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The effect of directing attention on melodic dictation testing

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Andrew S Paney

Abstract

The purpose of this study was to investigate the effect of guiding students through remembering and understanding a melody on their melodic dictation scores. Two matched groups of university music students ($N = 64$) took a dictation, but those in the treatment group received instructions directing their attention for the purpose of aiding their memory and understanding.

In every comparison (rhythm, pitch, and overall score), the control group scored higher than the treatment group. Results suggest that instructions guiding students through the memory and understanding phases may not be helpful to students. Early dictation instruction that focuses attention on important aspects of a melody without requiring a full transcription, however, may help to build students' melodic memory and understanding.

Keywords

attention, auditory perception/cognition, aural skills, listening, teaching

Aural skill development is an important aspect of competent musicianship and an essential component of music training. University-level music programmes require their graduates to demonstrate competence in aural skills, usually as part of the music theory curriculum in aural skills classes. US high school Advanced Placement (AP) Music Theory classes also emphasise aural development, as evidenced on the AP Music Theory Exam (The College Board, 2012). Though teachers of aural skills agree that melodic dictation is a reliable measure of a person's aural ability, many struggle with how best to develop these skills:

> Dictation is often the most difficult activity for students, for indeed the complexity of skills needed to be successful is great. The students who are good at taking dictation have well-developed inner ears with a strong sense of tonality, a good musical memory, a knowledge (conscious or unconscious) of common patterns, and a knowledge of basic notational procedures. (Foulkes-Levy, 1997, pp. 21–22)

Texas Tech University, USA

Corresponding author:
Andrew S. Paney, University of Mississippi, 164 Music Building, Oxford, MS 38677, USA.
Email: apaney@olemiss.edu

Gary Karpinski (2000) may have the most comprehensive explanation of the component parts of taking melodic dictation. He describes four phases in taking dictation: hearing, memory, understanding, and notation. The first phase, hearing, refers to the physiological process of the ear receiving sounds and transmitting them to the brain. The second phase, memory, is a prerequisite for all further steps in the process. The third phase, understanding, is crucial for successful notation. One must understand how rhythms are organised and how the melody moves. Better understanding of tendencies and expectations simplifies the task of taking dictation. For example, a person who understands that a melody is likely to end on the tonic is more likely to finish correctly than someone who relies on working with intervals from note to note. The final phase, notation, refers to the act of writing note-heads and stems on the staff, translating the understanding of the melody into traditional notation. Would guiding students through these phases, particularly the memory and understanding phases, yield improved dictation accuracy?

Despite its prominence in the music curriculum, few published studies have examined dictation since 2000. Only four studies were found: Gillespie (2001) surveyed aural skills instructors on their scoring of dictations; Norris (2003) studied the relationship between achievement in sight-singing and melodic dictation; Dooley and Deutsch (2010) asked whether having absolute pitch influences performance on musical dictation; and Paney and Buonviri (2014) interviewed high-school music teachers on their teaching of melodic dictation.

Older studies identified the following difficulty factors in the completion of dictation assessments: tempo (Hofstetter, 1981), tonality (Dowling, 1978; Long, 1977; Oura & Hatano, 1988; Pembrook, 1986), size of intervals (Ortmann, 1933), conjunct versus disjunct motion (Ortmann, 1933; Pembrook, 1986), length of the melody (Gephardt, 1978; Long, 1977; Pembrook, 1986), number of presentations of the melody (Hofstetter, 1981; Pembrook, 1986), context of the presentations (Schellenberg, 1985), participants' musical experience (Long, 1977; Oura & Hatano, 1988; Schellenberg, 1985; Taylor & Pembrook, 1983), and familiarity with the style of music (Schellenberg, 1985).

Musical memory and dictation success

Does singing a melody during the dictation process help to solidify it in memory? Pembrook (1987) assigned participants to three treatment groups. Group 1 heard a short melody followed by a second melody 2 seconds later. Their task was to determine whether the two melodies were the same or different. Group 2 followed the same procedure, but the melodies were separated by 19 seconds. Group 3 followed the same procedure as group 2, but was asked to sing back the melody during the 19 seconds of silence. Analysis revealed no significant difference between groups 1 and 2, but group 3 scored significantly lower than groups 1 and 2. "As a general rule, it seems that most people cannot sing accurately enough after one hearing to benefit from the singing technique" (p. 166). Pembrook believes that participants sing beyond what they can accurately recall. Of the sung responses, only 11 % were absolutely correct. He states, "In noting the excellent melodic discrimination ability of those who did sing perfectly, it should be recognised that singing appears to be a good melodic reinforcement technique if executed correctly" (1987, p. 166).

Pembrook suggests that students who begin writing immediately have more success in taking dictation:

> One pedagogical problem associated with the various strategies for melodic dictation is that each seems to have its limitations. Immediate writing creates a dual processing problem (listening to new stimuli

> while trying to interpret and encode those just heard). . . . On the other hand, "passive listening" (nonsimultaneous writing) to a melody of many tones leaves the listener with the problem of storage capacity. (1987, p. 156)

He concludes that students perform better when they begin writing as soon as possible.

Pedagogical experts object to this conclusion. Karpinski (1990) believes that writing while the music is playing encourages musical shorthand instead of building crucial musicianship skills, such as "focused attention, selective memory, and increased memory capacity" (p. 199). Rogers (2004) agrees: "the purpose of dictation . . . is not to produce correct written transcriptions but to produce a certain kind of listener who can hear sound as meaningful patterns" (p. 100). Students who begin writing immediately may experience initial success, but they may not be developing listening and memory skills that will be more important to their overall musical development.

Musical understanding and dictation success

Is it better to listen for specific details or to attempt a larger-scale, structural understanding of a dictation melody? Foulkes-Levy (1997) recommends listening for big-picture rhythmic and melodic information. She suggests that listening at the larger, structural level will facilitate understanding: "By making our students aware of the patterns that appear at structural levels close to the surface of a melody, we can greatly facilitate their abilities to hear, memorise, sight sing, improvise, and take dictation of tonal melodies" (p. 10). Foulkes-Levy (1998) presents a possible approach to helping students learn to hear at the structural level. She suggests having students memorise common rhythmic and melodic patterns so they will recognise them when they hear them. Students who can reduce melodies to the most basic level will have an advantage in all tasks requiring aural acuity.

Prediction of the melody and melodic expectations may help build understanding in taking melodic dictation. Pembrook (1986) had participants take dictations under multiple conditions. One set of participants tested whether a second hearing improved dictation scores. He found a dramatic increase in scores when participants were allowed to hear a melody a second time. He suggests that this may be a result of creating expectations: The first hearing may provide a schema by which participants can more meaningfully interpret the music on successive hearings. Another possible explanation is that the second hearing allows participants to disregard notes that have already been notated, thus avoiding problems of memory capacity.

Is it better to focus first on rhythm or on pitches when taking dictation? Beckett (1997) examined undergraduate music students in two-part dictation. Volunteers took three dictations, each under a different condition: melody first (note-heads), rhythms first, and a control condition in which students were instructed to complete the two-part dictation in the manner to which they were accustomed. Accuracy of pitch was not increased under any of the above conditions. Accuracy of rhythm was higher for the rhythm-first and control group. Beckett concludes, " . . . in polyphonic dictation, attending to rhythm first and pitch afterwards may be an effective way of maximising rhythmic accuracy" (p. 613).

Potter's (1990) qualitative study, in which he observed advanced musicians taking dictation and describing their processes aloud in the moment, found a similar result:

> . . . Those able to place notes easily in a metric framework, succeed in comparison with those who identify pitches quite easily but do not always know where to put them. One participant's comment sums up the opinions of many: "I don't like to write things down unless I know where they go." (p. 66)

Potter writes, " . . . the best dictation-takers have a whole box of tools to work with, tools that work synergistically toward the same end" (p. 69). Students who can hear scale degrees and confirm them through interval recognition have a better chance of completing dictations successfully and are more likely to feel confident about their work. Instructors who capitalise on this and teach their students many strategies and skills are helping their students become better musicians and experience more success in their dictation assignments.

Summary

In summary, an approach that encouraged students through the memory and understanding phases by asking them to sing aloud while avoiding problems of memory capacity (Pembrook, 1987); that allowed them to write as soon as possible (Pembrook, 1987); that facilitated understanding melodies at a larger, structural level (Foulkes-Levy, 1997, 1998); that allowed students more than one listening so they could develop expectations (Pembrook, 1986); and that encouraged students to focus first on the rhythm (Potter, 1990; Beckett, 1997) might show improvements in dictation scores. The current study examined the effects of directing students' attention using these strategies to encourage melodic memory and understanding. Do students who are prompted to remember and understand the music they hear score better on a dictation? Although research exists that examines successful strategies of taking dictation, no study was found that investigated whether giving spoken instructions to direct attention, specifically in melodic memory and understanding, had an effect on students' performance on melodic dictation assignments.

Method

Participants

This study examined the effects of directed exercises in memory and musical understanding on successful completion of a melodic dictation. Participants were 70 undergraduate music students (in 35 matched pairs) enrolled in aural skills courses at a large Southwestern American university, in their second, third, or fourth semester in the aural skills sequence.

Matching of participants

Participants were matched based on their pre-test scores. Scores were ordered from highest to lowest and each participant was matched with another who shared the same score. The groups were considered equivalent in dictation ability and had an equal number of high- and low-scoring participants. One group was designated the treatment group and one the control group by random selection (flipping a coin). Two pairs were eliminated because one participant in the pair reported familiarity with the melody. A third pair was eliminated because a participant did not complete the post-test dictation. Results were calculated using 64 participants in 32 matched pairs.

Musical excerpts used in dictations

The melody used in the pre-test was an excerpt from the second movement of Mozart's Divertimento No. 8 in F Major, K. 213 (1991a). The excerpt consisted of two phrases in a parallel period. The first four measures ended in a half cadence and the last four in a perfect authentic cadence. Both phrases started with the same material. There were no accidentals in the

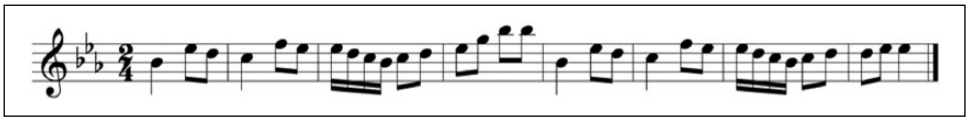

Figure 1. Post-test dictation melody. The melody used in the post-test for both groups, from the second movement of Mozart's Divertimento Number 9 in Bb Major, K. 240 (1991b).

melody and motion was generally stepwise. This selection was chosen for its conformity to classical conventions and its distinct melody line accompanied by instruments of a different timbre (the melody was played by the oboe, while two bassoons, two horns, and another oboe played accompanying lines). Participants heard the full version, but were asked to write only the melody line, as recommended by Harrington (1991).

The melody used in the post-test portion was an excerpt from the second movement of Mozart's Divertimento No. 9 in B-flat Major, K. 240 (1991b; see Figure 1). This excerpt followed all of the specifications used in the pre-test. Recordings of both were by St. Luke's Chamber Ensemble (Mozart, 1991a, 1991b) and were selected based on sound quality and their delineation of the melody.

Recordings in pre-test and post-test

Pre-test recording. For purposes of control, recordings were created for the pre-test and the post-test dictations. The recording used in the pre-test portion of the experiment included spoken instructions prior to the first hearing, notification of the number of hearings in the dictation as a whole, notification of the number of each hearing before the music began ("This is hearing number four"), and an instruction to stop writing once the time had expired.

Control group post-test recording. Two post-test recordings were required: one for the control group and one for the treatment group. Both included the same musical excerpt played four times. The control group recording followed the exact format of the pre-test recording: there was a brief introduction and participants were notified of the number of each hearing. The melody was played four times, with time for writing after each hearing.

Treatment group post-test recording. The treatment recording included cues directing participants' attention and asked for responses during the course of the dictation. Before each hearing, participants heard instructions directing their attention to specific aspects of the melody in order to increase their memory for and understanding of the melody. Instructions were arranged so that participants listened for the rhythm first (Beckett, 1997; Potter, 1990), focused on large-scale structure before details (Foulkes-Levy, 1998), and sang only what they could accurately remember (Pembrook, 1987). After the first hearing, participants stated how many beats were in each measure. After the second, they sang the tonic pitch, identified the key as major or minor, and wrote in measure lines. After the third, they sang the first few pitches aloud. After the final hearing, they sang the last few pitches aloud. They were asked to tap or conduct the beat throughout. Participants responded to the questions verbally or by performing the requested tasks.

Length of time between hearings

Participants in the treatment group were given 30 seconds of silence after the completion of each melody and the directives following the melody. Participants in the control group were

given a period of silence equal to the length between each of the hearings of the treatment group. The length of the silence for the control group varied each time, depending on the number of instructions used for the treatment group.

Response forms

Participants in both groups wrote the melody on identical forms that included two staves, the starting pitch, the first two beats of rhythm (shown with stems and beams only), and the key signature. Participants rated their familiarity with the piece at the bottom of the form. No participant reported having previously played the piece or studied it. All but four reported not knowing the work. Two of those had similar scores on the pre-test and were matched with each other. The other two and their corresponding pair were eliminated from the results.

Video recording of post-test

For the post-test, all participants took the dictation individually rather than as a group. This change allowed participants to react and respond aloud to the melody without disrupting other participants. Participants were video-recorded while they took the post-test dictation for additional data and to provide accountability for the treatment group in responding to the directives. Some of the video recordings were corrupted due to equipment malfunction after the experiment; therefore, comprehensive analysis of data from the video could not be regarded as conclusive. However, uncorrupted video recordings were observed for added insight into participants' response to the dictations.

Scoring

Both the pre-test and the post-test musical examples were two-phrase excerpts of music. Mozart composed each with 31 notes in eight measures of duple time. Four rhythm points were allotted for each measure, 1 for each half beat, for a total of 32 points. Participants' scores consisted of two numbers: the number of correct pitches and the number of correct beat lengths. Participants who included all the correct pitches in the correct order were given a pitch score of 31, regardless of rhythm errors. In keeping with Gillespie's study (2001) on scoring tonal melodies, no partial credit was given for correct contour or if a portion was transposed.

Reliability

An outside auditor, a doctoral student and music theory teaching assistant, scored 20% (n = 14) of participants' dictations. Reliability of scoring coefficients of $r = 0.99$ were obtained for all samples.

Results

The purpose of this study was to test the effect of directing attention through the areas of memory and understanding on dictation scores. Total scores for the entire sample ranged from 5 points to a perfect score of 63 points. Rhythm scores ranged from 4 to 32 points; pitch scores ranged from 1 point to a perfect score of 31 points, see Figure 2.

The control group scored higher than the treatment group in all comparisons. Wilcoxon Signed-ranks tests indicated that overall scores of the control group (median = 43) were

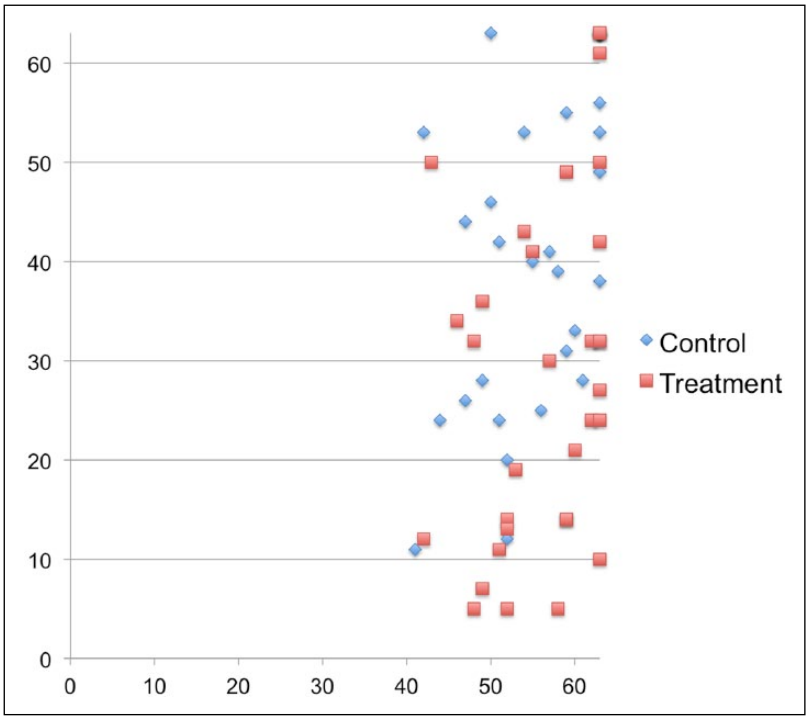

Figure 2. Scatter plot of combined scores with the post-test (y axis) plotted against the pre-test (x axis). This figure shows that the control group generally had higher post-test scores than the treatment group.

significantly higher than those of the treatment group (median = 28.5), $z = 3.12$, $p < 0.01$, $r = 0.39$; rhythm scores for the control group (median = 26) were significantly higher than the scores of the treatment group (median = 16), $z = 3.18$, $p < 0.01$, $r = 0.40$; and pitch scores for the control group (median = 23) were significantly higher than those of the treatment group (median = 6), $z = 2.62$, $p < 0.01$, $r = 0.33$.

Results were also compared for the highest and lowest scoring participants to see if the treatment affected their scores differently. The highest scoring 25% in the control group (median = 63) scored higher than their matched pairs in the treatment group (median = 41), but did not show a significant difference ($W = 20$; critical $W = 30$ for a non-directional test with this sample size at the 0.05 alpha level). The lowest scoring 25% in the control group (median = 43) scored higher than their matched pairs in the treatment group (median = 13), but, again, without a significant difference ($W = 26$).

In summary, participants in the treatment group scored lower in each comparison. Receiving spoken instructions appears to have hindered students' pitch, rhythm, and overall performance in melodic dictation. No other significant differences were found.

Discussion

Directing attention

Of most interest in the results of this experiment were the high achievement of the control group and the low achievement of the treatment group. These results suggest that directing

participants' attention through spoken instructions may have distracted them and prevented their success, rather than increasing their memory and understanding of the melody. New approaches, even helpful ones, may take time and practice in order to yield a noticeable improvement. Given their prior experience, participants may have had established routines for taking dictation that made listening to the instructions an extra burden. The approaches tested in this study (listening for the metre, determining if it is in a major or minor key, focusing on smaller chunks) may need to be practised in order to show effectiveness.

Dictation instructors could avoid giving instructions immediately after students hear a melody. They could allow students to write as soon as possible, even during the melodic example (Potter, 1990). Further, they could consider directing students' attention before they hear a dictation, but allowing silence after the music plays.

Musicianship development

Students may experience some success in taking dictation without mastering all of the requisite skills. The difficulties the treatment group experienced may reveal a lack of confidence in basic musicianship (singing the tonic, determining the metre, etc.). Though the questions were intended to have quick-response answers, the significantly lower scores of the treatment group suggest that participants may not have answered them with facility. Their previous dictation success, evidenced in the pre-test dictation, did not translate into answering questions about the melody without a disruption of their process. Teachers of aural skills could start dictations by asking questions about the basic aspects of a melody; for instance, students could be asked to report only the tonality, metre, or phrase structure instead of completing a full transcription.

Mental preparation

Video observations revealed that some participants in the treatment group were cut short when asked to respond to directives – the next instruction interrupted their sung or spoken response. Time was deliberately kept short to prevent participants from singing beyond their memory capacity (Pembrook, 1986, 1987). Some participants, however, took 1 or 2 seconds to think about the question before responding, rather than responding immediately. This may have contributed to a sense of being rushed.

Some participants in the treatment group appeared frustrated by the activity and seemed to run out of time. They appeared to have been preoccupied with the instructions and had little time to process the music. Examination of the response forms corroborates this conclusion. Twenty-two participants in the treatment group did not complete the dictation (writing something in every measure, whether right or wrong), compared to only eight in the control group. Nine participants in the treatment group completed less than four total measures, compared to only one participant in the control group. Though the time between each hearing was identical for both groups, the treatment group received instructions before and after each hearing. Their uninterrupted time (time in silence) was shorter than that of the control group.

When participants were unsure of how to answer a question they seemed to be hindered from further success. Some participants had trouble with a question and appeared flustered on the video. They hesitated on later questions and appeared to need some recovery time before they began writing again.

Dictation instruction that addresses these psychological issues could be of great value to students. Pedagogues have addressed these issues in previous papers and books on dictation

(Karpinski, 2000; Paney & Buonviri, 2014; Rogers, 2004), but no published study has been found that tests approaches for addressing these psychological concerns.

Limitations and further research

To reduce anxiety and to build familiarity with the procedure, participants in the treatment group may have benefited from taking a prior practice dictation with recorded instructions. Future studies could give both groups instructions before and after each hearing to address this issue. One group could receive more specifically chosen instructions (instructions that examined the research questions being asked) and the other group instructions that occupied the same amount of time.

Further research could also examine music students' mastery of basic musicianship skills. Instead of transcribing, participants could answer basic questions regarding a melody. Do students possess the individual skills that are assumed in completing a dictation assessment?

Conclusion

This study investigated the effect of verbal instructions that direct participants' attention through the memory and understanding phases of the dictation process on dictation success. Participants whose attention was directed scored lower, and, in most cases, significantly lower, than the control group. This result suggests that directing attention may initially hinder students' success. Implementing strategies that address questions of musicianship and that disrupt established routines may, however, be beneficial for developing the basic musicianship skills requisite for mastery of dictation.

Author note

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