The purpose of this investigation was to examine the effects that modeling, self-evaluation, and self-listening have on junior high school instrumentalists' music performance and attitude about practice. The pretest/posttest 2 × 2 × 2 factorial design involved a total of 82 woodwind, brass, and percussion students in the seventh (n = *36), eighth* (n = *31), or ninth grade* (n = *15). Data indicated that participants who listened to a model during self-evaluation improved more than those not listening to a model in the areas of tone, melodic accuracy, rhythmic accuracy, interpretation, and overall performance, but not intonation, technique/articulation, or tempo. When self-evaluation was not undertaken, modeling groups were no different in any performance subarea. Also, the main effects for modeling revealed that groups that listened to a model improved their performance more than did students who did not listen to a model in the areas of tone, technique/articulation, rhythmic accuracy, tempo, interpretation, and overall performance but not intonation or melodic accuracy. No statistically significant findings for self-listening or practice attitude were identified.*

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The Effects of Modeling, Self-Evaluation, and Self-Listening on Junior High Instrumentalists' Music Performance and Practice Attitude

Alternative views of music learning have surfaced in recent years that seem to represent more completely the multitude of tasks that are essential for improving music performance. Many of these viewpoints concern the area of music practicing. Music practice has been discussed in terms of deliberate or formal practice by Ericsson, Krampe, and Tesch-Romer (1993) and Sloboda, Davidson, Howe,

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and Moore (1996). These researchers envision music practicing as involving wide-ranging parameters that include any and all activities that work to improve performance, with the exception of playing for fun. To be most productive, music practice is believed to require a well-defined task with an appropriate difficulty level for the musician, informative feedback, and opportunities for repetition and correction of errors (Ericsson, 1997).

Expressing an even more encompassing view, Jørgensen (1995) describes music learning as "self-teaching" that is composed of a three-phase strategy: *planning, the conduct of practice,* and *evaluation of practice.* The *planning* stage incorporates strategies relating to the preparation of emotional, motivational, physical and musical elements. The *conduct of practice* stage deals with effective learning, monitoring and adjusting, and preparing for performance. The *evaluation* stage involves assessing products (performances), self-teaching, and the learning process. Furthermore, a meta-strategy classification is presented that formulates and controls the execution of the other three strategies.

Hallam (1997) presents a broader view of the nature of practice. She states that effective music practice is "that which achieves the desired end-product, in as short a time as possible, without interfering negatively with the longer-term goals" (p. 181). Effective practice is "what works" in learning. In her model, the physical act of practice and repetition are consolidated with a number of other elements she views as necessary for effective and efficient practice.

Each of the recent concepts or models of practice presented incorporates some method of self-evaluation. Assuredly, then, musicians' ability to effectively evaluate their own performances while using various practice strategies is an essential skill to acquire if independent musicianship is to be achieved. It would seem, then, that the attainment of independent musicianship would allow the student musician to become more involved in decision-making during ensemble rehearsals. Rehearsals, in turn, would become more efficient as students are better able to correct mistakes and make improvements individually rather than invariably relying on the leader of the ensemble to give directives.

Research on the effects of self-evaluation on music performance, perhaps because of limited study, is inconclusive. University students were unable to successfully evaluate their music performances as they related to expert evaluation; i.e., students' and expert evaluators' opinions did not match (Bergee, 1993; Kostka, 1997). Elementary students, after receiving instruction in self-evaluation, improved their performance ability (Davis, 1981; Sparks, 1990). Middle school students who participated more predominantly in their evaluation saw somewhat mixed results, but Aitchison (1995) noted that their self-evaluation accuracy increased while their music performance ability did not increase as much as that of students who were provided teacher feedback.

Self-evaluation may also have an effect on students' attitudes

toward certain musical concepts. Piano students lowered the degree to which they valued four of five performance areas after instruction in self-evaluation (Kostka, 1997). Following self-evaluation, attitudes among beginning band students were more positive toward music in general (Davis, 1981), toward their own band class, and in their attitude toward the band director (Sparks, 1990). Frequency of home practice also increased (Sparks, 1990). Aitchison (1995) found that self-evaluation produced positive influences for intrinsic interest in music and the perception of music performance ability. Together, these studies suggest that self-evaluation can affect certain student attitudes.

A fundamental element of self-evaluation is judging or comparing self-monitored information against a given standard, model, or goal (Davidson & Scripp, 1992; Slavin, 1991; Zimmerman, 1998). Thus, in music performance, musicians must have a firm grasp of the aural concept they wish to evaluate prior to making a particular assessment. The effectiveness of using models to improve musicians' performance has been mixed, though generally positive. Certain studies indicate that listening to a model may be more effective for music performance than other methods of practice. Aural models seem to be more effective than verbal models for improving notes, rhythms, dynamics, and tempo, but not phrasing (Rosenthal, 1984) and better than singing or not practicing for rhythm and phrasing/dynamics (Rosenthal, Wilson, Evans, & Greenwalt, 1988). When compared to physical practice, listening to a model seems to be as effective or more effective depending on the amount of "control" assumed by the researcher in the study. Although superior effects of modeling (compared to practice) on performance achievement were found by some investigators (Dickey, 1991, 1992; Puopolo, 1971; Zurcher 1975), others found modeling to be only "as good as" physical practice (Anderson, 1981; Linklater, 1997; Rosenthal et al., 1988). Studies in which researchers found a superior effect for modeling provided treatment to subjects, at least in part, during the regular school day, whereas studies in which no such effect was found either provided "take-home" treatment (Anderson, 1981; Linklater, 1997) or were relatively short in duration (Rosenthal et al.).

The aural conception of what a piece should sound like can be generated either internally (via audiation) or externally from a live or recorded performance. External models seem to be superior to internal ones, as they tend to be more reliable and accurate (Bundy, 1987; Kepner, 1986). Two studies examining self-listening reveal no conclusive indications as to whether the process of listening to one's performance on audiotape is a worthwhile task. Kepner (1986) indicates that students were better able to detect errors they made while using audiotape than when listening to live performances, but does not designate what types of errors (pitch, rhythm, etc.) these represented. Bundy found that students were able to detect pitch errors more accurately while listening to live performances. Perhaps these findings indicate that students can identify pitch errors more accu-

rately during live performance, but are more accurate at identifying other error types while using audiotape. Furthermore, it seems logical that a recorded model would be preferred in a practice situation as it is more consistent and more readily accessible than a live performer.

Given that self-evaluation is noted as an important element of practice by recently developed models and theories of practice and that a performance should be evaluated against a given external model to be effective, the amalgamation of these methods should provide an optimal learning strategy for effective and efficient music practice. To date, there are no studies that examine the relationships among these strategies. Therefore, the purpose of this study was to examine the effects that modeling, listening to oneself on audiotape (self-listening), and self-evaluation have on junior high school instrumentalists' music performance and attitude about practice.

METHOD

Subjects

Participants ($N = 82$) for this study were seventh- ($n = 36$), eighth- ($n = 31$), and ninth-grade ($n = 15$) woodwind, brass, and percussion students from a junior high school in a southwestern state. A stratified random sample was used to assign students to one of eight treatment groups—an interaction of two modeling conditions, two self-evaluation conditions, and two self-listening conditions. Groups were (A) Model × Self-Listening × Self-Evaluation ($n = 11$), (B) Model × Self-Listening × No Self-Evaluation ($n = 11$); (C) Model × No Self-Listening × Self-Evaluation ($n = 10$), (D) Model × No Self-Listening × No Self-Evaluation ($n = 10$), (E) No Model × Self-Listening × Self-Evaluation ($n = 10$), (F) No Model × Self-Listening × No Self-Evaluation ($n = 10$), (G) No Model × No Self-Listening × Self-Evaluation ($n = 10$), and (H) No Model × No Self-Listening × No Self-Evaluation ($n = 10$).

Preparation of Materials

The music selected as the performance material for the study (Performance Etude) began with the examination of a variety of musical works by the researcher and the participants' teacher to determine whether these works fit established criteria. The criteria against which the musical works were evaluated were that they must: (a) incorporate a diversity of technical components appropriate for junior high musicians, including a variety of articulations, styles, dynamics, rhythmic patterns, and a moderately wide melodic range; (b) be of appropriate difficulty so a "ceiling effect" would not be established; and (c) be of similar difficulty for each instrument involved in the study. The Performance Etude was then independently examined by three junior high school music teachers to determine if it met the criteria. It was concluded by all that it did.

Audiotaped models were prepared at a recording studio housed at a large southwestern university. University music majors were recruited to perform and record the musical excerpts. Separate recordings were made by individual musicians for each instrument used in the study. Musicians were provided the Performance Etude in advance of the recording session and asked to prepare it to perfection. The flute recording was made first. Extensive time was taken with this performer to assure that the performance was in ideal form, because it served as the model for the other studio musicians. While in the studio, each musician had a 30-minute period in which to record as many "takes" of the piece as possible. These recordings took place after the performers listened to the flute model. The researcher then guided the musicians so that their performances matched the flutist as closely as possible. Since the Performance Etude comprised three separate études, each one was recorded independently. Three professional musicians then selected the "best" recording of each étude, and their choice was used as the model in the study.

Evaluation of Student Performances

Student performances were evaluated by three independent adjudicators using the Woodwind Brass Solo Evaluation Form (WBSEF, Saunders & Holahan, 1997). This instrument uses a 5-point criteria-specific rating scale that independently examines individual tone, intonation, technique/articulation, melodic accuracy, rhythmic accuracy, tempo, and interpretation. Criteria-specific scales typically use written descriptors to characterize the performance qualities necessary to achieve scores at increasingly higher levels. Judges are asked to select the descriptor that most accurately describes the performance they are evaluating. The WBSEF is a criteria-rated instrument, "designed to diagnose specific levels of instrumental accomplishment and/or deficiency, yielding measurement characteristics comparable to those found for other types of rating instruments" (Saunders & Holahan, 1997, p. 261). It contains continuous performance criteria in six of the seven different categories, while in the technique/articulation section an additive (nonsequential) approach is used. For this last category, adjudicators are asked to mark any or all of five separate guidelines listed. The criteria are: appropriate and accurate tonguing, appropriate slurs as marked, appropriate accents as marked, appropriate ornamentation as marked, and appropriate length of notes as marked (i.e., legato, staccato).

Internal reliability of the WBSEF has been found to be high, with a reported median alpha reliability of .92. The authors of the WBSEF have suggested that it has strong validity in terms of its diagnostic abilities. The evidence used to support this claim is the low correlation exhibited among each subarea in conjunction with the high independent correlation of each subarea to the overall score. This seems to provide evidence of judges' abilities to isolate the performance characteristics described in the subareas.

Evaluation of Practice Attitude

Practice attitude was examined to determine whether students in a particular treatment group possessed different levels of enjoyment and satisfaction with the treatment process. It was important to measure this construct because the results could shed light on whether a particular practice method or self-evaluation method would be used in the students' future practice routines. If students did not enjoy a specific treatment or believed that it did not help them improve, it seems likely that it would not be used during their own independent practice. Conversely, when a practice method or self-evaluation was received positively, students would probably tend to return to that procedure in the future.

Students' practice attitude was measured using the Practice Attitude Questionnaire (PAQ), a researcher-created, self-report, Likert-type instrument that was completed by all students immediately following each treatment session. The survey used research on student attitudes as its basis for construction and implementation (Cutietta, 1992). The instrument was used to elicit answers regarding students' feelings, beliefs, and values with respect to their experience in the assigned treatment condition. To determine the content validity of the PAQ, one student from each of the eight treatment groups within each grade was randomly selected to be interviewed regarding his or her attitudes about the study. The interviews were videotaped and then viewed by three independent evaluators, who completed a PAQ for each student. The evaluators' scores were each compared to the students' self-reports completed during the posttesting to determine validity. Reliability between judges was found to be very strong (r = .86) and the correlation between the judges' mean scores and the students' final self-scores was also strong (r = .77).

Procedure

This study was implemented over the course of a 9-week period. During the first week, all students involved in the study were trained in the use of the WBSEF, which was adapted for student self-evaluation purposes. Terminology used on the form was explained and discussed to ensure participant understanding. A sample recording was played, and the students completed the form together. Participants then individually practiced completing the WBSEF while listening to additional audiotape recordings. The recordings represented a variety of performances both good and poor, and students discussed them with the researcher, in conjunction with the WBSEF, after each performance to assess students' understanding and proper use of the form.

Also during Week 1, students were introduced to the music to be used during the study, presented as the Performance Etude. A copy of the Performance Etude was distributed to each student. Students then participated in three daily performances led by the teacher and

researcher, each lasting approximately 3 minutes. These performances included only limited instruction by the teacher and researcher. Specific instructions given included the establishment of correct tempos and admonition of key and meter signatures. Following the performances, all copies of the music were collected.

The performance pretest was given during Week 2. Each student individually entered a practice room along with the researcher and was then recorded performing the Performance Etude in its entirety, stopping only briefly between sections. After this initial performance, students were instructed to keep a copy of the Performance Etude and to practice it throughout the duration of the treatment. Students were told they would not receive a grade for any of their performances, but should nevertheless prepare the piece to the best of their ability. Students were verbally prompted throughout the treatment period, both in class and during treatment, to practice the music. They were additionally surveyed each week to determine whether a new copy of the music was needed due either to loss or damage.

Treatment took place during Weeks 3–7. After in-class treatment (described later in this article) participants were given a tape to listen to depending upon their assigned practice condition. Students who received the Model treatment were given an audiotape that contained a recording of the Performance Etude performed in its "ideal" form. Students receiving the Self-Listening treatment were each provided an audiotape of the student's performance taped during treatment. Each week, members of the Self-Listening group recorded and received a new tape of their updated performance. Students who were assigned to both the Model and Self-Listening groups received tapes of the ideal model and their own performance. Students who were assigned to neither the Model nor the Self-Listening treatment were provided with an audiotape (for control purposes) of a professional wind ensemble, the contents of which had no direct relationship to the Performance Etude. Students in all treatment groups were asked to listen to their tape daily whenever they practiced the Performance Etude at home.

Specific instructions were provided to students in both oral and written form for the in-class treatment session. In subsequent treatments, students were reminded of the procedures to be followed and were monitored by the researcher for their adherence to these procedures. Model group participants were to (a) listen to the model recording, (b) perform the étude matching the recording as closely as possible, (c) practice the piece, (d) complete the Practice Attitude Questionnaire (PAQ), and (e) leave with their assigned tape. The students in the Model group who were also assigned to Self-Evaluation treatment additionally completed the adapted version of the WBSEF immediately after performing the étude. Students in the Self-Listening group (a) recorded themselves performing the étude, (b) listened to their performance, (c) practiced the piece, (d) completed the PAQ, and (e) left with the tape they had just recorded.

Self-Listening group participants who were also assigned to the Self-Evaluation group completed the adapted WBSEF immediately after listening to their performance.

Students appointed to both the Model and Self-Listening treatment groups were directed to (a) listen to the model recording, (b) perform and record the étude, matching the recording as closely as possible, (c) listen to their own performance, (d) practice the piece, (e) complete the PAQ (and the adapted WBSEF if also a member of the Evaluation group), and (f) leave with both the tape on which they recorded the étude and the model tape. Students assigned to neither the Model nor Self-Listening groups were allowed to physically practice the étude during the treatment period. They received instructions to (a) perform the étude from beginning to end, (b) practice the étude on their instrument in any manner they chose, and (c) complete the PAQ (and the adapted WBSEF, if an Evaluation group member).

Week 8 of the study was used to assess students' individual music performance for a second time. Similar to the pretest performance, all students individually entered a practice room and recorded themselves. During the final week of the study, 24 randomly selected students individually participated in a videotaped interview designed to determine validity of the PAQ.

RESULTS

A general linear model (GLM) repeated-measures analysis with multiple dependent variables was performed to determine relationships among two modeling conditions, two self-listening conditions, two self-evaluation conditions and test administration scores of seven WBSEF performance subareas (tone, intonation, technique/articulation, melodic accuracy, rhythmic accuracy, tempo, interpretation) and overall performance. Overall performance scores were calculated for both pretest and posttest data using sums of each subarea. Tests exhibiting statistically significant effects were succeeded by univariate analyses on each dependent variable. Relationship strength was determined using eta^2, while the nature of relationships was examined using profile plots and descriptive statistics. An alpha level of .05 was set for each test.

The four-way interaction for model, self-listening, self-evaluation, and test scores was found not to be statistically significant [F (7, 68) = .666, p = .700]. There were two statistically significant three-way interactions. First was a between-subjects interaction of model, self-listening, and self-evaluation [F (7, 68) = 2.162, p = .049, eta^2 = .182]. Second was the interaction of model, self-evaluation, and test [F (7, 68) = 2.185, p = .046, eta^2 = .184]. The interaction of model and test [F (7, 68) = 2.303, p = .036, eta^2 = .192] was the only statistically significant two-way interaction. Statistically significant main effects were found only for the test (pretest/posttest) condition [F (7, 68) = 12.560, p = .000, eta^2 = .564].

With regard to the three-way interaction of model, self-evaluation, and test, follow-up univariate analyses revealed statistically significant results for tone [F (1, 74) = 4.029, p = .048, eta^2 = .052], melodic accuracy [F (1, 74) = 3.994, p = .049, eta^2 = .051], rhythmic accuracy [F (1, 74) = 6.489, p = .013, eta^2 = .081], interpretation [F (1, 74) = 9.539, p = .003, eta^2 = .114], and overall performance scores [F (1, 74) = 5.430, p = .023, eta^2 = .068]. The nature of these interactions is displayed using profile plots in Figure 1. Scheffé post-hoc tests were performed on the mean gain scores of the test × model × self-evaluation interaction. These tests revealed that the Model/Self-Evaluation group improved more than the No Model/Self-Evaluation group for tone, melodic accuracy, rhythmic accuracy, interpretation, and overall performance. Furthermore, the Scheffé test also revealed no differences in scores between the Model/No Self-Evaluation and No Model/No Self-Evaluation groups for any performance subarea, indicating that these groups improved similarly.

Univariate analysis disclosed that all performance areas except intonation and melodic accuracy had statistically significant interactions between model and test. Significant findings were discovered for tone [F (1, 74) = 4.330, p = .041, eta^2 = .055], technique/articulation [F (1, 74) = 4.083, p = .047, eta^2 = .052], rhythmic accuracy [F (1, 74) = 12.467, p = .001, eta^2 = .144], tempo [F (1, 74) = 11.628, p = .001, eta^2 = .136], interpretation [F (1, 74) = 4.007, p = .049, eta^2 = .051], and overall performance [F (1, 74) = 9.277, p = .003, eta^2 = .111]. The natures of these relationships are displayed in Figure 2. For each subarea score and overall performance that was significant (and also those that were not), students in the Model condition showed a greater increase in performance scores than did students in the No Model group. These results indicate that music performance scores increased more when students listened to a model recording.

Each response category on the PAQ was assigned a corresponding numeric value, strongly disagree (1), disagree (2), agree (3), and strongly disagree (4), and the mean scores for the seven questions were calculated to get a composite score. Mean scores were then computed for all groups and subjected to a GLM-multivariate repeated measures analysis to determine relationships among two self-evaluation conditions, two modeling conditions, two self-listening conditions, and five practice attitude measures. An alpha level of .05 was set for each test.

No statistically significant interaction or main effects were found in the data. This indicates that mean practice attitude scores remained constant throughout the duration of the study for all of the groups and also that the treatment groups did not differ from each other in terms of their attitude about the procedure at any time during the treatment period. Furthermore, each group seemed to have a "strong" attitude toward their particular practice strategy. Using a 4-point scale with 4 representing the highest attitude, the grand mean throughout the study was high [M = 3.003, SD = .061], with scores ranging from 2.692 (.216) to 3.263 (.216).

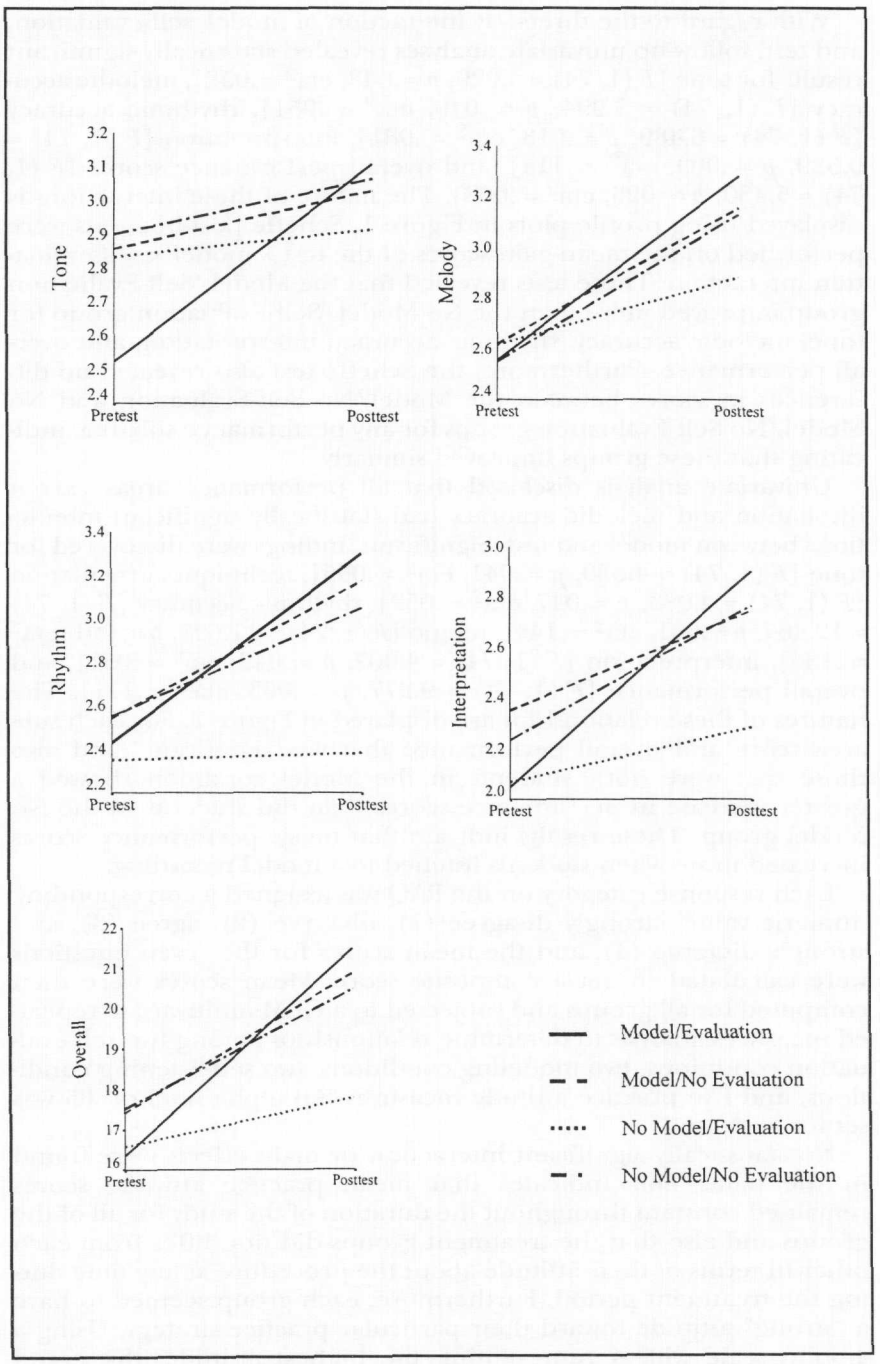

Figure 1. Mean performance gain scores for significant model × self-evaluation × test interactions.

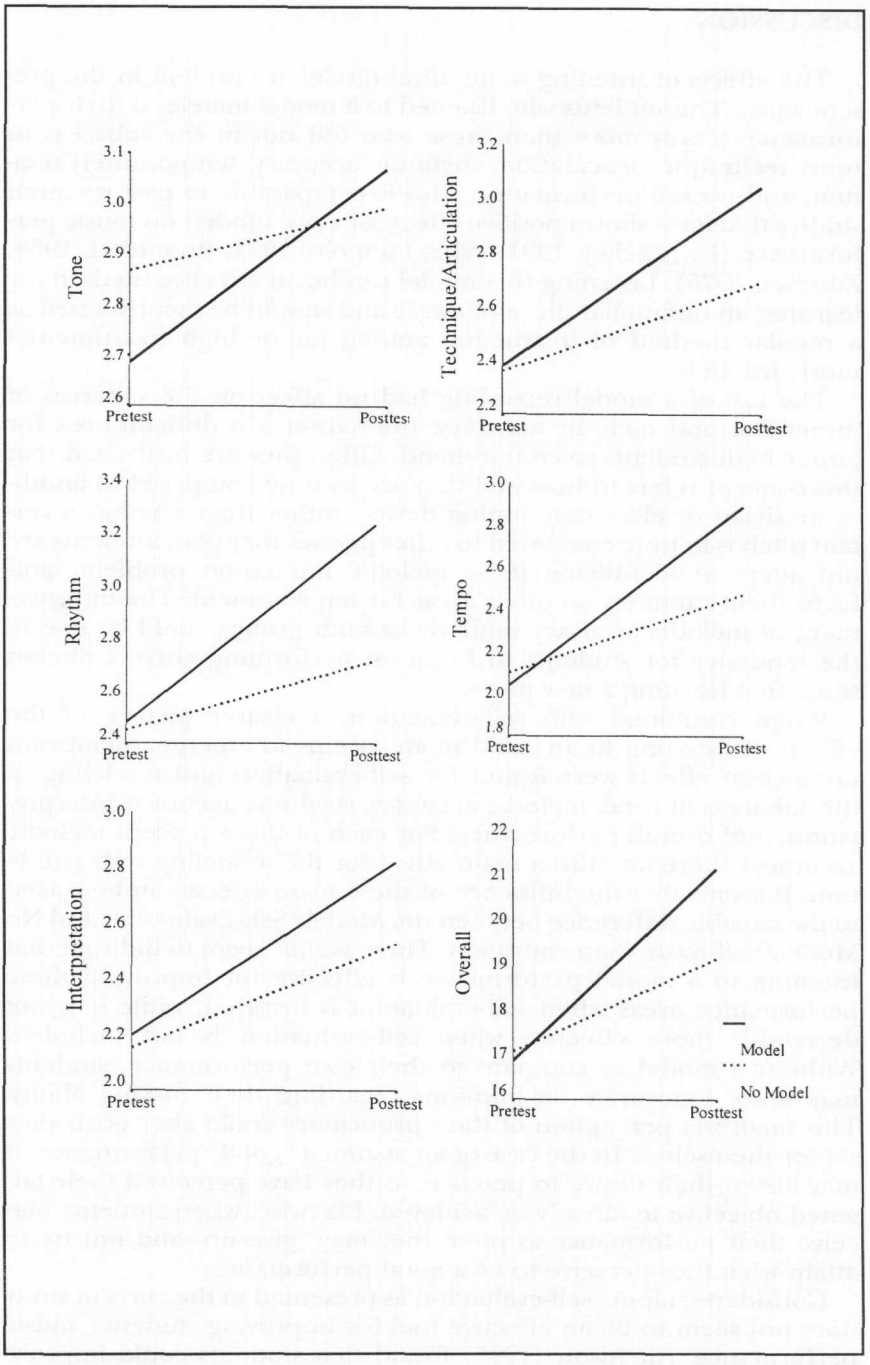

Figure 2. Mean performance gain scores for significant model × test interactions.

DISCUSSION

The effects of listening to an aural model are evident in the present study. The students who listened to a model increased their performance scores more than those who did not in the subareas of tone, technique/articulation, rhythmic accuracy, tempo, interpretation, and overall performance. This is comparable to past research studies that have shown positive effects of aural models on music performance (i.e., Dickey, 1991, 1992; Puopolo, 1971; Rosenthal, 1984; Zurcher, 1975). Listening to a model can be an effective method for learning an unfamiliar piece of music and should be incorporated as a regular method of instruction among junior high instrumental music teachers.

The use of a model recording had no affect on the subareas of intonation and melodic accuracy. Intonation is a difficult area for junior high students to comprehend. Often they are instructed that this concept refers to how well they are in tune compared to another musician or electronic tuning device, rather than whether a certain pitch is in tune compared to other pitches they play. Students are not adept at identifying these melodic intonation problems and focus their attention on other areas for improvement. The improvement of melodic accuracy similarly by both groups could be due to the tendency for students to focus on performing correct pitches when first learning a new piece.

When combined with self-evaluation, a clearer picture of the effects of listening to an aural model seems to emerge. Significant interaction effects were found for self-evaluation and modeling in the subareas of tone, melodic accuracy, rhythmic accuracy, interpretation, and overall performance. For each of these (except melodic accuracy) there was also a main effect for the modeling only condition. It seems that the influence of these main effects can be traced to the sizeable difference between the Model/Self-Evaluation and No Model/Self-Evaluation condition. These results seem to indicate that listening to a model performance is effective for improving these performance areas when self-evaluation is involved, while it is not detectably more effective when self-evaluation is not included. Without a model to compare to their own performance, students may make inaccurate assumptions regarding their playing ability. This incorrect perception of their proficiency could alter goals they set for themselves. In the case of an assumed "good" performance, it may lessen their desire to practice, as they have perceived their targeted objective to already be achieved. Likewise, when students perceive their performance as poor, they may "give up" and not try to attain what they perceive to be a good performance.

Considered alone, self-evaluation as presented in the current study does not seem to be an effective tool for improving students' music performance. Aitchison (1995) found that students could improve the accuracy of their self-evaluation with practice while the present study showed that students were unable to improve their perfor-

mance through self-evaluation. This may indicate that students are able to diagnose their strengths and weaknesses but seem unable to prescribe solutions that would assist them in improving their achievement. The development of diagnostic and prescriptive skills should constitute a greater portion of the junior high band curriculum. Often junior high and middle school teachers are charged primarily with preparing their students for upcoming group performances. Much classroom time is spent focusing on this endeavor, often to the detriment of individual learning. Teachers should develop strategies to incorporate into their rehearsals/classes that will assist in developing the individual growth of student musicians as well as high-quality group performances. Providing time, opportunity, and the proper structure for students to formally reflect on specific individual or group presentations seems appropriate for junior high students.

There is no direct statistical indication that self-listening is an effective practice strategy for improving music performance. Students who received self-listening treatment scored no differently than those who did not. Although past studies (Bundy, 1987; Kepner, 1986) have shown that students' ability to detect musical errors is more accurate when they are listening to audiotape than during a live performance, these studies did not indicate that this ability transfers to improvement in performance. Detecting errors and finding solutions to correct those errors and thus improve performance seem to be skills that are mostly unassociated with each other.

Students in all treatment groups seemingly enjoy the process of participating in the practice sessions. Additionally, practice attitude scores did not differ between treatment groups during any week of the study, nor did participants' attitudes differ within their own group throughout the treatment period. The processes in which students were involved contained different practice strategies than they had regularly used during practice sessions prior to the present study. It was also unlike experiences they have had in their regular band classes. This variance from their normal routine may have led to high attitude scores and may imply that students would enjoy using alternative learning strategies and situations during learning.

It seems consequential for music teachers working with junior high band students to include self-evaluation as part of the curriculum if independent learning is desired. The present study shows that when this takes place, an ideal representation of the music must be provided to students if they are to be successful in learning the music. In the last 10–15 years there has been a tremendous increase in the number of instrumental method books that include a recording of the music contained in the book. Using these books during classes and encouraging students to acquire these recordings could help them develop independent performance skills.

Though there have been a sufficient number of studies that have found benefits of using aural models, there are deeper issues regarding the use of these models that need exploration. It seems likely that music students would benefit from the knowledge of whether certain

types of models are more effective under specific conditions. For instance, it would be useful to know whether instrumentalists react differently to models that use their own instrument or even their own family of instruments than to models performed on other instruments.

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