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The Effect of Sight-Reading Instruction on Performance Achievement of Wind Players in a High School Band

Jacqueline C. Smith
The University of Hartford

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Jacqueline C. Smith
The University of Hartford

Abstract

The purpose of this study was to examine the effect of sight-reading instruction on the performance achievement of instrumentalists. Participants (N = 30) were high school band students divided into treatment (n = 16) and control (n = 14) groups. Participants engaged in pretest and posttest assessments for sight-reading accuracy using the Watkins-Farnum Performance Scale and for performance achievement using the Winds Brass Percussion Solo Evaluation Form. The treatment group members received instruction in sight-reading using The Sight-Reading Book for Band, Volume 4 for a portion of 20 consecutive band rehearsals before posttest assessments. Performance achievement of participants in the treatment group declined, while performance of the control group members improved. I found statistical significance in the between subjects effects for performance and grade level (F = 7.38, df = 3, p < .001). Ninth-grade students made significant gains in performance scores, consistent with previous researchers who found greatest gains in performance in younger grades. While there was modest improvement in the sight-reading scores of the participants in both groups, the control group members scored higher than the treatment group members, although the gains were not statistically significant.

Keywords: sight-reading, instrumental music performance, grade-level differences, music reading,

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In order for students to learn to read standard music notation and perform in a traditional school music ensemble, they need to become fluent music readers. Reading music notation involves several levels of complex skills working in synchronization to produce a kinesthetic action through the fingers on an instrument or through the body in singing. Reading music at sight involves listening, perception (decoding patterns), kinesthetics (playing the instrument), memory (recognizing patterns), and problem-solving skills (improvising and guessing) (Hodges & Nokler, 2011). The skills required to read music notation at sight are trainable processes that improve with experience. Good sight-readers have had extensive experience with sight-reading tasks and possess a large repertoire of rules and patterns to draw from when sight-reading (Lehmann & McArthur, 2002).

Duke (2013) explained that deep understanding involves the application of knowledge and skills in varying contexts that one has not learned previously. In sight-reading this would mean that students are able to give meaning to symbols rather than take meaning from them. The difference between taking meaning from symbols as opposed to giving sound and meaning to symbols involves applying kinesthetic or aural action. A person can respond mechanically to produce a notated sound, and can give meaning to that notated symbol by hearing it inwardly before a kinesthetic response (McPherson & Gabrielsson, 2002). In doing the latter, one may demonstrate deeper understanding.

An investigation into the skills involved in sight-reading can aid in creating strategies to use when teaching sight-reading. The research in this area spans several decades, but provides the foundation for current researchers. One of the first researchers to attempt to identify the skills involved in sight-reading was Sloboda (1974) who measured "eye-hand span" (EHS), or the number of notes the performer reads ahead of playing them. The researcher asked participants to sight-read a piece of music, and then the researcher removed the notation and counted the number of notes they could continue to play without the notation in front of them. The average EHS was five or six notes, proving that musicians read ahead while they were playing. Sloboda (1977) found that good sight-readers changed the length of their EHS depending on the length of phrases, often completing phrases longer than five or six notes. The researcher concluded that the musicians applied previous musical knowledge and experience to aid in sight-reading. Further, Sloboda (1984) proposed that skilled music readers are more sensitive to the musical structure of what they read than less-skilled readers. The implications from Sloboda's research are that sight-reading involves more than reading individual notes. The researcher suggested that musicians need an understanding of phrase structure, harmonic structure, and form in order to have greater success in sight-reading.

In a study concerning precise eye movements, Goolsby (1994) found that skilled music readers used the time allowed by long notes to look ahead in the music and that they fixated on the space between the notes, indicating that the musicians used *chunking* to perceive more than one note at a time. Goolsby referred to this chunking as the perceptual span. Similar to how language readers perceive the space between words to group letters into words, the music reader uses the space between notes and the relationship between notes to interpret their meaning. Goolsby found that skilled music readers do not look at every note and rest in order to perform the music accurately, but that less-skilled music readers do.

Gaynor (1995) examined the effects of teaching chunking exercises and melodic predicting on flute students' sight-reading performance. The researcher created chunking exercises that involved memory recall and eye movement. Additionally, the researcher created melodic predicting exercises that involved phrasing, tonality, melodic contour, melodic and rhythmic patterning, and modulation, in which students performed melodies and supplied the missing notes that the researcher removed. Gaynor found that although chunking exercises did not correlate to improvement in sight-reading performance, melodic predicting correlated to improvement in sight-reading performance. Gaynor's findings appear to contradict those of Goolsby; however, Gaynor did not consider that melodic predicting, as set up in the researcher's study, could be a form of chunking. Chunking, as defined by both researchers, involved perceiving more than one note at a time, so when Gaynor created melodic predicting by removing notes, the researcher may have unintentionally created chunks inherent in the examples. Further research in the area of chunking would help to clarify the results of both studies; however, the identification of chunking can guide teachers in creating instructional methods for sight-reading.

Penttinen and Huovinen (2011) studied eye movements and fixations to examine the effects of music reading instruction that included basic music theory concepts (e.g., meter, intervals, scales, triads) on beginning music readers' performance on piano. The researchers found that the novice readers' eye movements fixated on larger melodic interval skips more than on stepwise passages, and the participants reflected this in their performance of the music. After nine months of instruction, these fixations decreased, and performance improved, suggesting that repeated practice of sight-reading improved overall performance.

Several researchers have found that the ability to read and comprehend rhythms is the best predictor of sight-reading skill (Boyle, 1970; Elliott, 1982; Gromko, 2004; Henry, 2011). In addition, Boyle (1970) found that combining kinesthetic responses, such as foot tapping while reading rhythmic notation, led to improvements in sight-reading skill level. Grutzmacher (1987) investigated the effect of tonal pattern instruction using harmonization and vocalization on beginning wind instrumentalists performance achievement. The researcher found that students who received the instruction improved their melodic sight-reading skills. Grutzmacher recommended that teachers should guide students in developing tonal skills by using sequential learning activities that employ tonal and harmonic patterns, as well as vocalization. Kopiez and Lee (2008) examined the skills involved in sight-reading with 52 undergraduate and graduate piano majors. They found that the best predictor for sight-reading achievement was the number of accumulated hours of sight-reading practice up to the age of 15. They suggested that not only is it important to provide sight-reading experiences for students, but teachers should do so before the age of 15.

McPherson (1994) examined factors and abilities that influence sight-reading skill in music. The researcher used the Australian Music Examinations Board performance examinations to determine musical skill level of the subjects and then administered the Watkins-Farnum Performance Scale (Watkins & Farnum, 1962) to determine sight-reading level. McPherson found that there was no direct correlation between early level musicians' sight-reading ability and performance achievement, but the researcher found a correlation as students' ability level increased. The researcher also found that length of instrumental study and players' sight-reading ability most heavily influenced the skill of performing rehearsed music in more experienced players. McPherson concluded that since performance and sight-reading do not correlate in the early stages of music learning, they require separate instruction. In a review of the literature on sight-reading ability, Galyen (2005) suggested that ensemble directors should provide sight-reading instruction and experiences at the beginning levels of band instruction to complement performance skills.

In a review of music reading research, Gudmundsdottir (2010) reported that instruction of musical structure is more effective than emphasis on pitch identification. The author concluded that teachers who use methods focused on individual pitches, such as those that use color-coding of pitches, rather than structure, might not find success in building music-reading skills. In addition, Gudmundsdottir found that young piano students focus on pitch information at the expense of rhythmic information when music reading.

In a study designed to examine predictors of music sight-reading ability, Hayward and Gromko (2009) tested college wind instrumentalists on tasks involving aural, visual, spatial, and kinesthetic skills. The researchers found that they could predict the accuracy of music sight-reading by a combination of aural pattern discrimination, spatial-temporal reasoning, and technical proficiency. More importantly, they found that aural discrimination and spatial-temporal reasoning loaded together on one factor separate from technical proficiency in a subsequent factor analysis. The researchers concluded that sight-reading involves both reading and playing, and that these are separate skills requiring instruction. They suggested that music educators should assist students in developing these skills through activities that include singing tonal patterns to provide a context for pitches, and clapping rhythm patterns to provide context for rhythms. In addition, Hayward and Gromko suggested that educators should encourage students to play by ear, to memorize rehearsed music, and to improvise over harmonic progressions to develop the ear, eye, and hand coordination necessary to read with speed and accuracy.

In a meta-analysis of sight-reading research literature, Mishra (2014) found 92 studies where researchers reported correlations between sight-reading and another variable. The author found that studies involving music aptitude and sight-reading will unlikely yield further knowledge because researchers have extensively investigated this relationship. Additionally, Mishra found little or no correlation between sight-reading and studies involving attitude, perception, early exposure to music, and personality, implying research into these correlations could be unproductive. Mishra concluded that sight-reading may be developmental and that correlations with various constructs may change with age and experience. The author recommended that future research should focus on testing the theory that sight-reading is a teachable activity by using treatment methods that use a sight-reading method and instruction in sight-reading. Mishra further suggested that research investigating the theory that sight-reading skill increases with the performer's musical understanding would be beneficial. It is important to note that the 92 studies in the meta-analysis range in date from 1925 to 2009 with only seven studies published after 2005, and of those only four researchers investigated factors involved in instrumental sight-reading.

Purpose and Problems

Research in the area of assessment is necessary to support music educators in teacher evaluations. As stated in the National Association for Music Education (NAfME) Teacher Evaluation Position Statement, "Measures of student achievement used in teacher evaluation must be based on student achievement that is directly attributable to the individual teacher, in the subject area taught by that teacher" (NAfME, 2015). Music teachers, therefore, need to create subject-appropriate assessment that can yield demonstrable data to avoid being evaluated based on school-wide performance assessments such as graduation rates and standardized test scores. It is the responsibility of the music educator to assess student performance, collect and record data, and present the data to administrators and parents to demonstrate growth in student learning. The current study serves as an example of engaged scholarship (Boyer, 1996) that can assist the practicing teacher in creating such assessments.

Previously, researchers investigated the skills involved in sight-reading and concluded that these skills are separate from performance skills and require instruction (Grutzmacher, 1987; Kopiez & Lee, 2008; Lehmann & McArthur, 2002; McPherson, 1994; Penttinen & Huovinen, 2011). In particular, researchers found that instruction that focuses on musical structure rather than individual pitch recognition is the most beneficial (Goolsby, 1994; Gudmundsdottir, 2010; Sloboda, 1984). Sight-reading methods are available to educators, but I found no current literature examining the effectiveness of instructional methods on sight-reading improvement. In addition, it has been two decades since researchers examined possible relationships between sight-reading performance and musical performance. Therefore, the purpose of this study was to determine if instruction in sight-reading during band rehearsals would result in improvements in both sight-reading and music performance. More specifically, the research questions were:

1. Does instruction in sight-reading improve sight-reading performance?
2. Does instruction in sight-reading improve music performance?

Method

Participants

I conducted the study at a small suburban high school in the northeastern part of the United States. From a school population of 310, 20% of the students are in the concert band, with 10% of those taking it for honors credit. The school requires honors students to take private lessons and do extra assignments and performances. The band, which plays Grade Three literature, competed at various festivals in-state and out-of-state and consistently received

Excellent or Superior ratings, earning first place ratings in their division numerous times. Each year, the regional band accepts approximately five students from this program, with one or two moving forward to all-state band. The program attracts the top academic scholars in the school and often includes the valedictorian and salutatorian of the graduating class. Band members are often members of the choir as well, and members include student council leaders, honor society members, and sports team captains in the school.

The concert band and jazz ensemble are well-respected in the school and the town, and often perform for community events. When the director arrived, there was only concert band, honors concert band, and concert choir offered at the school. Under the band director's leadership, the program now boasts Concert Band, Honors Concert Band, Concert Choir, Jazz Ensemble (extra-curricular), Honors Concert Choir, AP Music Theory, College Prep Music Theory, Music Technology I, Music Technology II, and Guitar Performance. There is no marching band or orchestra.

From the concert band, I selected brass and woodwind players ($N = 31$) to participate in the study. In addition to the reputation of the ensemble and its director, I selected this school because the concert band met in two separate class periods. Because of this schedule, I could create the treatment group ($n = 16$) in one class, and the control group ($n = 15$) in the other class. The mean grade level for each group was $M = 11.4$ for the treatment group members, and $M = 10.7$ for the control group members. I chose the participants for each group based on which students wanted to participate. To ensure that all participants received the benefits of the treatment (Creswell, 2014), the students in the control group received the treatment at the conclusion of the study. Participation in this study was voluntary so there were students in both classes who received the instruction but were not part of the study.

Instrument

I used the Watkins-Farnum Performance Scale (WFPS) Form A (Watkins & Farnum, 1970) as a pretest and posttest measure of instrumental sight-reading performance. This standardized scale is a series of 14 progressively difficult exercises for wind instruments. It has a reliability coefficient of $r = .94$ for students in grades seven through twelve, and validity determined through rank-order correlations between teacher ratings and the WFPS ranging from $r = .69$ to $r = .90$ for each instrument group, with the majority above $r = .80$ (Watkins & Farnum, 1962). It is important to acknowledge here that Watkins and Farnum developed the WFPS over 50 years ago. In spite of extensive searching, it appears that the WFPS is the only standardized test in instrumental music performance (Russell, 2014). Boyle and Radocy (1987) made a similar observation, as well as Colwell and Hewitt (2011) who cautioned that there is only one test available:

> Surprisingly, performance skill, which receives much teaching emphasis, has had little attention from test makers. It is an on-demand task in teacher-constructed assessments. Only one performance test is in print, the *Watkins-Farnum Performance Scale*, which is available for wind, string, and percussion instruments. (p. 34)

There are technologies such as Smart Music™ software, to record and analyze student performance. To best meet the objectives of this study, I chose the Modified Woodwind Brass Solo Evaluation Form (MWBSEF) as a pretest and posttest measure for both woodwind and brass players to assess performance. The MWBSEF is a solo performance assessment designed by Vickers (2012) and adapted from Saunders and Holahan (1997) Woodwind Brass Solo Evaluation Form (WBSEF). The WBSEF is a 10-point, criteria-specific rating scale that evaluators use to examine seven subareas including tone, intonation, technique/articulation, melodic accuracy, rhythmic accuracy, tempo, and interpretation. Saunders and Holahan reported a high internal reliability with a median alpha reliability of .92. In the MWBSEF, Vickers reduced the subareas from seven to five, simplified the wording, and reduced the grading criteria from 10 to five to make it easier for band directors to use for evaluations and for students to use for self-evaluation. Vickers reported a median alpha internal reliability of .92 across all subareas. Though they participated in the sight-reading instruction, I decided not to include the percussion players in this study. To include them, I would have had to modify the Vickers assessment. In addition, the piece chosen for the performance assessment had minimal percussion and the sight-reading and performance requirements for them were not as challenging as for the other instrumentalists. In addition, since I audio-recorded the performance of the participants for later evaluation by raters, it was not possible to visually evaluate drum technique.

Procedure

For both the pretest and the posttest I collected the data by digitally recording each wind instrument participant playing both the WFPS and a section of *Havendance* (Holsinger, 1985) in a separate room from the band rehearsal. This was necessary to assess the level of performance prior to instruction in sight-reading. Individually, participants left the band rehearsal to perform the assessments and then returned to the rehearsal. The band director and I chose *Havendance* because it was a piece that the director rehearsed in class and taught to the participants using strategies that did not include sight-reading. Consistent with the procedure Hewitt (2005) used, I chose the sections for the performance assessment that included a variety of dynamics, meter, phrasing, articulation, and technique specific to each instrument so that the raters could assess these aspects on the MWBSEF. I used the following sections, indicated by measure number, for the assessment: flute, m. 89-106; oboe, m. 55-64; clarinet, m. 23-38, alto saxophone/tenor saxophone/French horn, m. 1-23; trumpet/trombone, m. 170-181; euphonium, m. 150-158; baritone saxophone/tuba, m. 97-106. Afterwards, I read the printed script for the WFPS and started the metronome as indicated in the administration instructions. The participants played the WFPS exercises until they scored a zero in two consecutive exercises, as indicated in the instructions, and then I stopped them.

After I collected the pretest data, the band director began instruction of sight-reading with the treatment group using *The Sight-Reading Book for Band, Volume 4* (West, 2012). I chose *The Sight-Reading Book for Band, Volume 4* (West, 2012), for use in this study because it was accessible from the publisher, had been approved in the school budget prior to instruction, and is simply a series of progressive sight-reading exercises without directions for instructions. This allowed the director and me to create our own list of strategies for instruction based on prior research. Although previous researchers suggested adding a kinesthetic component such as foot tapping while sight-reading (Boyle, 1970; Elliot, 1982; Hayward & Gromko, 2009), or practice with melodic patterns and vocalizations before sight-reading (Grutzmacher, 1987; Hayward & Gromko, 2009), I was concerned with adding too many variables to our strategies for instruction. Therefore, I focused on the larger formal components of meter, key, tempo, style, dynamics, and articulation in the sight-reading instructional strategies that was consistent with previous researchers (Goolsby, 1994; Gudmundsdottir, 2010; Penttinen and Huovenin, 2011; Sloboda, 1984). In future research I would add foot tapping and vocalizations to the instructional strategies in the hopes of improving student outcomes and creating a more effective instructional tool.

The director instructed the students in sight-reading for five minutes at the beginning of each band rehearsal for a period of 20 consecutive rehearsals. Following the suggestions of previous researchers (McPherson, 1994; Gaynor, 1995; Lehmann & McArthur, 2002), the director and I created a checklist of strategies for the participants to follow before each sight-reading exercise (see Figure 1).

Figure 1: *Checklist of Strategies for Sight-Reading*

1. Key Signature: Look for starting key signature and scan for changes.

2. Meter/Time: How many beats are in each measure? Does this change in the excerpt?

3. Repeats: Are there any repeated sections?

4. Tempo: How fast are you supposed to play?

5. Style: Look for words that tell you in what style to play.

6. Dynamic: Look for contrasts in dynamics.

7. Articulations: Look for contrasts in how the notes are to be started.

8. Tricky areas: Look for accidentals or unfamiliar rhythms.

Since *The Sight-Reading Book for Band, Volume 4* is a series of progressive sight-reading exercises, the director began instruction using the researcher-created Strategies for Sight-Reading with exercise number one and continued sequentially through the book for 20 rehearsals, reaching exercise number 58. Following the five minutes of sight-reading instruction, the band director spent the remaining 40 minutes of each class period rehearsing the band repertoire, and the last five minutes on announcements and clean up. After completion of the 20 rehearsals, I re-tested the players using the Vickers test instrument and coded the posttest data.

After data collection, and to ensure inter-rater reliability, I instructed two raters, who were experienced music educators, in the use of the WFPS and the MWBSEF. The two raters and I listened to each recorded sample and completed the corresponding assessments to create the raw data. The raters evaluated the pretest data at the beginning of the sight-reading instruction period, and the posttest data five weeks later.

Findings

To prepare to answer the first research question of the impact of sight-reading instruction on sight-reading performance of high school band students (*N* = 31), I established the mean gain scores (MGS) from the raters' analyses of the pretest and posttest recordings of the student performances on the Watkins-Farnum Performance Scale (WFPS). I reduced the number of participants to 30 for the analysis because one of the participants did not complete the posttest assessment. While there was modest improvement in the sight-reading scores of the participants in both groups, the control group members (*M* = 4.79, *SD* = 12.65, *n* = 14) scored higher than the treatment group members (*M* = 2.17, *SD* = 19.32, *n* = 16). To prepare to answer the second research question of the impact of sight-reading instruction on performance achievement, I established the mean gain scores from the raters' analyses of the pretest and posttest recordings of the student performances on the Modified Woodwind Brass Solo Evaluation Form (MWBSEF). The performance of the participants in the treatment group declined, while the performance of the control group members improved: treatment (*M* = -3.65, *SD* = 8.37, *n* = 16), control (*M* = 10.10, *SD* = 15.40, *n* = 14).

To answer the research questions, I conducted a Multivariate Analysis of Variance (MANOVA) using treatment and control groups as the independent variables, and the mean gain scores on the WFPS and the MWBSEF assessments as the dependent variables. I conducted Pearson correlations between the three raters to determine inter-rater reliability and found high correlations between all three raters on both test measures, with a mean correlation of *r* = .96 for WFPS, and *r* = .84 for MWBSEF (See Table 1).

Table 1: *Correlations between raters on each assessment measure*

Measure	Rater 1/Rater 2	Rater 2/Rater 3	Rater 1/Rater3
Pretest Watkins-Farnum	0.98	0.98	0.98
Posttest Watkins-Farnum	0.94	0.94	0.95
Pretest MWBSEF	0.83	0.91	0.90
Posttest MWBSEF	0.75	0.82	0.81

I established the equality of covariance matrices using the Box M test (Box M = 8.36, p = .052). I found significance in the omnibus test (Λ = .738, F = 4.789, p = .017), so I conducted univariate tests to determine which mean differences were significant. In these follow-up tests, I established the assumption of equal variance between the mean gain scores of each dependent variable using the Levene Test (WFPS, F = 1.26, df = 1, p = .27; MWBSEF, F = 3.33, df = 1, p = .08). I found statistical significance for the mean gain scores on the MWBSEF (F = 9.55, df = 1, p = .004) although I found a relatively weak effect size (η^2 = .25).

To further understand the significance of the MWBSEF scores, I conducted an additional MANOVA using grade level as the independent variable. I established the equality of covariance matrices using the Box M test (Box M = 10.22, p = .563). I found significance in the omnibus test (Λ = .507, F = 3.367, p = .007), so I conducted univariate tests to determine the between-subjects effects. I established the assumption of equal variance between the mean gain score of each dependent variable using the Levene Test (WFPS, F = .83, df = 3, p = .49; MWBSEF, F = .91, df = 3, p = .45). I found statistical significance in the between subjects effects for MWBSEF and grade level (F = 7.38, df = 3, p < .001) and a moderate effect size (η^2 = .46). I conducted Scheffe Post Hoc tests to determine at which grade level I could find the statistical significance. I found significance in the multiple comparisons of the ninth-grade students' MWBSEF scores with every other grade level (See Table 2).

Table 2: *Multiple comparisons by grade and MWBSEF mean gain scores (MGSPerformance)*

Dependent Variable	Grade	Grade	Mean Difference	Std. Error	Sig.
MGSPerformance	9	10	28.8667	7.83855	0.011
		11	26.0333	6.11897	0.003
		12	21.2952	5.59196	0.008

I examined the descriptive statistics of the analyses of the mean gain scores of the between-subjects factors and found the ninth-grade students' (M = 22.53, SD = 15.78, n = 5) improvement in performance was significantly higher than tenth-grade students' (M = -6.34, SD = 8.50, n = 3), eleventh-grade students' (M = -3.50, SD = 8.67, n = 8), and twelfth-grade students' (M = 1.24, SD = 10.11, n = 14).

Discussion

The purpose of this study was to determine if instruction in sight-reading during band rehearsals would result in improvements in both sight-reading and music performance. While there were modest gains in the sight-reading scores of both the treatment and the control group members, the participants in the control group made greater gains, and neither group members' scores were statistically significant. Factors that I can attribute to this finding are the small sample size, relatively large variability, and the relatively short amount of time for sight-reading instruction. Although the sample size was small, most researchers agree that a sample of at least 30 has the potential to yield a normal distribution (Creswell, 2014). In Penttinen and Huovinen (2011), participants received sight-reading instruction over a period of nine months. The time allocated to the sight-reading instruction in the current study was five minutes of the 50-minute band rehearsal, for 20 consecutive rehearsals, resulting in a total of 100 minutes of instruction. Future researchers should investigate longer instruction time during rehearsal or more days of instruction before assessment, e.g. 9 weeks, or the length of an academic quarter. Additionally, researchers might investigate if there would be a change in results if the band director gave the sight-reading instruction at the end of the rehearsal, rather than at the beginning. This rehearsal structure would allow the director to reinforce performance skills immediately before asking students to apply the concepts. The slight improvement in scores for all participants in the present study could be due to maturation, testing effect, and mortality (one student could not complete the study) (Creswell, 2014).

In investigating the second research question of the impact of sight-reading instruction on music performance, I found the performance of the treatment group members declined, while the performance of the control group members improved. In closer examination of these statistically significant results, I found the control group members included students in grades nine through twelve, but the treatment group members included only students in grades ten, eleven, and twelve. This led me to investigate the mean gain scores by grade level. In this analysis, I found the ninth-grade students made the greatest gains, but they did not receive the treatment. McPherson (1994) found that sight-reading performance and music performance improved with grade level and years of experience playing the instrument, and found the greatest correlation between these variables occurred in players with less experience. To explain this confounding variable of the ninth-grade students' improvement in performance, I considered that ninth-grade students are new to the high school environment and have the greatest room for growth. This interpretation is consistent with Hewitt (2005) who studied the performance of middle school-aged students and high school-aged students using the WBSEF, and found more variance in scores in the younger grades than in older. Hewitt concluded, "Perhaps instrumentalists make more noticeable progress between grade levels in the younger years than in older, providing for the greater variation in scores," (p. 159). In addition, I conducted the pretest assessments at the end of September when ninth-grade students were still getting used to a new school, with new teachers, and a new band director. I conducted the posttest assessments at the beginning of November when ninth-grade students were more accustomed to the high school environment.

The music selection the director and I chose for the performance assessment may be a contributing factor to explain the decline in the treatment group members' performance scores. *Havendance* (Holsinger, 1985) contains meter changes, and complex rhythms that students learned to play as an ensemble. Previous researchers (Boyle, 1970; Elliot, 1982; McPherson, 1994) found that participants received lower scores on rhythmic exercises than any other variable. Additionally, I observed that the greatest number of errors in the WFPS assessment occurred in rhythm. Perhaps playing excerpts that contain complex rhythmic passages for solo evaluation, without the assistance of the ensemble, created a confounding variable. Similar to the findings in the WFPS, I found the greatest number of errors in the MWBSEF assessment in areas related to rhythm. Choosing an excerpt from the band literature is consistent with Hewitt (2005), however, researchers should consider choosing excerpts from band literature that require less rhythmic independence when playing for a solo evaluation. This interpretation, however, does not explain the decline in the group members' performance scores because the participants performed the same excerpt for the pretest and the posttest assessments. I collected the pretest data three weeks before the participants' band concert when the director worked on the selection of music daily with the students. I collected the posttest data two weeks after the concert when the director was no longer rehearsing *Havendance.* The participants reviewed the performance excerpts individually before I recorded them for the posttest data collection, but they did not rehearse as an ensemble. It is possible that performing the excerpts without the reinforcement of the context of the ensemble, created an additional confounding variable. For future research, I would choose a selection for the posttest performance evaluation from the students' daily rehearsal literature. Additionally, I would consider examining performance within grade levels rather than across grade levels, because this was the area where the participants showed the most difference between factors.

In using the WFPS, I believe there may be a limitation that could have implications for future research. The scoring directions on the WFPS are quite strict. Evaluators must mark a measure as incorrect with a score of one regardless of the number of errors in the measure. When the student completes the exercise, the evaluator adds up the number of incorrect measures and subtracts it from the standard for that exercise. The problem with this scoring is that if a student makes the same error repeatedly, the evaluator must continue to mark the error in each subsequent measure. I found that in the subarea of articulation, if a student neglected to tongue the notes throughout the selection, the student would receive a score of zero for the exercise. This did not give an accurate evaluation of the students' ability to read pitches or rhythms because the same error of articulation superseded all other aspects of the assessment. Hewitt (2005) found similar results regarding articulation and performance assessment, and concluded that perhaps students focused on this area least because pitch and rhythm require more attention in performance. In the present study, I believe that the scoring of the WFPS is the primary reason for the decline in sight-reading scores in the treatment group. During the posttest data collection I observed that the students in the treatment group took the allotted 30 seconds between each example in the WFPS to finger through the example and visually scan the music. The students did not do this during the pretest data collection before receiving the instruction. Although it would appear that the students would have scored higher as a result of this preparation before playing, by neglecting to observe the articulation markings, regardless of improvements in pitch, rhythm, style, and dynamics accuracy, the students' scores declined.

Perhaps there is a need for a different means of assessing sight-reading. To date, the WFPS is the only standardized test in instrumental music performance (Russell, 2014). Boyle and Radocy (1987) made a similar observation, as well as Colwell and Hewitt (2011) who cautioned that there is only one test available:

> Surprisingly, performance skill, which receives much teaching emphasis, has had little attention from test makers. It is an on-demand task in teacher-constructed assessments. Only one performance test is in print, the *Watkins-Farnum Performance Scale*, which is available for wind, string, and percussion instruments. (p. 34)

Watkins and Farnum (1962) created the WFPS over 50 years ago by examining method books of the time and incorporating aspects of each method book into the assessment tool. Method books have evolved to contain portions for aural instruction and playing by ear. In addition, the learning preferences of millennial learners are different from those students a half-century ago (Sickler, 2009) and teaching strategies and assessments should connect to those preferences. One of the criticisms of the WFPS is that it can be time consuming to administer and difficult to score (Russell, 2014). Additionally, band directors who would like to assess sight-reading might consider using sight-reading examples from a progressive sight-reading instruction method, one that includes elements of technology and materials for home practice, using a director-created rubric for assessment. Although this would not be a standardized assessment that researchers could generalize to other schools, band directors could use the information in their own school for practical application in the ensemble classroom for creating student learning outcomes and indicators of growth and development.

Finally, I must acknowledge that a student's ability to sight-read may not correlate to that same student's ability to perform repertoire musically. I suggest this because the ninth graders demonstrated the most improvement but were not part of the treatment group. Instead, sight-reading ability may be more closely related to the speed at which a student might learn the repertoire. Students with poor sight-reading ability may take longer to master the performance challenges of a particular piece of band literature, yet in the end may perform equally well or even better that a student who sight-reads well. Another variable, not considered in this study, was the assumption that the only sight-reading the students did was in the band rehearsal. It is entirely possible, and even likely, that those students taking private applied lessons may be experiencing sight-reading opportunities in that instruction. Others may also play piano and work on sight-reading at those lessons, and still others could be in various music theory programs and that instruction might impact sight-reading in a positive way. In addition, it is clear from this study that 5 minutes of a band rehearsal is insufficient time to teach sight-reading and that the strategies selected to teach sight-reading may require further study to ensure that they were the best and most efficient given the constraints of the 5 minute time frame. A true commitment to improving student sight-reading may require more significant time and the inclusion of sight-reading assignments between rehearsals as part of home practice.

References

Boyer, E. (1996). The scholarship of engagement. *Journal of Public Service and Outreach 1*(1), 11–20.

Boyle, J. D. (1970). The effect of prescribed rhythmical movements on the ability to read music at sight. *Journal of Research in Music Education, 18*(4), 307-318. doi:10.2307/3344498

Boyle, J.D. & Radocy, R. E. (1987). *Measurement and Evaluation of Musical Experiences*. New York: Schrimer Books.

Colwell, R. J. & Hewitt, M. P. (2011). *The Teaching of Instrumental Music*, 4th ed. Boston: Prentice Hall.

Creswell, J. W. (2014). *Research Design.* Washington, D.C.: Sage Publications.

Duke, R. (2013). *Intelligent Music Teaching: Essays on the core principles of effective instruction.* Austin, TX: Learning and Behavior Resources.

Elliott, C. A. (1982). The relationships among instrumental sight-reading ability and seven selected predictor variables. *Journal of Research in Music Education, 30*(1), 5 – 14. doi:10.2307/3344862

Galyen, S. D. (2005). Sight-Reading Ability in Wind and Percussion Students: A Review of Recent Literature. *UPDATE: Applications of Research in Music Education, 24*(1), 57–70. doi:10.1177/87551233050240010107

Gaynor, J. (1995). Music reading comprehension : The effect of aid to chunking and melodic predicting on sight-reading performance achievement of secondary school instrumental music students (Doctoral dissertation, University of San Francisco, 1995). Dissertation Abstracts International, 56, 4693.

Goolsby, T. (1994). Profiles of processing: Eye movements during sightreading. *Music Perception*, *12*, 97–123. Retrieved from http://www.jstor.org/stable/40285757

Gromko, J. (2004). Predictors of music sight-reading ability in high school wind players. *Journal of Research in Music Education,52*(1), 6-15. doi:10.2307/3345521

Grutzmacher, P. A. (1987). The effect of tonal pattern training on the aural perception, reading recognition, and melodic sight-reading achievement of first-year instrumental music students. *Journal of Research in Music Education, 35*(3), 171 – 181. doi:10.2307/3344959

Gudmundsdottir, H. R. (2010). Advances in music-reading research. *Music Education Research, 12*(4), 331–338. doi:10.1080/14613808.2010.504809

Hayward, C. M., & Eastlund Gromko, J. (2009). Relationships among music sight-reading and technical proficiency, spatial visualization, and aural discrimination. *Journal of Research in Music Education, 57*(1), 26–36. doi:10.1177/0022429409332677

Henry, M. L. (2011). *The effect of pitch and rhythm difficulty on vocal sight-reading performance. Journal of Research in Music Education, 59*(2), 72–84. doi:10.1177/0022429410397199

Hewitt, M. P. (2005). Self-evaluation accuracy among high school and middle school instrumentalists. *Journal of Research in Music Education*, *53*(2), 148–161. doi:10.1177/002242940505300205

Hodges, D. A., & Nokler, D. B. (2011). The acquisition of music reading skills. In R. Colwell & P. Webster (Eds.), *Handbook of research on music learning* (Vol. 2., pp. 61–91). New York: Oxford University Press.

Holsinger, D. R. (1985). *Havendance.* Ruidoso, NM: TRN Music Publisher.

Kopiez, R., & Lee, J. (2008). Towards a general model of skills involved in sight reading music. *Music Education Research, 10*(1), 41–62. doi:10.1080/14613800701871363

Lehmann, A. C., & McArthur, V. (2002). Sight-reading. In R. Parncutt & G. McPherson (Eds.), *The science and psychology of music performance: Creative strategies for teaching and learning* (pp. 135–150). New York: Oxford University Press.

McPherson, G. E. (1994). Factors and abilities influencing sightreading skill in music. *Journal of Research in Music Education, 42*(3), 217–231. doi:10.2307/3345701

McPherson, G., & Gabrielsson, A. (2002). From sound to sign. In R. Parncutt & G. McPherson (Eds.), *The science and psychology of music performance: Creative strategies for teaching and learning* (pp. 95 – 118). New York: Oxford University Press.

Mishra, J. (2014). Factors Related to Sight-Reading Accuracy: A Meta-Analysis. Journal of Research in Music Education, 61(4), 452–465. doi:10.1177/0022429413508585

National Association for Music Education. (2015). *Teacher evaluation position statement*. Retrieved from http://musiced.nafme.org/about/position-statements/teacher-evaluation/

Penttinen, M., & Huovinen, E. (2011). The early development of sight-reading skills in adulthood: A study of eye movements. *Journal of Research in Music Education, 59*(2), 196–220. doi:10.1177/0022429411405339

Russell, J. A. (2014). Assessment in instrumental music. In *Oxford Handbooks Online*. doi: 10.1093/oxfordhb/9780199935321.013.100

Saunders, T. C., & Holahan, J. M. (1997). Criteria-specific rating scales in the evaluation of high school instrumental performance. *Journal of Research in Music Education*, *45*(2), 259–272. doi:10.2307/3345585

Sickler, S. M. (2009). Millennial student learning preferences: An analysis of two interior design class case studies. Retrieved from http://diginole.lib.fsu.edu/etd/1740

Sloboda, J. A. (1974), The eye-hand span: An approach to the study of sight reading. *Psychology of Music, 2*(2)*,* 4 – 10. doi: 10.1177/030573567422001

Sloboda, J. A. (1977), Phrase units as determinants of visual processing in music reading. *British Journal of Psychology, 68*(1)*,* 117 – 124. doi: 10.1111/j.2044-8295.1977.tb01566.x

Sloboda, J. A. (1984) Experimental Studies of Music Reading : A Review. *Music Perception, 2*(2), 222–236. doi:10.1007/BF01067255

Vickers, M. (2012). *The effect of self-assessment training on high school instrumental students' self-assessment accuracy*. Manuscript submitted for publication.

Watkins, J. G., & Farnum, S. E. (1962). *The Watkins-Farnum performance scale.* Milwaukee, WI: Hal Leonard.

Watkins, J. G. & Farnum, S. E. (1970). *Watkins-Farnum performance scale: Form A for all band instruments.* Milwaukee, WI: Hal Leonard.

West, J. (2012). *The sight-reading book for band, vol. 4.* Paoli, PA: Wingert-Jones Publications.

Jacqueline Smith (jacksmith@hartford.edu) is a Ph.D. student at the University of Hartford's Hartt School where she is a teaching fellow in music education supervising student teachers, assisting in undergraduate instrumental methods courses, and teaching woodwind methods. Her research interests include assessment in music education, preservice teacher preparation, and teaching music to children with special needs. She taught middle school instrumental music for 20 years in Connecticut before beginning her Ph.D., and she teaches piano in the Hartt School Community Division. Ms. Smith holds a master of arts in music therapy from Drexel University and a bachelor of music in music education from the Eastman School of Music.