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Effects of a Preparatory Singing Pattern on Melodic Dictation Success

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Abstract

The purpose of this study was to investigate effects of a preparatory contextual singing pattern on melodic dictation test scores. Forty-nine undergraduate music education majors took melodic dictations under three conditions. After hearing an orienting chord sequence, they (1) sang a preparatory solfége pattern in the key, meter, and tempo of the target dictations in the first condition; (2) prepared themselves silently during an equivalent time interval in the second condition; and (3) took the dictations immediately in the third condition. A repeated measures ANOVA and post hoc analysis revealed that participants scored significantly higher when they heard the dictation immediately following the chord sequence than when they sang the preparatory pattern first. Participants may have been distracted by the additional task of singing, interfering with their focus on the ensuing dictation. They reported a variety of preparatory strategies during the silent interval condition, suggesting that dictation students may benefit from learning multiple strategies and choosing what works best for them. Future research might investigate the relationship between strategies used during dictation and strategies used just prior to dictation. Implications for music educators include the need for careful decisions regarding when and how to combine musical tasks for student learning.

Keywords

aural skills, melodic dictation, solfége

Melodic dictation is a widely accepted method of assessing the aural skills of music students in high schools and colleges (College Board, 2012a; National Association of

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Schools of Music, 2012). Dictation tests typically focus on accurate perception of pitches and rhythms, demonstrated through standard music notation on the staff. Successful dictation requires coordination of multiple skills, including inner hearing, melodic memory, and transfer from aural comprehension to accurate notation (Foulkes-Levy, 1997). Limited repetitions and limited time in which to process and notate target melodies require dictation students to work efficiently (Karpinski, 2000).

Students may employ any of a broad range of strategies when taking dictation (Karpinski, 2000), including "chunking" of information for efficient memory storage and retrieval (Madsen & Staum, 1983; Oura, 1991; Potter, 1990; Rogers, 2004), applying contextual solfége syllables or numbers to percepts for identification (McClung, 2001), engaging kinesthetic or visual imagery to decode pitch information (Mikumo, 1994; Thompson, 2004), attending to broad melodic characteristics to reinforce context for the target melody (Buonviri, 2014), and employing flexible working memory to analyze the melody both forward and backward in chronological sequence (Berz, 1995; Margulis, 2005). Some instructors teach these strategies to boost students' learning and to assist them in dictation tests (Karpinski, 2000; Paney & Buonviri, 2013).

Research has demonstrated important similarities among underlying skills required for dictation, sight-singing, and error detection (Byo, 1997; Killian, 1991; Larson, 1977; Norris, 2003; Sheldon, 1998). Greater understanding of these skills and their relationships may have implications for both music students and teachers in a variety of applications, including performance (Duke & Simmons, 2006; Morrison, Treviño, & Sielert, 2008), critical listening (Cassidy, 2001; Gromko & Russell, 2002), composition (Younker & Smith, 1996), and conducting (Sheldon, 1998).

Paney and Buonviri (2013) found that many aural skills teachers strive to maintain parallel progress between dictation and singing materials in curriculum development and practice. One of the primary objectives of singing in aural skills course work is to help students develop internal context for musical elements such as pitch and rhythm, typically through syllable, number, or letter systems (Karpinski, 2000). Aural skills students practice singing aloud what they hear internally or what they read from notation. This skill may reciprocally reinforce dictation ability as students reverse the process: They attempt to turn what they have physically heard in dictation into internal understanding and written notation.

Some instructors encourage students to use their singing voices as an intermediate step during dictation practice. Pembrook (1987) warned, however, that this approach may be counterproductive because most students cannot sing back a full melody correctly. In his study, participants' singing actually hindered their accuracy. Attempting to sing the entire melody before notating it may have confused their memory of it.

Although caution should be exercised in teaching singing as a melodic memory tool, it may be useful to orient dictation students to important parameters of the task at hand, such as key and meter. Research suggests that pitch and rhythm processing are dissociated neurological functions (Hodges & Nolker, 2011). However, students must integrate these two elements to succeed at dictation. Their final product demonstrates an ability to recognize how pitch and rhythm contexts coincide through a specific example, the dictation melody. The singing voice may be useful for preparing and reinforcing this integration of contexts (Schellenberg & Moore, 1985).

During dictation, chunking strategies for melodic memory may be improved when understood in context, as Deutsch (1977) described:

> The differences between attempting to recall a musical sequence in a familiar tonal system as compared with a set of notes chosen at random, is equivalent to the difference between trying to recall a sentence as compared with a set of nonsense syllables. (p. 114)

Chunking may increase students' melodic memory during dictation and can improve their musical comprehension if they clearly attend to the contexts in which the melody sounds (Klonoski, 2006; Rogers, 2004).

The moments just prior to, or intervening between, singing tasks appear to influence auditory processing. Demorest and Clements (2007), for example, found that providing a tonal context may improve performance on pitch-matching tasks. Yarbrough, Orman, and Neill (2007) found that a tonal context, established through movable-*do* fluency, improved choral sight-singing. Students' readiness to perceive a melody accurately and convert it to notation may benefit from establishing a similar tonal context through singing.

In practice, some aural skills instructors teach orienting patterns and warm-ups to establish key, meter, pitch, and rhythm contexts before singing or dictation tasks begin (Henry, 2008), while others insist that students maintain silence just prior to dictation. Some instructors may also try to eliminate any distractions, internal or external, by setting up metric and tonal contexts through, for example, the piano and moving immediately to the dictation melody as one musical gesture. Systematic investigation of effects of these approaches on students' dictation performance is missing in the literature.

Formal investigation of these approaches could reveal important information not only about performing well on dictation tasks but also about how the mind processes aural percepts in light of prior preparation in general. Accurate perception of aural stimuli depends at least partially on the relationship between mental focus and distractions, both internal and external (Abril & Flowers, 2007; Flowers, 2001; Flowers & O'Neill, 2005; Madsen & Geringer, 2000). Mental engagement just prior to aural skills tasks must be taken into account when considering relative levels of success on those tasks. The purpose of this study was to investigate effects of a preparatory contextual singing pattern on melodic dictation scores of undergraduate music majors. The primary research question was this: Does singing a solfége pattern in the key, meter, and tempo of a dictation melody, just prior to hearing that melody, improve dictation scores?

Methodology

Participants

Participants ($N = 49$) were sophomore, junior, and senior music education majors, ages 18 to 21, at a large university. Participants represented a broad range of concentrations, vocal and instrumental, within the major. All participants had passed at least the first two semesters of music theory at the collegiate level, ensuring that they were familiar with melodic dictation and possessed the notational skills to complete the experimental tasks. Potential participants who confirmed they had absolute pitch were excluded from the study.

Design

This study was based on a within-subjects design. The independent variable was experimental condition, with three levels: preparatory singing pattern prior to dictation, equivalent silent interval prior to dictation, and neither singing pattern nor silent interval prior to dictation. The dependent variable was melodic dictation test scores. Each participant took the test under all three conditions in one sitting. Three sets of dictation melodies were employed—one for each condition—to avoid melody memorization and potential testing effects. Further threats to internal validity were addressed by counterbalancing melody sets and order of test conditions.

Testing Instrument

The researcher-designed testing instrument consisted of one audio file and one answer sheet for each of the three experimental conditions (three files and three sheets total). Each audio file and answer sheet contained a practice item and three target items, yielding 12 test items total across the three conditions. Each test item consisted of an orienting I–V7–I chord progression and a two-measure melody played by the grand piano patch in GarageBand.

Two experienced aural skills instructors reviewed all target melodies to establish external content validity by ensuring they were typical of tonal melodic dictations in content and difficulty level (see Figure 1). Face validity was also a particularly important characteristic of this instrument; the answer sheet staff prompted students to notate just as they would in standard dictations in a high school or college theory course. Reliability of the instrument was measured through internal consistency analysis. Results were well within acceptable limits: Melody Set 1, $\alpha = .93$; Melody Set 2, $\alpha = .78$; and Melody Set 3, $\alpha = .82$.

For two of the conditions—preparatory singing and equivalent silent interval—the audio files contained a two-measure silent interval between the orienting chord progression and the target melody of each item. In the preparatory singing condition, participants sang the preparatory pattern during this interval (see Figure 2), and in the silent interval condition, participants prepared themselves silently. In the third condition (no singing or silent interval), the audio file items continued directly from the orienting chord sequence to the target melody. In all conditions, the first item was for practice, enabling participants to familiarize themselves with the procedures for that condition.

Procedures

Each participant completed the experimental tasks under all three conditions in one sitting in a small, quiet office. Audio files were played directly from GarageBand on a MacBook Pro laptop computer, through Sony MDR-NC7 Noise Canceling Headphones.

Figure 1. Test melodies.
Note. MM = 88 for all melodies.

Participants heard the instructions for each condition at the beginning of the audio file for that condition and were able to read the instructions for themselves simultaneously.

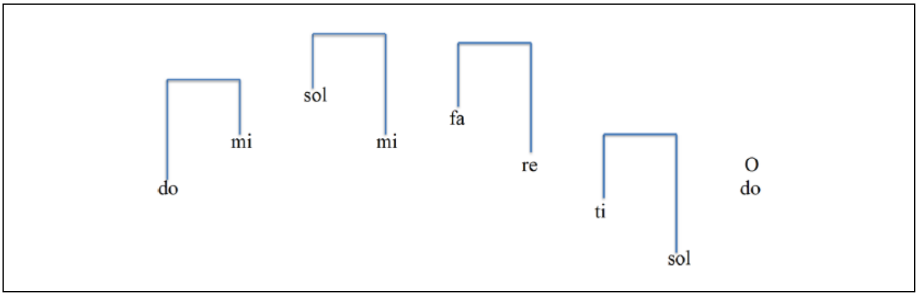

Figure 2. Preparatory singing pattern.

For the preparatory singing condition, participants were coached through rote learning of the pattern (see Figure 2) by a brief audio tutorial prior to beginning that section of the test. The pattern was modeled by a recorded male voice in two keys, C major and F major, each of which the participant echoed while referring to the printed pattern. Because the pattern was generically notated with appropriate contour and movable-*do* syllables, participants could easily transpose it to any key; movable-*do* solfége had been the primary syllable system employed in their prior theory coursework. The tutorial continued by establishing only the chord sequence in two more keys, D major and G major, after each of which the participant practiced the pattern without any model.

In all conditions, after the instructions the audio file announced the practice melody, played the orienting sequence, silent interval (in Conditions 1 and 2), and melody, and remained silent for 45 seconds while participants notated the melody. The decision to provide 45 seconds of work time was determined through review of dictation procedures on the AP Music Theory Exam (College Board, 2012b), averaging the work time provided on that exam (30 seconds or 60 seconds, depending on repetitions of the target melody), and pilot testing. Under all conditions the participants' objective was to write the target melody in standard notation on their answer sheet. The audio then proceeded to announce the next melody. Participants heard each melody only once. A single playing of these short melodies enabled completion of all experimental tasks under all conditions in one sitting, without potential for testing fatigue, a possible threat to internal validity.

In the preparatory singing condition, participants heard the orienting chord sequence and then sang aloud the preparatory pattern during the two-measure interval. They were permitted to use the Preparatory Singing Pattern sheet for reference while singing. Then they heard the melody and attempted to write it in standard notation. In the equivalent silent interval condition participants were instructed to "prepare yourself silently for two measures" during the two-measure interval following the chord sequence, and then they heard the melody and attempted to notate it. In the final condition, participants heard the chord sequence, followed immediately by the melody, and attempted to notate it. The researcher was in the room at all times to ensure functionality of the testing instrument and participants' successful compliance with procedures.

Analysis

One of the original 50 participants was unable to sing the preparatory pattern consistently correctly; his answer sheets were not scored, leaving 49 tests for data analysis. All melodies consisted of two measures of 4/4 meter and were scored per quarter-note beat for correct rhythm and pitch notation. Each beat contained a total possible score of two points (one for correct pitch and one for correct rhythm), each melody contained a total possible score of 16, and each condition (three melodies) contained a total possible score of 48. This scoring system is an adapted version of the AP Music Theory scoring system (College Board, 2012b) in which melodic dictations are scored by two-beat increments. Scoring each individual beat was important for precision in the current study because dictations were only two measures in length and heard only one time each.

Results

This study employed a within-subjects design in which all participants completed the experimental tasks under all three conditions. Mauchly's test indicated that the assumption of sphericity was not violated, $\chi^2(2) = .175$, $p > .05$, and a one-way repeated measures analysis of variance was used to analyze participants' test scores by condition.

The repeated-measures ANOVA revealed a significant difference in test scores, $F(2, 96) = 3.70$, $p = .03$, partial $\eta^2 = .07$, based on conditions of preparatory singing ($M = 34.29$, $SD = 9.76$), equivalent silent interval ($M = 34.78$, $SD = 11.24$), and no interval ($M = 36.37$, $SD = 10.14$). Post hoc pairwise comparisons with Bonferroni correction showed that participants scored significantly higher in the no interval condition than in the preparatory singing condition. There were no other significant pairwise comparisons. Participants scored significantly higher when they heard the dictation immediately following the opening chord sequence than when they sang the preparatory pattern in the intervening measures. Differences between other condition pairings were not significant.

Discussion and Implications

Participants scored significantly higher when they heard the dictation immediately compared to when they sang. However, there was no difference between when they heard the dictation immediately and when they experienced the equivalent silent interval. The difference between means in the significant pairwise comparison was only slightly more than two points, but statistical results suggest that the preparatory singing pattern did detract from students' success with the task. This finding has important implications for aural skills teachers considering whether to pair activities for mutual reinforcement of skills.

Participants' singing may have introduced some form of distraction into the process. Although production tasks related to the target task may be aimed at sparking cognitive processing, mental attention to the "complementary" task may actually usurp potential processing. Waggoner (2011), for example, found that college music majors were less accurate with error detection when conducting than when listening to recordings.

Participants in the current study were enrolled at a large university with multiple music theory faculty members. None of the three conditions in the current study is utilized more than any other on a regular basis in class, though singing with movable-*do* solfége is the norm. All participants sang the preparatory pattern correctly on all four items of the preparatory singing condition. They were able to complete the task correctly, which seemingly would have mentally "paved the way" for success on the dictation task in that condition. In other words, they appeared to be correctly reinforcing for themselves the basic key and meter information the preparatory pattern was designed to represent.

Pembrook (1987) found that attempting to sing an entire dictation melody from memory before notating it was generally counterproductive for students because they couldn't sing the melody correctly. In that study, the incorrect singing seems to have interfered with mental processing and subsequent notation. In the current study, however, the singing task was short and manageable, it occurred before participants heard the dictation, and it was sung with consistent success. Although participants were able to execute the pattern correctly, it appears that the preparatory singing still had some contrary effect on participants' performance.

Although singing and dictation seem generally to be mutually reinforcing aural skills long term (Paney & Buonviri, 2013), they may not be complementary within specific tasks such as those employed in this study. Instructors who routinely lead students through a preparatory singing pattern on, for example, movable-*do* solfége may be trying to trigger internal aural experiences of common patterns of pitch and rhythm relationships just prior to dictation. They may believe that rehearsing these patterns aloud just prior to dictation will prepare students for efficient and accurate perception of dictation materials and successful transfer to contextualized understanding and notation. Based on the results of this study, however, such an approach may actually hinder students' work; the additional task may be distracting them (Henry, 2008).

Instructors who insist on silence prior to dictation may be convinced that each student needs individual time to focus mentally without aural distractions. They may be trying to allow students the aural space to perceive the target melody clearly and fully, without any residual external or internal noise. In this study, participants were instructed to "prepare yourself silently for two measures" in the equivalent silent interval condition. After testing, they were asked what they did internally during that silent interval. Responses were quite varied, including singing *do*, singing the notes of the tonic triad, singing the first five notes of the major scale, maintaining internal silence, replaying the chord sequence, trying to predict which note the melody might start on, planning their strategy, counting beats carefully, and "nothing." This variation in strategies suggests that prior dictation experiences likely guided them to focus on whatever would be most helpful to them for the ensuing task, a finding consistent with Killian and Henry's (2005) study of preparation for sight-singing.

Research has shown that dictation students employ a number of different strategies to decode pitch and rhythm efficiently and accurately (Mikumo, 1994; Thompson, 2004). It may be helpful to students to explore and define their own strategies (Buonviri, 2014) and to draw connections between what they do during dictation and how they prepare themselves just prior to dictation. For example, for someone who listens for implied harmony while dictating a melody (Povel & Jansen, 2001), rehearsing typical tonal chords, externally or internally, might be helpful. For someone who focuses on metric placement of important landmarks in a dictation (Buonviri, 2014), counting carefully and internalizing the meter and tempo may be important preparations. In other words, actively bringing personally chosen strategies to the forefront of one's mind just prior to dictation may help to engage those strategies during the task.

Finally, those instructors who prefer to play a dictation immediately following an orientating chord or meter prompt may intend to help students avoid distractions and remain optimally focused. The results of this study suggest that participants performed equally well, statistically, whether the dictation was played directly following the orientating chord sequence or after two measures of intervening silence. It may be that participants were able to effectively eliminate distractions and maintain focus in both cases: in the no interval condition, through lack of time for distractions to arise, and in the silent interval condition, through customized mental focus. Since the only significant difference occurred between the preparatory singing and no interval conditions, it appears that the interval combined with the required singing task was what distracted participants.

Employing a particular routine just prior to taking dictation should aim to prepare students to take dictation purposefully, instead of just getting to the right notes and rhythms one by one. Students need to comprehend what they are hearing, but the successful notation of a dictation melody does not necessarily prove that (Klonoski, 2006). They need to arrive at the correct answer through understanding of the musical "big picture" (Buonviri, 2014), not just by patching together unrelated bits of information. Each student may understand the musical big picture in different ways.

Transfer between visual and aural domains is crucial for teaching and learning any notated music. Critical listening, music reading, sight-reading, error detection, performance, improvisation, composition, and conducting all depend to some extent on fluency across the two domains. Greater understanding of factors affecting performance on aural skills tasks will help teachers make wise decisions about how and when to help students create transfer across tasks and skills.

Recommendations for Further Research

This study compared effects of three preparatory conditions on melodic dictation success. Future research might investigate effects of the same or similar conditions on dictation scores of other populations. For example, high school students enrolled in theory courses may have less experience overall with dictation and singing than college students, providing additional insights into the efficacy of preparatory singing as a singular approach encouraged by their teacher, and the influence of singing ability on the effectiveness of this approach. Since high school theory experience appears to play an important role in college music majors' theory readiness (Livingston & Ackman, 2003), research comparing dictation skills and strategies across the college transition is crucial. Researchers might also further examine effects of juxtaposing aural skills activities (e.g., singing and error detection) in light of the discussion in this study about possible interference among seemingly "complementary" tasks. Finally, future research might explore the relationship between students' chosen strategies while taking, and just prior to taking, melodic dictation.

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References

Abril, C., & Flowers, P. (2007). Attention, preference, and identity in music listening by middle school students of different linguistic backgrounds. *Journal of Research in Music Education*, *55*, 204–215. doi:10.1177/002242940705500303

Berz, W. L. (1995). Working memory in music: A theoretical model. *Music Perception: An Interdisciplinary Journal*, *12*, 353–364. doi:10.2307/40286188

Buonviri, N. O. (2014). An exploration of undergraduate music majors' melodic dictation strategies. *Update: Applications of Research in Music Education*, *33*(1), 21–30. doi:10.1177/8755123314521036

Byo, J. L. (1997). The effects of texture and number of parts on the ability of music majors to detect performance errors. *Journal of Research in Music Education*, *45*, 51–66. doi:10.2307/3345465

Cassidy, J. W. (2001). Listening maps: Undergraduate students' ability to interpret various iconic representations. *Update: Applications of Research in Music Education*, *19*(2), 15–19.doi: 10.1177/87551233010190020104

The College Board. (2012a). *AP music theory exam*. Retrieved from http://professionals.collegeboard.com/profdownload/MusicTheo-AP-Exam-Ins-2012.pdf

The College Board. (2012b). *Sample questions and scoring guidelines*. Retrieved from http://www.collegeboard.com/student/testing/ap/music/samp.html?musictheory

Demorest, S. M., & Clements, A. (2007). Factors influencing the pitch-matching of junior high boys. *Journal of Research in Music Education*, *55*, 190–203. doi:10.1177/002242940705500302

Deutsch, D. (1977). Memory and attention in music. In M. Critchley & R. A. Henson (Eds.), *Music and the brain* (pp. 95–130). London, England: Heinemann.

Duke, R. A., & Simmons, A. L. (2006). The nature of expertise: Narrative descriptions of 19 common elements observed in the lessons of three renowned artist-teachers. *Bulletin of the Council for Research in Music Education*, *170*, 7–19.

Flowers, P. (2001). Patterns of attention in music listening. *Bulletin of the Council for Research in Music Education*, *148*, 48–59.

Flowers, P., & O'Neill, A. M. (2005). Self-reported distractions of middle school students in listening to music and prose. *Journal of Research in Music Education*, *53*, 308–321. doi:10.1177/002242940505300403

Foulkes-Levy, L. (1997). Tonal markers, melodic patterns, and musicianship training: Part I: Rhythm reduction. *Journal of Music Theory Pedagogy*, *11*, 1–24.

Gromko, J. E., & Russell, C. (2002). Relationships among young children's aural perception, listening condition, and accurate reading of graphic listening maps. *Journal of Research in Music Education*, *50*, 333–342. doi:10.2307/3345359

Henry, M. (2008). The use of specific practice and performance strategies in sight-singing instruction. *Update: Applications of Research in Music Education*, *26*(1), 11–16. doi:10.1177/8755123308317675

Hodges, D., & Nolker, B. (2011). The acquisition of music reading skills. In R. Colwell & P. Webster (Eds.), *MENC handbook of research on music learning, volume II: Applications* (pp. 61–91). Oxford, England: Oxford University Press.

Karpinski, G. (2000). *Aural skills acquisition*. Oxford, England: Oxford University Press.

Killian, J. N. (1991). The relationship between sightsinging accuracy and error detection in junior high singers. *Journal of Research in Music Education*, *39*, 216–224. doi:10.2307/3344721

Killian, J. N., & Henry, M. L. (2005). A comparison of successful and unsuccessful strategies in individual sight-singing preparation and performance. *Journal of Research in Music Education*, *53*, 51–66. doi:10.1177/002242940505300105

Klonoski, E. (2006). Improving dictation as an aural-skills instructional tool. *Music Educators Journal*, *93*(1), 54–59. doi:10.1177/002743210609300124

Larson, R. C. (1977). Relationships between melodic error detection, melodic dictation, and melodic sightsinging. *Journal of Research in Music Education*, *25*, 264–271. doi:10.2307/3345267

Livingston, C., & Ackman, J. (2003). Changing trends in preparing students for college level theory. *American Music Teacher*, *53*(1), 26–29.

Madsen, C. K., & Geringer, J. (2000). A focus of attention model for meaningful listening. *Bulletin of the Council for Research in Music Education*, *147*, 103–108.

Madsen, C. K., & Staum, M. J. (1983). Discrimination and interference in the recall of melodic stimuli. *Journal of Research in Music Education*, *31*, 15–31. doi:10.2307/3345107

Margulis, E. H. (2005). A model of melodic expectation. *Music Perception*, *22*, 663–714. doi:10.1525/mp.2005.22.4.663

McClung, A. C. (2001). Sight-singing systems: Current practice and survey of all-state choristers. *Update: Applications of Research in Music Education*, *20*(1), 3–8.

Mikumo, M. (1994). Motor encoding strategy for pitches of melodies. *Music Perception*, *12*, 175–197. doi:10.2307/40285650

Morrison, S. J., Treviño, A. M., & Sielert, V. (2008). Jazz expertise and its relationship to pitch and rhythm placement among trumpet players. *Bulletin of the Council for Research in Music Education*, *175*, 31–41.

National Association of Schools of Music. (2012). *National Association of Schools of Music handbook 2011-2012*. Retrieved from http://nasm.arts-accredit.org/site/docs/Handbook/NASM_HANDBOOK_2011-12.pdf

Norris, C. E. (2003). The relationship between sight singing achievement and melodic dictation achievement. *Contributions to Music Education*, *30*(1), 39–53.

Oura, Y. (1991). Constructing a representation of a melody: Transforming melodic segments into reduced pitch patterns operated on by modifiers. *Music Perception*, *9*, 251–265. doi:10.2307/40285531

Paney, A. S., & Buonviri, N. O. (2013). Teaching melodic dictation in AP music theory. *Journal of Research in Music Education*, *61*, 396–414. doi:10.1177/0022429413508411

Pembrook, R. G. (1987). The effect of vocalization on melodic memory conservation. *Journal of Research in Music Education*, *35*, 155–169. doi:10.2307/3344958

Potter, G. (1990). Identifying successful dictation strategies. *Journal of Music Theory Pedagogy*, *4*, 63–71.

Povel, D., & Jansen, E. (2001). Perceptual mechanisms in music processing. *Music Perception*, *19*(2), 169-198. doi:10.1525/mp.2001.19.2.169

Rogers, M. R. (2004). *Teaching approaches in music theory: An overview of pedagogical philosophies*. Carbondale: Southern Illinois University Press.

Schellenberg, S., & Moore, R. S. (1985). The effect of tonal-rhythmic context on short- term memory of rhythmic and melodic sequences. *Bulletin of the Council for Research in Music Education*, *85*, 207–217.

Sheldon, D. A. (1998). Effects of contextual sight-singing and aural skills training on error detection abilities. *Journal of Research in Music Education*, *46*, 384–395. doi:10.2307/3345550

Thompson, K. A. (2004). Thinking in sound: A qualitative study of metaphors for pitch perception. *Journal of Music Theory Pedagogy*, *18*, 81–107.

Waggoner, D. T. (2011). Effects of listening conditions, error types, and ensemble textures on error detection skills. *Journal of Research in Music Education*, *59*, 56–71. doi:10.1177/0022429410396094

Yarbrough, C., Orman, E. K., & Neill, S. (2007). Time usage by choral directors prior to sight-singing adjudication. *Update: Applications of Research in Music Education*, *19*(2), 15–19. doi:10.1177/87551233070250020104

Younker, B. A., & Smith, W. H., Jr. (1996). Comparing and modeling musical thought processes of expert and novice composers. *Bulletin of the Council for Research in Music Education*, *128*, 25–36.

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