as opposed to mere repetition, however, there was a noticeable difference in conductor satisfaction level. When using rehearsal techniques, he left the problem satisfied for 82% of the stops, while leaving satisfied for only 75% of the stops when merely repeating the passage. The presumed advantage of verbal explanation appears to have had at least some effect on the conductor satisfaction level.

In all conditions, the level of expert observer agreement is noticeably less when the conductor left the problem unsatisfied when compared to when the conductor left the problem satisfied. Two explanations seem plausible. The expert observer felt that the conductor should have worked harder on critical passages before leaving them unsatisfied; or the conductor should have given up unsatisfied and left the passage sooner, using fewer trials. A discussion with the expert observer following the analysis of the data revealed that the observer generally felt if he were conducting the ensemble, he would have attempted more trials before moving on. He also indicated that in most cases
he could not have predicted whether or not he would have achieved his own level of satisfaction by doing so. Since the data collection for this study did not provide for recording this information during specific stops, it would be difficult to speculate beyond this. During Conditions III and IV, when repetition only was used, the level of expert observer agreement was 67% and 60% respectively. This is noticeably less than the agreement level during Condition I (80%) and during Condition II (77%). Again, the observer felt that the conductor should have worked harder prior to leaving the problem, or, perhaps less likely, that he should have given up sooner and gone on to other problems. When the conductor left satisfied, even under Conditions III and IV, the observer agreement level was noticeably higher than when he left unsatisfied. The expert observer agreed with the conductor's decision to leave the problem more often when appropriate conducting was used, as opposed to inappropriate conducting. This could indicate that the expert observer places value on appropriate conducting, but again, an explanation is difficult, as information regarding why the expert observer agreed or disagreed was not recorded during the experimental process.

Conclusions

(1) Rehearsal effectiveness and rehearsal efficiency (in terms of time used) may not be synonymous and should be re-defined as separate variables.

(2) Conductors may tend to pursue more attempts to solve problems when they are using a technique in which they feel that progress is being made.

(3) Repetition alone can bring about achievement in instrumental rehearsals, but it was difficult to measure the degree of this, and it would be difficult
to subject this variable alone to experimental study with large instrumental ensembles.

(4) The degree to which appropriate baton technique makes a substantial difference in the effectiveness and efficiency of rehearsal progress is unclear, and may be, in part, dependent upon the level of the performing ensemble. Musical gestures from the teacher/conductor may have a larger, more immediate impact upon the performance levels of more performing ensembles of greater maturity. The effect may not be so great on less experienced performers.

(5) Prior to leaving a problem unsatisfied, it is likely that conductors make more attempts (trials) in pursuit of being able to leave the problem satisfied.

(6) Teacher/conductors of ensembles similar in ability level to the one used in this study would seem to spend most rehearsal stops addressing short-term concerns of pitch, correct notes, style and rhythm. Issues of musicality and expressiveness, though important, apparently cannot be addressed as frequently until the ensemble is proficient at understanding the more basic elements.

(7) Verbal-technical instruction and modeling are the techniques of choice in instrumental music rehearsals.

(8) Conductor satisfaction is greater when the conductor is allowed to use rehearsal techniques, however, with the level of ensemble used in this study, conductor satisfaction is about the same when comparing appropriate and inappropriate conducting.
Recommendations

(1) Further research is needed to determine at what point gestural conducting makes a notable impact upon ensemble performance.

(2) Further research is needed to determine the degree that gestural conducting affects the overall performance quality of ensembles.

(3) College conducting teachers should incorporate the application of rehearsal techniques as well as standard baton technique in the conducting curricula.

(4) Research needs to be conducted on the effects of verbal-technical instruction, modeling, questioning, and verbal/visual imagery on performance quality.

(5) The complexity of rehearsing, incorporating the cognitive, affective, and psychomotor domains of learning, is such that emphasis needs to be given to all facets of the art, but also to a synthesis of these items as they relate to teaching and rehearsing ensembles, particularly in regards to the training of future teachers.
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APPENDIX A

REHEARSAL OBSERVATION FORM
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APPENDIX B

DATA COLLECTION FORM BY CONDITION

CONDUCTOR SATISFACTION LEVEL
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MUSICAL ELEMENT ADDRESSED
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APPENDIX C

DATA COLLECTION FORM BY MUSICAL ELEMENT

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ELEMENT

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APPENDIX D

VIDEOTAPE CONDUCTING AGREEMENT LEVEL FORM

APPROPRIATE AND INAPPROPRIATE CONDUCTING
Using the following definitions as guidelines, please rate the examples of conducting shown on the videotape. A rating of 5 would indicate mostly appropriate conducting; a rating of 1 would indicate mostly inappropriate conducting. A monitor will instruct you as to when you should observe the conducting, and when you should record your response.

**Appropriate Conducting** -- The use of clear, musical, and expressive, gestures to assist the ensemble in performing music.

**Inappropriate Conducting** -- the use of clear, but non-expressive (mere time-beating) gestures to maintain the pulse of the ensemble while performing.

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