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A Theoretical Model for Practicing

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UNIVERSITY OF MIAMI

A THEORETICAL MODEL FOR PRACTICING

By

James Michael Drayton

A DOCTORAL ESSAY

Submitted to the Faculty
of the University of Miami
in partial fulfillment of the requirements for
the degree of Doctor of Musical Arts

Coral Gables, Florida

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UNIVERSITY OF MIAMI

A doctoral essay submitted in partial fulfillment of
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The purpose of this paper is to propose a new practice paradigm for musicians that allows them to quickly identify errors, choose the most appropriate strategy needed to help them maximize their efforts in the practice room, and also have a method that will allow the individual to see and measure their growth in an objective fashion. The researcher first reviewed the literature on practicing to distill the proven techniques. From this review, the researcher created a new practice paradigm that closely follows the current research testing method of pretest-practice-posttest provided a list of materials needed for the practice session, and a detailed explanation of how an individual should perform each step of the paradigm. After creating the paradigm, the researcher created a new purpose and hypothesis for some of the studies that he reviewed so that future researchers could easily test his model and compare it to prior researcher. Finally, the researcher gives an explanation of who can use this model.

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CHAPTER ONE: INTRODUCTION

Background

Musicians practice to overcome individual challenges. Typically, musicians choose one of three ways to practice: they follow their teacher's methodology of how to practice, whether it is effective for them or not; they create their own methodologies based on their own ideas and experiences of how to practice music, or 3) they read a book on practicing written by a famous musician which is based on that musician's own story of trial and error. In contrast, others could read prior research and create a practice plan based on the research they read. This chapter investigates whether or not prior researchers have created practice guidelines and methods from a review of the literature on practicing.

Several researchers have created models related to practicing or created guidelines based on their reviews of prior research. Nancy H. Barry and Susan Hallam co-authored a book chapter that reviewed the prior research on practicing, and then made recommendations on how individuals could integrate the constructs found in this literature into their own practice so they could have both efficient and effective practice sessions.¹ In addition to Barry and Hallam's book chapter on practicing, Susan A. O'Neill and Gary E. McPherson wrote a book chapter on motivation and reviewed the

¹ Nancy H. Barry and Susan Hallam. "Practice." In *The Science and Psychology of Music Performance: Creative Strategies for Teaching and Learning*, edited by Richard Parncutt and Gary E. McPherson, 151-165. New York: Oxford University Press, 2002.

research of how motivation can affect practice sessions and practice habits.² Like Barry and Hallam, the two researchers reviewed the literature and also made recommendations for how the individual and music teacher can use this research to identify their own and their student's motivational patterns, and then select the most appropriate strategies to encourage a positive, productive practice session that helps fuel an intrinsic motivation to practice.³

Along with O'Neill and McPherson, McPherson and Zimmerman reviewed the literature on how self-regulation can help musicians, and illustrated how a practice model based on Zimmerman's model of self-regulation can help the individual have efficient and effective practice sessions.⁴ Furthermore, Mishra (2005) proposed a theoretical model for memorization based on research.⁵ In her review and model, she not only combined all the literature she found on memorizing and practicing music, but she also explained how models based on research should still allow the individual to incorporate their own individual learning style and strategy use.⁶

Furthermore, Peter Miksza used a methodology similar to Robert Duke's 1999/2000⁷ review of literature to create his own literature review and model.⁸ After he

² Susan A. O'Neill and Gary E. McPherson. "Motivation." In *The Science and Psychology of Music Performance: Creative Strategies for Teaching and Learning*, edited by Richard Parncutt and Gary E. McPherson, 31-46. New York: Oxford University Press, 2002.

³ Ibid.

⁴ Gary E. McPherson and Barry J. Zimmerman. "Self-Regulation of Musical Learning." In *MENC Handbook of Research on Music Learning Volume 2: Applications*, edited by Richard Colwell and Peter R. Webster, 130-172. New York: Oxford University Press, 2006.

⁵ Jennifer Mishra. "A Theoretical Model of Musical Memorization," *Psychomusicology- A Journal in Music Cognition* 19, no. 1 (Spring 2005): 75-89.

⁶ Ibid.

⁷ Robert Duke. "Measures of Instructional Effectiveness in Music Research." *Bulletin of the Council for Research in Music Education* no. 143 (Winter 2011): 1-48.
<http://www.jstor.org/stable/40319011> (July 12, 2012).

⁸ Peter Miksza. "A Review of Research on Practicing: Summary and Synthesis of the Extant Research with Implications for a New Theoretical Orientation." *Bulletin of the Council for Research in*

reviewed and classified the literature into different categories, he created an instructional theory and model to help individuals build better practice skills instead of the primary goal to gain “performance competence.”⁹ Clearly, previous researchers have taken it upon themselves to review the literature and either create guidelines or create a model to help the individual gain better practice skills or higher achievement scores.

In addition to the prior research that has reviewed the literature, other researchers have suggested that individuals should have a self-evaluation element in their practice sessions to make greater achievement gains. Robert Lundin (1967) reviewed the literature on practicing, and suggested that immediate reinforcement can help the individual not only determine whether or not they have improved, but also the immediate knowledge of what they just did can help them select the appropriate measure to overcome the difficulty.¹⁰

Next, Ryan Daniel did a study researching a person’s self-evaluation and the results would suggest that individuals found more errors in their playing after listening to themselves than they did while playing.¹¹ Daniel later suggested that individuals may not identify many of their mistakes unless they have some type of self-evaluation method and then once they have identified the error, they can chose the most appropriate method of correcting it based on their knowledge.¹²

Along with Daniel, Rosenthal et al. (2009) suggested that a self-evaluative practice method could help individuals cope with the challenges they found in their

Music Education, no. 190 (Fall 2011): 51-92.

<http://www.jstor.org/stable/10.5406/bulcouresmusedu.190.0051> (accessed July 11, 2012).

⁹ Ibid., 82-83.

¹⁰ Robert A. Lundin. *An Objective Psychology of Music* (New York: The Ronald Press Company, 1967), 61-72.

¹¹ Ryan Daniel. “Self-assessment in performance.” *British Journal of Music Education* 18, no. 3 (2001): 215-226.

¹² Ibid., 223.

study.¹³ A self-evaluative practice method may help individuals access the necessary information to select the most appropriate strategy to deal with their current musical infraction.¹⁴ Both Daniel and Rosenthal et. al suggest the need for practice methods to have a self-evaluative component to them so individuals can easily identify errors and maximize their practice time instead of using that time to speculate on transgressions they think they may have committed.

Following the studies that recommended the need for a practice paradigm based on both research and self-evaluation, other researchers observed what individuals did while they practiced. Peter Miksza (2006) did a study where his results suggested that lower impulsive individuals had higher achievement gains than the higher impulsive individuals, but suggested that future research should adopt ways to study and compare the effectiveness of practice behaviors in a controlled setting.¹⁵ This could mean that research and individuals need a practice paradigm based on research with a self-evaluative component to help discriminate which practice behaviors will help them make more achievement gains while they practice.

Following his 2006 study, Miksza also did another study (2007) where he observed the practice behaviors of high school wind players and found that certain practice behaviors related to practicing strategically.¹⁶ Miksza reported that “teachers

¹³ Roseanne Rosenthal, Manju Durairaj and Joyce Magann. “Musicians’ Descriptions of Their Expressive Musical Practice.” *Bulletin of the Council for Research in Music Education*, no. 181 (Summer 2009): 37-49. <http://www.jstor.org/stable/40319226> (accessed July 11, 2012).

¹⁴ Rosenthal et al (2009), 46.

¹⁵ Peter Miksza. “Relationships Among Impulsiveness, Locus of Control, Sex, and Music Practice.” *Journal of Research in Music Education* 54, no. 4 (Winter 2006): 308-323. <http://www.jstor.org/stable/4139753> (accessed September 30, 2010).

¹⁶ Peter Miksza. "Effective Practice: An Investigation of Observed Practice Behaviors, Self-Reported Practice Habits, and the Performance Achievement of High School Wind Players." *Journal of*

could devise methods for demonstrating how to identify and focus on difficult or problematic musical passages when practicing.¹⁷ Clearly, Miksza's studies have suggested the need to have a practice paradigm that will not only help individuals practice strategically, but also helps the individual identify the most beneficial practice behaviors when trying to make positive, noticeable achievement gains.

Byo and Cassidy's article (2008) provide more evidence on using research to create another method for practicing.¹⁸ This survey examines what collegiate musicians do in the practice room.¹⁹ Like Miksza, Byo and Cassidy also realize and suggest for the need to expand the research on different practice methods.²⁰ In the last paragraph of their article, they state:

“...research should focus on “successful practicers” (defined as those who consistently improve through independent work) across different instruments and proficiency levels to flesh out similarities and differences.”²¹”

This clearly illustrates that while researchers have collected data regarding practicing, researchers should still collect more data on both practicing behaviors and the methods that individuals use while practicing.

Justification for Study

Musicians need to practice to improve and need a new practice paradigm that allows them to easily self-evaluate so they can quickly identify errors, choose the most

Research in Music Education 55, no. 4 (December 2007): 359-375. <http://www.jstor.org/stable/27639201> (accessed September 25, 2010).

¹⁷ Ibid.

¹⁸ James L. Byo and Jane W. Cassidy. 2008. ““An Exploratory Study of Time Use in the Practice of Music Majors: Self-Report and Observation Analysis.” *Update - Applications of Research in Music Education* 27, no.1 (November 2008): 33-40. <http://upd.sagepub.com/content/27/1/33> (accessed September 30, 2010).

¹⁹ Ibid, 35.

²⁰ Ibid. 39.

²¹ Ibid, 39.

appropriate strategy needed to help them maximize their efforts in the practice room, and also have a method that will allow the individual to see and measure their growth in an objective fashion. The researcher first reviewed the literature on practicing to distill the proven techniques. From this review, the researcher created a new practice paradigm that closely follows the current research testing method of pretest-practice-posttest provided a list of materials needed for the practice session, and a detailed explanation of how an individual should perform each step of the paradigm. After creating the paradigm, the researcher created a new purpose and hypothesis for some of the studies that he reviewed so that future researchers could easily test his model and compare it to prior researcher. Finally, the researcher gives an explanation of who can use this model.

Purpose

The purpose of this essay is to create a theoretical model for practicing based on a review and compilation of techniques proven effective by the literature. This study will generate the following:

- 1) A review the literature, and a distillation of which practice techniques that scholars have deemed effective.
- 2) Using these proven techniques, the researcher will then generate a research-based practice paradigm and create an assessment rubric/self-reflection guide for the new practice paradigm to help individuals score themselves.
- 3) A new purpose and hypothesis will be provided for some of the studies so that future researchers can test this model using similar methods to prior research

CHAPTER TWO: REVIEW OF RELATED LITERATURE

Overview

The review of related literature focuses on different aspects of research regarding practicing. First, the researcher examined different journal articles and book chapters that reviewed a large amount of prior research and then created their own models for future research to investigate. Next, it examined studies that used surveys and interviews to investigate how teachers and college students view an aspect of practicing (practice strategies, methods, teaching philosophies, ect.). Third, it investigated literature that deals with practice methods (such as mental practice versus physical practice), testing the effectiveness of certain models or behavioral contracts and memorizing. Finally, the researcher examined studies where prior research observed which practice strategies individuals commonly used and how sleep or resting intervals affected an individual's overall achievement gains.

Models Created from a Literature Review

Several researchers have created practice models or models for motivation based on a review of the literature. Robert W. Lundin wrote the book chapter, "Learning and Remembering Music," in his book, *An Objective Psychology of Music*.²² In his chapter's introduction, Lundin noted several studies on topics like practicing and musical constructs, like tonal memory.²³ The researcher wanted to create a review of the

²² Robert W. Lundin. *An Objective Psychology of Music* (New York: The Ronald Press Company, 1967), 61-72.

²³ *Ibid.*, 123-124.

literature surrounding the constructs of musical learning and remembering, and then explained how the individual might relate this information into their everyday life.²⁴

First, Lundin explored tonal memory in this chapter. He defined tonal memory as, “he is able to easily and effectively to repeat a sort of musical response after a period of delay following a previous contact with the musical stimulus.”²⁵ Next, he examined three, different models that tested tonal memory and their relevance to helping future researchers test an individual’s tonal memory.²⁶ Once he finished describing these models, Lundin asserted that while an individual may have an excellent tonal memory, they might not have the necessary musical skills to become an accomplished musician.²⁷ Furthermore, the researcher suggested that while accomplished musicians may have poor tonal memories, they may have other musical skills that make the up the differences for having a poor tonal memory.²⁸

After discussing tonal memory, Lundin described musical learning and the difference types of reinforcement. First, he described positive reinforcement and stated that when giving reinforcement (of whatever type), the individual should specify the exact behavior they want to correct or praise.²⁹ Next, he proposed that as a general rule, “...as the learning progresses, the degree of variability decreases.”³⁰ Yet, with this idea in mind, Lundin stated that past researchers built this idea on the premise that the individual could select the necessary responses towards to making improvement.³¹

²⁴ Ibid., 125.

²⁵ Ibid., 124.

²⁶ Ibid., 125-128.

²⁷ Ibid., 129.

²⁸ Ibid., 129.

²⁹ Ibid., 130.

³⁰ Ibid., 131.

³¹ Ibid., 132.

In addition to selecting the necessary response to promote growth, the researcher also asserted a need for an immediate response of reinforcement. This helps the individual take the necessary actions to improving, without sacrificing their time or in some cases, their ego.³² Finally, Lundin explained that while negative reinforcement (punishment) can stop a bad behavior, it does not eliminate it.³³ He later stated that the individual can use negative reinforcement if the individual applying the negative reinforcement replaces the negative behavior with a positive behavior coupled with positive reinforcement.³⁴

Once Lundin finished this section, he reviewed the literature on efficiency in learning music. First, the researcher explored some of the literature that examined whole versus part learning, and found that the individual's current situation (their musical selection, their musical level, and their time limit to work on the music) should dictate which method they employ to practice.³⁵ Next, the researcher examined one study, from Grace Rubin-Rabson³⁶ (and like O'Brien³⁷) agreed with her researcher that stated individuals should choose to employ a distributed practice method over mass practice method when learning a piece.³⁸

After discussing distributed versus mass practice, Lundin suggested that score study can help the individual before they begin working on a piece, and mental practice

³² Ibid., 134.

³³ Ibid., 135.

³⁴ Ibid., 135.

³⁵ Ibid., 136-138 and 144.

³⁶ Grace Rubin-Rabson. "Studies in the psychology of memorizing piano music: II. A comparison of massed and distributed practice." *The Journal Of Educational Psychology* 31, no. 4 (April 1940): 270-284.

³⁷ Cyril C. O'Brien. "Part and Whole Methods in the Memorization of Music." *Journal Educational Psychology* 34, (1943): 552-560.

³⁸ Lundin 1967, 138-139 and 144.

can also help if the individual places it at the halfway point in their practice session.³⁹

Furthermore, the researcher found that over-learning does not help improve a piece once the individual has learned it, and Lundin also stated that practicing mistakes to help eliminate them does not help.⁴⁰

In addition to Lundin, Nancy H. Barry and Susan Hallam wrote the book chapter, “Practice,” in the book, *The Science and Psychology for Teaching and Learning*.⁴¹ In their chapter’s introduction, Barry and Hallam defined practice as, “repeated performance or systematic exercise for the purpose of learning or acquiring proficiency.”⁴² For this chapter, the researchers created a literature review of the studies that examined practice, and gave ideas of correct learning and practicing strategies.⁴³

The researchers first discussed how to use time as a learning and a practicing strategy. They stated that the individual needs to manage their practice time since studies have suggested that accumulated practice time and how the individual uses their practice time (the quality of practice time) can both indicate performance achievement.⁴⁴ Next, they found that while most studies have suggested a that distributed practice method results in higher performance gains and higher recall scores, studies have suggested that individuals can successfully implement mass practicing if they have good training and a good understanding of the piece or if they have obtained expert status.⁴⁵

Following their discussion on time, the researchers explored different cognitive strategies that individuals use while they practice. The researchers first discussed three

³⁹ Ibid., 140-141 and 144-145.

⁴⁰ Ibid., 141-143 and 144.

⁴¹ Nancy H. Barry and Susan Hallm. “Practice.” *British Journal of Music Education* 18, no. 3 (2001): 151-165.

⁴² Ibid., 151.

⁴³ Ibid., 151-152.

⁴⁴ Ibid., 152.

⁴⁵ Ibid., 152-153.

different forms of mental practice, possible times to use it, and finally stated that most studies have suggested that mental practice proves most effective when combined physical practice.⁴⁶ Next, the researchers briefly touched on analysis (as a cognitive strategy) and found that studies recommended that the individual could maximize their practice time if they used music analysis elements in their practice sessions.⁴⁷

After their section on analysis, the researchers explored how metacognition related to practicing and found that high-level achieving musicians (most professionals) demonstrated high levels of metacognition.⁴⁸ Lower-level achieving musicians, normally novice or beginning musicians, did not normally display high levels of metacognition let alone, self-regulation.⁴⁹ Finally, the researchers discussed individual differences (deep versus surface learners or loose versus structured practice sessions, and found that deep learners (and those who structured their practice sessions) generally made significant gains over surface learners (and individuals who did not structure their practice sessions).⁵⁰

Once Barry and Hallam finished discussing the research related to cognitive activities, they explored studies that examined practice activities. They first talked about purposeful practicing and came up with three stages for developing a motor skill: 1) cognitive verbal-motor, 2) associated stage, and 3) autonomous stage.⁵¹ Each of the stages relate to the idea that practice should allow the individual to go from concerning

⁴⁶ Ibid., 153-154.

⁴⁷ Ibid., 154.

⁴⁸ Ibid., 154.

⁴⁹ Ibid., 154.

⁵⁰ Ibid., 155.

⁵¹ Ibid., 156.

himself with the notes to gradually start concerning himself with communicating the overall presentation of the composition to the audience.⁵²

In addition to the purpose of practice activities, the researchers also found that when learning a piece of music, practicing may vary due to the individual's needs or the composition's needs.⁵³ Researchers discovered that individuals develop strategies to cope with both the musical structure and the musical difficulties they encounter as they work on a piece of music.⁵⁴

Along with learning a new piece of music, the researchers discovered that two types of mindsets form when developing an interpretation: intuitive and analytical. The intuitive approach allows for an evolving interpretation, and the analytical approach allows for individuals to compare and contrast recordings or complete an analysis of the musical structure.⁵⁵ Either way, the researchers explained that individuals can exhibit both approaches, but most tend to use one or the other.⁵⁶

Furthermore, the researchers briefly discussed memorizing music and preparing for a performance as practice activities. For memorizing, the researchers found that the task at hand dictates the necessary strategies needed to complete it.⁵⁷ In preparing for a performance, the researchers stated that few studies examined where the individual recorded himself as a practice strategy; but they suggested that as a general rule, most individuals did record themselves before performances.⁵⁸

⁵² Ibid., 155-156.

⁵³ Ibid., 156.

⁵⁴ Ibid., 156.

⁵⁵ Ibid., 156-157.

⁵⁶ Ibid., 157.

⁵⁷ Ibid., 157.

⁵⁸ Ibid., 157.

After talking about various practice activities, the researcher made many suggestions for how to teach students to practice effectively. First, Barry and Hallam found that while most individuals talked about how to practice, students reported a more profound influence on their practice if the teacher demonstrated the skill to them.⁵⁹ Next, the researchers discussed the idea of providing models or other examples for their students and found that modeling can help individuals practice effectively.⁶⁰

Third, the researchers found that supervised practice can help if done in a respectful manner that allows for younger musicians to develop the necessary skills without causing harm or frustration.⁶¹ Finally, the researchers suggested that structured that a practice session would lead to an effective practice session if the individual agreed to the regiment of a structured practice session.⁶²

Susan A. O'Neill and Gary E. McPherson wrote the book chapter, "Motivation," in the book, *The Science and Psychology for Teaching and Learning*.⁶³ In their chapter's introduction, O'Neill and McPherson noted studies that wanted to understand why individuals pursued the study of music, why they continued studying music and the motivation needed to continue studying music (motivation).⁶⁴ For this book chapter, the researchers created a literature review of the studies that examined motivation, and then created a framework to illustrate teaching strategies to help students with different types of motivation that resembled Barry and Hallam's book chapter⁶⁵ on practicing.⁶⁶

⁵⁹ Ibid., 157-158.

⁶⁰ Ibid., 158.

⁶¹ Ibid., 159.

⁶² Ibid., 160.

⁶³ Susan A. O'Neill and Gary E. McPherson. "Motivation." In *The Science and Psychology of Music Performance: Creative Strategies for Teaching and Learning*, edited by Richard Parncutt and Gary E. McPherson, 31-46. New York: Oxford University Press, 2002.

⁶⁴ Ibid., 31.

⁶⁵ Barry and Hallam 2001.

For the first part, the researchers created a literature review of the research regarding motivation. First, O'Neill and McPherson discussed the expectancy value theory and its four components: attainment value, intrinsic value, extrinsic value and perceived cost.⁶⁷ Next, the researchers examined self-efficacy (how well the individual believes they can perform an activity and produce positive outcomes).⁶⁸ They found that future research should study the relationship between the amount of time an individual practices and their self-belief.⁶⁹

In addition to self-efficacy, the researchers examined the studies that looked at flow theory- the belief that the individual finds activities pleasurable when the present challenge matches their skill level.⁷⁰ Following their discussion on flow theory, the researchers examined attribution theory (what causes belief in success or failure of an activity) and two types of attribution: common/internal (ability or effort) and less/external (luck).⁷¹ Furthermore, the researchers found that individuals who believed that their successes or failures related to an internal attribution had a higher self-esteem over those who attributed their successes or failures to external reasons.⁷²

Finally, the researchers examined the two different types of motivational patterns: mastery-oriented motivation and maladaptive/helpless motivation. Mastery-oriented motivated individuals focus on achieving their goals despite the difficulties. Maladaptive-oriented individuals, on the other hand, stop working on the activity if it gets difficult

⁶⁶ O'Neill and McPherson 2002., 31-32.

⁶⁷ Ibid., 32.

⁶⁸ Ibid., 34.

⁶⁹ Ibid., 35.

⁷⁰ Ibid., 35.

⁷¹ Ibid., 36.

⁷² Ibid., 37.

since they believe they cannot do anything to overcome the difficulty.⁷³ The researchers then suggested that motivational patterns may influence an individual's development and knowing this, can help music educators tailor curriculums to fit the needs of individual motivational patterns.⁷⁴

Once the researchers completed the literature review of these five areas, they then outlined guidelines. They examined two types of self-theory beliefs: entity (ability viewed as a fixed feature) and incremental (ability increases as effort increases).⁷⁵ Following the idea that an increase in an individual's self-belief can lead to a higher self-efficacy, they proposed five areas to explore: teach specific strategies, set goals, communicate expectations and encouragement, monitor a student's anxiety levels, and provide positive, successful modeling from responsible authorities.⁷⁶ The researchers also suggested that teachers and their students should examine and monitor their successes and failures, their overall enjoyment and engagement of the activities they participate, the goals that they set for themselves, and the evaluations they receive.⁷⁷ If any one of these areas demonstrates too much ease or difficulty, then the individual may either not work hard enough or find themselves burdened with challenges that they cannot handle.⁷⁸

In addition to O'Neill and McPherson, Jennifer Mishra created a theoretical model for memorizing music that synthesized the prior research on memorizing music.⁷⁹ Furthermore, the researcher also wanted to provide clear and concise definitions of terms

⁷³ Ibid., 38.

⁷⁴ Ibid., 38.

⁷⁵ Ibid., 39.

⁷⁶ Ibid., 40.

⁷⁷ Ibid., 40-43.

⁷⁸ Ibid., 42.

⁷⁹ Jennifer Mishra, "A Theoretical Model of Musical Memorization," *Psychomusicology- A Journal in Music Cognition* 19, no. 1 (Spring 2005): 75-89. (accessed May 29, 2012).

commonly associated with memorizing to help avoid unclear terminology that existed in previous literature.⁸⁰

Mishra's model of how to memorize music has four distinct stages that depend on the following: 1) the individual's ability, 2) stage of learning, 3) the performer's physiological state, and 4) the performer's physical environment.⁸¹ Mishra defined the first stage, "Enculturation and Experience," as the stage where the individual uses their former knowledge and performing experience to start working on a piece of music.⁸² For example, if an individual starts preparing a Mozart piano sonata, they use their form and analysis skills, remember a recording or live performance of the piece (any Mozart piece), or possibly drawing on the prior experience of performing a Mozart piano sonata.

After the initial stage, Mishra stated that, like Hallam's 1997 study⁸³ and Miklaszewski's 1995 study,⁸⁴ individuals tend to preview "to establish tempo identify difficult passages and get a general overview of the piece."⁸⁵ In order to preview the piece, Mishra stated that individuals preview a piece of music in three ways: aural (listening to a recording), notational (formal analysis or personal analysis of the piece) and performance (play or sing through the entire piece).⁸⁶ She additionally stated that an individual can use any of the preview styles in combination with each other or none at all. It simply depends on the individual and their needs for the particular piece they need to prepare and memorize.⁸⁷

⁸⁰ Ibid., 76.

⁸¹ Ibid., 76.

⁸² Ibid., 76.

⁸³ Hallam 1997.

⁸⁴ Miklaszewski, 1995.

⁸⁵ Ibid., 78.

⁸⁶ Ibid., 78.

⁸⁷ Ibid., 78.

Following the preview stage, Mishra explained her ideas about the practice stage. In the practice stage, the performer should work on accurately performing the piece as they see it printed on the score, and adds that individuals start memorizing the music in this stage.⁸⁸ Furthermore, she discussed four processing strategies for memorizing music: segmenting (practicing fragments and then as a unit), additive (when the individual continues adding material to what they have memorized), holistic (playing through the entire piece even if a small transgression occurs) and serial (if a person makes a mistake, they have to start over). Mishra discussed all of these strategies to demonstrate that an individual can implement them depending on their current stage in the learning or memorizing process.⁸⁹

In addition to how the individual memorizes the music, Mishra discussed sensory learning styles and analytical styles. Mishra identified three different learning styles: Aural (being able to hear a piece of music without music or sound sources), Visual (being able to remember musical notes from the whole or segmented parts of music) and Kinesthetic (muscle memory).⁹⁰ She also stated that using several strategies will help the individual have a better memory of the music.⁹¹

After discussing the different learning styles to memorizing, Mishra described and explained the details of an Analytical Learning style (forming a memory relationship to the music by establishing musical relationships and musical patterns).⁹² First, she stated that those with advanced form and analysis skills have an easier time using this style

⁸⁸ Ibid., 78.

⁸⁹ Mishra., 80.

⁹⁰ Ibid., 82.

⁹¹ Ibid., 82.

⁹² Ibid., 83.

since they use music theory to recognize patterns and the structure of the piece.⁹³ She also stated that those who have better form and analysis skills may learn atonal and modal music faster because they can recognize patterns like modal scales and twelve-tone rows.⁹⁴ Furthermore, she stated that those individuals who used an analytical learning style typically used the segmented process for memorizing music.⁹⁵ Yet, she suggested that this might not always work since most individuals make segments based off the page and not a musical structure.⁹⁶

After discussing the Processing/Practicing stage, Mishra explained the three different stages of over-learning. First, she described relearning as a time where the individual can recognize the information learned in the practice/processing stage to help ensure a more secure memory, and help create and eliminate retrieval cues.⁹⁷ Next, after relearning the piece, Mishra described the process automatization as: “the extended and consistent repetition of a behavioral sequence, which results in a routine, stereotyped, inflexible performance that is completely automatically without any conscious control.”⁹⁸

Finally, Mishra described maintenance rehearsal as a period of time where an individual keeps the piece active in their memory for a long period of time.⁹⁹ Mishra explained that most individuals in this stage constantly test their memory to ensure that they do not have memory lapses while they perform the piece.¹⁰⁰ She also stated that her

⁹³ Ibid., 83.

⁹⁴ Ibid., 83.

⁹⁵ Ibid., 83.

⁹⁶ Mishra., 83.

⁹⁷ Ibid., 84.

⁹⁸ Ibid., 85.

⁹⁹ Ibid., 85.

¹⁰⁰ Ibid., 85.

model would have to adapt and change as future research tested her model and asked new questions after they collected more data.¹⁰¹

In addition to Jennifer Mishra' model on memorizing, Gary E. McPherson and Barry J. Zimmerman reviewed the literature available on self-regulation in music and other academic fields.¹⁰² After they reviewed that literature, they created a working model to help individuals apply self-regulation to their daily practicing.¹⁰³

McPherson and Zimmerman believe six cognitive processes affect the self-regulating person, his environment, and his behavior. The authors described that several factors influence a young musician's motive for choosing and continuing to learn an instrument. These factors include parental support, self-motivation, self-efficacy, and self-beliefs.¹⁰⁴ After reviewing the literature on "motive-influences," the researchers suggested that all these sources do influence an individual's motive.¹⁰⁵

Following motive, the researchers examined the research on method. They found that method also had several sub-sections to explore such as: strategies and the development of those strategies, the differences between practicing for the individual's self and the individual's teacher, and a person's use of mental strategies and self-instruction.¹⁰⁶ Once the researchers explored all these areas in the literature, they found that self-regulated individuals had a systematic approach to how they employed and utilized all these powers in their practice session to help avoid poor performances.¹⁰⁷

¹⁰¹ Ibid., 86.

¹⁰² Gary E. McPherson and Barry J. Zimmerman. "Self-Regulation of Musical Learning." In *MENC Handbook of Research on Music Learning Volume 2: Applications*, edited by Richard Colwell and Peter R. Webster, 130-172. New York: Oxford University Press, 2006.

¹⁰³ Ibid., 133.

¹⁰⁴ Ibid., 134, 139, 140, and 141.

¹⁰⁵ Ibid., 142.

¹⁰⁶ Ibid., 143, 144, and 145.

¹⁰⁷ Ibid., 147.

After reviewing the literature on method, the researchers explored time and how it influenced self-regulation in music. The researchers defined time as the duration of self-practice and not the time of day or the time of year, for example.¹⁰⁸ They found that like Nielsen's 1999 study¹⁰⁹ and in Hallam and Barry's chapter on Practicing,¹¹⁰ self-regulated individuals organize their time efficiently to gain the most out of their "formal" practice sessions.¹¹¹ The researchers use formal to qualify this type of practice session since researchers, like Sloboda,¹¹² have described two different types of practice sessions that they believe individuals should use while they practice.

Along with time and how individuals use it, McPherson and Zimmerman examine the literature on behavior, and identified three specific subsections to explore: metacognition, self-evaluation and motivational orientations. Metacognition, according to McPherson and Zimmerman, affects how a person's self-regulating skills develop in two ways: their ability to remember and understand problems increases, and their ability to create solutions to the problems they encounter as they practice.¹¹³ This leads to an increase in efficiency in the practice session whereas non-regulating students have not fully developed their metacognition skills and waste lots of their practice time.¹¹⁴

Next, after metacognition, the researchers explored self-evaluation. McPherson and Zimmerman saw that self-regulated individuals practice self-evaluation through the entire practice session.¹¹⁵ They also found that individuals needed different apparatuses for different types of self-evaluation and for different points of the practice session. First,

¹⁰⁸ Ibid., 147-149.

¹⁰⁹ Nielsen 1999.

¹¹⁰ Barry and Hallam 2001.

¹¹¹ McPherson and Zimmerman, 147-149.

¹¹² Sloboda, Davidson, Howe and Moore 1996..

¹¹³ Ibid., 149.

¹¹⁴ Ibid., 148-149.

¹¹⁵ Ibid., 152.

before the individual starts, they used past experiences (what happened yesterday in the practice room or earlier that day) to self-evaluate before they start.¹¹⁶ Next, they used themselves to help correct problems while they practiced.¹¹⁷ Finally, they used a tape recording device at the end of the session to measure if they had made any achievement gains after the practice session.¹¹⁸

Following self-evaluation, the researchers examined different types of motivational orientations. They saw that motivational orientations influence a person's behavior and they identified two different types of motivational orientations: adaptive mastery-oriented (individuals who maintain their goals even when faced with difficulty) and maladaptive help-less-oriented (individuals who avoid challenges and when faced with difficulties, will either lower their standards or give up).¹¹⁹ While the researchers summarized prior research for their article, they did remark that individuals have both motivational patterns regardless of intelligence.¹²⁰

In addition to behavior, McPherson and Zimmerman described and examined how physical environment affects the self-regulated learner. The researchers found that self-regulated learners chose environments to perpetuate better learning environments.¹²¹ They also stated that further research should investigate the relationship between physical environment and practicing in order to collect more data to help educators and researchers.¹²²

¹¹⁶ Ibid., 152.

¹¹⁷ Ibid., 152.

¹¹⁸ Ibid., 152.

¹¹⁹ Ibid., 153.

¹²⁰ Ibid., 153.

¹²¹ Ibid., 154.

¹²² Ibid., 155.

Finally, the researchers examined how social influences affect musicians as self-regulated learners. They found four subsections that research has investigated: parents, teachers, siblings and peers, and others. The researchers saw parental involvement as an important factor, but they also found that it as an equally important social factor. For instance, they found that young individuals would play in front of their parents before competitions or in their examinations.¹²³

In addition to using parents, they also discovered that individuals used their teachers as social influences, but not necessarily as influencing the motive. They found that high-achieving beginning students had fun with their teachers and believed that they took lessons with good players.¹²⁴ As they get older, the teachers went from a fun, outgoing person who plays well, to the more serious, diligent exceptional player.¹²⁵ Lower-achieving individuals or dropouts, on the other hand, had less positive experiences in the beginnings with bad teachers and did not continue pursuing an instrument.¹²⁶

Along with teachers, McPherson and Zimmerman examined how siblings, peers and others can affect the self-regulated learner. They found that the self-regulated learner will actively seek out information to help themselves, but prior music research has not yet focused on these specific areas. The researchers therefore recommended that future research should investigate these areas.

Like Zimmerman's prior reserach¹²⁷ on self-regulation, both researchers agreed that self-regulation has three main components (in no particular order) that function in a cyclical process: self-reflection phase, forethought phase, and performance/volitional

¹²³ McPherson and Zimmerman, 155.

¹²⁴ Ibid., 155.

¹²⁵ Ibid., 156.

¹²⁶ Ibid., 156.

¹²⁷ See Zimmerman 1998 or Zimmerman 1986.

control phase. The self-reflection phase includes processes that involve “self-evaluation, casual attributions, self-satisfaction and adaptivity.”¹²⁸ Next, the Forethought phase includes processes that involve setting long and short-term goals, strategic planning, self-efficacy, goal orientations, outcome expectations and intrinsic interest/involvement.¹²⁹ Finally, the performance/volitional control phase involves processes that include self-control and self-observation.¹³⁰

In addition to McPherson and Zimmerman’s review, Peter Miksza wrote the article, “A Review of Research on Practicing: Summary and Synthesis of the Extant Research with Implications for a New Theoretical Orientation,” in the journal, *Bulletin of the Council for Research in Music Education*.¹³¹ In his article’s introduction, Miksza noted several different studies that examined practicing, but he found that none of them created an extensive literature review.¹³² For this study, the researcher wanted to create a literature review from articles found in music research journals, and then created a model to practice from the articles he reviewed.¹³³

Miksza created a review of the literature similar to Robert Duke’s 1999/2000¹³⁴ review of literature that examined teaching music in both group and private lessons. Miksza divided the research into three categories, reviewed them, and then created tables to create a summary of those studies. These tables provided basic information on each of

¹²⁸ Ibid., 161.

¹²⁹ Ibid., 159.

¹³⁰ Ibid., 159.

¹³¹ Peter Miksza. “A Review of Research on Practicing: Summary and Synthesis of the Extant Research with Implications for a New Theoretical Orientation.” *Bulletin of the Council for Research in Music Education* no. 190 (Fall 2011): 51-92.
<http://www.jstor.org/stable/10.5406/bulcouresmusedu.190.0051> (accessed July 11, 2012).

¹³² Ibid., 52.

¹³³ Ibid., 52.

¹³⁴ Robert Duke. “Measures of Instructional Effectiveness in Music Research.” *Bulletin of the Council for Research in Music Education* no. 143 (Winter 2011): 1-48.
<http://www.jstor.org/stable/40319011> (July 12, 2012).

the studies (author, population size, materials, ect.) and Miksza further compared and contrasted the results of these different studies.

After structuring the literature review, Miksza constructed three large categories to divide the literature. The first category examined music practice room behaviors. This category included studies that compared student and teacher perspectives, changes in practice as they relate to changes in development, practicing and how it relates to memorizing music, and self-reports of practice sessions.¹³⁵ The second category reviewed studies that dealt with experiments on practicing. This included studies that explored the use of mental practice, modeling, traditional practice, and even effects of sleep and how it related to practice.¹³⁶

Third, Miksza reviewed studies that examined the different aspects of motivation and how it related to practice. This included studies that explored mastery-orientation versus mastery-avoid orientation, locus of control, self-efficacy, and intrinsic versus extrinsic motivation.¹³⁷ Finally, Miksza reviewed literature that discovered whether or not students used self-regulating behaviors in their practice sessions.¹³⁸

Once he completed his literature review, Miksza created an instructional theory for practicing. All of these components in his flow theory depend mainly on the developmental conditions of the students and whether or not the teacher could implement these expectations. Miksza hoped that these would help encourage and impact choice, intentionality, action, achievement outcome, rest and recovery and still accommodate

¹³⁵ Miksza 2011, 53-65.

¹³⁶ Ibid., 65-73.

¹³⁷ Ibid., 73-78.

¹³⁸ Ibid., 78-82.

individual differences.¹³⁹ Furthermore, he hoped that this model would promote individuals who practice with a better understanding of their process as opposed to making getting performance gains.¹⁴⁰

From these studies, prior research has created models based on reviews of literature to create their model. Furthermore, when creating a model, individuals should not find fault with prior research but instead use that research to springboard to another idea. These researchers demonstrated that viewing all the research in positive light can help the individual create a model that does not admonish any prior research, but instead helps strengthen the field's understanding on a particular topic.

Interviews and Surveys

Along with literature reviews, several researchers have used interview methods and surveys to gather retrospective information on how individuals practice, how and why they want to join the music field, and why they employ certain tactics in the practice room. This interview and survey method has allowed researchers to gather data either in a very personal interview or the survey allows musicians to remain anonymous and give information.

Maria Manturzevska wrote the article, "A Biographical Study of the Life-Span Development of Professional Musicians," in the journal, *Psychology of Music*.¹⁴¹ In her article's introduction and literature review, Manturzevska noted several different studies that examined the developmental phases of different musicians, but none had investigated

¹³⁹ Ibid., 84.

¹⁴⁰ Ibid., 83.

¹⁴¹ Maria Manturzevska. "A Biographical Study of the Life-Span Development of Professional Musicians." *Psychology of Music* 18, no. 4 (October 1990): 112-139 <http://pom.sagepub.com/content/18/2/112> (accessed July 1, 2012).

the musician's entire development from start to beginning.¹⁴² For this study, the researcher collected data from different musicians that represented their entire lives. She also wanted to describe the natural course of events that happens to musicians, explore how the psychological and sociological aspects influence a musician's development, and use the data to familiarize a younger generation of musicians with the necessary skills to function in the Polish contemporary music scene.¹⁴³

Manturzevska recruited and interviewed 165 Polish musicians over a four year period (1976-1980) and divided them into two subgroups: basic (thirty-five outstanding musicians) and control (the remaining 130 musicians).¹⁴⁴ Next, the researcher used a semi-formal interview setting when interviewing the musicians, and interviewed most of the participants in their homes.¹⁴⁵ The researcher selected ten areas to interview the participants based on her own previous research (twenty years of research) and other established research.¹⁴⁶ These areas included biographical information, work history, overcoming difficulties, time management, self-evaluation procedures and other successful measures.¹⁴⁷

Furthermore, when analyzing the data, the researcher wanted to find three main areas. First, Manturzevska wanted to examine the different life spans and determined whether or not different developmental phases sparked differences in the "musical behavior, motivation and social connections to musicians."¹⁴⁸ Next, the researcher

¹⁴² Ibid., 112-113.

¹⁴³ Ibid., 113.

¹⁴⁴ Ibid., 113.

¹⁴⁵ Ibid., 113.

¹⁴⁶ Ibid., 114.

¹⁴⁷ Ibid., 114.

¹⁴⁸ Ibid., 115.

discovered the similarities between them.¹⁴⁹ Finally, after the researcher examined the biographical information, she tried to locate the “predictors of formation, development, and function of musical talent in various phases of life and various areas of musical activity.”¹⁵⁰

Once the researcher finished analyzing the data, she made several observations. First, men mostly comprised the population sample for Manturzevska’s study, and she suggested that the higher proportion resulted from differences in both intrinsic and extrinsic motivations.¹⁵¹ Second, while most musicians have musicians in their family, it did not automatically predict that all musicians have them in their families.¹⁵² In addition, she found that most musicians came from upper-class working families and only a small proportion of the study’s population came from lower-class families.¹⁵³ Finally, the researcher found that most musicians came from urban areas, not rural communities.¹⁵⁴

After exploring the family backgrounds, Manturzevska examined their education backgrounds. First, most of the participants in the study started taking lessons between the ages of five and six.¹⁵⁵ Next, most of the individuals who gained a reputation as a professional musician studied their instrument for about sixteen years; but the researcher noted that time spent in school does not automatically mean someone plays at a professional level.¹⁵⁶ The researcher additionally stated and later hypothesized that the environmental and motivational factors play a part in helping musicians at this age

¹⁴⁹ Ibid., 115.

¹⁵⁰ Ibid., 115.

¹⁵¹ Ibid., 118-119.

¹⁵² Ibid., 119.

¹⁵³ Ibid., 119.

¹⁵⁴ Ibid., 119.

¹⁵⁵ Ibid., 123.

¹⁵⁶ Ibid., 124-125.

develop their full potential.¹⁵⁷ Third, the researcher found that different generations completed their musical studies at different times. For example, individuals who studied before World War II, could have graduated at a young age unlike those who studied after World War II due to the employment of standardized testing in the Polish music system.¹⁵⁸

Once the researcher compiled the data on their educational lives, she examined their musical careers. First, only a small percentage of musicians gave what she called an “Artistic Debut.” From this data, the researcher suggested that most musicians give their debuts in either childhood (8-10 years) or in their early adult life (20-30 years).¹⁵⁹ Next, while most participants had optimal performance years in the middle of their lives (25 to 45 years), it did depend on which medium they chose as their musical path.¹⁶⁰ Conductors, for example, did not really achieve optimal artistic activity until much later in life.¹⁶¹ Finally, most of the musicians in the study started to end their musical careers after seventy, but some pianists in the study continued playing until ninety.¹⁶²

After analyzing all this biographical data, the researcher suggested that six developmental stages existed in a musician’s life. First, Stage I covers the first six years of life and individuals start developing a sensitivity to musical sounds, start to perceive pitches and start to form a musical memory.¹⁶³ Next, in Stage II, individuals start receiving music lessons on basic techniques and other musical knowledge pertinent to

¹⁵⁷ Ibid., 125.

¹⁵⁸ Ibid., 126.

¹⁵⁹ Ibid., 127.

¹⁶⁰ Ibid., 129.

¹⁶¹ Ibid., 129.

¹⁶² Ibid., 130.

¹⁶³ Ibid., 132.

their basic musical development.¹⁶⁴ Following this stage, Stage III occurs during puberty (and lasts through college), and the individual forms their own unique personality with or without the guidance of a mentor or teacher.¹⁶⁵ After college, Stage IV commences when individuals win their first professional job and engage in more performing activities than in the previous stages.¹⁶⁶ Then, once the individual has performed professionally for a while, they start teaching professionally in Stage V.¹⁶⁷ Finally, in Stage VI, most individuals start retiring from their professional activities, and some may even start their teaching careers in this stage.¹⁶⁸

With this in mind, the researcher noted that an emotional crisis can happen between stages if unfavorable circumstances affect the transition.¹⁶⁹ For example, if a musician had a great career during Stage IV, but it got cut short due to an orchestra failing, or a rock band that fell apart. The musician then might not have prepared himself mentally to start the next stage of his life and may go through a period of suffering.

Nancy H. Barry and Victoria McArthur wrote the article, “Teaching Practice Strategies in the Music Studio: A Survey of Applied Music Teachers,” in the journal, *Psychology of Music*.¹⁷⁰ For this study, the researchers wanted to know which studio teachers taught practice strategies to their students.¹⁷¹ In order to better address this purpose the researchers had four specific questions. First, the researchers wanted to

¹⁶⁴ Ibid., 133.

¹⁶⁵ Ibid., 134.

¹⁶⁶ Ibid., 136.

¹⁶⁷ Ibid., 137.

¹⁶⁸ Ibid., 137.

¹⁶⁹ Ibid., 138.

¹⁷⁰ Nancy H. Barry and Victoria McArthur. “Teaching Practice Strategies in the Music Studio: A Survey of Applied Music Teachers.” *Psychology of Music* 22, no. 1 (April 1994): 44-55. <http://pom.sagepub.com/content/22/1/44> (accessed October 3, 2010).

¹⁷¹ Ibid., 44.

ascertain whether or not teachers taught effective practice.¹⁷² Next, they wanted to know how they taught students how to practice.¹⁷³ Then, the researchers wanted to know if a relationship existed between the current literature and the practice strategies that studio teachers taught to their students.¹⁷⁴ Finally, Barry and McArthur wanted to know if teachers who taught university students teach practicing music differently from those who teach pre-college students.¹⁷⁵

In order to collect their data, Barry and McArthur administered a Music Practice Instruction Inventory (MPII) to ninety-eight members of the Music Teachers National Association who primarily taught piano and had students that ranged from pre-kindergarten through college and on to adulthood.¹⁷⁶ Barry and McArthur divided their survey into two parts: 1) background information about the teacher and their studio, and 2) their ideas of practicing.¹⁷⁷

After collecting the results, Barry and McArthur found several answers to their research questions. First, they suggested that most teachers discussed practicing methods with their students.¹⁷⁸ Next, the researchers found that teachers believed that their students should start the piece slowly and gradually increase the tempo.¹⁷⁹ Finally, Barry and McArthur found differences between teachers who taught college-level students and those who taught pre-college students. They found that university-level teachers did not necessarily make their students follow a practice routine, enlisting parental involvement to help or monitor the student's practice, and it did not matter to them if a student to

¹⁷² Ibid., 46.

¹⁷³ Ibid., 46.

¹⁷⁴ Ibid., 46.

¹⁷⁵ Ibid., 46.

¹⁷⁶ Ibid., 47.

¹⁷⁷ Ibid., 46.

¹⁷⁸ Ibid., 52.

¹⁷⁹ Ibid., 52.

started slow and increased the tempo; whereas the pre-college teacher did find these items necessary for their students to achieve success.¹⁸⁰

In addition to Barry and McArthur, Donald L. Hamann, Kieth V. Lucas, Peter McAllister and David Teachout wrote the article, “An Investigation Into the Factors Contributing to Individual Practice,” in the journal, *Journal of Band Research*.¹⁸¹ In their article’s introduction and literature review, Hamann et. al examined reasons for practice and some experiments that tested practice.¹⁸² For this study, the researchers wanted to catalogue as many variances as they could after speaking with university students about their practice sessions.¹⁸³

Hamann et. al recruited 711 participants from various instrumental, piano and vocal backgrounds and from various undergraduate and graduate degree programs in music.¹⁸⁴ The researchers instructed the participants to complete a practice questionnaire that included background, questions about their practice habits, practice procedures, concepts about practice.¹⁸⁵ Furthermore, the researchers defined practice as, “the individual study and preparation of music.¹⁸⁶” Finally, once the researchers received the completed questionnaires, they analyzed and reported the results.

After they analyzed the data, Hanmann et. al reported their results. First, most of the participants reported that they “sometimes” or “often” felt satisfied with their music

¹⁸⁰ Ibid., 52.

¹⁸¹ Donald L. Hamann, Kieth V. Lucas, Peter McAllister and David Teachout wrote the article, “An Investigation Into the Factors Contributing to Individual Practice,” in the journal, *Journal of Band Research* 34 no. 1 (1998): 59-68.

¹⁸² Ibid., 59-60.

¹⁸³ Ibid., 61.

¹⁸⁴ Ibid., 61.

¹⁸⁵ Ibid., 61.

¹⁸⁶ Ibid., 62.

practice.¹⁸⁷ Next, the results suggested that many participants felt guilty when they could not practice and many of them reported that they needed to find a balance between the social, physical, family and school with their individual practicing.¹⁸⁸

Third, the participants reported that they mainly organized their practice sessions to monitor not only the hours they practice, but also so they can monitor pain and avoid schedule conflicts.¹⁸⁹ Along with organizing their practice sessions, the researchers also discovered that the students try to practice in optimal conditions to avoid mental or physical pain.¹⁹⁰

Along with practice organization and choosing optimal conditions, the researchers also found that the participants reported that they “sometimes” feel exhausted after practicing.¹⁹¹ Finally, the researchers found that most of the students practiced to satisfy their own intrinsic needs, although they admitted that sometimes they play to please other’s expectations.¹⁹² Overall, the researchers promote the idea that the individual should create an organized practice method that will allow for internal satisfaction and not allow the person to feel guilty if they miss a practice session to enjoy their family or any other aspect of their social life.¹⁹³

Susan Hallam wrote the article, “The Predictors of Achievement and Dropout in Instrumental Tuition,” in the journal, *Psychology of Music*.¹⁹⁴ In her article’s introduction and literature review, Hallam noted that few models existed in music for learning and

¹⁸⁷ Ibid., 64.

¹⁸⁸ Ibid., 64.

¹⁸⁹ Ibid., 65.

¹⁹⁰ Ibid., 65.

¹⁹¹ Ibid., 65.

¹⁹² Ibid., 65-66.

¹⁹³ Ibid., 64.

¹⁹⁴ Susan Hallam. “The Predictors of Achievement and Dropout in Instrumental Tuition.” *Psychology of Music* 26, no. 2 (October 1998): 116-132. <http://pom.sagepub.com/content/26/2/116> (accessed June 1, 2012).

interpreting music. In this study, she proposed using prior research to determine the degree of learning in music.¹⁹⁵ For this study, the researcher wanted to examine how the interactions between time-spent practicing, ability factors and aspects of perseverance.¹⁹⁶

Hallam recruited 109 participants who played violin and viola and studied with the same teacher (in group lessons provided from a scholarship fund).¹⁹⁷ Participants all took part in the standardized tests and a questionnaire four weeks before their board exams, and their parents kept records of their practice time.¹⁹⁸ Finally, the participants took their board examination four weeks later.¹⁹⁹

After Hallam recruited the participants, she measured four different aspects (aptitude, ability to understand instruction, and quality of instruction) to measure time needed for learning.²⁰⁰ First she measured aptitude through three different standardized tests, and asked the music teacher to rate the student's musical ability on a scale from one to seven.²⁰¹ Next, in order to measure the participant's ability to understand instruction, Hallam asked the participant's teachers to rate them on a scale of one to seven.²⁰² Third, the researcher believed that all the participants had similar instruction since the same teacher had taught the participants for three years.²⁰³

After creating the measures, Hallam examined three areas in order to observe time spent learning: how long the participant had played the instrument, the participant's

¹⁹⁵ Ibid., 116.

¹⁹⁶ Ibid., 118.

¹⁹⁷ Ibid., 118.

¹⁹⁸ Ibid., 121.

¹⁹⁹ Ibid., 121.

²⁰⁰ Ibid., 121.

²⁰¹ Ibid., 119.

²⁰² Ibid., 119.

²⁰³ Ibid., 119.

practice time and perseverance.²⁰⁴ The researcher consulted the participant's school records to measure how long they had played their respective instrument.²⁰⁵ Next, the researcher asked the parents to record daily practicing over a two-week period to help determine the participant's practice time.²⁰⁶ Third, Hallam measured perseverance through a questionnaire containing eleven statements that examined the participant's attitude.²⁰⁷ Finally, she used the participant's final exam scores (also known as the Associated Board of the Royal Schools of Music) to measure achievement.²⁰⁸ The researcher also stated that an experienced, certified board examiner scored each participant.

Once she completed the study, she made several observations. First, Hallam suggested that the length of time learning proved more important than time spent practicing. She gave four reasons for this: (1) self-reports of practicing are not always accurate, (2) even if the practice times are equal, that does not mean that they will all have the same level of being effective, (3) some individuals count playing as practice when they are not fixing anything, and (4) some individuals take on more practice because of their level of musicianship and not because they need to do it.²⁰⁹

The researcher found other important factors that could help in predicting achievement. Hallam found that the ability to understand instructions could predict achievement.²¹⁰ She also found that the teacher's rating of musical ability created a

²⁰⁴ Ibid., 119.

²⁰⁵ Ibid., 120.

²⁰⁶ Ibid., 120.

²⁰⁷ Ibid., 120.

²⁰⁸ Ibid., 120.

²⁰⁹ Ibid., 127 and 128.

²¹⁰ Ibid., 128.

better predictor of achievement instead of the standardized test of musical ability.²¹¹ The researcher then found that according to the attitude motivation could not predict achievement and that the participant's friend's attitudes and influences negatively affected their learning outcomes.²¹² Instead, the results suggested that a person's self-determination proved important in predicting achievement.²¹³ Moreover, while the results suggested that the length of time spent practicing can factor into achieving achievement, an individual must consider other factors in order to accurately determine achievement or musical expertise.²¹⁴

Gary E. McPherson and John McCormick wrote the article, *Motivational and Self-Regulated Learning Components of Musical Practice*, in the journal, *Bulletin of the Council for Research in Music Education*.²¹⁵ In their introduction, they explained that two aspects regulated an individual's learning in music: Cognitive strategies ("the ability to control and monitor learning") and Self-Regulation ("a person's ability to manage their own learning").²¹⁶ For this study, McPherson and McCormick wanted to understand how self-regulation and the motivational components of learning interact with both the quality and content of one's musical practice.²¹⁷

McPherson and McCormick administered a survey to 190 pianists who started preparing for their performance examinations.²¹⁸ The survey consisted of seventeen items that the researchers divided into different categories. First, McPherson and

²¹¹ Ibid., 128.

²¹² Ibid., 128.

²¹³ Ibid., 129.

²¹⁴ Ibid., 130.

²¹⁵ Gary E. McPherson and John McCormick, "Motivational and Self Regulated Learning Components of Musical Practice," *Bulletin of the Council for Research in Music Education* 17, no. 141 (Summer 1999): 98-102. <http://www.jstor.org/stable/40318992> (accessed May 30, 2012).

²¹⁶ Ibid., 98 and 99.

²¹⁷ Ibid., 98.

²¹⁸ Ibid., 99.

McCormick asked questions about the participant's cognitive abilities: rehearsing strategies, elaboration strategies, and organizational strategies.²¹⁹ Next, the researchers asked questions about the participant's self-regulated behaviors and their intrinsic values regarding music.²²⁰ Then they asked the participant about their confidence and anxiety levels on the upcoming performance test.²²¹ Finally, they asked eleven other items about their practice frequency, quantity, informal/creative activities, repertoire and technical work.²²²

After collecting and tabulating all the data, the researchers made several observations. First, they found that as examines got closer, the participants practiced more on technical exercises and their anxiety levels went up.²²³ Next, they observed that harder working musicians reported more practice time and that they probably worked harder to refine their musical abilities.²²⁴ Finally, McPherson and McCormick found a relationship between mental strategy use and achievement, yet they cautioned that future research should collect more data on this relationship to if see a relationship does exist.²²⁵

Stephanie E. Pitts and Jane W. Davidson wrote the article, "Developing Effective Practice Strategies: Case Studies of three young instrumentalists" in the journal, *Music Education Research*.²²⁶ In their article's introduction and literature review, the authors noted different studies regarding practicing, learning strategies and also noted studies that

²¹⁹ Ibid., 100.

²²⁰ Ibid., 100.

²²¹ Ibid., 100.

²²² Ibid., 100.

²²³ Ibid., 100.

²²⁴ Ibid., 101.

²²⁵ Ibid., 101 and 102.

²²⁶ Stephanie E. Pitts and Jane Davidson. "Developing Effective Practice Strategies: Case Studies of three young instrumentalists." *Music Education Research* 2, no. 1 (2000): 45-65. <http://dx.doi.org/10.1080/14613800050004422> (accessed May 30, 2012).

looked at motivation.²²⁷ For this study, the researchers examined three participants, evaluated the differences between their practice strategies, their self-assessments, their practice methods, and wanted to determine which of their methods would benefit developing musicians.²²⁸

The researchers took these three case studies from participants who participated in a longitudinal study at the University of New South Wales in Sydney, Australia. For this study, the researchers selected and examined three practice videos from students in the first six months of learning an instrument.²²⁹ While the researchers agreed that these practice sessions did not give a complete picture, they did feel that they discovered a consistent practice routine, strategies and changes in motivation and behavior that could help future research.²³⁰

The researchers first examined a ten-year old male, trumpet player. In the first session, the researchers noticed that this participant simply played through most of his pieces without stopping to correct any of the errors.²³¹ They also noticed that he got easily distracted and could only maintain concentration for a few minutes.²³² At the end of the session, the researchers noticed that the participant maintained a happy disposition throughout his practice session.²³³

In the next session, the researchers noticed that even though the student's confidence level rose, he still continued to play through pieces without correcting any of

²²⁷ Ibid., 45-47.

²²⁸ Ibid., 47.

²²⁹ Ibid., 47.

²³⁰ Ibid., 48.

²³¹ Ibid., 48.

²³² Ibid., 48.

²³³ Ibid., 48.

the mistakes.²³⁴ Furthermore, when he encountered difficulties, he avoided dealing with the difficulty of the situation and would start doing something else, like oil his trumpet.²³⁵ The researchers noticed that although the session ended in frustration, the participant still maintained an optimistic attitude towards improvement.²³⁶

Unlike the second session, the final session (three months later) seemed more productive. First, the researchers noticed that the participant had learned more practice strategies and could play through more pieces with success.²³⁷ They did note, however, that when the participant went to harder music, he still did not stop to correct errors. Next, the researchers observed that the participant still got easily distracted despite having gained the capacity to practice for a longer period of time.²³⁸ Finally, the researchers suggested, that while the participant maintained a happy disposition throughout his practice sessions, he clearly needed more guidance on how to practice.²³⁹

After the trumpet player, the researchers examined a ten-year old, female saxophone player. In the first session, the researchers noticed that this participant had not only severe problems in using any type of practice method, they also noticed that her the environment she practiced in kept distracting her and she could not maintain concentration for any length of time.²⁴⁰ The researchers also noticed that she had a bad attitude and poor disposition towards the music she had to practice.²⁴¹ The participant,

²³⁴ Ibid., 48.

²³⁵ Ibid., 48.

²³⁶ Ibid., 48.

²³⁷ Ibid., 47.

²³⁸ Ibid., 47.

²³⁹ Ibid., 48.

²⁴⁰ Ibid., 49.

²⁴¹ Ibid., 49.

along with the previous participant, failed to correct any errors she made, and struggled to solve problems as they arose.²⁴²

In the next session, the researchers noticed that the participant continued to play her scales incorrectly without any attempt to correct them.²⁴³ The researchers did notice more parental involvement in this session than the previous one.²⁴⁴ The researchers additionally noticed that the participant used ineffective practice strategies and did not know how to use any type of practice strategy her teacher might have given her.²⁴⁵ Furthermore, the participant's attitude and body language illustrate her discontent while she practiced.²⁴⁶

Unlike the second session, the final session (three months later) seemed somewhat more productive. First, the researchers noticed that the participant showed signs of improvement in terms of fingering and ability to play the right notes while she played.²⁴⁷ They did note, however, the participant's obsession with the time limits, and she constantly asked her mother whether or not she could stop practicing.²⁴⁸ Next, the researchers noticed that this parent offered false praise, despite a poor performance; but then again, the parent might not have any musical knowledge to accurately judge the performance.²⁴⁹ Finally, the researchers suggested that while the participant did show signs of improvement, they noticed that she did not have enough intrinsic motivation to maintain learning an instrument.²⁵⁰

²⁴² Ibid., 50.

²⁴³ Ibid., 50.

²⁴⁴ Ibid., 50.

²⁴⁵ Ibid., 50.

²⁴⁶ Ibid., 50.

²⁴⁷ Ibid., 51.

²⁴⁸ Ibid., 51.

²⁴⁹ Ibid., 51.

²⁵⁰ Ibid., 51.

In addition the saxophone player, the researchers examined a nine-year old female, flute player. In the first session, the researchers noticed the participant displayed an unhappy disposition, played every note under duress and did not have any basic control of notational reading or fingering.²⁵¹ The participant did, however, use a music stand to support her music unlike the others who used their cases or a chair.²⁵²

In the next and final sessions, the researchers noticed more parental involvement. The researchers noticed that these parents would sometimes argue over how to videotape the practice session and other times would intervene with her practice to correct posture or wrong notes.²⁵³ The researchers then noticed that the participant did not make any improvement over the first few months of observation, and none of her practicing, nor parents support, helped her improve.²⁵⁴

After observing all three participants, the researchers made several observations. First, they found that measurable practice gains can occur if the child enjoys practicing.²⁵⁵ Next, the researchers suggested that the type of parental support proves more important than the level of parental involvement.²⁵⁶ With this in mind, the researchers stated that the individual's intrinsic value should motivate them to practice, and they should not let their extrinsic needs dictate their practice goals.²⁵⁷

Furthermore, most of these participants had no knowledge of how they practiced. They either ignored their own playing or they did not know that they played wrong

²⁵¹ Ibid., 51.

²⁵² Ibid., 51.

²⁵³ Ibid., 52.

²⁵⁴ Ibid., 52.

²⁵⁵ Ibid., 53.

²⁵⁶ Ibid., 53.

²⁵⁷ Ibid., 53.

notes.²⁵⁸ With this in mind, the researchers stated that future research should help find ways for students to better articulate their problems to help foster ideas that not only solve the problems in their playing, but also lead to a better experience while they practice.²⁵⁹

Donald L. Hamann and Robert S. Frost wrote the article, “The Effects of Private Lesson Study on the Practice Habits and Attitudes Towards Practicing of Middle School and High School String Students,” in the journal, *Contributions to Music Education*.²⁶⁰ In their article’s introduction and literature review, Hamann and Frost noted different studies that examined the different practice habits of musicians and the characteristics of effective practice.²⁶¹ They did find, however, only a small amount research on the relationship between private lesson and practice.²⁶² For this study, the researchers wanted to observe the attitudes and practice habits of middle and high school string students who took private lessons.²⁶³

Hamann and Frost recruited 512 middle school and high school participants who played various string instruments in Utah.²⁶⁴ First, the researchers administered a questionnaire to all the participants. They also based their questions on prior research that examined practice and interviews they had done with university faculty and students.²⁶⁵ Next, the researchers analyzed all the data.²⁶⁶

²⁵⁸ Ibid., 53.

²⁵⁹ Ibid., 55.

²⁶⁰ Donald L. Hamann and Robert S. Frost. “The Effect of Private Lesson Study on the Practice Habits and Attitudes Towards Practicing of Middle School and High School String Students.” *Contributions to Music Education* 27, no. 2 (2000): 71-93.

²⁶¹ Ibid., 72-74.

²⁶² Ibid., 73-74.

²⁶³ Ibid., 74.

²⁶⁴ Ibid., 75.

²⁶⁵ Ibid., 75.

²⁶⁶ Ibid., 77.

Once the researchers analyzed the data, they made several observations. First, they found that fifty-nine percent of the population took private lessons, and the researchers noted that high school students made up the majority of that fifty-nine percent.²⁶⁷ Next, from the first four questions on the survey, the researchers found that participants who took private lessons often had practice plans, had more than one practice session a day, and likely had an established practice time unlike participants who did not take private lessons.²⁶⁸

In analyzing the next section of the survey, the researchers also found participants not enrolled in private lessons less frequently experienced “anxiety, depression, guilt and irritation,” than participants enrolled practice sessions.²⁶⁹ Furthermore, students without private lessons did not feel their practice interfered with social activities, family activities than students taking private lessons.²⁷⁰ Third, students without private lessons did not practice if it interfered with their homework.²⁷¹

Along with whether or not practice interfered with daily activities, the researchers found that private lesson participants practiced more frequently to avoid some type of embarrassing remark from their teachers, but the researchers found no differences between private lesson and non-private lesson participants when they asked the question about parental approval.²⁷² Second, Hamann and Frost found that individuals in private lessons experienced physical fatigue after practicing whereas non-private lessons experienced this less frequently.²⁷³ Furthermore, the researchers did not find any

²⁶⁷ Ibid., 77.

²⁶⁸ Ibid., 77 and 84.

²⁶⁹ Ibid., 84.

²⁷⁰ Ibid., 84.

²⁷¹ Ibid., 84.

²⁷² Ibid., 85.

²⁷³ Ibid., 85.

differences between the two groups when they asked if the participants used practice as a means of escape.²⁷⁴ Finally, the researchers found that individuals enjoyed practicing more if they took private lessons.²⁷⁵ Yet, in addition to this, the researchers stated that participants who did not take private lessons enjoyed practicing when they wanted to relieve stress.²⁷⁶

With a need for an individualized method that promoted self-regulating behaviors, Susan Hallam wrote the article, “The Development of Expertise in Young Musicians: Strategy Use, Knowledge Acquisition and Individual Diversity,” in the journal, *Music Education Research*.²⁷⁷ In her article’s introduction and literature review, Hallam noted several different studies that examined the cognitive complexity in musicians.²⁷⁸ For this study, the researcher wanted to examine the relationship between practice strategy use and improvement.²⁷⁹

Hallam recruited fifty-five, pre-college or near college age participants who played a string instrument.²⁸⁰ For this study, the researcher had all the participants record a short excerpt for ten minutes, and then had two judges independently score the tapes for correct notes, rhythms, steady tempo, steady intonation, and observed all the expression marks on the page.²⁸¹ Hallam also interviewed the participants about their general practice time, attitude, musical interpretation, and other influences that might influence

²⁷⁴ Ibid., 85.

²⁷⁵ Ibid., 85.

²⁷⁶ Ibid., 85.

²⁷⁷ Susan Hallam. “The Development of Expertise in Young Musicians: Strategy Use, Knowledge Acquisition and Individual Diversity.” *Music Education Research* 3, no. 1 (March 2001): 7-23. <http://dx.doi.org/10.1080/14613800020029914> (accessed May 30, 2012).

²⁷⁸ Ibid., 7.

²⁷⁹ Ibid., 7.

²⁸⁰ Ibid., 8.

²⁸¹ Ibid., 8.

their practice time.²⁸² Three judges then independently reviewed the statements and only classified it they completely agreed on each statement.²⁸³

After examining the results, Hallam made several observations. First, Hallam found (from the interviews) that most participants saw practicing as a time to learn the notes.²⁸⁴ Next, Hallam found that most of the students just played through the piece whereas a small amount of students used practice techniques like playing through smaller sections, mental practice, and working the piece through one part at a time.²⁸⁵

In addition, Hallam also found a difference between what participants said they did and what they did in the practice session.²⁸⁶ Several participants said they practiced in small sections, and could identify difficult sections; but from the analysis of the recorded practice sessions, Hallam found that most students did not practice in small sections and less than half of the participants practiced slowly.²⁸⁷ Furthermore, the researcher discovered that most of the students did not correct errors, and instead of correcting them, the participants continued to practice the error.²⁸⁸

Hallam had additional observations. First, she found that participants developed practice strategies when they recognized the errors they corrected and could identify the difficult section.²⁸⁹ Next, she found that individuals developed practice strategies based on how well they knew how to play the instrument rather than their age.²⁹⁰ Third, as the researcher had discovered earlier, students may have reported knowing several strategies,

²⁸² Ibid., 9.

²⁸³ Ibid., 9.

²⁸⁴ Ibid., 9.

²⁸⁵ Ibid., 9.

²⁸⁶ Ibid., 10.

²⁸⁷ Ibid., 10.

²⁸⁸ Ibid., 10.

²⁸⁹ Ibid., 20.

²⁹⁰ Ibid., 20.

but failed to employ them in their practice sessions, and Hallam called this production deficiency.²⁹¹ Furthermore, the researcher also suggested that no relationship existed between playing the correct note and intonation.²⁹²

Along with intonation, the data suggested that individuals who did not have much experience only focused on playing the correct pitch.²⁹³ Next, the research suggested that these tests skills do not always develop evenly and some individuals may fall behind even after a few weeks of starting an instrument, even with help from their teachers.²⁹⁴ With this in mind, the researcher recommended that teachers should help students master the basic skills first so they do not fall behind.²⁹⁵

In addition to the previous article, Susan Hallam wrote another article, “The development of metacognition in musicians: Implications for Education,” in the journal, *British Journal of Music Education*.²⁹⁶ In her article’s introduction and literature review, Hallam defined two terms- metacognition (“is thinking about one’s own thoughts”) and effective practicing (“that which achieves the desired end-product, in as short a time as possible, without interfering negatively with longer-term goals”).²⁹⁷ For this study, the researcher wanted to examine how planning and metacognition change as musicians get better.²⁹⁸

Hallam had two different groups of participants: professionals and students. First, the researcher recruited and interviewed twenty-two participants who played

²⁹¹ Ibid., 9.

²⁹² Ibid., 21.

²⁹³ Ibid., 21.

²⁹⁴ Ibid., 21.

²⁹⁵ Ibid., 21.

²⁹⁶ Susan Hallam. “The development of metacognition in musicians: Implications for Education.” *British Journal of Music Education* 18, no. 1 (March 2001): 27-39
<http://dx.doi.org/10.1017/S0265051701000122> (accessed October 20, 2010).

²⁹⁷ Ibid., 27 and 28.

²⁹⁸ Ibid., 28.

professionally, but did not have a full-time symphony orchestra job.²⁹⁹ Next, Hallam recruited fifty-five, pre-college or near college age participants who played a string instrument.³⁰⁰ The researcher had all the participants record a short excerpt for ten minutes, and then had two judges independently score the tapes for correct notes and rhythms, steady tempo, steady intonation, and observed all the expression marks on the page.³⁰¹ Finally, she interviewed all the student participants.³⁰²

Once she finished recruiting and running the study, Hallam transcribed all the interviews. Three judges then independently reviewed the statements and reviewed it for similarities and differences between novice and professional musicians.³⁰³ Finally, all the judges had to agree on the classification of the statement before they classified it.³⁰⁴

After examining the results, Hallam made several observations. First, Hallam found that most professional musicians had a firm understanding of their strengths and weaknesses, what they needed to do to improve and how to handle difficult tasks as they encountered them.³⁰⁵ Next, she found that most professionals overviewed their music to set the tempo, a general feeling, locate difficult sections and anything else to help them understand the music better.³⁰⁶

Once the professional musicians identified difficult sections, Hallam found that professional musicians had many practice strategies to help them overcome the difficulties.³⁰⁷ In addition to the strategies to overcome the difficulties, professional

²⁹⁹ Ibid., 29.

³⁰⁰ Ibid., 28.

³⁰¹ Ibid., 28.

³⁰² Ibid., 28.

³⁰³ Ibid., 29.

³⁰⁴ Ibid., 29.

³⁰⁵ Ibid., 30.

³⁰⁶ Ibid., 30.

³⁰⁷ Ibid., 31.

musicians had specific practice plans or goals, and if they did not or could not organize their practice session, they used their own strategies to help plan their practice.³⁰⁸ The article did not illustrate whether or not student participants had a practice plan; but Hallam did note, that students increased their practice time as it grew closer to perform their exams.³⁰⁹

Along with planning their practice sessions, Hallam reported that about half of the professionals marked the part whereas the rest of them had no consistency in marking the part.³¹⁰ Finally, Hallam found two different ways to deal with performance anxiety.³¹¹ The professionals either had strategies to deal with stage fright, or some of the professionals actually needed the audience to help get them pumped for the performance.³¹² Students also reported specific strategies on how to deal with nerves.³¹³

Harald Jørgensen wrote the article, “Instrumental learning: is an early start a key to success,” in the journal, *British Journal of Music Education*.³¹⁴ In his article’s introduction and literature review, Jørgensen noted prior research that examined both expertise theory and the time when individuals started taking music lessons.³¹⁵ For this study, the researcher wanted to explore two questions. First, he wanted to know at what age high-achieving instrumentalists started taking lessons.³¹⁶ Second, the researcher wanted to determine whether or not instrumentalists and vocalists started taking lessons

³⁰⁸ Ibid., 31.

³⁰⁹ Ibid., 37.

³¹⁰ Ibid., 32.

³¹¹ Ibid., 33.

³¹² Ibid., 33.

³¹³ Ibid., 37.

³¹⁴ Harald Jørgensen. “Instrumental learning: is an early start a key to success?” *British Journal of Research in Music Education* 18, no. 3 (November 2001): 227-239.

³¹⁵ Ibid., 227-230.

³¹⁶ Ibid., 228.

at the same age.³¹⁷ Finally, Jørgensen stated that his research would also expand the data on this topic since prior research only examined piano, strings, or voice.³¹⁸

Jørgensen recruited 106 first or second year students from a European conservatory who represented various instruments and represented various degree programs.³¹⁹ Each participant answered a questionnaire before starting their degree program that examined not only their practice behaviors, but also biographical data regarding when they started their respective instruments.³²⁰ Once they answered the questionnaire and completed their performance exams in their fourth year, the researcher obtained those exam grades to compare those results with their answers from their questionnaires.³²¹

After four years of collecting data and analyzing the data, the researcher made several observations. First, he examined the age when individuals started taking music lessons and discovered that instrumental students started taking lessons at the age of eleven, vocalists started at fourteen, music education students started at around fourteen, and church music students started at sixteen.³²² Next, the researcher found a statistical difference in the starting age for students in the instrumental department and the other three degree departments (music education, vocal and church music).³²³ He did not find, however, any differences between music education, vocal and church music students.³²⁴ Finally, he found that students pursuing a classical instrumental music education program

³¹⁷ Ibid., 228.

³¹⁸ Ibid., 230.

³¹⁹ Ibid., 230.

³²⁰ Ibid., 230.

³²¹ Ibid., 230.

³²² Ibid., 231.

³²³ Ibid., 230.

³²⁴ Ibid., 230.

(oboe or viola for example) started lessons earlier than students in both the jazz and voice programs.³²⁵

Once the researcher collected and analyzed the biographical data, he obtained the performance grades from seventy-one students. First, Jørgensen found that his data supported the expertise theory since students who started taking lessons at an earlier age, received higher marks on their fourth year examination results.³²⁶ Next, the researcher examined the starting ages for the instrumental, vocal and church music programs, and while he found that starting age did not predict the instrumental performance grades, it could possibly predict the performance grades for students enrolled in the vocal and church music programs.³²⁷ Furthermore, the researcher examined the individual instruments in the instrumental group and found different starting ages with achievement scores for different groups.³²⁸

After comparing starting age and performance, Jørgensen made a few general observations. First, he believed three time variables contributed to practicing: the starting level, the amount of time one puts into practicing and the accumulated amount of time from the starting level to present time of the performance examination.³²⁹ Next, the researcher explained four possibilities as to why starting age did not predict achievement in the instrumental program: the talent hypothesis, careful and appropriate teacher guidance, the quality of practice (deliberate versus fun) and “a bundle of other variables”(playing poorly, performance anxiety, motivation, circadian influences, ect).³³⁰

³²⁵ Ibid., 233.

³²⁶ Ibid., 233.

³²⁷ Ibid., 233.

³²⁸ Ibid., 234-235.

³²⁹ Ibid., 235.

³³⁰ Ibid., 236-237.

Overall, however, Jørgensen stated that an individual can see a “positive relationship between starting age of lessons and later levels of performance.³³¹”

Marilyn J. Kostka wrote the article, “Practice Expectations and Attitudes: A Survey of College-Level Music Teachers and Students,” in the journal, *Journal of Research in Music Education*.³³² In her article’s introduction and literature review, Kostka noted studies that tested practice methods and ideologies (mental versus physical).³³³ In this study, Kostka, conducted a survey that examined the expectations and attitudes of studio teachers and college students.³³⁴ Kostka examined four areas: “(1) attitudes about certain music skills, (2) expectations for use of practice time, (3) expectations for routines and strategies for practicing, and (4) attitudes about practice in general.³³⁵”

In order to collect her data, Kostka administered a questionnaire to 127 studio teachers and 134 music majors (both undergraduate and graduate) from sixteen different collegiate music programs.³³⁶ Kostka had two surveys, one for teachers and one for students. Each participant anonymously completed a survey that contained ten questions and a separate panel reviewed the questions to make sure the questions answered one of Kostka’s four areas of concern.³³⁷

After collecting the results, the researcher made several observations. First, the researcher found that both teachers and students believed musicality proved the most

³³¹ Ibid., 238.

³³² Marilyn J. Kostka. “Practice Expectations and Attitudes: A Survey of College-Level Music Teachers and Students.” *Journal of Research in Music Education* 50, no. 2 (Summer 2002): 145-154. <http://jrm.sagepub.com/content/50/2/145> (accessed September 30, 2010).

³³³ Ibid., 146.

³³⁴ Ibid., 147.

³³⁵ Ibid., 147.

³³⁶ Ibid., 147.

³³⁷ Ibid., 147.

important skill to have; but Kostka later noted that while none of the participants stated specific skills to achieve musicality, future research should investigate this further.³³⁸ On the other hand, the researcher found that both students and teachers ranked sight-reading as an unimportant skill, and this result differed from prior research.³³⁹ Third, teachers and students placed practicing repertoire as the highest priority since most individuals have juries and concerts to play.³⁴⁰

The researcher, however, found discrepancies between students and teachers. First, while the majority of teachers reported speaking about practice strategies with their students, less than half of the students said that they discussed practice strategies with their teachers.³⁴¹ Next, Kostka observed that most teachers expected their students to have a routine, but most students stated they did not have a set routine for practicing.³⁴² Third, the researcher found that most teachers found their practicing fulfilling or challenging, and students found practicing “tedious, but necessary.”³⁴³ Finally, she found that teachers and students did somewhat agree that one needs the necessary skills, expectations and strategies to practice effectively.³⁴⁴

Clifford K. Madsen wrote the article, “A 30-Year Follow-Up Study of Actual Applied Music Practice versus Estimated Practice,” in the journal, *Journal of Research in Music Education*.³⁴⁵ In his article’s introduction and literature review, Madsen noted studies that examined an individual’s total practice time as a predictor of performance

³³⁸ Ibid., 150.

³³⁹ Ibid., 151.

³⁴⁰ Ibid., 147.

³⁴¹ Ibid., 151.

³⁴² Ibid., 151.

³⁴³ Ibid., 151.

³⁴⁴ Ibid., 152.

³⁴⁵ Clifford K. Madsen. “A 30-Year Follow-Up Study of Actual Applied Music Practice versus Estimated Practice.” *Journal of Research in Music Education* 52, no. 1 (Spring 2004): 77-88.

achievement and noted an earlier study he did in 1972 with students.³⁴⁶ For this study, the researcher wanted to discover if individuals could remember the amount they practiced, and if the amount of practice related to the level of achievement.³⁴⁷

Madsen tried to recruit 125 of the original 246 participants from the original study, but received responses from seventy-eight of the 125 letters sent.³⁴⁸ The researcher sent a cover letter and a questionnaire that asked specific questions and contained a section that asked the participant to provide any further information that would explain their answers on previous questions.³⁴⁹ Next, the researcher compared the results from the 2004 study with those from his 1972 study.³⁵⁰ In addition, the researcher cautioned the readers with the results due to a small population.³⁵¹

After examining the results, Madsen stated his observations. First, he discovered that all but one of the participants indicated they attended the university during the first study (the researcher later discovered that the one was enrolled in the university as well).³⁵² Next, the researcher discovered that most of the participants over-estimated their practice use, while about twenty-three percent underestimated their practice.³⁵³ The researcher then stated that most individuals could not accurately remember their practice time even though they stated the importance of practicing.³⁵⁴

³⁴⁶ Ibid., 77-78.

³⁴⁷ Ibid., 78.

³⁴⁸ Ibid., 81.

³⁴⁹ Ibid., 81.

³⁵⁰ Ibid., 81.

³⁵¹ Ibid., 84.

³⁵² Ibid., 84.

³⁵³ Ibid., 84.

³⁵⁴ Ibid., 86.

Third, most of the participants indicated that their practice records from the first study did reflect their overall practice time of their college study.³⁵⁵ In addition to the third question, three judges created six classifications from the participants' reported professional activities: professional, semi-professional, free-lance, musician, college professor, music teacher and recital/jury.³⁵⁶ The researcher then found that the amount of practice time done in their undergraduate years did not indicate a person's musical future after comparing the participant's occupation with their practice records from 1972.³⁵⁷

Following the classification of the participant's professions, Madsen found that eighty-nine percent of the participants believed that the amount of deliberate practice did relate to the highest level an individual could achieve in the music profession.³⁵⁸ Furthermore, the group did indicate, again, that a strong relationship existed between high achievement levels in the music profession and deliberate practice.³⁵⁹ Overall, the researcher found that individuals could not accurately remember their practice times from thirty-years ago, but did indicate that their practice time from the 1972 study, did represent their overall practice record from college.³⁶⁰

Siw G. Nielsen wrote the article, "Strategies and Self-Efficacy Beliefs in Instrumental and Vocal Individual Practice: A Study of Students in Higher Music Education," in the journal, *Psychology of Music*.³⁶¹ In her article's introduction and

³⁵⁵ Ibid., 85.

³⁵⁶ Ibid., 85.

³⁵⁷ Ibid., 85 and 86.

³⁵⁸ Ibid., 85.

³⁵⁹ Ibid., 85.

³⁶⁰ Ibid., 84.

³⁶¹ Siw Graabraek Nielsen. "Strategies and Self-Efficacy Beliefs in Instrumental and Vocal Individual Practice: A Study of Students in Higher Music Education." *Psychology of Music* 32, no. 4 (October 2004): 418-431. <http://pom.sagepub.com/content/32/4/418> (accessed September 25, 2010).

literature review, Nielsen noted several studies that examined the importance of practicing strategies and different studies that tested models in practice sessions.³⁶²

For this study, Nielsen had three research questions she tried to answer. First, she wanted to know whether or not first-year college level students used learning and practice strategies.³⁶³ Next, she wanted to observe the relationship between the strategies they used and self-efficacy.³⁶⁴ Finally, she wanted to examine if different genders, degree programs and instruments had different attitudes towards the strategies they used and self-efficacy.³⁶⁵

Nielsen recruited 130 undergraduates in their first year of undergraduate from six different Norwegian universities or conservatories to participate in a survey that examined goal orientations and learning strategies.³⁶⁶ In order to collect data, the researcher administered a survey to different classes many participants could complete the survey.³⁶⁷ If any of the participants missed the opportunity to take the survey, they could have made an arrangement to complete the survey at a different time.³⁶⁸

Along with recruiting the participants and administering the survey, Nielsen first adapted two different scales from prior research to construct her survey. The researcher stated that this scale had three subscales that examined: cognitive strategies, metacognitive strategies, and resource management strategies.³⁶⁹ Next the researcher also wanted to observe the participant's self-efficacy beliefs and used prior research to adapt a scale. Like the previous scale, this also had three subscales: cognitive learning,

³⁶² Ibid.

³⁶³ Ibid., 419.

³⁶⁴ Ibid., 419.

³⁶⁵ Ibid., 420.

³⁶⁶ Ibid., 420.

³⁶⁷ Ibid., 421.

³⁶⁸ Ibid., 421.

³⁶⁹ Ibid., 420.

metacognitive learning and social learning strategies.³⁷⁰ After developing her scale, Nielsen had trouble obtaining the achievement scores from some of the schools so she only obtained scores for fifty-two of the participants.³⁷¹

Once Nielsen analyzed the data, she made several observations. First, she found that the participants reported cognitive, metacognitive and resource management strategies in their practice sessions, but most students used resource management strategies less often than they did cognitive or metacognitive strategies.³⁷² Furthermore, she stated that most first-year college students do not use peer help.³⁷³ Next, the researcher found data to answer the second research question, and suggested that participants who stated they could perform assignments through instrumental practice also stated that they used several learning and practice strategies to complete the task they needed to accomplish.³⁷⁴

Finally, the results would suggest that although she did not find any significant differences in how instruments or degree programs employed learning or practicing strategies, she did find differences for gender.³⁷⁵ After running a Mann-Whitney U test, the results would suggest that more men than women utilized critical thinking skills.³⁷⁶ In addition, Nielsen found that men showed more confidence that they could master tasks than women thought they could.³⁷⁷ Yet, the results would also suggest that female music

³⁷⁰ Ibid., 425.

³⁷¹ Ibid., 425.

³⁷² Ibid., 425.

³⁷³ Ibid., 425.

³⁷⁴ Ibid., 423.

³⁷⁵ Ibid., 423.

³⁷⁶ Ibid., 423.

³⁷⁷ Ibid., 424.

education majors proved more likely to have higher self-efficacy scores than their male counterparts.³⁷⁸

Aine MacNamara, Patricia Holmes and Dave Collins wrote the article, “The pathway to excellence: the role of psychological characteristics in negotiating the challenges of musical development,” in the journal, *British Journal of Music Education*.³⁷⁹ In their article’s introduction and literature review, the researchers reviewed and explained the literature on different stages of development, the transitions between the different stages and the different psychological characteristics for developing excellence.³⁸⁰ For this study, the researchers wanted to explore each of the stages of development and if phase, activity, or individual determined the psychological characteristics for developing excellence associated with each stage.³⁸¹

The researchers recruited eight professional musicians who represented different instruments and represented various professional musical activities to participate in the study.³⁸² Next, to collect the necessary data for their study, the researchers used a semi-structured interview to graph the participant’s careers and the various stages of their development.³⁸³ This 45-60 minute, semi-structured interview allowed the researchers to not only gather the necessary data, but also allowed the participants the freedom to give more information about their development that may have helped give better explanations of their development and careers.³⁸⁴

³⁷⁸ Ibid., 424.

³⁷⁹ Aine MacNamara, Patricia Holmes and Dave Collins. “The pathway to excellence: the role of psychological characteristics in negotiating the challenges of musical development.” *British Journal of Music Education* 23, no. 3 (2006): 285-302.

³⁸⁰ Ibid., 285-288.

³⁸¹ Ibid., 288.

³⁸² Ibid., 288.

³⁸³ Ibid., 288.

³⁸⁴ Ibid., 288-289.

Once the researchers completed all the interviews, they transcribed all the interviews word for word.³⁸⁵ They then clarified all the time lines for each of the participants and created a report for each participant. Next, the researchers did a content analysis of these reports so they could look for common characteristics and challenges that occurred at each stage of development.³⁸⁶

After they finished their analyses, the researchers presented their data based on each stage of development. First, the researchers found that while their family's economic situation did have an impact on their musical choice in the earlier years of their development, the researchers stated that the individual initial positive experience, enthusiasm, and motivation sustained their desires to continue studying their instrument.³⁸⁷ Next, in the middle years, the researchers stated that the participants discovered that they needed to increase their deliberate practice, focus and self-belief so they could keep up with not only the demands of the universities, but the demands of their teachers.³⁸⁸ Furthermore, the participants noted that during this time, they realized that they could not solely rely on their talent to sustain their musical abilities.³⁸⁹

Once the researchers examined the early and middle years, they examined the later years. At this stage, the participants reported the need to balance both personal and financial obligations with the needs to practice music; the researchers noted a recurring theme, the need to balance family and work.³⁹⁰ The researchers noted that in the later stages of a musician's career, the individual needed to demonstrate awareness of

³⁸⁵ Ibid., 289.

³⁸⁶ Ibid., 290.

³⁸⁷ Ibid., 291-293.

³⁸⁸ Ibid., 293-296.

³⁸⁹ Ibid., 294.

³⁹⁰ Ibid., 296-297.

environmental and personal factors to help them deal with the different variables of sustaining a musical career.³⁹¹ Overall, the researchers found data to help support the theory that in order to achieve success in a musical career the individual needs to develop certain psychological characteristics at certain points in their career to help them balance out the unforeseen variables that may impact an individual's musical career.³⁹²

In another study, Siw G. Nielsen wrote the article, "Achievement goals, learning strategies and instrumental performance," in the journal, *Music Education Research*.³⁹³ In her article's introduction and literature review, Nielsen noted studies that examined the importance of learning strategies and different studies that have tested models in practice sessions.³⁹⁴ For this study, Nielsen had three research questions she tried to answer. First, she wanted to know how achievement goal orientations related to instrumental in first-year music students.³⁹⁵ Next, she wanted to observe learning strategies related to achievement goals.³⁹⁶ Finally, she wanted to examine the differences between achievement goals and grade.³⁹⁷

Nielsen recruited 130 undergraduates in their first year from six different Norwegian universities or conservatories to participate in a survey that examined their goal orientations and their learning strategies.³⁹⁸ In order to collect her data, the researcher administered a survey to different classes so many participants could complete

³⁹¹ Ibid., 298-300.

³⁹² Ibid., 300.

³⁹³ Siw Graabraek Nielsen. "Achievement goals, learning strategies and instrumental performance." *Music Education Research* 10, no. 2 (June 2008): 235-247. <http://dx.doi.org/10.1080/14613800802079106> (accessed September 30, 2010).

³⁹⁴ Ibid., 235-237.

³⁹⁵ Ibid., 237.

³⁹⁶ Ibid., 237.

³⁹⁷ Ibid., 238.

³⁹⁸ Ibid., 238.

the survey.³⁹⁹ If any of the participants missed the opportunity to take the survey, they could have made an arrangement to complete the survey at a different time.⁴⁰⁰

Along with recruiting the participants and administering the survey, Nielsen adapted two different scales from prior research.⁴⁰¹ Next, the researcher wanted to observe what learning strategies the students would report. After developing her scale, Nielsen obtained achievement scores, but had trouble since some of the schools did not release some of the achievement scores to her.⁴⁰²

Once Nielsen analyzed the data, she made several observations. First, she observed that many of the participants displayed ability-approach goal orientations (those concerned with performing at high level instead of trying to out-performing their peers) and task-goal orientations (those concerned with mastering the music for their own self-gain).⁴⁰³ Next, she found that many of the participants did not display ability-avoidance orientation, suggesting, that they did not just perform well to keep from looking incompetent.⁴⁰⁴

After finding answers to her first research question, she also found answers to her second research question. She observed that most of the students who demonstrated a task goal orientation also tended to exhibit high cognitive, metacognitive and also engage themselves in the learning process.⁴⁰⁵ Next, she saw that participants who

³⁹⁹ Ibid., 239.

⁴⁰⁰ Ibid., 239.

⁴⁰¹ Ibid., 238.

⁴⁰² Ibid., 241.

⁴⁰³ Ibid., 241.

⁴⁰⁴ Ibid., 241.

⁴⁰⁵ Ibid., 241.

displayed ability-avoidance orientations proved less likely involve themselves their learning process on a cognitive, metacognitive and social level.⁴⁰⁶

Finally, the researcher found no significant differences between the goals individuals adopted for their instrumental grade and the grade they received on their instrument.⁴⁰⁷ Although this supports previous research, she stated that a bigger population size might have yielded different results.⁴⁰⁸

James L. Byo and Jane W. Cassidy wrote the article, “An Exploratory Study of Time Use in the Practice of Music Majors: Self Report and Observation Analysis,” in the journal, *UPDATE: Applications of Research in Music Education*.⁴⁰⁹ In their article’s introduction and literature review, Byo and Cassidy noted the literature on practicing and the literature that explored the aspects of time with practicing. For this study, the researchers wanted to gather survey and observational data on the behaviors of music education majors in the practice room.⁴¹⁰ They divided the study into two parts: a survey and a video-tape of recording of a practice session for junior-level students.

Byo and Cassidy recruited thirty-eight music education majors who played different instruments enrolled in their sophomore, junior, or senior years.⁴¹¹ For the first part of the study, the researchers administered a researcher-designed survey to the participants about their practice time, attitudes and some basic demographics. The

⁴⁰⁶ Ibid., 242.

⁴⁰⁷ Ibid., 244.

⁴⁰⁸ Ibid., 244.

⁴⁰⁹ James L. Byo and Jane W. Cassidy. “An Exploratory Study of Time Use in the Practice of Music Majors: Self-Report and Observation Analysis.” *Update - Applications of Research in Music Education* 27, no.1 (November 2008): 33-40. <http://upd.sagepub.com/content/27/1/33> (accessed September 30, 2010).

⁴¹⁰ Ibid., 33.

⁴¹¹ Ibid., 35.

researchers categorized and coded all the responses, and then had an independent judge review half of them.⁴¹²

After gathering the data, the researchers reported several results. First, they found that woodwind players practiced more than brass, percussion or strings players, and felt more satisfied with their practice.⁴¹³ Next, they found that seniors and juniors reported a higher amount of practice, but in general most of the participants did not have a set time for practicing.⁴¹⁴ Third, the researchers found that while only twenty-four percent of the participants did not have a practice routine, only forty-five percent of those who reported using a routine said that they followed a teacher specific model.⁴¹⁵ Byo and Cassidy additionally found that juniors and seniors reported a more positive attitude than sophomores towards practicing.⁴¹⁶ Finally, they found that most participants believed self-discipline would improve practice efficiency over other strategies.⁴¹⁷

After calculating the results of the survey, the researchers then asked the Junior level participants to videotape themselves for a behavior observation, and instructed them to record themselves practicing naturally.⁴¹⁸ As a result, the researchers found most of the students practiced an average of forty-nine minutes.⁴¹⁹ They also found that the junior-level music education majors practiced for most of the session.⁴²⁰

Furthermore, Byo and Cassidy analyzed the videotapes to observe the different strategies reported in the survey, but they did not link individual surveys to individual

⁴¹² Ibid., 35.

⁴¹³ Ibid., 35 and 37.

⁴¹⁴ Ibid., 35.

⁴¹⁵ Ibid., 35.

⁴¹⁶ Ibid., 36.

⁴¹⁷ Ibid., 36.

⁴¹⁸ Ibid., 37.

⁴¹⁹ Ibid., 37.

⁴²⁰ Ibid., 37.

observed practice sessions.⁴²¹ They found that seven out of nine participants did have some type of routine that included warm-up, etude, technical exercise and solo literature.⁴²² After a further review of the videotapes, the researchers found that all the participants used repetition as a practice strategy.⁴²³

Finally, the researchers made some general observations about their study. First, they discovered that the participants articulated some type of practicing strategy, but very few of the participants actually used the strategies they articulated.⁴²⁴ Next, the results suggested that repetition proved both an effective and non-effective strategy; but if used well, could help the participant isolate and fix problems in the practice session.⁴²⁵ Third, the researchers observed that the individual's ability to stay focused to correct an error proved an important aspect of effective practicing.⁴²⁶ Finally, they suggested the following: "Practice begins before notes are performed—it begins when planning begins," and "Practice is better viewed not as monolith, that is, as one uniform activity but, but instead as a multifaceted, fluid, in-the-moment venture."⁴²⁷

James R. Austin and Margaret Haefner Berg wrote the article, Exploring music practice among sixth-grade and orchestra students, in the journal, *Psychology of Music*.⁴²⁸ In their article, Austin and Berg wanted to examine different types of self-regulation strategies and motivation factors that middle school band and orchestra students used

⁴²¹ Ibid., 37.

⁴²² Ibid., 33.

⁴²³ Ibid., 38.

⁴²⁴ Ibid., 38.

⁴²⁵ Ibid., 38.

⁴²⁶ Ibid., 38.

⁴²⁷ Ibid., 39.

⁴²⁸ James R. Austin and Margaret Haefner Berg, "Exploring music practice among sixth-grade band and orchestra students," *Psychology of Music* 34, no. 4 (2006): 535-558. <http://pom.sagepub.com/content/34/4/535> (accessed March 11, 2012).

while practicing.⁴²⁹ For this study, Austin and Berg had four main research questions they were trying to answer. First, they wanted to know about the “motivational and self-regulatory dimensions in practice,” and if researchers could ascertain them through a person’s self-report on their practicing.⁴³⁰ Next, they wanted to discover whether or not band and orchestra students had similar “practice profiles.”⁴³¹

After looking for similarities between the two, the researchers wanted to determine whether or not a relationship existed between regulation and motivation, and other practice features like environment, how much an individual practices and how often they practice.⁴³² Finally, Austin and Berg wanted to know to what extent young musicians could “reflect upon and describe their typical practice session.”⁴³³

Austin and Berg administered a survey to 250 elementary school level students participating at a music festival that played both band and orchestra instruments, and represented various abilities and backgrounds.⁴³⁴ The survey contained three sections: (1) looked at motivation and regulation, (2) had the participants give two personal narratives, and (3) background or personal information about the participant.⁴³⁵

After they administered the survey to the participants, they determined that they could only use 224 of the 250 responses.⁴³⁶ For the second section, the researchers coded the participant’s responses using sight and sound since the researchers asked the participants to describe what someone would hear and see while they practiced.⁴³⁷ For

⁴²⁹ Ibid., 541.

⁴³⁰ Ibid., 541.

⁴³¹ Ibid., 541.

⁴³² Ibid., 541.

⁴³³ Ibid., 541.

⁴³⁴ Ibid., 542.

⁴³⁵ Ibid., 542.

⁴³⁶ Ibid., 543.

⁴³⁷ Ibid., 543.

the second question in section two, the researchers listed all the practice strategies the participants reported and then grouped them into three categories: “planning strategies, monitoring progress and the use of physical and social environment.”⁴³⁸

After tabulating and coding all the responses, the researchers made several observations. First, a majority of participants did have experience playing another instrument, such as the piano.⁴³⁹ They also found that the participants reported that a majority of their parents did have experience with music and 91% of the students had a home environment that allowed them to practice.⁴⁴⁰ Finally, the researchers reported that while many of the students did not take private lessons (only 29%), the students did demonstrate a motivation to practice, exhibited “volitional control” while practicing a piece of music, and employed a variety of practice strategies.⁴⁴¹

The researchers then found several relationships after analyzing the data. First, the researchers found that more orchestra students reported taking private lessons on their instrument and had higher levels of practice motivation than band students.⁴⁴² Next, Austin and Berg found that a participant’s practice schedule had no significant effect on their motivation or self-regulation, but did report that a participant who had a good place to practice reported higher levels of self-regulation and motivation.⁴⁴³

Once the researchers explored the relationships found in the quantitative results, the researchers then examined the qualitative results using frequency counts. They found four categories of self-regulation from the participant’s narratives (mainly from the

⁴³⁸ Ibid., 543.

⁴³⁹ Ibid., 544.

⁴⁴⁰ Ibid., 544.

⁴⁴¹ Ibid., 544.

⁴⁴² Ibid., 546.

⁴⁴³ Ibid., 547.

orchestra students): planning, strategies, monitor progress, use of physical/social environment.⁴⁴⁴ In the planning category, most the band and orchestra students said that they planned their practice sessions on the difficult parts of the music.⁴⁴⁵ In the strategies section, Austin and Berg found that most of the students used repetition and slow practice as their main strategies.⁴⁴⁶ Finally, in the use of physical/social environment, the researchers also found that a high number of participants did ask their parents or a friend with questions about a specific problem they encountered while practicing.⁴⁴⁷

After reviewing all their data, the researchers made several observations. First, they found that factors (like teacher guidance, establishing a stable practice environment and structured practice routine) can help establish advanced practice behaviors- such as tool implementation, how to use certain strategies, how monitor one's progress and evaluate what the individual must do in order to succeed further.⁴⁴⁸ Next, the results suggested that no significant differences existed between band and orchestra students.⁴⁴⁹ Yet, the data did show, however, that participants who had a stable work environment and employed the social and physical resources could likely demonstrate self-regulation skills.⁴⁵⁰

Peter Miksza wrote the article, "The Development of a Measure of Self-Regulated Practice Behavior for Beginning and Intermediate Instrumental Music Students," in the

⁴⁴⁴ Ibid., 547 and 548.

⁴⁴⁵ Ibid., 547 and 458.

⁴⁴⁶ Ibid., 549.

⁴⁴⁷ Ibid., 548.

⁴⁴⁸ Ibid., 551.

⁴⁴⁹ Ibid., 551.

⁴⁵⁰ Ibid., 551.

journal, *Journal of Research in Music Education*.⁴⁵¹ In his article's introduction and literature review, Miksza noted Zimmerman's self-regulation model⁴⁵² and several studies that incorporated Zimmerman's model in their study.⁴⁵³ For this study, the researcher wanted "to test the construct validity and reliability of a self-report measure of self-regulated behaviors for beginning and intermediate instrumentalists."⁴⁵⁴

Miksza recruited 302 middle school participants who played various wind instruments and represented a diverse socioeconomic range.⁴⁵⁵ Miksza's questionnaire had forty-seven questions that covered the following topics: self-efficacy/motive, method, behavior, time management and social influences.⁴⁵⁶ Next, the researcher distributed the survey to the selected band programs and either picked them up or had the band director mail them to him.⁴⁵⁷

After examining the results, Miksza made several observations. First, he found that participants who had more efficient practice sessions exhibited higher degrees of self-regulation.⁴⁵⁸ Miksza then found that the combined method/behavior subscales could predict how much a person practiced and how much that person spent practicing a particular piece of music.⁴⁵⁹ Finally, the researcher found that going from a five-factor structure to a four-factor structure (combined the method/behavior into one factor) made

⁴⁵¹ Peter Miksza. "The Development of a Measure of Self-Regulated Practice Behavior for Beginning and Intermediate Instrumental Music Students." *Journal of Research in Music Education* 59, no. 4 (September 2011): 321-338. <http://jrm.sagepub.com/content/59/4/321> (accessed February 29, 2012).

⁴⁵² Zimmerman 1998.

⁴⁵³ Miksza 2011, 325.

⁴⁵⁴ *Ibid.*, 325.

⁴⁵⁵ *Ibid.*, 326.

⁴⁵⁶ *Ibid.*, 327-328.

⁴⁵⁷ *Ibid.*, 328.

⁴⁵⁸ *Ibid.*, 333.

⁴⁵⁹ *Ibid.*, 332.

it better at predicting the results.⁴⁶⁰ With this in mind, Miksza observed that the data stayed consistent with previous studies, and stated that future research should continue to test his questionnaire.⁴⁶¹

Observations and Case Studies

Along with researchers who have used surveys to gather data on practicing, other researchers have observed musicians practicing and created profiles of those musicians to help gather a better understanding of how musicians practice and what strategies they use while they practice. John M. Geringer and Marilyn J. Kostka wrote the article, “An Analysis of Practice Room Behavior of College Music Students,” in the journal, *Contributions to Music Education*.⁴⁶² In their article’s introduction and literature review, the researchers noted various studies that examined practice methods and different components that influenced individuals while they practiced.⁴⁶³ For this study, the researchers observed how much time college level students actually spent practicing and not practicing while they sat in the practice room.⁴⁶⁴ They also compared their observations with results from a survey they administered to 100 music students at the University of Texas-Austin.⁴⁶⁵

Unlike other studies that observe practice room behavior, Geringer and Kostka did not recruit any participants, except to administer their survey.⁴⁶⁶ Instead, the researchers observed the practice rooms at the University of Texas-Austin for eight

⁴⁶⁰ Ibid., 333.

⁴⁶¹ Ibid., 334.

⁴⁶² John M. Geringer and Marilyn J. Kostka. “An Analysis of Practice Room Behavior of College Music Students.” *Contributions to Music Education*, 11 (1984): 24-27.

⁴⁶³ Ibid., 24.

⁴⁶⁴ Ibid., 24.

⁴⁶⁵ Ibid., 24.

⁴⁶⁶ Ibid., 24.

weeks with the participants unaware of the fact that the researchers observed them.⁴⁶⁷

With the participants unaware, the researchers could observe the participants as they would naturally act in the practice room, and the researchers would walk through the halls and record any behavior they observed in the practice room that lasted for more than 10.5 seconds.⁴⁶⁸ Finally, the researchers administered a survey to the students to do comparative research.⁴⁶⁹

After observing and categorizing all the 1,440 performing (solo music, ensemble music, technique music, conducting the music or other) and the 560 non-performing behaviors (reading, writing, looking at score, getting ready or other), the researchers compared those results with the survey results from 100 participants.⁴⁷⁰ First, they found that most of the participants spent their time in performing activities and practiced solo music (53.3%), technical exercises (11%), ensemble music (4.8%), other (2.5%) and conducting (0.4%).⁴⁷¹ Next, the researchers found that the nonperforming activities happened less frequently than the performing activities.⁴⁷²

After comparing the observational results with the survey results, the researchers found discrepancies between the two. The participants reported that they normally practiced about two hours a day, spent about 86% of their time in performing activities, and 14% of their time in nonperformance activities.⁴⁷³ Once they examined the

⁴⁶⁷ Ibid., 24.

⁴⁶⁸ Ibid., 24.

⁴⁶⁹ Ibid., 24-25.

⁴⁷⁰ Ibid., 25.

⁴⁷¹ Ibid., 25.

⁴⁷² Ibid., 25.

⁴⁷³ Ibid., 25.

differences between the two, the data showed that a significant relationship did not exist between the two.⁴⁷⁴

In addition to Geringer and Kostka's observational study, Kacper Miklaszewski wrote the article, "A Case Study of a Pianist Preparing a Musical Performance," in the journal, *Psychology of Music*.⁴⁷⁵ In his article, Miklaszewski wanted to examine "whether theoretical concepts derived from previous studies and discussions may be identified in video recordings of practice accompanied by the subject's comments on his own behavior as seen on the video."⁴⁷⁶ Furthermore, the researcher wanted to address the following concerns: "(1) whether divisions of musical material and actions of the subject evolve as the work progresses, and (2) whether any systematic relationship exists between the musical material, the subject's actions, and the subject's comments on the goals of his activity."⁴⁷⁷

Miklaszewski recruited a 21 year-old, male piano student from the Chopin Academy.⁴⁷⁸ For this study, the pianist learned the prelude, "Feux d'Artifice" from Debussy's *Second Book of Preludes*.⁴⁷⁹ Similar to Chaffin and Imreh,⁴⁸⁰ Miklaszewski also discussed the pianist's background to ensure the audience of the artist's high professional level.⁴⁸¹ After recruiting this participant, Miklaszewski had the participant

⁴⁷⁴ Ibid., 25-26.

⁴⁷⁵ Kacper Miklaszewski, "A Case Study of a Pianist Preparing a Musical Performance," *Journal of Psychology of Music* 17, no. 2 (1989): 95-109. <http://pom.sagepub.com/content/17/2/95> (accessed May 14, 2012).

⁴⁷⁶ Ibid., 98.

⁴⁷⁷ Ibid., 98.

⁴⁷⁸ Ibid., 98.

⁴⁷⁹ Ibid., 98.

⁴⁸⁰ Roger Chaffin and Gabriela Imreh, "A Comparison of Practice and Self-Report as Sources of Information About the Goals of Expert Practice." *Psychology of Music* 54, no. 4 (Winter 2006): 350-362. <http://jrm.sagepub.com/content/54/4/350> (accessed May 14, 2012).

⁴⁸¹ Ibid., 98.

record all the practice sessions for a week.⁴⁸² Once the participant felt ready to perform the piece for his teacher, he stopped recording the sessions and performed it for his teacher.⁴⁸³

In his study, Miklaszewski found various results. First, after observing the participant over the week, he found three different stages for working on a piece of music. First, Miklaszewski found that the participant explored the piece in the first session and the researcher also noticed that this session lasted the longest (ninety minutes).⁴⁸⁴ Miklaszewski found that in the second stage, the participant worked very hard on the technical difficulties of the music.⁴⁸⁵ In the third stage, Miklaszewski saw that the pianist combined all the elements together to give, what Miklaszewski described, as a “flawless performance.”⁴⁸⁶

After establishing how his study collaborated with prior research, Miklaszewski found that the participant used the practice strategies: trial and error (trying something to see if it would work) and alternating fast/slow tempos.⁴⁸⁷ He did not determine, however, the success rates of these strategies, but he did suggest that the participant used trial and error simply to gauge whether or not he could play something at sight.⁴⁸⁸ If he could not play something, the participant then used a different strategy to play it correctly.⁴⁸⁹

Miklaszewski also found that when the pianist worked on memorizing the music, he would work on smaller sections based on the musical structure of the piece.⁴⁹⁰ The

⁴⁸² Ibid., 99.

⁴⁸³ Ibid., 99.

⁴⁸⁴ Ibid., 107.

⁴⁸⁵ Ibid., 107.

⁴⁸⁶ Ibid., 107.

⁴⁸⁷ Ibid., 107.

⁴⁸⁸ Ibid., 107.

⁴⁸⁹ Ibid., 107.

⁴⁹⁰ Ibid., 107.

researcher further reported that this strategy of dividing up the music into smaller sections actually supported the research that had investigated the concept of sub-routines.⁴⁹¹ The sub-routines that the participant added throughout the practice sessions helped him give a proficient performance once he finished working on the piece.⁴⁹²

Miklaszewski further found that after each practice session some of the partial goals changed. Based on the recording and what had happened in the practice session, the participant adjusted what he needed to do in order to make more practice gains.⁴⁹³ This strategy allowed the performer to quickly pinpoint what he needed to correct so he did not waste time while working.⁴⁹⁴

Siw G. Nielsen wrote the article, “Learning strategies in instrumental music practice,” in the journal, *British Journal of Music Education*.⁴⁹⁵ In her article’s introduction and literature review, Nielsen noted several different studies that examined different learning strategies and different practice methods.⁴⁹⁶ For this study, the researcher wanted to observe the different types of learning strategies that occurred at the different stages of practicing, and then explored the similarities and differences between the two learning periods.⁴⁹⁷

Nielsen recruited two college level organists who worked on two different pieces for two different occasions: Student 1 worked on a solo piece and Student 2 worked on an ensemble piece.⁴⁹⁸ Next, the researcher observed the participants twice over two

⁴⁹¹ Ibid., 108.

⁴⁹² Ibid., 1085.

⁴⁹³ Ibid., 1085.

⁴⁹⁴ Ibid., 1085.

⁴⁹⁵ Siw G. Nielsen. Learning strategies in instrumental music practice.” *British Journal of Music Education* 16, no. 3 (November 1999): 275-291.

⁴⁹⁶ Ibid., 277.

⁴⁹⁷ Ibid., 277.

⁴⁹⁸ Ibid., 277.

different learning periods. In both learning periods, Nielsen first observed the participant and noted the different practice behaviors they used.⁴⁹⁹ On the second day, she video-recorded both participants in an hour-long practice session, gave them a brief fifteen-minute pause and then interviewed them about the practice behaviors they used in their practice sessions.⁵⁰⁰ Finally, Nielsen transcribed and categorized all the reports from the second and third reports.⁵⁰¹

After examining the results, Nielsen made several observations. First, the researcher noticed that while both participants worked on different pieces, they used several of the same strategies in the first learning period.⁵⁰² Both participants used the following strategies: focused on specific areas, segmented the music based on difficulty, played different segments at different tempi, played with both and separate hands, sometimes changed rhythms, used several strategies to fix a problem, marked the music, would work with one set of fingerings, and stop when they needed to digest what they did or to study the score.⁵⁰³ The second participant's use of a metronome however, created the single difference between the two participants in the first period.⁵⁰⁴

Along with the first period, Nielsen learned that both participants used many of the same practice strategies that they used in the first practice session. The researcher observed that the participants played through the piece more often than sectionalizing the piece.⁵⁰⁵ In addition, the researcher noticed that both participants played the music at

⁴⁹⁹ Ibid., 277.

⁵⁰⁰ Ibid., 278.

⁵⁰¹ Ibid., 279-280.

⁵⁰² Ibid., 279-280.

⁵⁰³ Ibid., 280-281.

⁵⁰⁴ Ibid., 281.

⁵⁰⁵ Ibid., 281.

tempos closer to the performance tempo.⁵⁰⁶ Finally, Nielsen noticed that while both participants used almost all the same strategies, they used them at different times to help accomplish their specific practice goals.⁵⁰⁷

Furthermore, Nielsen categorized all the observed practice behaviors and then created a classification system based on prior research.⁵⁰⁸ She found two main classifications: primary strategies (“intended to directly influence the learner’s acquisition of knowledge”) and supportive strategies.⁵⁰⁹ For the primary strategies, the researcher created three subcategories: selection strategies, organization strategies and integration strategies.⁵¹⁰ Next, she divided the supportive strategies into three subcategories: strategies related to concentration and motivation, strategies related to anxiety, and strategies used to help maintain efficient use of time.⁵¹¹

Stephanie E. Pitts, Jane W. Davidson and Gary E. McPherson wrote the article, “Models of Success and Failure in Instrumental Learning: Case Studies of Young Players in the First 20 Months of Learning” in the journal, *Bulletin of the Council for Research in Music Education*.⁵¹² In their article’s introduction and literature review, the authors noted different studies that examined practicing and several studies that looked at motivation

⁵⁰⁶ Ibid., 281.

⁵⁰⁷ Ibid., 282.

⁵⁰⁸ Ibid., 289.

⁵⁰⁹ Ibid., 287.

⁵¹⁰ Ibid., 287.

⁵¹¹ Ibid., 288.

⁵¹² Stephanie E. Pitts, Jane W. Davidson and Gary E. McPherson. “Models of Success and Failure in Instrumental Learning: Case Studies of Young Players in the First 20 Months of Learning.” *Bulletin of the Council for Research in Music Education*, no. 146 (Fall 2000): 51-69.
<http://www.jstor.org/stable/40319033> (accessed May 31, 2012).

and how it can affect a person's practice.⁵¹³ For this study, the researchers examined three different groups of participants who had just started learning their instrument.⁵¹⁴

The researchers examined nine participants and their parents who just started playing their respective instruments from various schools and represented a wide socioeconomic background.⁵¹⁵ All the participants had videotaped their practice sessions from an earlier study and the researchers applied that data to this study.⁵¹⁶ Along with the videotaped practice sessions, the researchers interviewed all the participants and their parents.⁵¹⁷ The researchers also interviewed the participant's parents (notably the mother) at the ten-month mark and again at the twenty-month mark.⁵¹⁸ Finally, the researchers analyzed and coded the results and found specific themes reported in previous literature: "motivation, the quantity, the quality of practice, parental involvement, enjoyment and satisfaction."⁵¹⁹

After categorizing the results, the researchers divided the participants into three groups based on the previously stated themes. The researchers stated that the first group of participants, "maintained interest and enthusiasm for their instrument after the first twenty months of learning."⁵²⁰ First, the researchers noticed that motivation showed a key factor for these students to continue learning their instrument. The researchers stated that the participants needed both external motivation (receiving an allowance, awarded first chair) and internal motivation (self-worth, wanting to better himself) in order to

⁵¹³ Ibid., 51-54.

⁵¹⁴ Ibid., 55.

⁵¹⁵ Ibid., 55.

⁵¹⁶ Ibid., 55.

⁵¹⁷ Ibid., 55.

⁵¹⁸ Ibid., 55.

⁵¹⁹ Ibid., 55-56.

⁵²⁰ Ibid., 56.

continue learning their instrument.⁵²¹ The researchers did suggest, however, that the participant's internal motivation proved more important in maintaining high motivation.⁵²²

Next, the researchers discovered that the participants in this group grew increasingly aware that they could not gauge the length of their practice sessions as an indicator of effective practice.⁵²³ Instead, these participants stopped practicing when they knew they finished all the practice tasks or they got tired of playing the instrument.⁵²⁴ The researchers also observed that these participants could evaluate themselves.⁵²⁵ For example, one participant decided that they if they could play something correctly, they would stop; and if they could not play something correctly, they would work on the passage until they could play it correctly.⁵²⁶

Along with their self-awareness, the researchers also examined the level of parental involvement with this group. They noticed a high level of parental involvement in this group.⁵²⁷ Yet, the researchers noticed a variety of different parenting styles from very involved parents to more restrained parents.⁵²⁸ In addition to parental involvement, the researchers noticed that all the participants had happy dispositions and got excited to play their instruments.⁵²⁹ The participants also all liked learning hard music so they

⁵²¹ Ibid., 56.

⁵²² Ibid., 56.

⁵²³ Ibid., 57.

⁵²⁴ Ibid., 57.

⁵²⁵ Ibid., 56.

⁵²⁶ Ibid., 56.

⁵²⁷ Ibid., 58.

⁵²⁸ Ibid., 58.

⁵²⁹ Ibid., 58.

could get better.⁵³⁰ Clearly, these participants demonstrated self-awareness, intrinsic motivation, and got excited to play and learn music.

Along with examining the first group, the researchers then examined three participants “whose motivation decreased but who continued lessons beyond the first twenty months of learning.⁵³¹” First, the researchers noticed that this group of participants’ illustrated an extrinsic motivation, and the researchers also found that these participants practiced so that they could place into higher ensembles or they practiced to avoid poor feedback from their teachers.⁵³² The researchers stated that the participants did possess motivation to learn the instrument, but any type of negative experience could cause them to lose their motivation.⁵³³

Next, the researchers discovered that the children in this group tried to do the smallest amount practice needed to gain social approval.⁵³⁴ The researchers also noticed that several of the participants decreased their practice sessions and only practiced when they had nothing else to do.⁵³⁵ The researchers also observed that two of the children could evaluate themselves and knew of some practice strategies, but it did not bother them if they made mistakes while they practiced.⁵³⁶ The other participant, Oliver, stated that if he made a mistake in his practice session he would wait until his lesson to have his teacher to correct the mistake.⁵³⁷ Moreover, the researchers discovered that the participants viewed practicing as work and searched for approval rather than a positive, fun experience.

⁵³⁰ Ibid., 58-59.

⁵³¹ Ibid., 59.

⁵³² Ibid., 59.

⁵³³ Ibid., 59.

⁵³⁴ Ibid., 57.

⁵³⁵ Ibid., 60.

⁵³⁶ Ibid., 60.

⁵³⁷ Ibid., 60.

Along with the participant's level of self-awareness, the researchers also examined the level of parental involvement with this group. First, they noticed that these parents differed from the first group since they only seemed to "tolerate" their child's interest in playing an instrument.⁵³⁸ It did not matter to these parents if their child stopped playing an instrument. Yet, if their child needed help, they provided the necessary help they could or help get their child the necessary help.⁵³⁹

In addition to parental involvement, the researchers noticed that all the participant's attitudes varied in this group with respect to playing their instrument.⁵⁴⁰ The researchers suggested that most of the participants could continue performing and learning the instrument, but they would not get upset if they had to stop playing the instrument.⁵⁴¹

Finally, the researchers also examined three participants who stopped playing the instrument after the first twenty months.⁵⁴² First, the researchers noticed that this group of participants' motivation illustrated a clear external motivational pattern.⁵⁴³ They learned an instrument since their friends learned one, and they practiced since their teachers and parents expected them too.⁵⁴⁴

Next, the researchers discovered that when the participants did practice, they did it simply to fulfill the practice requirement and they did not have any knowledge of practice strategies or self-evaluative strategies.⁵⁴⁵ With this in mind, the researchers also

⁵³⁸ Ibid., 61.

⁵³⁹ Ibid., 61.

⁵⁴⁰ Ibid., 61.

⁵⁴¹ Ibid., 61.

⁵⁴² Ibid., 61.

⁵⁴³ Ibid., 62.

⁵⁴⁴ Ibid., 62.

⁵⁴⁵ Ibid., 62.

observed that with this lack of knowledge and desire, most of the practice sessions would result in the participant getting frustrated and stopping.⁵⁴⁶

Along with lacking any self-awareness, the researchers also examined the level of parental involvement with this group. First, they noticed little to no parental involvement in supporting these participants.⁵⁴⁷ The parents who the researchers interviewed about their children in this group had low expectations about them continuing to learn an instrument past the beginning stages.⁵⁴⁸ Next, the researchers also noticed that these parents did not have any advice for these students, and offered either false praise or none at all.⁵⁴⁹

In addition to parental involvement, the researchers noticed that the participants in this group stopped the instrument so they could explore other interests. Yet, some of the students did have a negative attitude about playing an instrument saying that they would have to do lots of practicing that might interfere with other activities.⁵⁵⁰ The researchers then suggested that this group differed from the first group when they noticed that they had dissimilar motivational patterns, self-critical behaviors, and/or demonstrated no self-awareness with regards to their practice sessions.⁵⁵¹

Roger Chaffin and Gabriela Imreh wrote the article, “A Comparison of Practice and Self-Report as Sources of Information About the Goals of Expert Practice,” in the journal, *Psychology of Music*.⁵⁵² In their article, Chaffin and Imreh wanted to take a different approach to doing self-report. First, Chaffin and Imreh wanted to observe

⁵⁴⁶ Ibid., 62.

⁵⁴⁷ Ibid., 63.

⁵⁴⁸ Ibid., 63.

⁵⁴⁹ Ibid., 63.

⁵⁵⁰ Ibid., 64.

⁵⁵¹ Ibid., 61.

⁵⁵² Roger Chaffin and Gabriela Imreh, “A Comparison of Practice and Self-Report as Sources of Information About the Goals of Expert Practice.” *Psychology of Music* 29, no. 1 (April 2001): 39-69.

whether or not a musician practiced what they said they did while they practiced.⁵⁵³ The researchers also wanted to examine the possibility of the pianist mentioning goals that she had not addressed.⁵⁵⁴

Chaffin and Imreh had Gabriela Imreh, a professional Romanian pianist, learn the third movement of J.S. Bach's *Italian Concerto*. The researchers discussed the pianist's background to ensure the artist's high professional level, and gave the participant's current work schedule.

After recruiting this participant, Chaffin and Imreh collected data over forty-two practice sessions.⁵⁵⁵ The participant needed fifty-seven practice sessions to prepare this movement, but the researchers lost some of the sessions due to malfunctioning equipment. In order to score the participants' performance achievement, Chaffin and Imreh, recorded all the sessions and asked the pianist to give a retrospective report of what she did.⁵⁵⁶ They then decided to categorize the comments into three different levels of interpretation: basic, interpretative and performance.⁵⁵⁷ Chaffin and Imreh gave a concise explanation of each of the categories. Comments like "I need to use this fingering" or "I need to correct that rhythm" fell into the basic interpretation. The researchers then categorized her comments about for phrasing, dynamics, style of articulation, tempo changes and use of pedal as interpretative.⁵⁵⁸ Finally, the researchers categorized the performance comments that concerned memory, overall music structure

⁵⁵³ Ibid., 42.

⁵⁵⁴ Ibid., 45.

⁵⁵⁵ Ibid., 46.

⁵⁵⁶ Ibid., 43.

⁵⁵⁷ Ibid., 49.

⁵⁵⁸ Ibid., 52

and the ability to maintain concentration.⁵⁵⁹ Chaffin and Imreh noted that the pianist always concerned herself with the performance aspects of the music.

In their study, Chaffin and Imreh found various results. First, after observing the participant over fifty-seven practice sessions, Chaffin and Imreh found that through deliberate practice, the pianist moved from being concerned with one dimension of interpretation to another. For example, in the first learning period (the first twelve sessions), the participant's comments illustrated her primary concern with learning the correct notes and applying the correct fingerings that would help her not only with a smooth performance, but also with memorizing the piece for a later performance.⁵⁶⁰

After establishing these three areas, Chaffin and Imreh found that they had developed new and novel descriptions as they analyzed this case study of this particular pianist. They suggested that their use of basic and interpretive dimensions proved novel in measuring and categorizing not only the participant's comments, but also how the pianist continued structuring her practice from one level to the next.⁵⁶¹

Lisa Maynard wrote the article, "The Role of Repetition in the Practice Sessions of Artist Teachers and Their Students," in the journal, *Bulletin of the Council for Research in Music Education*.⁵⁶² In her article's introduction and literature review, Maynard noted several different studies that examined different practice methods and studies that researched the effectiveness of practice strategies.⁵⁶³ For this study, the

⁵⁵⁹ Ibid, 49

⁵⁶⁰ Ibid., 61.

⁵⁶¹ Ibid., 67.

⁵⁶² Lisa M. Maynard. "The Role of Repetition in the Practice Sessions of Artist Teachers and Their Students." *Bulletin of the Council for Research in Music Education* no. 167 (Winter 2006): 61-72 <http://www.jstor.org/stable/40319290> (accessed June 1, 2012).

⁵⁶³ Ibid., 61-63.

researcher wanted to determine how artist teachers and their students utilized repetition and why they used this specific practice strategy in their practice session.⁵⁶⁴

Maynard recruited fourteen university-level participants and five university teachers who each played different instruments to participate in the study.⁵⁶⁵ She also explained that these participants represented four different categories of music professionalism: artist-teachers, advanced graduate students, advanced undergraduate, and beginning undergraduate.⁵⁶⁶ To start the study, the researcher had each participant record two different practice sessions on music that they had already started learning and in a location of their choosing- possibly in an attempt to make the participant comfortable and to create a more natural environment to conduct the study.⁵⁶⁷

Once the participants recorded their practice sessions, Maynard then watched and outlined all of the participant's practice activities so she could ask questions in an interview.⁵⁶⁸ Next, the researcher sat with the participant to watch a ten to twenty minute segment of their practice sessions, and then proceeded to ask questions about their practice session goals while she audio recorded them.⁵⁶⁹ After completing the interviews, the researcher then analyzed the practice sessions for target passages, aspects of performance and musical passages.

After she completed the experiment and analyzed the data, Maynard reported her results. First, the researcher found that all four groups used repetition in their practice sessions.⁵⁷⁰ The researcher additionally found that that most of the participants worked

⁵⁶⁴ Ibid., 64.

⁵⁶⁵ Ibid., 64.

⁵⁶⁶ Ibid., 64.

⁵⁶⁷ Ibid., 64.

⁵⁶⁸ Ibid., 64.

⁵⁶⁹ Ibid., 64.

⁵⁷⁰ Ibid., 68 and 69.

on smaller sections for a shorter amount of time, and they would then work on this short passage (target passage) and then put it back into the larger context.⁵⁷¹ Furthermore, Maynard stated that these advanced participants showed more consistency in their use of repetition, almost as if they had planned out that they would repeat certain target passages to help obtain specific practice session goals.⁵⁷²

Next, the researcher found that the more advanced participants (artist-teachers and advanced graduate students) played longer practice frames than did the musicians in the undergraduate section of the study.⁵⁷³ Maynard suggested in her discussion that that these practice sessions illustrated that these participants had better practice strategies to help promote efficiency in their practice sessions.⁵⁷⁴

Nancy H. Barry wrote the article, “A Qualitative Study of Applied Music Lessons and Subsequent Student Practice Sessions,” in the journal, *Contributions to Music Education*.⁵⁷⁵ In her article’s introduction and literature review, Barry noted that while most of the research had explained the importance of the student-teacher interaction, she did not find any studies that actually addressed it.⁵⁷⁶ For this study, the researcher wanted to witness how college students interacted with their teachers, and which type of practice behaviors would result given the type of interaction.⁵⁷⁷

⁵⁷¹ Ibid., 69.

⁵⁷² Ibid., 69.

⁵⁷³ Ibid., 66-67. See table 1 on page 67 for full details.

⁵⁷⁴ Ibid., 64.

⁵⁷⁵ Nancy H. Barry, “A Qualitative Study of Applied Music Lessons and Subsequent Student Practice Sessions.” *Contributions to Music Education* 34 (March 2007): 51-65.
<https://iiiprxy.library.miami.edu/login?url=http://search.proquest.com/docview/1306617?accountid=14585>
 (accessed October 20, 2010).

⁵⁷⁶ Ibid.

⁵⁷⁷ Ibid., 53.

Barry conducted her research at two universities and recruited three college music professors and their students.⁵⁷⁸ She informed both the teachers and students about the nature of the study and she had all the teachers videotape their lessons so they could use them in their next practice session and complete a questionnaire.⁵⁷⁹ Once the student completed the lesson, the teachers gave each student an envelope and a questionnaire for the students to complete.⁵⁸⁰ After their lesson, the researcher asked the students to videotape the practice session, complete the questionnaire and return it all in a sealed envelope to their respective music office.⁵⁸¹

Barry developed her questionnaire, had two independent judges review it and then modified it accordingly. The final questionnaire had three parts. The first part of the questionnaire asked for basic background information, career goals and whether or not their university prepared them for their career goals.⁵⁸² The researcher then asked the participants to describe how they would teach or practice a new solo or etude in the second part.⁵⁸³ Finally, Barry asked the participants to rate the provided statements on a Likert-type scale of 5 (always) to 1 (never).

In order to score the results, Barry did two things. First, she had a graduate assistant transcribe all the observations from the videotapes, and then (with another experienced educator) reviewed the transcriptions, so she could develop profiles about the teachers and the student's practice sessions.⁵⁸⁴ Next, Barry tabulated the

⁵⁷⁸ Ibid., 53.

⁵⁷⁹ Ibid., 53.

⁵⁸⁰ Ibid., 53.

⁵⁸¹ Ibid., 54.

⁵⁸² Ibid., 54.

⁵⁸³ Ibid., 54.

⁵⁸⁴ Ibid., 55.

questionnaire results, and then she and another experienced educator each coded the responses for the Free Response section.⁵⁸⁵

After collecting and tabulating the results, Barry found several different observations. First, she found that most of the students felt that their teachers helped prepare them for their musical career goal.⁵⁸⁶ Next, Barry found that the teachers stated that they gave their students a written format for practicing, advocated for two or more practice sessions a day, practice with a metronome, gave their students specific practice techniques and illustrated a high self confidence level about their abilities.⁵⁸⁷ Finally, the results suggested that teachers proved more descriptive and exact about they wanted their students to practice whereas students proved less descriptive.⁵⁸⁸

Once Barry finished some basic calculations and explanations, she then answered her five research questions. First, she found that while teachers expressed knowledge of various effective practice strategies the video tapes only revealed that they used a few of them.⁵⁸⁹ She later suggested that the teacher may not have needed to use many practice strategies.⁵⁹⁰

Next, after watching the videotapes she found that most students used few of the techniques that their teachers illustrated in their lessons. The students did use the techniques: slow practice and isolating difficult spots; but the students who used metronomes, warm up procedures and only used them if their teachers consistently employed them in the lesson.⁵⁹¹

⁵⁸⁵ Ibid., 55.

⁵⁸⁶ Ibid., 55.

⁵⁸⁷ Ibid., 55.

⁵⁸⁸ Ibid., 56-57.

⁵⁸⁹ Ibid., 58.

⁵⁹⁰ Ibid., 58.

⁵⁹¹ Ibid., 58.

After observing the students using the techniques on their videotapes, Barry found and named three distinct styles of teaching: the coach, the professor and the conductor.⁵⁹² The Coach offered constant feedback, had the student perform short excerpts, positioned themselves close to the student and paid close attention to the details and how they played.⁵⁹³ The students of the coach also attempted to use several practice strategies in their practice sessions.⁵⁹⁴

Next, Barry observed that the professor had a slower teaching style that allowed the student to perform longer excerpts, had longer explanations for the student and emphasized the use of technical exercises and the metronome.⁵⁹⁵ The professor's students used the metronome in their lessons more often than other students and also worked hard on technical exercises.⁵⁹⁶

Finally, the researcher saw that the conductor maintained a friendly, lively atmosphere with the student, and would sometimes count aloud and conduct the student, as they would play.⁵⁹⁷ Students from this teacher demonstrated the least amount of practice strategies in their practice session.⁵⁹⁸

Barry noted that although she had a small population, she suggested that teachers do influence their student's practice sessions.⁵⁹⁹ Next the study suggested that "if teachers want their students to follow their advice, they should reinforce their words

⁵⁹² Ibid., 59.

⁵⁹³ Ibid., 59.

⁵⁹⁴ Ibid., 60.

⁵⁹⁵ Ibid., 60.

⁵⁹⁶ Ibid., 61.

⁵⁹⁷ Ibid., 61.

⁵⁹⁸ Ibid., 61.

⁵⁹⁹ Ibid., 62.

through repeated student experiences paired with teacher evaluation and feedback throughout the music lesson.⁶⁰⁰”

Roseanne Rosenthal et. al wrote the article, “Musicians’ Descriptions of Their Expressive Musical Practice,” in the journal, *Bulletin of the Council for Research in Music Education*.⁶⁰¹ In their chapter’s introduction and literature review, Rosenthal and company noted several studies that examined the use of words to describe music, and strategies that would help musicians play music more expressively.⁶⁰² For this study, the researchers wanted to examine the types of words musicians used as they described their own expressive practice.⁶⁰³

Rosenthal et. al recruited eighteen musicians that played various instruments and represented three different levels of musicianship: Professional Level (five participants), College Level (five music education majors) and High School Level (eight participants).⁶⁰⁴ The researcher then had each of the participants perform a work that they knew for about ten minutes and the researcher videotaped the performance.⁶⁰⁵ Next, a researcher met with each participant right after their practice sessions, and used a semi-structured interview to ask participants to describe their thoughts as they practiced.⁶⁰⁶ Following the interviews, the researchers categorized the word sentences into two

⁶⁰⁰ Ibid., 63.

⁶⁰¹ Roseanne Rosenthal, Manju Durairaj and Joyce Magann. “Musicians’ Descriptions of Their Expressive Musical Practice.” *Bulletin of the Council for Research in Music Education* no. 181 (Summer 2009): 37-49 <http://www.jstor.org/stable/40319226> (accessed July 11, 2012).

⁶⁰² Ibid., 37-39.

⁶⁰³ Ibid., 39.

⁶⁰⁴ Ibid., 39.

⁶⁰⁵ Ibid., 39.

⁶⁰⁶ Ibid., 39.

categories (content and function) and the individual vocabulary words into two categories (conventional and metaphoric).⁶⁰⁷

After examining the results, Rosenthal and her colleagues made several observations. First, they found that participants viewed their practicing as an emotional experience from the number of words used to describe the practice sessions.⁶⁰⁸ Next, the researchers found that more of the advanced subjects did not merely use repetition, but instead chose strategies to help them remember the information that they had just processed.⁶⁰⁹

Third, Rosenthal and company found that the advanced participants used a proactive approach to practicing.⁶¹⁰ For example, the researchers illustrated that the advanced participants set small goals to help them ascertain a set objective, whereas the younger players would react to what they had done instead of setting out to accomplish an objective.⁶¹¹ In addition to the different approaches, the researchers also found that high school participants used more evaluative statements than the two other groups, and most of them were negative.⁶¹² Rosenthal and her colleagues suggested that this idea of constantly employing a negative critique can hinder one's ability to practice.⁶¹³

Following their discussion of results from the interviews, the researchers also examined the vocabulary that the participants used in the discussion of their practice sessions. First, they found that the more advanced level participants tended to use the music language to describe why they did things, whereas the less advanced level

⁶⁰⁷ Ibid., 40-41.

⁶⁰⁸ Ibid., 45.

⁶⁰⁹ Ibid., 41, 42, and 45.

⁶¹⁰ Ibid., 41 and 45.

⁶¹¹ Ibid., 46.

⁶¹² Ibid., 43 and 46.

⁶¹³ Ibid., 46.

participants tended to use more conventional language.⁶¹⁴ They did find, however, that all the participants did use bodily motion in their vocabulary, especially when talking about or describing the direction of the music.⁶¹⁵ Furthermore, they commented that the use of metaphors could help and “also open imaginative doors to different interpretations of a composition from which to scale a musical response.”⁶¹⁶

They did warn, however, that while metaphors (and they added that all musicians commonly utilize them when speaking about and teaching music) may help young children in the present, future research should help performers and educators come up with methods to introduce more concrete language to younger students to help them easily access and express their feelings that help them clarify their own thoughts when communicating them to others. They further suggested that research should further investigate musical expressiveness in adults and children so musicians and educators can make it more enjoyable for them.⁶¹⁷

Steve Oare wrote the article, “Decisions Made in the Practice Room: A Qualitative Study of Middle School Students’ Thought Processes While Practicing,” in the journal, *Updates: Applications of Research in Music Education*.⁶¹⁸ In his article’s introduction and literature review, Oare noted several different studies that examined the importance of self-evaluation and different studies that have tested models in practice sessions.⁶¹⁹ For this study, Oare had four research questions he tried to answer. First, he wanted to know how middle school students set and used goals during their practice

⁶¹⁴ Ibid., 43 and 46.

⁶¹⁵ Ibid., 46.

⁶¹⁶ Ibid., 47.

⁶¹⁷ Ibid., 47.

⁶¹⁸ Steve Oare. “Decisions Made in the Practice Room: A Qualitative Study of Middle School Students’ Thought Processes While Practicing.” *Update: Applications of Research in Music Education* 30, no. 2 (2012): 63-70. <http://www.upd.sagepub.com/content/30/2/63> (accessed June 1, 2012).

⁶¹⁹ Ibid., 63-64.

sessions.⁶²⁰ Next, he wanted to know what practice strategies middle school students employed while practicing.⁶²¹ Third, the researcher wanted to examine how middle school students assessed their practice sessions and how their personal assessment influenced future goals they might set for themselves.⁶²² Finally, he wanted to observe how their perceptions of self-efficacy effected the decisions they made while practicing.⁶²³

Oare recruited five middle school participants who played various instruments.⁶²⁴ Next, the researcher videotaped a twenty-minute individual practice session, and then did an interview with the student immediately following the practice session.⁶²⁵ Although the researcher did not ask the exact same questions of each student, his questions did cover the following six categories: “(a) choice and quality of goals and why the participant chose them, (b) methods, uses and accuracy of self-assessment, (c) feelings of self-efficacy, (d) choice of, and reasons for, the practice strategies used, (e) uses of mental practice techniques (analysis, use of rhythmic and tonal Solfege, and mental imaging), and (f) decisions related to the use of remedial goals and strategies.”⁶²⁶

After examining the videotapes and transcribing the interviews, Oare noticed four main trends: “motivation, goals, strategies and assessment.”⁶²⁷ Along with this, the research found three different ways that influenced motivation in this population. First, he discovered the need for improving their performances motivated the eighth graders to

⁶²⁰ Ibid., 64.

⁶²¹ Ibid., 64.

⁶²² Ibid., 64.

⁶²³ Ibid., 64.

⁶²⁴ Ibid., 64-65.

⁶²⁵ Ibid., 65.

⁶²⁶ Ibid., 65.

⁶²⁷ Ibid., 65.

practice.⁶²⁸ The seventh grade participants, on the other hand, fulfilled the need to complete twenty minutes (fill time); and in order to do this, played music that they knew they could play.⁶²⁹

Next, the researcher also found that the level of difficulty in the music affected the participant's motivation in three ways. First, Oare found that when encountering difficult spots, some students would get frustrated and move on to an easier spot.⁶³⁰ Then, the researcher found that if the music's difficulty proved too much, some students would simply go back to repeat easier sections of the music.⁶³¹ Finally, the researcher noticed that some students would also return to easier spots when they encountered difficult spots, but then they would go back to the troublesome spot and work it out.⁶³²

In addition to dealing with difficult spots, the researcher suggested that the ability to stay focused also affected motivation. The researcher found that most of the participants could only stay focus for eight to twelve minutes, and that their concentration started fade as the practice session continued.⁶³³

Along with concentration, Oare found that the second trend he noticed from his analyses had to deal with goals. First, while the students could choose their music, they could not tell the researcher what they needed to do, what they needed to fix or how to fix problems as they arose.⁶³⁴ Next, the researcher found that the participant's priorities also influenced their decisions about setting goals.⁶³⁵ Finally, the researcher discovered that

⁶²⁸ Ibid., 65.

⁶²⁹ Ibid., 65.

⁶³⁰ Ibid., 66.

⁶³¹ Ibid., 66.

⁶³² Ibid., 66.

⁶³³ Ibid., 66.

⁶³⁴ Ibid., 67.

⁶³⁵ Ibid., 67.

the inability to clearly set a “criteria” or expectations for fulfilling a goal can affect the practice session.⁶³⁶

Following his observations of how the participants set goals, Oare also noticed three classifications for categorizing the comments related to practice strategies. First, the researcher noticed the importance to have a vast knowledge of different practice strategies available, and he noticed that the participants knew about many practice strategies.⁶³⁷ Next, the researcher noticed that the individual must know how to appropriately use them. In this case, the researcher saw that all the participants, with the exception of one, did not know how to correctly apply strategies while they practiced.⁶³⁸ Finally, the researcher noticed that the music’s difficulties could overwhelm and frustrate the students; and in turn, their frustration would prevent them from applying the necessary strategies to correct their mistakes.⁶³⁹

Finally, Oare created the assessment category after examining the results, and created four main classifications of assesstment. First, Oare found two main questions that influenced student achievement: 1) Do you know when you have completed a goal, and 2) Do you know when to move on to the next goal?.⁶⁴⁰ Most of the students knew when they completed a goal, but some hesitated about moving on to the next goal. Next, he found that recognizing mistakes also affected self-assessment. For this study, he found that some students could identify their mistakes and some students could not.⁶⁴¹

⁶³⁶ Ibid., 67.

⁶³⁷ Ibid., 68.

⁶³⁸ Ibid., 68.

⁶³⁹ Ibid., 68.

⁶⁴⁰ Ibid., 68.

⁶⁴¹ Ibid., 68.

Third, the researcher found that once the individual recognized a mistake, the researcher asked the question, “Do you know what is causing the mistake?” In this study, most students did not know what caused the mistakes they made.⁶⁴² Finally, after knowing what caused the mistake, the individual must know how to fix the mistake. Again, most participants did not give specifics on how to repair problems except to repeat the music until they got it right.⁶⁴³

Stephanie E. Christensen wrote the article, “Practicing Strategically: The Difference Between Knowledge and Action in Two Eighth-Grade Students’ Independent Instrumental Practice” in the journal, *Update: Applications of Research in Music Education*.⁶⁴⁴ In her article’s introduction and literature review, Christensen noted the importance of practicing and having her students complete practice logs.⁶⁴⁵ For this study, the researcher wanted to examine how two different types of students practiced using a collective case approach.⁶⁴⁶

Christensen recruited two eighth grade participants, and their parents from the middle school where she taught at in Michigan.⁶⁴⁷ Christensen interviewed the students twice (once in either February or March and again in May and June), and asked them general questions about their practice habits, attitudes about practicing and their general enjoyment.⁶⁴⁸ Along with the students, the researcher also interviewed the parents about

⁶⁴² Ibid., 69.

⁶⁴³ Ibid., 69.

⁶⁴⁴ Christensen, Stephanie E. “Practicing Strategically: The Difference Between Knowledge and Action in Two Eighth-Grade Students’ Independent Instrumental Practice.” *Update: Applications of Research in Music Education* 29, no. 1 (November 2011): 22-32 <http://upd.sagepub.com/content/29/1/22> (accessed June 1, 2011).

⁶⁴⁵ Ibid., 24

⁶⁴⁶ Ibid., 24

⁶⁴⁷ Ibid., 25

⁶⁴⁸ Ibid., 25

their child's practicing.⁶⁴⁹ In addition to the interview, the researcher also had both of the participants videotape a practice session and answer general questions about their practice session.⁶⁵⁰

The researcher interviewed both participants and their respective parents about their practicing. The participant who played the flute spoke very specifically about her practice time and routine.⁶⁵¹ Her mother (also a musician) showed support and got involved in helping her daughter achieve her goals.⁶⁵² The clarinet player, on the other hand, had no set practice time or routine; and his mother, unlike the flute player's mother, saw this as an extra-curricular activity for him to have fun.⁶⁵³

After identifying the background information on the participants, Christensen asked for verbal descriptions about their practice strategies. Both participants used reducing speed as an effective practice strategy, and they also both reported asking others for help if they had a hard time learning something.⁶⁵⁴ The flute participant additionally stated that she used a metronome, practiced smaller sections, and demonstrated the need to plan out her practicing.⁶⁵⁵

In addition to the interview, the researcher had each participant videotape a single practice session. The participant who played the flute only practiced for fifteen minutes, while she had reported she normally practiced for an hour and a half in the interview; but Christensen noticed that this participant used a metronome, repetition and stopped

⁶⁴⁹ Ibid., 25

⁶⁵⁰ Ibid., 24

⁶⁵¹ Ibid., 25

⁶⁵² Ibid., 24

⁶⁵³ Ibid., 24

⁶⁵⁴ Ibid., 25

⁶⁵⁵ Ibid., 25

immediately to correct errors when she made them.⁶⁵⁶ She also followed a practice routine of a warm-up, technical exercises, and a solo piece.⁶⁵⁷

The participant who played clarinet gave a more theatrical view of his practice session. He narrated his practice session, played several pieces and did not stop to correct any errors.⁶⁵⁸ He also tended to play songs from his sixth grade practice book. Next, the participant did articulate strategies in his first interview, but the researcher found after watching the videotape that he did not use any of the strategies.⁶⁵⁹ The participant, however, did admit that he did not have an effective practice session.⁶⁶⁰

In addition to observing the differences between the videotapes, the researcher noticed some similarities between the two participants. First, she noticed that both participants did enjoy playing their instrument and expressed that they practiced to improve.⁶⁶¹ Next, she noticed that the students did not concern themselves with time limits, and often practiced until they got tired or they got bored.⁶⁶² Then, she noticed that while both students could articulate strategies, they both did not fully utilize them in their practice session, even though the participant, who played flute, used more than the participant who played clarinet.⁶⁶³ These lead the researcher to suggest that if students do not know how to apply the practice strategy then it cannot help them have an effective practice session.⁶⁶⁴

⁶⁵⁶ Ibid., 26

⁶⁵⁷ Ibid., 26

⁶⁵⁸ Ibid., 26

⁶⁵⁹ Ibid., 27

⁶⁶⁰ Ibid., 27.

⁶⁶¹ Ibid., 28.

⁶⁶² Ibid., 28.

⁶⁶³ Ibid., 28.

⁶⁶⁴ Ibid., 29.

Effects of Sleep on Practicing

Robert A. Duke and Carla M. Davis wrote the article, “Procedural Memory Consolidation in the Performance of Brief Keyboard Sequences,” in the journal, *Journal of Research in Music Education*.⁶⁶⁵ In his article’s introduction and literature review, Duke and Davis noted several studies that examined the importance of memory consolidation (“the process of physical change that occurs following active learning experiences⁶⁶⁶”) and the different types of consolidation (night versus day).⁶⁶⁷ For this study, the researchers wanted to observe the effects that consolidation would have on a simple musical task such as performing a keyboard sequence.⁶⁶⁸

Duke and Davis recruited forty-nine, non-musical university-level participants who were right-handed.⁶⁶⁹ Next, the researchers explained that they had five experimental conditions, but they did not clarify if all the participants participated in each group or they if divided the participants into the five different experimental groups.⁶⁷⁰

After they selected, and probably divided the participants up, the researchers had the participants perform one or two keyboard sequences with their left hand that appeared on a keyboard screen in front of them as they performed the sequence.⁶⁷¹ In addition, the researchers had a training session that consisted of a thirty-second working block followed with a thirty second block of rest.⁶⁷² Following the training session, all the participants completed a retesting session at least twenty-four hours later where they also

⁶⁶⁵ Robert A. Duke and Carla M. Davis. “Procedural Memory Consolidation in the Performance of Brief Keyboard Sequences.” *Journal of Research in Music Education* 54, no. 2 (Summer 2006): 111-124 <http://www.jstor.org/stable/3345614> (accessed June 1, 2012).

⁶⁶⁶ Ibid., 112.

⁶⁶⁷ Ibid., 111-114.

⁶⁶⁸ Ibid., 115.

⁶⁶⁹ Ibid., 115.

⁶⁷⁰ Ibid., 115 and 116.

⁶⁷¹ Ibid., 115.

⁶⁷² Ibid., 116.

gave information about their rest and the number of hours they slept.⁶⁷³ Throughout the sessions, the participants could not hear themselves perform the sequence (they did not need to hear themselves since the study focused on a motor skill).⁶⁷⁴

After they completed the experiment and analyzed the data, Duke and Davis reported their results. First, they found that the participants in Group 1 (those who trained on one day and got tested twenty fours later) had an increase in the correct number of keys pressed, which the researchers believed demonstrated overnight consolidation-based enhancements.⁶⁷⁵ Second, the researchers noticed that in the second group (those who learned a sequence one day, rested, tested the next day, rested again, and tested a second time) made significant improvements on the first, and they did not make as many improvements as they did following the first night of rest.⁶⁷⁶

Unlike the first groups, the participants in the third group, however, learned two sequences on one day and then the researchers retested the participants twenty-four hours later. They found that while both sequences did significantly improve, the participants improved even more on the second sequence.⁶⁷⁷ Following the third group, the researchers had the participants in the fourth group also learn both sequences, but this time they had them learn the first sequence one day, the second sequence on the next, and then rested them again following a night of rest.⁶⁷⁸ They found, like in the third group, that sequences did improve following a night of rest, but in this case, the sequences improved equally.⁶⁷⁹ Finally, the researchers had the participants (in Group 5) learn one

⁶⁷³ Ibid., 116.

⁶⁷⁴ Ibid., 115.

⁶⁷⁵ Ibid., 116.

⁶⁷⁶ Ibid., 117-118.

⁶⁷⁷ Ibid., 118.

⁶⁷⁸ Ibid., 118.

⁶⁷⁹ Ibid., 118.

sequence, retest twenty-four hours later and then learn another sequence right after, and then rest both of them again on the third day.⁶⁸⁰ They found like all the other groups that both sequences did significantly improve with sleep; but after introducing the second sequence on the second day, the first sequence did not retest well at the second retest.⁶⁸¹ They suggested that learning a new sequence right after testing an old one, “may interfere with the sleep-based enhancement of the sequence learned first.”⁶⁸²

Furthermore, the researchers reported that their data illustrated findings contrary to other research that investigated sleep-based enhancements.⁶⁸³ They did note, however, that future research needed to explore how sleep-based enhancement would affect auditory skills, since most of the research had focused solely on visual and motor skills.⁶⁸⁴

Robert A. Duke and Amy L. Simmons wrote the article, “Effects of Sleep on Performance of a Keyboard Melody,” in the journal, *Journal of Research in Music Education*.⁶⁸⁵ In their article’s introduction and literature review, Duke and Simmons noted several different studies that examined the prior research on consolidation (“the process through which motor skills and other procedural memories are encoded and refined, resulting in their resistance to interference and forgetting⁶⁸⁶”) and several studies that examined motor skills.⁶⁸⁷ For this study, the researchers wanted to determine whether or not experienced learners and their performances benefited from sleep-

⁶⁸⁰ Ibid., 118.

⁶⁸¹ Ibid., 118.

⁶⁸² Ibid., 118.

⁶⁸³ Ibid., 119-120.

⁶⁸⁴ Ibid., 120-121.

⁶⁸⁵ Amy L. Simmons and Robert A. Duke. “Effects of Sleep on Performance of a Keyboard Melody.” *Journal of Research in Music Education* 54, no. 3 (Autumn 2006): 257-269. <http://www.jstor.org/stable/4151346> (accessed July 11, 2012).

⁶⁸⁶ Ibid., 258.

⁶⁸⁷ Ibid., 257-259.

enhanced consolidation.⁶⁸⁸ Furthermore, Duke and Simmons hypothesized that sleep-enhanced consolidation would help “speed, accuracy and evenness of motor skill.”⁶⁸⁹

Duke and Simmons recruited seventy-five, college-level, non-pianist participants that completed four semesters of class piano training.⁶⁹⁰ First, the researchers had all the participants learn two melodies each in twelve thirty-second training blocks with a thirty-second rest interval in between each training block.⁶⁹¹ The researchers told the participants that they needed to play the melody as accurately and quickly as possible, but still adhere to the printed fingerings on the music.⁶⁹² Once they completed their twelve minute training session, the researchers instructed the participants to abstain from caffeine, other mind altering substances, and avoid naps if the participants had to retest in twelve hours.⁶⁹³ Finally, Duke and Simmons retested all the subjects at a prescribed time depending on one of the five treatments.⁶⁹⁴

After analyzing the data, the researchers made several observations. First, they found the groups that included sleep in their experimental treatment improved accuracy at retest over those groups that did not include some interval of sleep.⁶⁹⁵ More specifically, the AM/AM group (24 hour period that included sleep) and PM/AM group (12 hour period that included sleep) illustrated “significant enhancements in accuracy.”⁶⁹⁶ Next, the researchers discovered that performance speed did not show any significant

⁶⁸⁸ Ibid., 259.

⁶⁸⁹ Ibid., 259.

⁶⁹⁰ Ibid., 259.

⁶⁹¹ Ibid., 260-261.

⁶⁹² Ibid., 260.

⁶⁹³ Ibid., 261.

⁶⁹⁴ Ibid., 261.

⁶⁹⁵ Ibid., 261.

⁶⁹⁶ Ibid., 262.

difference between training and retest for none of the groups that included sleep or did not include sleep.⁶⁹⁷

Unlike speed, however, the researchers did find that temporal evenness did improve following a twenty-four period (AM/AM group) as opposed to groups that only had twelve hours between training and retest (AM/PM and PM/AM).⁶⁹⁸ The other groups, however, did not demonstrate any statistical significance gain to demonstrate improvement in temporal evenness.⁶⁹⁹ Finally, Duke and Simmons discovered that like speed, dynamic evenness did improve regardless of the group.⁷⁰⁰

From these findings, Duke and Simmons suggested that they found measurable observations that sleep-based consolidation did affect a person's performance at retest.⁷⁰¹ Furthermore, the researchers observed that most participants settled in on certain tempos that felt comfortable to them and did not feel the need to push the tempo any faster.⁷⁰² This possibly could explain why speed did not improve significantly from training to retest regardless of the treatment. Finally, the researchers suggested that their research helped expand the current knowledge on consolidation since their experiment required a variety of skills that involved evaluation, planning and physical activity rather than the standard experiments that had no auditory feedback.⁷⁰³

Robert A. Duke, Amy L. Simmons, and Carla Davis wrote the article, "It's Not How Much; It's How: Characteristics of Practice Behavior and Retention of Performance

⁶⁹⁷ Ibid., 262.

⁶⁹⁸ Ibid., 263.

⁶⁹⁹ Ibid., 264.

⁷⁰⁰ Ibid., 265.

⁷⁰¹ Ibid., 265.

⁷⁰² Ibid., 265.

⁷⁰³ Ibid., 267.

Skills,” in the journal, *Journal of Research of Research in Music Education*.⁷⁰⁴ In their article’s introduction and literature review, they noticed the limited amount of literature that looked at the practice behaviors of advanced musicians.⁷⁰⁵ For this study, the researchers wanted to assess the quality of a pianist’s performance twenty-four hours after learning a difficult passage, and whether or not the practice behaviors could predict how the performance would turn out.⁷⁰⁶

Duke et al. recruited seventeen advanced pianists to participate in two practice sessions.⁷⁰⁷ For this study, the researchers used a three-measure excerpt from Shostakovich’s *Concerto for Piano, Trumpet and String orchestra*.⁷⁰⁸ The researchers used this excerpt since they believed the participants could learn it in a single practice session, but the music still provided a challenge and proved very difficult to sight-read at tempo.⁷⁰⁹

After recruiting the participants and selecting the music, a test proctor escorted each participant to the room. The proctor gave the participant two minutes to warm up, and after the participants completed the warm up the proctor began the experiment when they gave the test excerpt, a metronome and a pencil to each participant.⁷¹⁰ The proctor read the instructions to each participant, stayed in the room with them, and video recorded the practice session.⁷¹¹ Once the practice session ended (the participants could

⁷⁰⁴ Robert A. Duke, Amy L. Simmons, and Carla Davis. “It’s Not How Much; It’s How: Characteristics of Practice Behavior and Retention of Performance Skills.” *Journal of Research in Music Education* 56, no. 4 (January 2009): 310-321. <http://jrm.sagepub.com/content/56/4/310> (accessed September 25, 2010).

⁷⁰⁵ Ibid., 114.

⁷⁰⁶ Ibid., 114.

⁷⁰⁷ Ibid., 6.

⁷⁰⁸ Ibid., 6.

⁷⁰⁹ Ibid., 6.

⁷¹⁰ Ibid., 6.

⁷¹¹ Ibid., 6.

practice as long as they wanted), the proctor informed them not to practice the excerpt until the next session twenty-four hours later and then collected the materials.⁷¹²

For the second session, the researchers gave the participants two minutes to warm up, but advised them not to play any part of the excerpt from the day before.⁷¹³ Once they finished the warm-up, the proctor handed the participant back their copy of the excerpt, and instructed them to play the excerpt fifteen times without stopping between any of the performances.⁷¹⁴ The proctor videotaped the test session for further analysis.⁷¹⁵

After administering the practice session and test session, the researchers observed all seventeen of the participant's videos. First, they observed the practice sessions for practice behaviors such as: amount of time, number of performance trials, number of complete trials, how many correct performances, how many near correct performances, etc.⁷¹⁶ Next, Duke et. al, examined the test videos to find the following: how many correct performances, how many near correct performances, and the sum of correct and near correct-trials.⁷¹⁷ Finally, the researchers each ranked the test performances from best to worst in regards to: tone, character and performance's expressive nature.⁷¹⁸

Once the researchers tabulated the results, they found that a participant's total practice time, the number of performance trials, the number of complete trials and total numbers of correct and near-correct trials did not significantly relate to their test score.⁷¹⁹

Next, the researchers found that the top three scoring pianists had a better and more

⁷¹² Ibid., 6.

⁷¹³ Ibid., 6.

⁷¹⁴ Ibid., 6.

⁷¹⁵ Ibid., 6.

⁷¹⁶ Ibid., 6.

⁷¹⁷ Ibid., 6.

⁷¹⁸ Ibid., 6.

⁷¹⁹ Ibid., 6.

consistent tone, rhythmic accuracy, better dynamics and an overall better execution than the other pianists.⁷²⁰

Of these three top performers, the researchers identified eight, common practice behaviors among all three: played with their hands together very early, practiced the musical inflections from the beginning, did use mental practice, stopped before they made the errors, addressed errors and corrected them, gradually increased their tempos as they could handle the music, and repeated the passages until they had an error free and fluid performance.⁷²¹

After noticing the practice strategies of the top performers, the researchers made a few observations. First, the way they used their practice strategies and not the length of their practice session determined the participant's performance.⁷²² Next, they suggested that the biggest differences between the top three performers and the rest, proved how they addressed, handled and corrected errors.⁷²³ The researcher also found a slow enough tempo that would allow the participant to play the correct notes demonstrated the most effective way of handling errors.⁷²⁴ Furthermore, the researchers suggested that future research should examine the best ways of how to help younger musicians learn how to correct errors.

Carla Davis Cash wrote the article, "Effects of Early and Late Rest Intervals on Performance and Overnight Consolidation of a Keyboard Sequence," in the journal,

⁷²⁰ Ibid., 6.

⁷²¹ Ibid., 6.

⁷²² Ibid., 6.

⁷²³ Ibid., 6.

⁷²⁴ Ibid., 6.

Journal of Research in Music Education.⁷²⁵ In her article's introduction and literature review, Cash noted the literature on how rest affected musicians, but generalized that most of the time, studies showed resting provides relief from either mental or physical practice.⁷²⁶ For this study, Cash wanted to examine how early, middle or late intervals of rest in the practice session would affect beginning keyboard players.⁷²⁷

Cash recruited thirty-six undergraduate or graduate students, who were right handed, and who were non-musicians.⁷²⁸ Cash also deliberately asked the participants not to use caffeine or drugs, and she also paid her participants for their service in the study.⁷²⁹ For this study, the researcher had the participants learn a five-note sequence with their left hand on a keyboard.⁷³⁰ She used this task since the researcher saw that it had worked with success in previous studies. Cash did not allow the participants to hear themselves, and explained that with this method, the participants could focus on the motor aspect of the skill and not what it sounded like.⁷³¹

Each of the participants came to the testing location between 8:00 p.m. and 10:30 p.m. Cash then randomly assigned participants to one of three practice groups: Early rest (five minute rest interval introduced between the third and fourth blocks), Late rest (five minute rest interval between the ninth and tenth blocks), and no rest (no rest intervals between the practice groups).⁷³² Once assigned, the researcher instructed the participants to practice the sequence as accurately and quickly as possible in thirty seconds, and then

⁷²⁵ Carla Davis Cash. "Effects of Early and Late Rest Intervals on Performance and Overnight Consolidation of a Keyboard Sequence." *Journal of Research in Music Education* 57, no. 3 (October 2009): 252-266. <http://jrm.sagepub.com/content/57/3/252> (accessed October 3, 2010).

⁷²⁶ Ibid., 112 and 113

⁷²⁷ Ibid., 114.

⁷²⁸ Ibid., 114.

⁷²⁹ Ibid., 114.

⁷³⁰ Ibid., 114.

⁷³¹ Ibid., 114.

⁷³² Ibid., 114.

once the participants finished the practice blocks, they looked away from the keyboard and computer for a rest break.⁷³³

Cash conducted retest sessions twelve hours later the next morning after the participants had slept. Each of the experimental groups practiced six thirty-second blocks and then rested for five minutes between their third and fourth blocks.⁷³⁴ The researchers recorded the participants for both the retest and training sessions so she could analyze it later.⁷³⁵

After collecting and tabulating the results, Cash made several observations. First, Cash found that like other studies, her study showed the importance in determining where a person places rest intervals in their practice session.⁷³⁶ Next, the results suggested that if a person does well in the practice session, putting a rest interval early in the session can help continue and improve the amount of achievement gains.⁷³⁷ Third, if an individual rests earlier while they make gains, they can do more repetitions in the practice session and help themselves achieve “a more stabilized skill memory.”⁷³⁸

Late rest intervals also gave similar gains to early rest intervals, but the researcher noticed that the participants did not make any more gains in the practice session like the early rest interval group did.⁷³⁹ Furthermore, the researcher noticed that after all the participants rested after the third and fourth blocks, they all showed improvements.⁷⁴⁰ Finally, Cash observed that the participants would have unlikely suffered from mental or physical fatigue since they only played for thirty-seconds and then rested for thirty-

⁷³³ Ibid., 114.

⁷³⁴ Ibid., 114.

⁷³⁵ Ibid., 114.

⁷³⁶ Ibid., 114.

⁷³⁷ Ibid., 114.

⁷³⁸ Ibid., 114.

⁷³⁹ Ibid., 114.

⁷⁴⁰ Ibid., 114.

seconds.⁷⁴¹ The researcher also stated that rest from a skill, if only for a few minutes, “may allow for memory processing events to initiate advantaging learners when practice resumes.”⁷⁴²

Studies that Tested Different Aspects of Practicing

In addition to the studies that have tested the effects of sleep on practicing, other researchers examined strategy use, self-evaluation, motivation, and goal planning, and how they all affected an individual’s ability to practice and make achievement gains. Roberta W. Brown wrote the article, “The Relation Between Two Methods of Learning Piano Music,” in the journal, *Journal of Experimental Psychology*.⁷⁴³ Unlike several other articles, Brown did not provide a literature review or look at other studies that examined practicing music prior to her own investigation.⁷⁴⁴ For this study, the researcher wanted to observe the efficiency of two different methods of practicing music.⁷⁴⁵

From the article, one cannot find how many participants Brown recruited for her study.⁷⁴⁶ The researcher, however, did explain that the participants participated in both treatments: hands together and hands separated.⁷⁴⁷ Next, the researcher picked excerpts that had different technical aspects, contained an appropriate level of difficulty, and had an equal level of difficulty as not to make one piece harder than the other.⁷⁴⁸ In addition, the researcher made the participants play the scores at the same time each day to avoid,

⁷⁴¹ Ibid., 114.

⁷⁴² Ibid., 114.

⁷⁴³ Roberta Brown. “The Relation Between Two Methods of Learning Piano Music.” *Journal of Experimental Psychology* 16, no. 3 (June 1, 1933): 435-441 PsycheArticles Database (accessed June 1, 2012).

⁷⁴⁴ Ibid., 435.

⁷⁴⁵ Ibid., 435.

⁷⁴⁶ Ibid., 435.

⁷⁴⁷ Ibid., 435.

⁷⁴⁸ Ibid., 437.

“the benefit of freshness or warming up.”⁷⁴⁹ Finally, unlike the pretest-posttest design, the researcher used the common practice routine (walk into a room, sit down and start trying to get the piece at the prescribed tempo) as her design.⁷⁵⁰ This might have helped her create a more naturalistic environment so the experiment would not have affected the participants as much.

After recruiting and handing out the materials to the participants, Brown had the participants use the “hands-together method,” and a metronome while they played through the entire piece without stopping to correct mistakes or work on difficult measures.⁷⁵¹ Next, once the participant felt ready to test their performance at the metronome marking, the researcher tested and evaluated them using only the notes, rhythms and articulations to score them.⁷⁵² If they played everything correctly, then the researcher moved the metronome up to a faster speed, and the researcher also used this procedure for the “hands separate” treatment.⁷⁵³ Instead of reading the piece three times with both hands together, the participant would play the treble clef line with the right hand, the bass clef line with the left hand, and finally play both hands together.⁷⁵⁴ Through this method, Brown determined how long it took to learn the piece at tempo while they still played everything on the page correctly.⁷⁵⁵

After examining the results, Brown made three observations. First, she found that participants learned music faster using the “hands-together” treatment.⁷⁵⁶ Next, she found that participants had a hard time combing both hands together in the “hands-

⁷⁴⁹ Ibid., 439.

⁷⁵⁰ Ibid., 439.

⁷⁵¹ Ibid., 435-437.

⁷⁵² Ibid., 437.

⁷⁵³ Ibid., 439.

⁷⁵⁴ Ibid., 437.

⁷⁵⁵ Ibid., 439.

⁷⁵⁶ Ibid., 441.

separate” treatment since they memorized the treble and bass lines independent of each other.⁷⁵⁷ Finally, Brown observed that more individuals took pleasure in using the “hands-together” treatment.⁷⁵⁸ She did not, however, illustrate any evidence of asking the participants if they enjoyed one treatment over the other; but instead it seems she stated her own observation.⁷⁵⁹

Graham F. Welch wrote the article, “Variability of Practice and Knowledge of Results as Factors in Learning to Sing in Tune,” in the journal, *Council for Research in Music Education*.⁷⁶⁰ In his article’s introduction and literature review, Welch reviewed and explained the literature surrounding schema theory and its’ three subdivisions (according to Welch): recall, recognition and error labeling.⁷⁶¹ For this study, the researcher wanted to observe whether three different practice treatments helped participants sing in tune better.⁷⁶²

Welch recruited sixty-six elementary school children from various schools in London.⁷⁶³ First, the researcher taught the melodies he tested to the participants in groups and then divided the participants into six different learning trials: Treatment 1 (groups 1 and 2 sat in front of the machine turned off and did not know their results), Treatment 2 (groups 3 and 4 sat in front of the machine turned on and did not know their results), and Treatment 3 (groups 5 and 6 sat in front of the machine turned on and did

⁷⁵⁷ Ibid., 441.

⁷⁵⁸ Ibid., 441.

⁷⁵⁹ Ibid., 441.

⁷⁶⁰ Graham F Welch. “Variability of Practice and Knowledge of Results as Factors in Learning to Sing in Tune.” *Council for Research in Music Education*, no. 85 (Late Fall 1985): 238-247. <http://www.jstor.org/stable/40317960> (accessed July 12, 2012).

⁷⁶¹ Ibid., 238-239.

⁷⁶² Ibid., 240.

⁷⁶³ Ibid., 240.

know their results).⁷⁶⁴ Next, after he taught the melodies to the participants, he took each participant through the prescribed treatment and attached two electrodes to their throats so an image could appear on a screen while they sang. Then the researcher had the participants place a set of headphones over their ears and listen to a recorded pitch(es) from a cassette tape for four seconds.⁷⁶⁵ The participants then attempted to sing back the pitch(es) they heard from the tape after six seconds of silence.⁷⁶⁶ The participants repeated this procedure in blocks of thirty followed with a minute interval of rest.⁷⁶⁷ Finally, the researcher analyzed the data to determine the accuracy of the student's singing and pitch placement.⁷⁶⁸

After analyzing the data, the researcher made several observations. First, he found that groups five and six did significantly better than groups one and two, or three and four.⁷⁶⁹ Next, the researcher found that groups one and two significantly differed from each other even though neither one of them had visual feedback, nor knowledge of the results.⁷⁷⁰ Third, the researcher found no difference in gender between any of the groups.⁷⁷¹

In addition, Welcher suggested that visual feedback without knowing the results proved an effective method when the participants did not have an objective measure to determine the feedback.⁷⁷² Furthermore, the researcher suggested that children could correct themselves from singing-out-tune if they placed themselves in an environment

⁷⁶⁴ Ibid., 241 and 242.

⁷⁶⁵ Ibid., 241.

⁷⁶⁶ Ibid., 241.

⁷⁶⁷ Ibid., 243.

⁷⁶⁸ Ibid., 244.

⁷⁶⁹ Ibid., 245.

⁷⁷⁰ Ibid., 245.

⁷⁷¹ Ibid., 245.

⁷⁷² Ibid., 245.

that allowed them to obtain knowledge about their pitch error and enough practice time to fix it.⁷⁷³

Linda M. Gruson wrote the chapter, “Rehearsal Skill and musical Competence: does practice make perfect?,” in the Sloboda’s book, *Generative Processes in Music*.⁷⁷⁴ In the chapter’s introduction and literature review, Gruson noted the various literature that examined how individuals both acquire skill and execute the skill.⁷⁷⁵ For this study, the researcher wanted to examine “the process of musical acquisition through an examination of the rehearsal behavior of piano students varying in musical competence.”⁷⁷⁶ Furthermore, Gruson stated she would observe how practice strategies related and changed depending on the level of musical expertise.⁷⁷⁷

Gruson divided her study into two parts. The first part of her study compared the practice behaviors of different pianists as they worked on three pieces.⁷⁷⁸ In the second part of her study, Gruson examined the practice behaviors of novice, intermediate, and advanced pianists as they continued to work on the pieces for an additional nine sessions.⁷⁷⁹ In order to score both of these parts, Gruson used the Observational Scale for Piano Practicing (twenty noticeable behavior categories) and a self-report.⁷⁸⁰

In the first part, Gruson recruited forty pianists that ranged from beginning to professional pianists according to the Toronto Royal Conservatory of Music

⁷⁷³ Ibid., 246.

⁷⁷⁴ Linda M. Gruson. Rehearsal Skill and musical Competence: does practice make perfect?. In *Generative Processes in Music*, ed. John A. Sloboda, 91-112. Oxford University Press.

⁷⁷⁵ Ibid., 91-92.

⁷⁷⁶ Ibid., 93.

⁷⁷⁷ Ibid., 93.

⁷⁷⁸ Ibid., 93 and 94.

⁷⁷⁹ Ibid., 93 and 94.

⁷⁸⁰ Ibid., 93 and 94.

examinations.⁷⁸¹ The researchers asked the participants to learn one page from three different pieces over one practice session that the researcher recorded.⁷⁸² The researcher also asked the participants in Grades II, VI, and Artist to practice the pieces for an additional nine sessions; and of those nine sessions.⁷⁸³ The researcher then analyzed and coded the first, fourth, seventh and tenth sessions.⁷⁸⁴

After they had all completed the first practice session, Gruson looked for behaviors every five seconds in the recording using a stopwatch. Gruson later had two independent judges examine seventeen random practice sessions to determine reliability.⁷⁸⁵ Gruson then made several observations about the second part of the study. First, she found that repeating sections tended to increase as the skill level increase. In fact, the researcher used three variables to easily identify the three groups: repeating sections, playing hands separately, and pausing.⁷⁸⁶

Furthermore, as the practice sessions continued, Gruson found that Grade II and Grade IV started repeating more sections; where the Artist Grade repeated the entire piece.⁷⁸⁷ In addition, Gruson saw that as students repeated more sections or the entire piece, the number of times the participants paused decreased.⁷⁸⁸

Next, Gruson found no significant differences in tempo across the three groups, but, she did make two observations. First, she found that Grade II participants increased their tempo over the sessions, whereas the other two groups had already set their tempos

⁷⁸¹ Ibid., 93 and 94.

⁷⁸² Ibid., 93 and 94.

⁷⁸³ Ibid., 93 and 94.

⁷⁸⁴ Ibid., 93 and 94.

⁷⁸⁵ Ibid., 95.

⁷⁸⁶ Ibid., 101.

⁷⁸⁷ Ibid., 93 and 94.

⁷⁸⁸ Ibid., 93 and 94.

earlier in earlier practice sessions.⁷⁸⁹ Next, she found that after the Grade IV and Artist groups had mastered the tempo indications, they could experiment with different musical ideas and even start memorizing the piece.⁷⁹⁰

After observing the tapes of the second group, the researcher interviewed the participants to examine the differences between the groups.⁷⁹¹ She gave each practice strategy or cognitive ability to practice a number on a scale of one to four. Each point represented a different cognitive level of practice strategy. First, Gruson classified the lowest level as simple and undifferentiated (a general response that did not specify a particular practice strategy).⁷⁹² She categorized the next level as concrete behavioral (using the same practice strategy and not taking into account whether or not it was appropriate to the situation or piece).⁷⁹³ She then labeled the third category as having general strategies (this allowed the performer to change his behavior and possibly modify the strategy depending on the need).⁷⁹⁴ Finally, she saw that the highest level used high order strategies (the ability to rank the demands of what is needed and then determine how to use the general strategies to the best of their ability).⁷⁹⁵

Once she coded responses, the researcher noticed that more experienced students generally employed high order strategies, while novice participants employed the simple strategies.⁷⁹⁶ Next, Gruson noticed that novice students tended to repeat the notes, but as the music level increased, the older students tended to repeat larger chunks such as larger

⁷⁸⁹ Ibid., 93 and 94.

⁷⁹⁰ Ibid., 93 and 94.

⁷⁹¹ Ibid., 104.

⁷⁹² Ibid., 105.

⁷⁹³ Ibid., 105.

⁷⁹⁴ Ibid., 105.

⁷⁹⁵ Ibid., 105.

⁷⁹⁶ Ibid., 107.

sections or the entire piece.⁷⁹⁷ Furthermore, the researcher noticed a difference between automatization and a controlled process. She later suggested that a controlled process proved more accurate and could help the musician if they found themselves in a changing situation (like performing a concerto in six different places).⁷⁹⁸

Nancy H. Barry wrote the article, “The Effects of Different Practice Techniques Upon Technical Accuracy and Musicality in Student Instrumental Performance,” in the journal, *Research Perspectives in Music Education*.⁷⁹⁹ In the article’s introduction and literature review, Barry noted the literature on different fields of practicing, but found few studies that addressed what variables from practicing music affected the variables that affected student progress.⁸⁰⁰ For this study, the researcher wanted to examine how different practice designs affected student achievement.⁸⁰¹ Furthermore, Barry predicted she would not find any significant differences between the following experimental groups: number of correct pitches played, correct rhythms played, rating for technical accuracy or musicality.

Barry recruited eighty-four participants who played various brass and woodwind instruments and attended a Florida State University summer music camp.⁸⁰² For this study, the researcher used a melody from a sight-reading book since it proved not too difficult, had a moderate range, she could obtain parts for all the instruments, had a

⁷⁹⁷ Ibid., 9

⁷⁹⁸ Ibid., 108.

⁷⁹⁹ Nancy H. Barry. “The Effects of Different Practice Techniques Upon Technical Accuracy and Musicality in Student Instrumental Performance.” *Research Perspectives in Music Education* 44, no. 1 (Fall 1990): 4-8.

⁸⁰⁰ Ibid., 6.

⁸⁰¹ Ibid., 6.

⁸⁰² Ibid., 6.

variety of rhythms for the short etude, and the participants would not know it.⁸⁰³ She also developed two questionnaires for the students to take.

After gathering all the materials and participants, the researcher administered a pretest to all the participants in a private room, recorded them, had each of them sight-read the experimental etude and had them complete the first questionnaire.⁸⁰⁴ Once they completed the pretest, the researcher divided the participants into three experimental groups: group 1 (followed a specific, teacher written practice method), group 2 (participants developed their own specific practice method) and group 3 (no special instructions on how to practice).⁸⁰⁵

After the researcher assigned each participant to a group, each participant went to a private room so they could complete their first fifteen-minute practice session.⁸⁰⁶ Then after one day of rest, the students completed the second fifteen-minute practice session.⁸⁰⁷ Once the participants completed the second practice session, the researcher collected the materials, and administered the posttest and second questionnaire.⁸⁰⁸ Finally, Barry scored the tapes for both melodic and rhythmic accuracy (2 points possible).⁸⁰⁹ She also awarded a score of 1-10 for musicality and technical ability.⁸¹⁰

After collecting and tabulating the results from the tapes and questionnaires, Barry made several observations. First, she found in the first questionnaire that participants reported using the practicing strategies: section-whole, studying key

⁸⁰³ Ibid., 6.

⁸⁰⁴ Ibid., 6.

⁸⁰⁵ Ibid., 6.

⁸⁰⁶ Ibid., 6.

⁸⁰⁷ Ibid., 6.

⁸⁰⁸ Ibid., 6.

⁸⁰⁹ Ibid., 7.

⁸¹⁰ Ibid., 7.

signature and other aspects of the music.⁸¹¹ Next, in the second questionnaire Barry illustrated that sixty percent of the subjects expressed an interest in changing the way they practice after they participated in this experiment.⁸¹²

In addition to the questionnaires, Barry found several results after examining the posttest scores of the different groups. First, the researcher saw that gain scores proved higher in the teacher-practice method and student-practice method group over the free practice group.⁸¹³ The researcher suggested that the higher gain scores resulted from a structured practice environment. However, the researcher stated that she did not endorse one method or the other, but looked to recommend a structured practice session over a non-practice session.⁸¹⁴

Nancy H. Barry wrote the article, “The Effects of Practice Strategies, Individual Differences in Cognitive Style, and Gender upon Technical Accuracy and Musicality of Student Instrumental Performance,” in the journal, *Psychology of Music*.⁸¹⁵ In her article’s introduction and literature review, Barry noted the literature on field dependence (experiences are governed by organization of the visual field) and field independence (experiences are analyzed and reconstructed for different situations).⁸¹⁶ For this study, the researcher wanted to examine how structured and free practice sessions, field dependence/independence, and gender would all affect technical accuracy.⁸¹⁷

⁸¹¹ Ibid., 7.

⁸¹² Ibid., 7.

⁸¹³ Ibid., 8.

⁸¹⁴ Ibid., 8.

⁸¹⁵ Nancy H. Barry. “The Effects of Practice Strategies, Individual Differences in Cognitive Style, and Gender upon Technical Accuracy and Musicality of Student Instrumental Performance.” *Psychology of Music* 22, no. 1 (October 1992): 112-123. <http://pom.sagepub.com/content/20/2/112> (accessed October 20, 2010).

⁸¹⁶ Ibid. 112 and 113

⁸¹⁷ Ibid., 114.

Barry recruited fifty-five participants who played various brass and woodwind instruments in grades seven through ten to participate in a study that included a pretest, practice session and posttest.⁸¹⁸ For this study, the researcher transcribed a piano piece since she believed it proved not too difficult, had a moderate range, contained various rhythmic values, and the participants would not know it.⁸¹⁹ She also had a questionnaire and asked the participants to write a brief narrative.

She divided up the participants into two groups (structured and free practice groups) after administering them a test that measured field dependence-independence.⁸²⁰ Barry designed the experimental design from the researcher's prior research in 1990.⁸²¹ The structured practice group participant followed a strict protocol that Barry wrote, and an adult stayed throughout the session to remind the student to follow the instructions, but did not record the session.⁸²² The free practice session, however, had no written instructions, no supervisor, but did contain a cassette player to monitor the session.

The experiment started with the researcher administering a pretest to all the participants. Once they completed the pretest, they went to one of two practice rooms and practiced the etude for an additional ten minutes, and both groups left their music after they completed the session.⁸²³ The second and third practice sessions did not include a pretest, but instead had a fifteen-minute practice session.⁸²⁴ The fourth and final practice session included a five-minute practice session along with a recorded posttest.⁸²⁵ Barry

⁸¹⁸ Ibid., 114.

⁸¹⁹ Ibid., 114.

⁸²⁰ Ibid., 114.

⁸²¹ Ibid., 114.

⁸²² Ibid., 115.

⁸²³ Ibid., 116.

⁸²⁴ Ibid., 116.

⁸²⁵ Ibid., 116.

awarded 1 point for both melodic and rhythmic accuracy, and awarded a score of 1-10 for musicality.⁸²⁶

After collecting and tabulating the results, Barry made several observations. First, she found seven differences between the two practice groups. She found that free practice participants played at faster tempos, and found that while participants in the structured practice session had to use a metronome, free practice participants did not (even though the researcher provided them with one).⁸²⁷ Next, Barry suggested that while structured practice participants had to finger through the passage and tap out rhythms before performing, most free practice participants did not exhibit these behaviors in their practice sessions.⁸²⁸ Finally, the researcher noted that while students in the structured practice session had to identify trouble spots, play them slowly and mark errors in their music, the participants in the free practice session did not exhibit any of those behaviors.⁸²⁹

After Barry made her observations of the tapes she did a statistical analysis of the differences between the groups. First, Barry found no relationship between an individual's classification as Field-Dependence or Field Independence and their posttest scores.⁸³⁰ Next, Barry found no significant differences between males and females.⁸³¹ She did, however, observe that free practice group females scored significantly higher than their free practice group male counterparts for rhythmic accuracy.⁸³² The researcher also suggested that structure practice participants scored higher and improved more than

⁸²⁶ Ibid., 116.

⁸²⁷ Ibid., 119.

⁸²⁸ Ibid., 120.

⁸²⁹ Ibid., 120.

⁸³⁰ Ibid., 120.

⁸³¹ Ibid., 120.

⁸³² Ibid., 116.

their free practice counterparts.⁸³³ She did caution readers somewhat since the structured practice session had an adult supervisor present to ensure that the participants followed the procedure.

John A. Sloboda and Jane W. Davidson wrote the article, “The Role of Practice in the Development of Performing Musicians,” in the journal, *British Journal of Psychology*.⁸³⁴ In their article’s introduction and literature review, the researchers noted several studies that examined deliberate practice, practicing at professional levels over a sustained period and different studies that have tested practice methods.⁸³⁵ For this study, the researchers wanted to observe what and how different levels of musicians practiced, their practice activities, and whether this changed over time.⁸³⁶

Sloboda and Davidson recruited 257 young musicians between the ages of eight and eighteen who played various wind instruments.⁸³⁷ The researcher then divided the participants into five groups: Target Group (individuals enrolled at a specialized music school), Group 2 (individuals that auditioned at the specialized school, but did not receive admission), Group 3 (wanted to apply at the specialized school, but did not), Group 4 (individuals not learning an instrument at the specialized music school) and Group 5 (individuals who stopped a playing an instrument).⁸³⁸

⁸³³ Ibid., 116.

⁸³⁴ John A. Sloboda, and Jane W. Davidson. “The Role of Practice in the Development of Performing Musicians.” *British Journal of Psychology* 87, no. 2 (May 1996): 287-310. <http://search.ebscohost.com/login.aspx?direct=true&db=buh&AN=9606272829&site=ehost-live> (accessed September 30, 2010).

⁸³⁵ Ibid., 307-310.

⁸³⁶ Ibid., 310.

⁸³⁷ Ibid., 310.

⁸³⁸ Ibid., 310.

Next, the researchers administered and recorded their interviews to both parent and child either face-to-face or over the phone.⁸³⁹ The researchers recorded the interviews so the researchers could code the responses, and have an independent judge review a portion of them to check for reliability.⁸⁴⁰ In addition, the researchers based the questionnaire off prior research that asked about the participant's practice habits, musical activities, background information, lessons, concert and competitions.⁸⁴¹ Finally, the researchers had some of the participants in groups 1, 3, and 4 keep practice diaries for forty-weeks, and each six-week period the researchers would collect the diaries and distributed new ones to the participants.⁸⁴²

After coding the responses and having some of the recordings reviewed, the researchers made several observations. First, the researchers found the participants in Group 1 accomplished more than those in Group 5, and they also found no significant differences in achievement between Groups 2 and 4.⁸⁴³ Next, the researchers found significant differences for formal practice, and they found that the participants in Group 1 did significantly more formal practicing than the other groups starting at age twelve.⁸⁴⁴

Third, the researchers found that while Group 1 started their instruments earlier than Group 5, they did not find a significant difference for starting age between Groups 1, 2, 3, and 4.⁸⁴⁵ The researchers, however, did note that while they found no significant difference for starting age, they noticed that the participants in Group 1 did double the

⁸³⁹ Ibid., 310.

⁸⁴⁰ Ibid., 310.

⁸⁴¹ Ibid.

⁸⁴² Ibid.

⁸⁴³ Ibid.

⁸⁴⁴ Ibid.

⁸⁴⁵ Ibid.

amount of practice that the other three groups did when they started their instruments.⁸⁴⁶

The researchers noticed along with the double amounts of practice in the beginning,

Group 1 also had more minutes of private lessons per week than the other groups.⁸⁴⁷

In addition to the differences between groups, Sloboda and Davidson also examined the differences between instruments and did not find any significant differences between them, but did find that pianists practiced the most and vocalists practiced the least.⁸⁴⁸ Furthermore, the researchers found no differences between the students for informal playing between grade levels or instrument type.⁸⁴⁹

Along with not finding any differences between instruments, they also examined the diary results. First, they found no significant differences between informal playing for any of the groups.⁸⁵⁰ Next, they found that most of the participants in Group 1 did scales and technical exercises, but suggested that they did this since the school they attended allowed for this, while other schools did not.⁸⁵¹

The diaries additionally showed that the participants in Group 1 had a more stable practice routine than the other groups did. Finally, the researchers did notice, however, that regardless of group, most of the participants did not complete their practice diaries during the holiday breaks.⁸⁵² They also reported that the results suggested that achievement did relate to the amount of formal practice.⁸⁵³

Gary E. McPherson wrote the article, *Cognitive Strategies and Skill Acquisition in Musical Performance*, in the journal, *Bulletin of the Council for Research in Music*

⁸⁴⁶ Ibid.

⁸⁴⁷ Ibid.

⁸⁴⁸ Ibid.

⁸⁴⁹ Ibid.

⁸⁵⁰ Ibid.

⁸⁵¹ Ibid.

⁸⁵² Ibid.

⁸⁵³ Ibid.

Education.⁸⁵⁴ In his article, McPherson looked to gather more data from previous studies. For this study, McPherson had three main research questions he wanted to answer. First, he wanted to reevaluate the musical skills of a population he had evaluated three years earlier.⁸⁵⁵ Next, he would analyze what had or had not changed in the participant's musical abilities.⁸⁵⁶ Finally, McPherson wanted to determine if a significant relationship existed between the practice strategies the participants' reported, and their actual achievement on each of the four measures.⁸⁵⁷

McPherson ran his study while the participants prepared for their examinations.⁸⁵⁸ McPherson re-recruited fifty-three participants from a previous study who played trumpet or clarinet, and found ten of them had stopped playing.⁸⁵⁹ After gathering the participants from the initial study, he administered the four different measures (abilities to play by ear, from memory, improvise and a sight read) and a post interview that looked at how often they practiced each measure.⁸⁶⁰

In tabulating the results, the researcher found significant improvements for all the skills between the first and the third years.⁸⁶¹ Not only did he find that their skills had improved, McPherson also discovered that the participants had done more ensemble participation, but this did not indicate that they practiced more.⁸⁶² Finally, he found that

⁸⁵⁴ Gary E. McPherson, "Cognitive Strategies and Skill Acquisition in Musical Performance," *Bulletin of the Council for Research in Music Education* no. 133 (Summer 1997): 64-71. <http://www.jstor.org/stable/40318841> (accessed May 30, 2012).

⁸⁵⁵ *Ibid.*, 65.

⁸⁵⁶ *Ibid.*, 65.

⁸⁵⁷ *Ibid.*, 65.

⁸⁵⁸ *Ibid.*, 65.

⁸⁵⁹ *Ibid.*, 65.

⁸⁶⁰ *Ibid.*, 66.

⁸⁶¹ *Ibid.*, 66.

⁸⁶² *Ibid.*, 66.

none of the participants in this study received instruction on how to play by ear, nor how to memorize music.⁸⁶³

The researcher then did a content analysis of the participants' comments and coded each of them into specific classifications. The researcher coded comments for the "Playing by ear" and "Playing from memory" into three categories: "independent of the instrument or sound of item, independent of the instrument but involving singing inwardly and involving kinesthetic recall on an instrument linked with sound."⁸⁶⁴ Likewise, McPherson had four classifications for the section, "Sight reading:" "could remember key signature, could remember time signature, analyzed the first part of the music, and scanned the music to identify possible obstacles."⁸⁶⁵ Finally for the "Improvising section," McPherson categorized the comments into four sub-classifications: participant had no plan; participant had a "vague conception" of what to do, "some idea for shaping the improvisation," and definitely knew what they needed to do.⁸⁶⁶

In his discussion section, McPherson discussed the differences between high scorers and low scorers. Higher scorers on the measures had several learning strategies to help them prepare for the performance.⁸⁶⁷ McPherson also stated higher scorers knew many practice strategies, but they also knew how and when to use them.⁸⁶⁸ Lower scoring students, on the other hand, did not have very many strategies, did not know how to use them, and even lacked the basic ability to control their instrument.⁸⁶⁹ In his

⁸⁶³ Ibid., 68.

⁸⁶⁴ Ibid., 68 and 69.

⁸⁶⁵ Ibid., 69.

⁸⁶⁶ Ibid., 69.

⁸⁶⁷ Ibid., 70.

⁸⁶⁸ Ibid., 70.

⁸⁶⁹ Ibid., 70.

conclusion section, he stated that the study suggested the importance of how and when to employ certain learning strategies when performing.⁸⁷⁰

Susan A. O'Neill wrote the chapter, "The role of practice in children's early musical performance achievement," in the book, *Does Practice make perfect? Current theory and research on instrumental music practice*.⁸⁷¹ In her chapter's introduction and literature review, O'Neill noted different studies that examined children's practicing behavior⁸⁷² and motivation to practice.⁸⁷³ For this study, the researcher wanted to explore why some children succeed in learning an instrument and while others did not, even though they had similar levels of ability and potential.⁸⁷⁴

O'Neill recruited forty-six primary school participants who had not started taking lessons on their respective instruments.⁸⁷⁵ After recruiting these participants, O'Neill interviewed them on two occasions: before they took their first music lesson, and then again after they completed their first year of musical training.⁸⁷⁶ First, she interviewed the students to ascertain their attitudes towards starting their musical journey using her prior research to structure the interview.⁸⁷⁷ Next, she had the participants complete a parent-supervised (to ensure accuracy) practice diary for two weeks that they would turn in to the researcher.⁸⁷⁸ The researcher additionally had the participant's parents and

⁸⁷⁰ Ibid., 70.

⁸⁷¹ Susan A. O'Neill. "The role of practice in children's early musical performance achievement." In *Does Practice make perfect? Current theory and research on instrumental music practice*, edited by Harald Jørgensen and Andreas C. Lehmann, 54-67. Oslo: Norges musikkhogskole, 1997.

⁸⁷² Ibid., 54-57.

⁸⁷³ Ibid., 62.

⁸⁷⁴ Ibid., 57.

⁸⁷⁵ Ibid., 57-58.

⁸⁷⁶ Ibid., 58.

⁸⁷⁷ Ibid., 58.

⁸⁷⁸ Ibid., 58.

teachers complete questionnaires so she could obtain more information on the participant's behaviors while they practiced.⁸⁷⁹

After the participants completed their first year, the researcher video-taped a three-minute performance and had four independent judges score their overall performance on a five point scale (1-lowest and 5-highest).⁸⁸⁰ O'Neill based her assessment on the Associated Board of the Royal Schools of Music examinations since the judges and the participants knew how the system worked.⁸⁸¹

After examining the results, O'Neill made several observations. First, she found three distinct groups of achievers: low (16 children), middle (18 children) and high (12 children).⁸⁸² Next, after analyzing the practice diaries, the researcher found that the participants spent an average of 142 minutes a week practicing, with the high achieving group averaging 174 minutes a week practicing.⁸⁸³ After comparing the three groups, the researcher determined that high achieving students practiced significantly more than the lower achieving students, who averaged eighty-four minutes a week.⁸⁸⁴

Furthermore, the researcher also examined how many days a week, of the two weeks, the participants spent practicing.⁸⁸⁵ On average, the researcher reported that they approximately spent eight out of the fourteen days practicing.⁸⁸⁶ The researcher found significant differences between the lower and middle achieving groups, but none between either the lower and higher achieving groups and the middle and higher achieving

⁸⁷⁹ Ibid., 58.

⁸⁸⁰ Ibid., 58.

⁸⁸¹ Ibid., 58.

⁸⁸² Ibid., 59.

⁸⁸³ Ibid., 59.

⁸⁸⁴ Ibid., 59.

⁸⁸⁵ Ibid., 60.

⁸⁸⁶ Ibid., 60.

groups.⁸⁸⁷ From this data, the researcher suggested that higher achieving participants practiced more than lower achieving participants.⁸⁸⁸

After reviewing the participant's two week practice diaries, O'Neill then asked the participant's music teachers to report on the parental involvement in four different categories: "(a) sat in on lessons, (b) enquired about their child's progress, (c) asked advice about how to assist their child and (d) provided information about how the child's practice progressed at home."⁸⁸⁹ First, the teachers reported that seventy-three percent of the parents did not sit in on lessons.⁸⁹⁰ Next, the researcher did find that higher achieving participants had parents who were more involved in lessons, asked about their child's progress and provided information.⁸⁹¹ From this data, the researcher suggested that teacher-parent communication may help benefit a student's success in learning an instrument in the first year.⁸⁹²

Following her examination of the teacher reports, O'Neill also had the participants report how frequently their parents: "(a) listened to them practice, (b) sat with them and helped them practice, (c) had to remind them to practice, and (d) got cross with them if they did not do their practice."⁸⁹³ Unlike the results from the teacher's reports, the researcher found no significant differences between parental involvement and the participant's level of achievement.⁸⁹⁴

Furthermore, O'Neill investigated which participants demonstrated adaptive and maladaptive behaviors when they failed a problem solving task. The researcher found

⁸⁸⁷ Ibid., 60.

⁸⁸⁸ Ibid., 61.

⁸⁸⁹ Ibid., 60.

⁸⁹⁰ Ibid., 60.

⁸⁹¹ Ibid., 60.

⁸⁹² Ibid., 60.

⁸⁹³ Ibid., 61.

⁸⁹⁴ Ibid., 61.

that twenty-eight of the forty-six participants illustrated adaptive patterns while eighteen participants demonstrated maladaptive behaviors.⁸⁹⁵ O'Neill also discovered that higher achieving students demonstrated adaptive strategies while lower achieving participants tended to employ maladaptive strategies.⁸⁹⁶ The researcher stated that while participants who show adaptive patterns tend to learn goals to increase their competence, and participants who employ maladaptive patterns practice simply to avoid negative feedback on their performance.⁸⁹⁷

Aaron Williamon and Elizabeth Valentine wrote the article, "Quantity and quality of musical practice as predictors of performance quality," in the journal, *British Journal of Psychology*.⁸⁹⁸ In their article's introduction and literature review, the researchers noted several studies that examined deliberate practice, quantity of practice, and different studies that have tested practice methods.⁸⁹⁹ For this study, the researchers wanted to observe three different areas. First, the researchers wanted to examine how much and how long the participants worked on a piece of music while preparing for a performance.⁹⁰⁰ Next, the researchers wanted to know how often the participants practiced played a role in the quality of their final performance.⁹⁰¹

Williamon and Valentine recruited twenty-two pianists, and divided the participants into four groups based upon their achievement grade from the Associated Board of the Royal Schools of Music (the standard achievement scoring in the United

⁸⁹⁵ Ibid., 64.

⁸⁹⁶ Ibid., 64.

⁸⁹⁷ Ibid., 65.

⁸⁹⁸ Aaron Williamon and Elizabeth Valentine. "Quantity and quality of musical practice as predictors of performance quality." *British Journal of Psychology* 91, no. 3 (August 2000): 353-376. <https://iiiprxy.library.miami.edu/login?url=http://search.proquest.com/docview/199583045?accountid=14585> (accessed October 3, 2010).

⁸⁹⁹ Ibid., 353-358.

⁹⁰⁰ Ibid., 358.

⁹⁰¹ Ibid., 358.

Kingdom and has eight different levels of achievement possible to pre-college youth): Group 1 (individuals who scored a level 1 or 2 on their boards), Group 2 (individuals who scored a level 3 or 4 on their boards), Group 3 (individuals who scored a level 5 or 6 on their boards), and Group 4 (individuals who scored a level 7 or 8 on their boards).⁹⁰² The researchers then chose four selections from J.S. Bach that had different technical aspects, and had an appropriately level of difficulty for each level of musicianship.⁹⁰³

After recruiting and handing out materials to the participants, the researchers started their experiment. First, the researchers had the participants record all their practice session using a cassette tape player, explained to them that they could practice as much as they wanted, and told them that they would play a memorized performance of the piece on a recital that the researchers would video record.⁹⁰⁴ In addition, the researchers told the participants to comment while they practiced and then again, after they practiced.⁹⁰⁵

Next, the researchers recorded interviews from both the participant and their parent about their practice sessions and performance.⁹⁰⁶ Furthermore, Williamon and Valentine had their respective teacher rate the participant's general ability.⁹⁰⁷ Finally, the researchers transcribed all the comments from the practice sessions for further analysis and had three independent judges score and evaluate each participant's performance.⁹⁰⁸

After analyzing the data, the researchers made several observations. First, they found no significant difference between any of the levels for total time spent practicing, nor their frequency, and this led the researchers to suggest that all the pieces they chose

⁹⁰² Ibid., 358.

⁹⁰³ Ibid., 358-359.

⁹⁰⁴ Ibid., 359.

⁹⁰⁵ Ibid., 359.

⁹⁰⁶ Ibid., 359.

⁹⁰⁷ Ibid., 359.

⁹⁰⁸ Ibid., 359.

had an equal difficulty for each level.⁹⁰⁹ Next, the researchers found that the higher two levels did longer practice sessions while the younger levels did shorter sessions.⁹¹⁰ The researchers suggested that this could have had to do with “maturity, patience, ability,” and possibly the ability to concentrate longer.⁹¹¹ Along with longer practice sessions, the researchers discovered that how much a person practiced did not relate to the quality of the performance, and they stated that some individuals simply practiced longer to overcome technical difficulties.⁹¹² Most of the advanced pianists who overcame the technical difficulties early, started working on their ability to communicate the music as opposed to drilling the technical facets of the music.⁹¹³

Furthermore, the researchers found from their interviews that participants in the first stage of learning concerned themselves with learning the correct notes and trying to deal with the difficulties of the piece.⁹¹⁴ Then, in the third stage they found it necessary to concentrate on memorizing the music and doing longer practice session possibly due to the upcoming performance.⁹¹⁵ Finally, the researchers stated that the participants who achieved higher grades normally made concentrated efforts to do the following:

1. Mix isolated practice on selected portions of a score with run-throughs of the entire composition
2. Use musical structure to guide the encoding and retrieval of musical information during practice and performances—especially practicing from memory
3. Limit errors only to the most difficult bars in a composition
4. Correct their errors⁹¹⁶

⁹⁰⁹ Ibid., 368.

⁹¹⁰ Ibid., 369.

⁹¹¹ Ibid., 369.

⁹¹² Ibid., 370-371.

⁹¹³ Ibid., 371.

⁹¹⁴ Ibid., 372.

⁹¹⁵ Ibid., 372.

⁹¹⁶ Ibid., 373.

Gary E. McPherson and James M. Renwick wrote the article, “A Longitudinal Study of Self-Regulation in Children’s Musical Practice,” in the journal, *Music Education Research*.⁹¹⁷ In their article’s introduction and literature review, they noted several different studies that examined deliberate practice, learning strategies and studies exploring self-regulation.⁹¹⁸ For this study, the researchers wanted to take data from an earlier study and compare those findings to the participant’s video recording of their practice session.⁹¹⁹

McPherson and Renwick recruited twenty-seven families out of 157 who agreed to video record their child’s practice session.⁹²⁰ The researchers chose to use only seven (two would later drop out of the study) of the twenty-seven videos submitted since the parents regularly videotaped their child and where the video camera did not influence the child’s practice session.⁹²¹ The participants played wind instruments and submitted two practice videos from the first year and third year of practicing.⁹²² The researchers then coded all the responses and compared the two video results with their responses from the 157 questionnaires.⁹²³

After examining the results, McPherson and Renwick made several observations using Zimmerman’s model of self-regulation:⁹²⁴ motive, method, time, performance outcomes, physical environment and social environment.⁹²⁵ First, the results suggested

⁹¹⁷ Gary E. McPherson and James M. Renwick. “A Longitudinal Study of Self-Regulation in Children’s Musical Practice.” *Music Education Research* 3, no. 2 (2001): 169-186. <http://dx.doi.org/10.1080/14613800120089232> (accessed May 30, 2012).

⁹¹⁸ *Ibid.*, 169-171.

⁹¹⁹ *Ibid.*, 171.

⁹²⁰ *Ibid.*, 171.

⁹²¹ *Ibid.*, 171 and 172.

⁹²² *Ibid.*, 172.

⁹²³ *Ibid.*, 172.

⁹²⁴ See Zimmerman 1998.

⁹²⁵ McPherson and Renwick 2001, 172.

that self-motivated students will likely achieve more in the music program over those who need their peers to motivate them.⁹²⁶ Next, the researchers found that most of the participants in this study did not have a particular method (other than simply running through), and none of the participants used a metronome.⁹²⁷ McPherson and Renwick observed that most students take years to learn the practicing strategies needed to accomplish effective practicing.⁹²⁸ The researchers examined that the length of time spent practicing, and found that most students only put the minimum time in to practice.⁹²⁹ They did find, however, that non-playing activities such as non-playing, day-dreaming, talking to parents significantly dropped and the time spent practicing rose.⁹³⁰

In addition, the researchers also discovered different results when they examined performance outcomes. First, McPherson and Renwick found that the participants in the first year who had prior learning on another instrument (such as piano) averaged fewer melodic errors per minute than those who had no prior learning on an instrument.⁹³¹ They suggested that these participants made fewer errors since they could identify musical errors and correct them whereas other participants who could not readily identify errors, may not have had the necessary knowledge to do so.⁹³² The researchers did not code rhythmic errors since the participants made too many errors, and the researchers noted that only one participant (a male clarinetist) showed any rhythmic accuracy in his sessions.⁹³³

⁹²⁶ Ibid., 172.

⁹²⁷ Ibid., 174.

⁹²⁸ Ibid., 174.

⁹²⁹ Ibid., 175.

⁹³⁰ Ibid., 175.

⁹³¹ Ibid., 177.

⁹³² Ibid., 172.

⁹³³ Ibid., 181.

Next, the researchers found that efficient learners were aware of their physical environment when they practiced. When analyzing the videotapes, the researchers saw that the participants who utilized their environment to help promote good playing habits (sitting in a chair as opposed to a pillow), generally had better practice sessions.⁹³⁴

Along with the physical environment, McPherson and Renwick also examined the social environment surrounding the participants. First, the researchers noticed four different types of parenting styles from the videotapes: instructive, guiding, less supportive and autonomy supportive.⁹³⁵ In addition to the parent styles, the researchers noticed that parental involvement dropped as the years continued, possibly due to the child gaining more independence as they progressed. Furthermore, the researchers found that students significantly stopped using their practice diaries after the first year, yet the researchers could not find any clear explanations.⁹³⁶

Yvette (Millard) Sullivan and Robert H. Cantwell wrote the article, “The Planning Behaviors of Musicians Engaging Traditional and Non-Traditional Scores,” in the journal, *Psychology of Music*.⁹³⁷ In their article’s introduction and literature review, Sullivan and Cantwell noted several different studies that examined different types of learners and their approaches to learning (surface versus deep), prior knowledge, depth of cognitive engagement and the quality of strategy use.⁹³⁸ For this study, the researcher wanted to determine how the participant’s learning style, prior knowledge, depth of

⁹³⁴ Ibid., 182.

⁹³⁵ Ibid., 182.

⁹³⁶ Ibid., 172.

⁹³⁷ Yvette (Millard) Sullivan and Robert H. Cantwell. “The Planning Behaviors of Musicians Engaging Traditional and Non-Traditional Scores.” *Psychology of Music* 27, no. 2 (1999): 245-266. <http://pom.sagepub.com/content/27/2/245> (accessed July 11, 2012).

⁹³⁸ Ibid., 245-248.

cognitive engagement and the quality of strategy use related to their success in reading both traditional and nontraditional scores.⁹³⁹

Sullivan and Cantwell recruited fifty-three university students who played various wind instruments, had enrolled in a performance or music education degree program and obtained at least Grade Level 5 on their Australian Music Examination Board.⁹⁴⁰ Once the researchers recruited the students, they obtained personal consent from each of the participants.⁹⁴¹ Next, the researcher took each of the participants to a practice room and introduced them to the computer procedures that they would use for each of the treatments.⁹⁴² The researchers then gave the participants time to practice so they could master both of the researcher-composed compositions.⁹⁴³ The participants then answered a questionnaire to determine each participant's approach to learning (surface or deep) and other questions relating to demographics.⁹⁴⁴ In addition, the researchers interviewed the participants on each score and how they would go about learning the score.⁹⁴⁵ Finally, the researchers scored and coded all the responses, analyzed the data and then reported the results.

After examining the results, Sullivan and Cantwell made several observations. First, after the researchers coded the fifteen planning strategies and then divided them into three categories: high-level (patterning, time management, interpretation), mid-level (chunking, alternating speeds, linking), and low-level (trial and error, avoidance, sight-

⁹³⁹ Ibid., 248.

⁹⁴⁰ Ibid., 248-249.

⁹⁴¹ Ibid., 248-249.

⁹⁴² Ibid., 248-249.

⁹⁴³ Ibid., 248-249.

⁹⁴⁴ Ibid., 249.

⁹⁴⁵ Ibid., 253.

reading).⁹⁴⁶ Next, the researchers created seven different levels of planning focus based on the interviews with the participants. These levels started at Level 1 (participant did not know or stated confusion) to Level 3 (participant still focused on individual elements, but showed signs of prioritizing) and finally to Level 7 (participant has a complete understanding of the music, starts speaking about the music from various perspectives and starts creating his own interpretation).⁹⁴⁷

In addition to coding the responses and categorizing the interview responses, the researchers explored the differences between surface and deep learners. First, the researchers found that typically deep learners used high-level and mid-level strategies when exploring both the traditionally notated and graphically notated scores.⁹⁴⁸ They also found that surface learners used low level strategies when examining traditionally notated and graphically notated scores.⁹⁴⁹ Yet, prior knowledge did not significantly influence strategy use or planning in the study.⁹⁵⁰ Overall, the researchers found that deep learners tended to use higher level planning strategies and focus of planning.⁹⁵¹

Doris da Costa wrote the article, “An investigation into instrumental pupils’ attitudes to varied, structured practice: two methods approach,” in the journal, *British Journal of Music Education*.⁹⁵² In her article’s introduction and literature review, da Costa noted the literature on different practice methods and the external features such as motivation, environment and how overall attitude can effect practicing. For this study, the

⁹⁴⁶ Ibid., 253.

⁹⁴⁷ Ibid., 254-255.

⁹⁴⁸ Ibid., 256-257.

⁹⁴⁹ Ibid., 258-259.

⁹⁵⁰ Ibid., 259.

⁹⁵¹ Ibid., 263.

⁹⁵² Doris da Costa. “An investigation into instrumental pupils’ attitudes to varied, structured practice: two methods approach.” *British Journal of Music Education* 16, no. 1 (March 1999): 65-77.

researcher wanted to examine how participants would respond to two different kinds of practice methods over a five-week period.⁹⁵³

da Costa recruited twenty-eight participants who played various instruments and came from a very diverse, socioeconomic background to take part in the five week study.⁹⁵⁴ For this study, the researcher had all the participants do the two different practice methods: Practice A and Practice B.⁹⁵⁵ da Costa did not have a control group for this experiment, but she said that she could evaluate which strategies each group used, ask the participants which strategies they felt were most effective, what they learned from structure practice and if they would take anything from this experiment for practicing in the future.⁹⁵⁶

After selecting the participants, the researcher handed them many materials: a letter of introduction, instructions for both methods, five method A practice sheets, three method B practice and then a questionnaire to complete at the end of the five weeks.⁹⁵⁷ When the participants used method A, they followed a strict protocol of playing through the music, marking the small phrase sections, marking through the sheet every time they did a repetition of the section, and then play through the entire piece again.⁹⁵⁸

The participants in Practice Method B, however, had greater flexibility when practicing. The participants who used this method had three cards labeled, 1B (just starting), 2B (getting Better) and 3B (fluency).⁹⁵⁹ Each card had five ideas or the participant could choose an idea from a list to try and make the music better, but the

⁹⁵³ Ibid., 65.

⁹⁵⁴ Ibid., 67.

⁹⁵⁵ Ibid., 67.

⁹⁵⁶ Ibid., 67.

⁹⁵⁷ Ibid., 67.

⁹⁵⁸ Ibid., 68.

⁹⁵⁹ Ibid., 69.

participant always had to try and play the fifth repetition from memory.⁹⁶⁰ At the end of the five weeks, the participants completed their questionnaires that helped the researcher observe what the participants learned, what was new to them, and how did they feel when they used the sheets.⁹⁶¹

After running the study and calculating the results, the researcher made several observations. First, da Costa saw that many of the participants found in Method B that choosing from a list of practice strategies, playing the phrases in different ways, and playing the phrase from memory was brand new to them.⁹⁶² Next, da Costa found that all the participants said that they believed they had improved, especially with regards to their technique.⁹⁶³

Third, the researcher observed that most of the participants had a general positive response to the structured practice session since they believed that they learned their music faster, could play the music more fluently and more musically.⁹⁶⁴ Finally, da Costa saw that most of the participants noticed that others (like their teachers) saw an improvement in their playing, and they saw a difference in their playing.⁹⁶⁵ While da Costa noticed some positive results her study, she cautioned that with a small sample and no control group, future research should duplicate the study to check the data.⁹⁶⁶

Marilyn J. Kostka wrote the article, “The Effects of Error-Detection Practice on Keyboard Sight-Reading Achievement of Undergraduate Music Majors,” in the journal,

⁹⁶⁰ Ibid., 70.

⁹⁶¹ Ibid., 71.

⁹⁶² Ibid., 71.

⁹⁶³ Ibid., 72.

⁹⁶⁴ Ibid., 72.

⁹⁶⁵ Ibid., 72.

⁹⁶⁶ Ibid., 76.

Journal of Research in Music Education.⁹⁶⁷ In her article's introduction and literature review, Kostka noted several different studies that examined the importance of teaching students how to become better sight-readers and better at error-detection.⁹⁶⁸ For this study, the researcher wanted to observe three different methods of sight-reading and error detection and which one helped university students get better at both over an entire semester of keyboard study.⁹⁶⁹

Kostka recruited sixty-nine college level participants enrolled in either a Level 1 Keyboard Class or a Level 3 Keyboard for a sixteen week study.⁹⁷⁰ The researcher then divided the participants into three different experimental models: error-detection plus shadowing, shadowing only, and a control group.⁹⁷¹ Next, the researcher picked an eight bar etude for both classes to serve as a pretest and a posttest.⁹⁷² In addition, all the participants performed their pretest and posttest on a keyboard that allowed both the participant and researcher to hear the performance, but still record the performance.⁹⁷³

After recruiting and handing out materials to the students, she reviewed note reading and did a general class overview in the first week. Next, she gave a pretest (sight-reading test) to the participants in both classes in the second week, allowing them to look over the piece for a few seconds before they sight-read it.⁹⁷⁴ Over the next ten weeks, she gave brief, five-minute demonstrations two weeks apart to the error

⁹⁶⁷ Marilyn J. Kostka. "The Effects of Error-Detection Practice on Keyboard Sight-Reading Achievement of Undergraduate Music Majors." *Journal of Research in Music Education* 48, no. 2 (Summer 2000): 114-122. <http://www.jstor.org/stable/3345570> (accessed June 4, 2012).

⁹⁶⁸ *Ibid.*, 114-115.

⁹⁶⁹ *Ibid.*, 116.

⁹⁷⁰ *Ibid.*, 116.

⁹⁷¹ *Ibid.*, 116.

⁹⁷² *Ibid.*, 3.

⁹⁷³ *Ibid.*, 313.

⁹⁷⁴ *Ibid.*, 117.

shadowing detection on how to listen for errors in the music.⁹⁷⁵ Finally, in the fifteenth week, Kostka had all the participants record another eight-bar etude (posttest).⁹⁷⁶ Once Kostka collected the data, two independent judges scored all the pretest and posttest examining the performances for right notes, right rhythms and hesitations.⁹⁷⁷

With a high reliability, and using a variety of statistical analysis, Kostka made several observations. First, Kostka found no significant differences between any of the treatment groups between the pretest and posttest.⁹⁷⁸ The researcher found that all three groups did have high improvement scores for rhythm, but the researcher saw no significant improvement for hesitations from pretest to posttest.⁹⁷⁹ Next, while Kostka found a significant difference between the three groups, the control group did have the fewest number of errors across all three grading criteria.⁹⁸⁰ Kostka remarked that further research should explore what strategies these participants used. Finally, the researcher remarked that while the error-detection and shadowing group did show improvement, readers should treat the data with skepticism because of the low statistical difference.⁹⁸¹

Ryan Daniel wrote the article, “Self-assessment in performance,” in the journal, *British Journal of Music Education*.⁹⁸² In his articles’s introduction and literature review, Daniel noted several different studies that examined the assessment methods used in the arts and other studies that explored the individual and how they practiced self-

⁹⁷⁵ Ibid., 117.

⁹⁷⁶ Ibid., 117.

⁹⁷⁷ Ibid., 118.

⁹⁷⁸ Ibid., 119.

⁹⁷⁹ Ibid., 119.

⁹⁸⁰ Ibid., 120.

⁹⁸¹ Ibid., 120.

⁹⁸² Ryan Daniel. “Self-assessment in performance.” *British Journal of Music Education* 18, no. 3 (2001): 215-226.

assessment.⁹⁸³ For this study, the researcher wanted to explore how music students self-evaluated their performances.⁹⁸⁴

Daniel recruited thirty-five full time, Bachelor of Music students, enrolled in the first, second or third years of their degree program.⁹⁸⁵ After recruiting these participants, the researcher had them complete a survey about the experience of using a new form of assessment that their university had employed that year.⁹⁸⁶ More specifically, the researcher's questionnaire examined the participants' demographics, their prior training, assessment methods they previously encountered, and the trial process itself.⁹⁸⁷ Next, once the participants completed their surveys, the researcher analyzed the data.⁹⁸⁸

Once the researcher tabulated all the results, he stated several observations. First, while the study consisted mostly of female participants (77%), Daniel found that almost all the participants had private lessons before university and more than half had participated in band/orchestra and classroom music.⁹⁸⁹ Next, when the researcher examined how the students assessed their performances he found that most of the participants received some type of feedback from their teachers, and most of the participants did not use audio or video equipment to assess their performances due to limited or no access to said equipment.⁹⁹⁰ The researcher hypothesized an additional theory, that in addition to the limited access to the equipment, the participants' teachers may not have pursued or pushed using these forms of assessment with their students.⁹⁹¹

⁹⁸³ Ibid., 216-219.

⁹⁸⁴ Ibid., 215.

⁹⁸⁵ Ibid., 219.

⁹⁸⁶ Ibid., 219.

⁹⁸⁷ Ibid., 219.

⁹⁸⁸ Ibid., 219.

⁹⁸⁹ Ibid., 219-220.

⁹⁹⁰ Ibid., 220.

⁹⁹¹ Ibid., 220.

Once the researcher examined the participant's biographical data, he then found several results pertaining to the new form of assessment the school wanted the students to use. First, Daniel found that most of the students viewed the assessment in a positive light when they selected comments like "I was not concerned at all, I considered it a personal challenge and I was looking forward to the process."⁹⁹² Next, when the researcher asked the participants about their initial reactions towards viewing their performance, some (43%) took a very critical reaction to it, and the researcher explained that this critical reaction occurred as a result of: the participant's unfamiliarity with the process, an over-critical reaction, a negative self-image or difficulty in analyzing the performance.⁹⁹³ At the end of the twelve-month trial process, however, most of the students found that the process did help them improve their performance.⁹⁹⁴

In addition to the participant's reaction to their videotaped performances, Daniel also found that almost half of the students reported that they could identify more mistakes through the video.⁹⁹⁵ The researcher then suggested that students who do not regularly view themselves through a video could miss several mistakes and transfer them to their live performances.⁹⁹⁶ In addition to using the videotape, Daniel also found that about eighty-percent of the study's population viewed the writing assessment of the performance as somewhat beneficial to very beneficial.⁹⁹⁷

Overall, the researcher found that the participants found numerous ways that both the videotape and writing helped benefit them over the course of the year. On the other

⁹⁹² Ibid., 221.

⁹⁹³ Ibid., 222.

⁹⁹⁴ Ibid., 222.

⁹⁹⁵ Ibid., 223.

⁹⁹⁶ Ibid., 223.

⁹⁹⁷ Ibid., 223.

hand, some of the participants did not like the video's sound quality.⁹⁹⁸ With that said, the researcher found that more than half of the participants would recommend the process to others.⁹⁹⁹

Michael P. Hewitt wrote the article, "Self-Evaluation Tendencies of Junior High Instrumentalists," in the journal, *Journal of Research in Music Education*.¹⁰⁰⁰ In his article's introduction and literature review, Hewitt noted several different studies that examined the importance of self-evaluation, different studies that have examined self-evaluation, and modeling.¹⁰⁰¹ For this study, the researcher wanted to examine the self-evaluation tendencies of junior high musicians over a period of time, whether or not using a model could affect those self-evaluation tendencies and "if a relationship existed between self-evaluation accuracy and music performance achievement."¹⁰⁰²

Hewitt recruited forty-one, junior-high school participants who played various wind instruments for a six-week study.¹⁰⁰³ The researcher then divided the participants into two different experimental groups: model available to participants and no model available to participants.¹⁰⁰⁴ Next, in the first week, the researcher trained the participants how to use a student version of Saunders and Holahan's "Solo Evaluation area of the Woodwind and Brass Solo Evaluation Form (S-WBSEF) so they could

⁹⁹⁸ Ibid., 223.

⁹⁹⁹ Ibid., 224.

¹⁰⁰⁰ Michael P. Hewitt. "Self-Evaluation Tendencies of Junior High Instrumentalists." *Journal of Research in Music Education* 50, no. 3 (2002): 215-226 <http://www.jrm.sagepub.com/content/50/3/215> (accessed July 11, 2012).

¹⁰⁰¹ Ibid., 215-217.

¹⁰⁰² Ibid., 217.

¹⁰⁰³ Ibid., 217.

¹⁰⁰⁴ Ibid., 218.

evaluate themselves for the study.¹⁰⁰⁵ Those judging the tapes used the original version of Saudners and Holahan’s form for scoring the tapes.¹⁰⁰⁶

In addition to learning how to the evaluate themselves, the researcher had all the participants perform the selected music for the study in a large ensemble setting first.¹⁰⁰⁷ The participants then walked into a practice room, recorded themselves, and evaluated themselves in the subsequent weeks.¹⁰⁰⁸ The participants in the model treatment group, would first listen to a model recording before engaging in performing the music and self-evaluation; and the researcher gave them each a copy of the tape so they could take it home with them and practice or listen to it if they wanted too.¹⁰⁰⁹ In the final week, the participants came into the practice room, recorded themselves, and then evaluated themselves.¹⁰¹⁰ Once the researcher completed the experiment, three judges reviewed the tapes and scored them.¹⁰¹¹

After examining the results, Hewitt made several observations. First, Hewitt found that regardless of the condition, the participant’s evaluation scores increased over time.¹⁰¹² Next, the researcher found that the participants could not accurately self-evaluate themselves over time, even when the researchers provided them with a model.¹⁰¹³ Hewitt later explained that if participants based their observations on another performance, it could likely weaken their own “selective self-observation” abilities.¹⁰¹⁴

¹⁰⁰⁵ Ibid., 218 and 219.

¹⁰⁰⁶ Ibid., 218 and 219.

¹⁰⁰⁷ Ibid., 219.

¹⁰⁰⁸ Ibid., 219.

¹⁰⁰⁹ Ibid., 219.

¹⁰¹⁰ Ibid., 219.

¹⁰¹¹ Ibid., 219.

¹⁰¹² Ibid., 220.

¹⁰¹³ Ibid., 220 and 222.

¹⁰¹⁴ Ibid., 223.

In addition to this explanation, the researcher then noted that self-evaluation ability does not relate to the performance ability based on the data he collected in this study.¹⁰¹⁵ He did note, however, that given more time, this might have changed. Finally, the researcher did note, that while the participants did not necessarily demonstrate accuracy in their self-evaluations, they at least showed similar tendencies to that of how the judges rated their performances.¹⁰¹⁶ Overall, while the participants could not successfully self-evaluate their performances, Hewitt did note that the data from this study can help other researchers come up with different methods of teaching self-evaluation to junior high students.¹⁰¹⁷

Martin J. Bergee and Lecia Cecconi-Roberts wrote the article, “Effects of Small-Group Peer Interaction on Self-Evaluation of Music Performance,” in the journal, *Journal of Research in Music Education*.¹⁰¹⁸ In their article’s introduction and literature review, Bergee and Cecconi-Roberts noted several studies that examined self-evaluation methods and other studies that explored the use of modeling in practicing music.¹⁰¹⁹ For this study, the researcher wanted to explore two different research questions for their exploratory study. First, they wanted to know how peer interaction and peer evaluation affected one’s ability to accurately self-evaluate one’s performance.¹⁰²⁰ Second, they wanted to understand if peer interaction and feedback affected correlations among instructor, peer and self-evaluations.¹⁰²¹

¹⁰¹⁵ Ibid., 223.

¹⁰¹⁶ Ibid., 223.

¹⁰¹⁷ Ibid., 223-224.

¹⁰¹⁸ Martin J. Bergee and Lecia Cecconi-Roberts. “Effects of Small-Group Peer Interaction on Self-Evaluation of Music Performance.” *Journal of Research in Music Education* 50, no. 3 (Fall 2002): 256-268.

¹⁰¹⁹ Ibid., 256-258.

¹⁰²⁰ Ibid., 258.

¹⁰²¹ Ibid., 258.

To answer the first research question, the researchers recruited thirty random music education and performance majors who played various instruments.¹⁰²² After one withdrew from the study, the researchers divided fifteen of the participants into the experimental group and the remaining fourteen into the control group.¹⁰²³ Next, three weeks before the semester had ended for the participants, divided the experimental group into four further groups (vocalists, brass, woodwinds, strings).¹⁰²⁴ The researchers then met with each of these groups four times over two weeks to have each of them video record a performance (mainly their jury music) and engage in both peer and self-evaluations.¹⁰²⁵

The control group, on the other hand, had no sessions with the researchers, but had their juries videotaped and then they did a self-evaluation immediately following their exam.¹⁰²⁶ The experimental group followed a similar procedure at the end of their jury. In addition to the participants completing a self-evaluation after their performance exams, the faculty at this university also completed both normal jury sheets and a form for the experiment.¹⁰²⁷ Finally, the researchers analyzed the data and compared the evaluations between the participant's self-evaluation and faculty evaluations.

Once the researchers tabulated all the results, they made several observations. First, they did not find any significant differences between class year, talent or performance medium.¹⁰²⁸ Next, the researchers found that their data supported the notion that "peer interaction combined with feedback" could possibly help university students

¹⁰²² Ibid., 258.

¹⁰²³ Ibid., 258-259.

¹⁰²⁴ Ibid., 259.

¹⁰²⁵ Ibid., 259.

¹⁰²⁶ Ibid., 259.

¹⁰²⁷ Ibid., 260.

¹⁰²⁸ Ibid., 260.

improve their self-evaluation abilities.¹⁰²⁹ More importantly, the researchers found that both groups (experimental and control) evaluated themselves very closely to how faculty members would have evaluated them.¹⁰³⁰

After completing the first experiment, the researchers then started another experiment to answer the second research question. To answer the second research question, the researchers recruited fifty-six (originally they had seventy-participants, but many dropped out of the study) random music education and performance majors who played various instruments.¹⁰³¹ Like the in first study, the researchers divided twenty-eight of the participants into the experimental group based on their performance medium and the remaining twenty-eight into the control group.¹⁰³² The researchers then met with each of these groups five times to have each of them record a performance and engage in both peer and self-evaluations.¹⁰³³ The participants in the second experiment not only performed and evaluated but also had access to more detailed descriptors for their evaluations and listened to reference recordings to help them refine their listening skills.¹⁰³⁴

The control group, on the other hand, had one session with the researchers, and they recorded a single performance, listened to the two recordings that the experimental group did, and then they did a self-evaluation immediately following their exam.¹⁰³⁵ Following all the sessions, both of the researchers evaluated the performances. For a

¹⁰²⁹ Ibid., 260.

¹⁰³⁰ Ibid., 260.

¹⁰³¹ Ibid., 258.

¹⁰³² Ibid., 258-259.

¹⁰³³ Ibid., 262.

¹⁰³⁴ Ibid., 262.

¹⁰³⁵ Ibid., 262.

further reliability check, Bergee and Cecconi-Roberts submitted ten percent of the recordings to a graduate student committee to review the data.¹⁰³⁶

Once the researchers tabulated all the results, they made several observations. First, the researchers noticed that with the experimental group, the participants and the researchers slowly got smaller indicating that as weeks continued, the participants got better at evaluating their own performances.¹⁰³⁷ With that said the researchers noted in both text and a graph that the participants' peers scored consistently higher than the evaluators did.¹⁰³⁸

Next, the researchers found that in this experiment group interaction and peer feedback did not seem to help self-evaluation.¹⁰³⁹ Third, and unlike the first experiment, the participants expressed more content with the sound quality of their performances.¹⁰⁴⁰ Bergee and Cecconi-Roberts did note that this higher quality of sound could possibly help with self-evaluation procedures.¹⁰⁴¹ Furthermore, the researchers found that sharing peer-evaluations with the participant could possibly damage their abilities to self-evaluate. With this information, further educators and even students, should cautiously implement peer evaluations into their daily musical practicing.¹⁰⁴²

Gary E. McPherson wrote the article, From child to musician: skill development during the beginning stages of learning an instrument, in the journal, *Psychology of*

¹⁰³⁶ Ibid., 263.

¹⁰³⁷ Ibid., 263-264.

¹⁰³⁸ Ibid., 264.

¹⁰³⁹ Ibid., 265.

¹⁰⁴⁰ Ibid., 265.

¹⁰⁴¹ Ibid., 265.

¹⁰⁴² Ibid., 265-266.

Music.¹⁰⁴³ In his article, McPherson observed how students improved in five different musical measures over the first three of learning an instrument. For this study, McPherson's had two main objectives. First, he wanted to investigate the participants' thoughts before they performed each of the five measures in this study.¹⁰⁴⁴ Second, the researcher wanted to gather data on how much the participant had practiced in order to determine how this impacted their mental and physical abilities to perform the measures.¹⁰⁴⁵

McPherson conducted his research in eight different Australian middle schools band programs over a vast region of different economic and sociological areas of Sydney, Australia with students who played various instruments.¹⁰⁴⁶ McPherson further stated that over the course of the three years he had lost fifty participants due to either them moving away or they stopped playing their instrument.¹⁰⁴⁷

After selecting his participants, the researcher planned to administer five different measures and conduct interviews after the students had completed each year of schooling for the study: performed rehearsed music, sight-read, play by memory, play by ear, and improvise.¹⁰⁴⁸ McPherson also interviewed the participants several times over the course of three years.¹⁰⁴⁹

In order to collect data on his population, McPherson recorded each of the participants completing the five measures and the interview (asking the same questions

¹⁰⁴³ Gary E. McPherson, "From child to musician: skill development during the beginning stages of learning an instrument," *Psychology of Music* 33, no. 1 (2005): 5-35.
<http://pom.sagepub.com/content/33/1/5> (accessed May 30, 2012).

¹⁰⁴⁴ Ibid., 6 and 25.

¹⁰⁴⁵ Ibid., 6 and 25.

¹⁰⁴⁶ Ibid., 8.

¹⁰⁴⁷ Ibid., 8.

¹⁰⁴⁸ Ibid., 9 and 10.

¹⁰⁴⁹ Ibid., 10.

each year) at the end of each year.¹⁰⁵⁰ After running the experiment and gathering the reports, McPherson scored each year separately so the participant's improvement or digression would not influence him.¹⁰⁵¹ He later sent a fraction of the recording to an independent judge to determine reliability.¹⁰⁵²

After analyzing the five measures, the researcher found that all the participants significantly improved over the three years.¹⁰⁵³ Yet, the researcher did note that the participants did not improve in the improvising category between years two and three.¹⁰⁵⁴ McPherson did not find this surprising since the participants reported they did not learn how to improvise in their lessons.¹⁰⁵⁵ He did find, however, that students who had learned a second instrument, like piano, generally had higher abilities in “playing by memory and playing by ear.”¹⁰⁵⁶

He also noted that participants who had less than average scores on the five measures in the first year, either continued to struggle throughout the next two years or stopped playing their instrument entirely.¹⁰⁵⁷ In noticing these results, McPherson suggested that future research should look at ways to make practicing more efficient and less frustrating for a young student.¹⁰⁵⁸

In addition to his first analysis, McPherson also took all the interviews with the participants and classified all the comments into different categories to illustrate a clear-

¹⁰⁵⁰ Ibid., 12 and 17.

¹⁰⁵¹ Ibid., 13.

¹⁰⁵² Ibid., 13.

¹⁰⁵³ Ibid., 14 and 25.

¹⁰⁵⁴ Ibid., 14 and 25.

¹⁰⁵⁵ Ibid., 14 and 26.

¹⁰⁵⁶ Ibid., 26.

¹⁰⁵⁷ Ibid., 26.

¹⁰⁵⁸ Ibid., 26 and 27.

cut picture of what students thought while they performed a musical instrument.¹⁰⁵⁹ First, the researcher divided the comments about the measure, “performing rehearsed music strategies,” into two categories: “organizational strategies and improvement strategies.”¹⁰⁶⁰ McPherson then divided the organizational strategies comments into two categories: “keeping track of what is to be learned” and “order of practice.”¹⁰⁶¹

McPherson then coded the responses for each of the categories into further categories. First, in “keeping track of what is learned,” the researcher divided the comments into classifications: those who had a practice log and used it regularly and those who had a practice log but did not use it regularly.¹⁰⁶² Yet, the researcher did not give any statistics as to how many participants used their practice logs and how many did not.

Along with keeping track of what they did, McPherson also divided the comments from the “order of practice section,” into two categories. First, McPherson stated that students with a “more strategic style” practiced the required music first and the students with the “less strategic style” practice items they enjoyed before what they needed to practice.¹⁰⁶³ Yet, like the previous division and classification, the researcher provided no statistics to show these results.

McPherson did the same thing with the improvement strategies category: “practicing to improve” and “self-correction strategies.”¹⁰⁶⁴ Similar to the other classifications, he also divided classifications into further categories to better organize the

¹⁰⁵⁹ Ibid., 16 and 17.

¹⁰⁶⁰ Ibid., 17 and 18.

¹⁰⁶¹ Ibid., 17 and 18.

¹⁰⁶² Ibid., 18.

¹⁰⁶³ Ibid., 18.

¹⁰⁶⁴ Ibid., 18 and 19.

participant's comments. First, he categorized the comments related to "practicing to improve," section into four categories: "played through the hard piece once, played the piece a couple of times without any real plan to improve, played until it improved and played the piece with the necessary strategies to refine it."¹⁰⁶⁵ While McPherson did not provide any statistical analysis as to how many participants said what, he stated that categories showed the progression from lower achieving students (played the piece just one through) to higher achieving students (played the piece with the necessary strategies to refine it).¹⁰⁶⁶

Along with the "practicing to improve" section, McPherson also divided the "self-correction" strategies section into four categories: comments that reflected a negative outlook on succeeding, strategies that included mainly trial/error, strategies that looked for more concentrated efforts to fix errors, and finally, a deliberate effort to use refined strategies and correctly applied them to fix specific problems as they arose.¹⁰⁶⁷ Again, McPherson provided no statistical analysis to illustrate the amount of comments he collected for each category over the three years. Yet the researcher noted that these comments also reflected the attitudes of low and high achievers.¹⁰⁶⁸

After classifying and discussing all the comments associated with "performing rehearsed music strategies," the researcher also classified the comments about "sight-reading." Unlike the previous category, McPherson only classified the strategies that embodied both organizational and improvement strategies. With this in mind, he classified the strategies into the five categories: studying the first measure, identifying the

¹⁰⁶⁵ Ibid., 18 and 19.

¹⁰⁶⁶ Ibid., 18.

¹⁰⁶⁷ Ibid., 19.

¹⁰⁶⁸ Ibid., 19.

key-signature, identifying the time-signature, establishing a tempo before performing, and scanning the music for difficulties.¹⁰⁶⁹ Unlike the previous section, McPherson did provide statistical analysis for these comments when his analysis showed that in every progressing year, more students used the five identified sight-reading strategies to improve their sight-reading ability.¹⁰⁷⁰

Once he identified, classified and analyzed the sight-reading strategies, McPherson then classified the comments from the section, “playing from memory.” After categorizing all the comments, he found five strategies that he believed represented a “conceptual kinesthetic or musical approach” to playing from memory.¹⁰⁷¹ McPherson associated three strategies as conceptual from the comments: “trying to remember the sound without singing or playing the instrument, trying to remember the sound with some chanting of the rhythm or melody without the instrument, trying to remember the sound by singing melodies and rhythms.”¹⁰⁷²

McPherson then labeled one strategy as kinesthetic: “trying to chant or sing the melody while fingering the instrument;” and one strategy as musical: “the participants could link the sound of the melody to the fingerings of the instrument.”¹⁰⁷³ McPherson, however, did not provide any statistical information as to how many participants represented each category.

After identifying these categories and the strategies associated with the playing from memory, McPherson then classified the comments from the section, “playing by ear.” After categorizing all the comments he found five strategies that he believed

¹⁰⁶⁹ Ibid., 19.

¹⁰⁷⁰ Ibid., 20.

¹⁰⁷¹ Ibid., 21.

¹⁰⁷² Ibid., 21.

¹⁰⁷³ Ibid., 21.

represented a “conceptual kinesthetic, or musical approach” to playing from memory.¹⁰⁷⁴

McPherson associated two strategies as conceptual from the comments: trying to remember the sound without singing or playing the instrument, trying to remember the sound with some chanting of the rhythm or melody without the instrument.¹⁰⁷⁵

McPherson then labeled one strategy as kinesthetic: “thinking how the notes might be related to fingerings on the instrument;” and one strategy as musical: “the participants could link the sound of the melody to the fingerings of the instrument and could play with the recordings.”¹⁰⁷⁶ Unlike the previous section, the researcher added a fourth category, mental: fingering through the melody with chanting rhythm or pitch.¹⁰⁷⁷ Again, McPherson, did not provide any statistical information as to how many participants represented each category.

After transcribing, identifying and classifying all the verbal and video reports, McPherson made several observations. First, he found that while a participant’s quantity of practice may have helped him score well in the rehearsed music measure, his mental abilities to process and determine what strategies he would employ in the other four measures was the single biggest factor in predicting achievement.¹⁰⁷⁸ Next, he found that the high-achieving participants could correctly apply the necessary strategies to fix a specific problem.¹⁰⁷⁹ Finally, the researcher found that this study extended the belief that an individual needs several abilities to successfully reproduce the music and create a musical experience for himself and the others who listen to him.¹⁰⁸⁰

¹⁰⁷⁴ Ibid., 22.

¹⁰⁷⁵ Ibid., 21.

¹⁰⁷⁶ Ibid., 23.

¹⁰⁷⁷ Ibid., 23.

¹⁰⁷⁸ Ibid., 27.

¹⁰⁷⁹ Ibid., 32.

¹⁰⁸⁰ Ibid., 31.

Debbie Rohwer wrote the article, “A Case Study of Adult Beginning Instrumental Practice,” in the journal, *Contributions to Music Education*.¹⁰⁸¹ In her article’s introduction and literature review, Rohwer noted several different studies that examined the importance of self-report and different studies that have tested age with regards to learning music.¹⁰⁸² For this study, the researcher wanted to observe and transcribe practice sessions of adult beginners in order to gain a better understanding of what they do and how to help them practice more efficiently.¹⁰⁸³

Rohwer recruited three participants who played saxophone in a beginning adult band and had various years of playing, but had just started reading music.¹⁰⁸⁴ Next, the researcher distributed tape recorders to the participants in their fifth week of band, and instructed them to record all their practice sessions.¹⁰⁸⁵ In addition, she had each participant state name, date and the music they would practice to confirm the accuracy of the documentation.¹⁰⁸⁶

After transcribing and evaluating the practice sessions, Rohwer made several discoveries. First, she reported that all three participants dedicated themselves practicing, and noticed that these individuals used repetition as their primary practice strategy.¹⁰⁸⁷ This strategy proved problematic since most of the participants would sometimes repeat the error instead of correcting it.¹⁰⁸⁸ With this in mind, this lead the researcher to suggest

¹⁰⁸¹ Debbie Rohwer. “A Case Study of Adult Beginning Instrumental Practice.” *Contributions to Music Education* 32, no. 1 (2005): 45-58.

¹⁰⁸² *Ibid.*, 45-46.

¹⁰⁸³ *Ibid.*, 47

¹⁰⁸⁴ *Ibid.*, 47.

¹⁰⁸⁵ *Ibid.*, 47.

¹⁰⁸⁶ *Ibid.*, 47.

¹⁰⁸⁷ *Ibid.*, 50, 51 and 53.

¹⁰⁸⁸ *Ibid.*, 50, 51 and 53 .

that adult beginners may need help with their “feedback loop” in order better self-evaluate during their practice sessions.¹⁰⁸⁹

Next, she noticed that while some of the participants did have knowledge of certain practice strategies, they did not use them. Participant 3, for instance, did use a metronome but did not use it to help correct errors, nor did he pay attention to the beat.¹⁰⁹⁰ Participants 1 and 2 did not use a metronome, but Participant 2 did demonstrate evidence of foot tapping.¹⁰⁹¹ Clearly all three participants had rhythmic errors, but they did not demonstrate any evidence that they corrected their errors, either out of inability or not knowing they committed an error.

Janice N. Killian and Michele L. Henry wrote the article, “A Comparison of Successful and Unsuccessful Strategies in Individual Sight-Singing Preparation and Performance,” in the journal, *Journal of Research in Music Education*.¹⁰⁹² In their article’s introduction and literature review, Killian and Henry noted several different studies that examined sight-singing and moveable do versus fixed do.¹⁰⁹³ For this study, the researchers wanted to create an exploratory study that examined the behaviors of both high achieving and lower achieving individuals before and while they sight-read a melody.¹⁰⁹⁴ The researchers wanted to know if differences occurred between those who had a thirty second practice period, how that practice period benefited different accuracy levels, and do different accuracy levels demonstrate different behaviors.¹⁰⁹⁵

¹⁰⁸⁹ Ibid., 54.

¹⁰⁹⁰ Ibid., 52-53.

¹⁰⁹¹ Ibid., 50 and 51.

¹⁰⁹² Janice N. Killian Michele L. Henry. “A Comparison of Successful and Unsuccessful Strategies in Individual Sight-Singing Preparation and Performance.” *Journal of Research in Music Education* 53, no. 1 (Spring 2005): 51-65

¹⁰⁹³ Ibid., 51-53.

¹⁰⁹⁴ Ibid., 53.

¹⁰⁹⁵ Ibid., 53.

Killian and Henry recruited two hundred high school participants who participated in two different Texas All-State choir groups.¹⁰⁹⁶ The researchers first administered a survey that asked questions regarding “background, choral and instrumental experience, whether or not they had piano lessons, and the nature of the sight-singing training practices in school choral ensembles.¹⁰⁹⁷” Next, the researcher had the participants sing two etudes that used different treatments: (1) sight sing an etude with a thirty-second practice period and (2) sight sing an etude without a thirty second practice period.¹⁰⁹⁸ The researchers escorted each participant to the testing area, where the participant sang each etude with the prescribed treatment, and recorded them for further analysis.¹⁰⁹⁹ The researchers also analyzed the video recordings to observe the participant’s behaviors (whether they accurately used the strategy or not) throughout their sight-singing session.¹¹⁰⁰ Finally, the researchers scored all the performances for note accuracy, rhythmic accuracy, steady tempo and starting on the right note (twelve points possible for each etude).¹¹⁰¹

After examining the results, Killian and Henry made several observations. First, they divided the population into three different categories: high achieving (composite score of 20-24), medium achieving (composite score of 10-19) and lower achieving (composite score of 0-9).¹¹⁰² Next, the researchers found that the higher and medium

¹⁰⁹⁶ Ibid., 53.

¹⁰⁹⁷ Ibid., 54.

¹⁰⁹⁸ Ibid., 54.

¹⁰⁹⁹ Ibid., 54-55.

¹¹⁰⁰ Ibid., 55.

¹¹⁰¹ Ibid., 55.

¹¹⁰² Ibid., 56.

achieving groups benefited greatly from having the thirty-second practice period, but the thirty second practice period did not benefit the lower achieving group.¹¹⁰³

Once the researchers analyzed the composite scores, they then analyzed the videotapes for the participant's use of strategies for first experimental treatment (thirty second practice period before sight singing). First, they found that different achieving groups used different strategies, and high and medium achieving participants used practice strategies like tonicizing the first note, hand signs, singing out loud, isolate problems and finished the melody in thirty-seconds.¹¹⁰⁴ Lower achieving students, on the other hand, tended to use strategies like not keeping a steady tempo, stopping in the middle of the melody, taking their eyes off the music and not finishing the melody.¹¹⁰⁵

After analyzing the behaviors for the thirty-second period, the researchers then observed the participant's behaviors for the second experimental treatment (no practice period before sight-singing). Killian and Henry only saw that higher achieving participants tonicized the first note more often than lower achieving students.¹¹⁰⁶ Otherwise, no other behaviors showed a significant difference between any of the groups.¹¹⁰⁷

In addition to the video analyses, the researchers made a few more general observations from the data they received. Overall, the researchers found that the thirty seconds did help make a difference in a student's sight-singing ability.¹¹⁰⁸ They also found that successful singers physically kept a steady beat while they performed the

¹¹⁰³ Ibid., 56-57.

¹¹⁰⁴ Ibid., 57.

¹¹⁰⁵ Ibid., 57.

¹¹⁰⁶ Ibid., 58.

¹¹⁰⁷ Ibid., 58.

¹¹⁰⁸ Ibid., 61.

etudes.¹¹⁰⁹ Furthermore, the researchers found that participants in the two higher achieving groups had better time management skills and used their time efficiently unlike the lower achieving groups.¹¹¹⁰ Finally, the researchers found that gender and age did not make a difference in predicting groups for this study.¹¹¹¹

Peter Miksza wrote the article, “Relationships Among Impulsiveness, Locus of Control, Sex, and Music Practice,” in the journal, *Journal of Research in Music Education*.¹¹¹² In his article’s introduction and literature review, Miksza noted several studies that examined different practice methods and different studies that examined gender, locus of control, and impulsiveness.¹¹¹³ Furthermore, Miksza defined practice effectiveness as “the amount of change in achievement scores from the pretest to the posttest.”¹¹¹⁴ For this study, the researcher wanted to observe how locus of control, impulsiveness, and gender affected the effectiveness of practice sessions for college-level brass players.¹¹¹⁵ Miksza also wanted to observe the practice behaviors college-level brass players exhibited when they practiced an etude.¹¹¹⁶

Miksza recruited forty undergraduate and graduate participants who played various brass instruments.¹¹¹⁷ Next, the researcher adapted a flute etude that had both lyrical and technical aspects, provided enough challenge, and provided an equal level of

¹¹⁰⁹ Ibid., 62.

¹¹¹⁰ Ibid., 62.

¹¹¹¹ Ibid., 63.

¹¹¹² Peter Miksza. “Relationships Among Impulsiveness, Locus of Control, Sex, and Music Practice.” *Journal of Research in Music Education* 54, no. 4 (Winter 2006): 308-323. <http://www.jstor.org/stable/4139753> (accessed September 30, 2010).

¹¹¹³ Ibid., 307-310.

¹¹¹⁴ Ibid., 310.

¹¹¹⁵ Ibid., 310.

¹¹¹⁶ Ibid., 310.

¹¹¹⁷ Ibid., 310.

difficulty for different instruments.¹¹¹⁸ In addition, Miksza administered surveys to measure impulsiveness, locus of control, and a self-report of practice behaviors.¹¹¹⁹

After recruiting the participants, Miksza conducted his experiment over two practice sessions. First, he administered a pretest to the participants in which they sight-read the etude, and then he had each of the participants practice for twenty-three minutes any way they deemed necessary to improve their score.¹¹²⁰ The researcher then administered a posttest, and had the participants fill out a questionnaire.¹¹²¹ Throughout all the sessions, Miksza recorded all the sessions using an audio recording to determine pretest and posttest scores, and a video camera to record the practice sessions for different practice behaviors.¹¹²²

In order to score these results the researcher used two different scales. First, he used an objective performance scale that analyzed the notes, rhythms, articulations and dynamics. Next, he used subjective performance scale to address subjective musical elements in four categories: “etude specific criteria, interpretation/musical effects, tone/intonation and technique/articulation.¹¹²³” Miksza analyzed and categorized the video-recordings using a scale that combined prior research.¹¹²⁴ Finally, Miksza had three graduate music education majors independently reviewed all the audio, and had one graduate music education major reviewed twenty randomly selected video recordings to judge reliability.¹¹²⁵

¹¹¹⁸ Ibid., 310.

¹¹¹⁹ Ibid., 311.

¹¹²⁰ Ibid., 313.

¹¹²¹ Ibid., 314.

¹¹²² Ibid., 314.

¹¹²³ Ibid., 314.

¹¹²⁴ Ibid., 314.

¹¹²⁵ Ibid., 314.

After examining the results, Miksza made several observations after he examined the results from the locus of control and impulsive tests. First, the researcher found that an impulsive person likely blamed their success and failures on outside influences.¹¹²⁶ Next, he found that older subjects did not often demonstrate impulsive behaviors.¹¹²⁷ Finally, he found no significant differences between the sexes for locus of control, impulsiveness, and performance achievement scores.¹¹²⁸ The researcher did find, however, after using a Mann-Whitney U test which suggested that men do more informal practicing than women.¹¹²⁹

In addition to the previous two scales, the researcher found several results after examining the Music Practice Questionnaire. First, although Miksza found various differences among the participant's responses for practice time and frequency, the results suggested that the participants preferred long massed practice sessions instead of shorter practice sessions spread out over longer periods of time.¹¹³⁰ Next, the researcher found that most of the participants normally engaged in formal practicing as opposed to informal practicing.¹¹³¹ Third, the participants found that the practice sessions during the experiment suggested only moderately efficient.¹¹³²

Miskza then made more observations about the achievement scores. First, Miksza found that participants who he classified as low impulsive, made greater gains in the performance achievement scores than those who he classified as high impulsive.¹¹³³ The researcher then suggested that this means either low impulsive participants practice more

¹¹²⁶ Ibid., 314.

¹¹²⁷ Ibid., 314.

¹¹²⁸ Ibid., 314.

¹¹²⁹ Ibid., 314.

¹¹³⁰ Ibid., 314.

¹¹³¹ Ibid., 314.

¹¹³² Ibid., 314.

¹¹³³ Ibid., 314.

efficiently, or know how and when to employ certain practice strategies.¹¹³⁴ Next, the researcher found no significant differences between locus of control scores and achievement scores.¹¹³⁵

Furthermore, the researcher examined the videotapes to observe the practice behaviors. First, Miksza found that most of the students used the following practice behaviors: “repetition of section, repetition of measure, slowing, varying pitch and marking the part.¹¹³⁶” The researcher, on the other hand, noticed only the least number of subjects used the following behaviors: “self-guiding, repetition of the entire piece, varying the dynamics, and using the piano.¹¹³⁷” Next, the researcher found that the time spent practicing varied tremendously throughout the population.¹¹³⁸

After examining the varied practice times, the researcher found that the practice behavior, repetition of section larger than a measure, related to practice effectiveness.¹¹³⁹ With this in mind, the researcher then suggested that strategic practice related to performance scores and practice behaviors.¹¹⁴⁰ The researcher then found that participants who exhibited more venturesome characteristics proved more likely to vary pitches and octave displacement in their practicing as a practice strategy.¹¹⁴¹ Finally, the researcher suggested that from the analysis, that quality of the session instead of time duration indicated the effectiveness of a practice session.¹¹⁴²

¹¹³⁴ Ibid., 314.

¹¹³⁵ Ibid., 314.

¹¹³⁶ Ibid., 314.

¹¹³⁷ Ibid., 314.

¹¹³⁸ Ibid., 314.

¹¹³⁹ Ibid., 314.

¹¹⁴⁰ Ibid., 314.

¹¹⁴¹ Ibid., 314.

¹¹⁴² Ibid., 314.

Amanda Leon-Guerrero wrote “Self-Regulation Strategies Used by Student Musicians During Music Practice,” in *Music Education Research*.¹¹⁴³ In her article, Guerrero observed the different types of self-regulation strategies that middle school band students used.¹¹⁴⁴ For this study, Guerrero had three main research questions she asked throughout the study. First, she wanted to find the verbalized practice strategies of adolescents as they practiced in front of a video camera recorder. Next, she would analyze the video camera to determine which strategies she saw and group them according to Nielsen’s¹¹⁴⁵ 2001 study.¹¹⁴⁶ Finally, Guerrero asked the participants to recall the practice strategies they used while they watch a video-recording of themselves.¹¹⁴⁷

Guerrero recruited sixteen, middle school band students that played various instruments.¹¹⁴⁸ After selecting her participants, the researcher used a piece in F minor from an unspecified, advanced band method and she explained that she used this particular piece since they did not know it, contained a challenging key, and had musical items that the participants might or might not recognize (ornamentation, tenuto, ect.).¹¹⁴⁹

In order to collect data on this population, Guerrero video-taped each of the participants at an appointed time after school while they practiced the assigned music, commented on their actions while practiced and performed the piece in its’ entirety.¹¹⁵⁰ Once they completed the session, Guerrero asked each of the participants to watch the

¹¹⁴³ Amanda Leon-Guerrero, “Self-Regulation strategies used by student musicians during music practice,” *Music Education Research* 10, no. 1 (2008): 91-06.
<http://dx.doi.org/10.1080/14613800701871439> (accessed May 31, 2010).

¹¹⁴⁴ Ibid., 95.

¹¹⁴⁵ Nielsen 2001.

¹¹⁴⁶ Leon-Guerrero., 95.

¹¹⁴⁷ Ibid., 95.

¹¹⁴⁸ Ibid., 96 and 97.

¹¹⁴⁹ Ibid., 96.

¹¹⁵⁰ Ibid., 96.

videotape and comment on the different practice strategies they saw.¹¹⁵¹ For this recall session, Guerrero used an audio-recorder to gather the participant's comments.¹¹⁵²

After running the experiment and gathering the reports, Guerrero used two different coding schemes to group and analyze the self-regulated strategies that the participants said they used in the study. First, in order to categorize the participants' comments on their self-regulating studies during and after the study, Guerrero used Nielsen's 2001 study¹¹⁵³ to classify each of the comments.¹¹⁵⁴ This helped the researcher answer research questions one and three. Next, in order to answer research question two, the researcher used McPherson and Renwick's 2001 study¹¹⁵⁵ as a means of categorizing the self-regulation strategies that she noted.¹¹⁵⁶

Guerrero found that the participants had identified twenty-one different self-regulating strategies. Of these comments, she, like Renwick and McPherson's 2001 study,¹¹⁵⁷ divided them into four larger classifications: musical elements, repetition, non-playing and non-specific task, and found that most of the participants used repetition as a strategy for working on the music.¹¹⁵⁸ More specifically, Guerrero found that participants most commonly used "repeating a segment."¹¹⁵⁹

After finding data for research question number one, Guerrero then classified the comments as she saw them. Once she reviewed the tapes again, she only found fifteen different self-regulating studies. After identifying and defining all the different, observed

¹¹⁵¹ Ibid., 96.

¹¹⁵² Ibid., 96.

¹¹⁵³ Nielsen study 2001.

¹¹⁵⁴ Leon-Guerrero, 96.

¹¹⁵⁵ Renwick and McPherson 2001 study.

¹¹⁵⁶ Leon-Guerrero, 96.

¹¹⁵⁷ Ibid., 96.

¹¹⁵⁸ Ibid., 98.

¹¹⁵⁹ Ibid., 99.

strategies she also found that the participants used repetition more often and that “restarting a measure” proved the most specific strategy used.¹¹⁶⁰

Finally, Guerrero then classified the reflective comments from the audio recording in the same fashion as she did when she coded the responses off the videotape.¹¹⁶¹ After classifying all the comments, the researcher then took the comments from the “strategy selection” section and found that the students had identified twenty-four strategies.¹¹⁶² Like the earlier two analyses that she completed, she also categorized each of these strategies into four categories: repetition, musical elements, non-specific and non-playing.¹¹⁶³ Unlike the previous two analyses, the participant’s recall testimony showed that more of their comments on strategy were classified in the musical elements category as opposed to repetition like the first time.¹¹⁶⁴ Yet, the participants said that they used the strategy, “going back to the beginning,” most of the time.¹¹⁶⁵

Peter Miksza wrote the article, Relationships among achievement goal motivation, impulsivity, and the music practice of collegiate brass woodwind players, in the journal *Psychology of Music*.¹¹⁶⁶ In his article, Miksza had two distinct purposes for running this particular study. First, Miksza wanted to observe whether or not deliberate practice indicated certain practice behaviors.¹¹⁶⁷ Next, Miksza wanted to explore how the practice behaviors observed in the study related to performance achievement.¹¹⁶⁸

¹¹⁶⁰ Ibid., 101.

¹¹⁶¹ Ibid., 101.

¹¹⁶² Ibid., 102.

¹¹⁶³ Ibid., 102.

¹¹⁶⁴ Ibid., 102.

¹¹⁶⁵ Ibid., 103.

¹¹⁶⁶ Peter Miksza. “Relationships among achievement, goal motivation, impulsivity, and the music practice of collegiate brass and woodwind players.” *Psychology of Music* 39, no. 1 (June 2012): 50-67. <http://pom.sagepub.com/content/39/1/50> (accessed June 4, 2012).

¹¹⁶⁷ Ibid., 54

¹¹⁶⁸ Ibid., 54

Miksza recruited fifty-one participants who played various instruments and who had enrolled in different degree programs.¹¹⁶⁹ After recruiting his participants, Miksza collected his data in one, forty-five minute session that included a pre-test, a practice session and a post-test on an etude that Miksza had checked with both faculty and other graduate students to ensure that multiple instruments could play it.¹¹⁷⁰

Along with recruiting and selecting materials, Miksza used two different performance measures from prior research in order to judge the performances on both an objective and subjective level.¹¹⁷¹ Unlike the etude selection, though, Miksza did not consult with faculty and graduate students to determine if they normally employed them in their studios when they determined performance achievement with their students.

In his study, Miksza found various results. First, Miksza found that certain practice strategies emerge when administering a post-test to students after they completed one practice under the time limit specified (in this case 23-30 minutes).¹¹⁷² After observing participants in one practice session, Miksza found five, effective behaviors that helped raise scores: “1) repeating relatively larger chunks of music as compared to smaller chunks; 2) slowing difficult passages; 3) playing through musical chunks, isolating problems areas, and recontextualizing the problem area into the whole; 4) gradually building the complexity of the musical phrases by adding consecutive larger segments; and 5) using a metronome may be particularly effective in increasing achievement.”¹¹⁷³

¹¹⁶⁹ Ibid., 54

¹¹⁷⁰ Ibid., 54

¹¹⁷¹ Ibid., 55

¹¹⁷² Ibid., 62

¹¹⁷³ Ibid., 64

Mental Practice versus Physical Practice

In addition to the studies that examined the self-regulating behaviors of individuals while they practice, other research looked at the effectiveness of mental practice in comparison to physical practice. Stewart L. Ross wrote the article, “The Effectiveness of Mental Practice in Improving the Performance of College Trombonists,” in the journal, *Journal of Research in Music Education*.¹¹⁷⁴ In his article’s introduction and literature review, Ross noted several different studies that examined mental practice in fields outside of music.¹¹⁷⁵ For this study, the researcher wanted to observe the effectiveness of mental practice in relation to other forms of practice.¹¹⁷⁶

Ross recruited thirty trombone players from both an undergraduate or graduate programs at various Midwestern universities in the United States.¹¹⁷⁷ The researcher then divided the participants into five experimental groups: all physical practice, all mental practice, mental practice with slide movements, combined physical and mental practice, and then no practice.¹¹⁷⁸ Next, the researcher adapted an etude that had different technical aspects that could provide an appropriate challenge for this level of musicianship.¹¹⁷⁹

After recruiting and handing out materials to the students, the researcher had each of the participants record a pretest as a means to determine achievement gain.¹¹⁸⁰ He used a stopwatch, instead of a metronome, to check for consistency in performance

¹¹⁷⁴ Stewart L. Ross. “The Effectiveness of Mental Practice in Improving the Performance of College Trombonists.” *Journal of Research in Music Education* 33, no. 4 (Winter 1985): 221-230. <http://jrm.sagepub.com/content/33/4/221> (accessed October 3, 2010).

¹¹⁷⁵ *Ibid.*, 221-223.

¹¹⁷⁶ *Ibid.*, 223.

¹¹⁷⁷ *Ibid.*, 223.

¹¹⁷⁸ *Ibid.*, 223.

¹¹⁷⁹ *Ibid.*, 223.

¹¹⁸⁰ *Ibid.*, 223.

lengths.¹¹⁸¹ Once he administered the pretest, he allowed each the experimental groups to practice the music according to the instructions for that experimental condition.¹¹⁸² After the practice sessions, Ross had the participants record the posttest.¹¹⁸³ Finally, the researcher had the participants fill out a questionnaire to collect retrospective data.¹¹⁸⁴

After testing all the participants, Ross made several observations. First, Ross found no substantial gains in the combined practice group over the physical group; but Ross did find, however, that combined mental and physical practice groups did better than the no-practice groups.¹¹⁸⁵ Next, the researcher found it difficult to observe mental practice since he had no way of knowing whether or not the participants processed the instructions the way he intended.¹¹⁸⁶

Ross also stated that he believed that physical practice provided a great benefit to the performer since the physical movements and listening to the sound help give the performer a greater understanding of how many errors they make while the perform.¹¹⁸⁷ He also stated, however, that mental practice can help focus the performer's attention on certain aspects of the performance.¹¹⁸⁸ Finally, he suggested that a trombone player who combines mental practice with physical practice can make as many practice gains as one who uses an all physical practice session.¹¹⁸⁹

¹¹⁸¹ Ibid., 223-224.

¹¹⁸² Ibid., 224.

¹¹⁸³ Ibid., 224.

¹¹⁸⁴ Ibid., 224.

¹¹⁸⁵ Ibid., 225.

¹¹⁸⁶ Ibid., 225.

¹¹⁸⁷ Ibid., 226.

¹¹⁸⁸ Ibid., 226.

¹¹⁸⁹ Ibid., 227.

Serene Lim and Louis G. Lippman wrote the article, “Mental Practice and Memorization of Piano Music,” in the journal, *The Journal of General Psychology*.¹¹⁹⁰ In their article’s introduction and literature review, the researchers reviewed the literature that focused on mental practice and other that tested mental practice as an effective skill when musicians practice.¹¹⁹¹ For this study, the researchers wanted to explore how musicians could use mental practice as physical skill that involved the components of auditory, kinesthetic and visual when they played piano.¹¹⁹² Furthermore, they posited that the auditory component would make mental practice more effective.¹¹⁹³

The researchers recruited seven university musicians who had several years of formal piano training and at least two years of music theory for a study that lasted six days.¹¹⁹⁴ Throughout the six days, the participants participated in two of the three experimental conditions: mental practice, mental practice with listening, and physical practice.¹¹⁹⁵

Next, the researchers used a semi-structured interview to graph the participant’s careers and the various stages of their development.¹¹⁹⁶ This 45-60 minute, semi-structured interview allowed the researchers to not only gather the necessary data, but also allowed the participants the freedom to give more information and possibly better explanations about their development and careers.¹¹⁹⁷ When the researchers finished the

¹¹⁹⁰ Serene Lim and Louis G. Lippman. “Mental Practice and Memorization of Piano Music.” *The Journal of General Psychology* 118, no. 1 (1986): 21-30.

¹¹⁹¹ *Ibid.*, 21-22.

¹¹⁹² *Ibid.*, 22.

¹¹⁹³ *Ibid.*, 22.

¹¹⁹⁴ *Ibid.*, 22.

¹¹⁹⁵ *Ibid.*, 24.

¹¹⁹⁶ *Ibid.*, 288.

¹¹⁹⁷ *Ibid.*, 288-289.

experiment, they rated the recorded performances for note accuracy, dynamics, phrasing and rhythmic accuracy; and then they reported the results.¹¹⁹⁸

After tabulating the results, the researcher made several observations. First, they found that physical practice resulted in a higher rate of improvement than either one of the mental practice conditions.¹¹⁹⁹ Next, while physical practice produced superior results for note accuracy, the researchers did find that mental practice with listening did help with note accuracy as opposed to just mental practice alone.¹²⁰⁰

Lim and Lippman also found that physical practice produced higher gains for rhythmic accuracy, and the researchers found no differences between either mental practice conditions.¹²⁰¹ Following their analysis of rhythmic accuracy, the researchers analyzed the differences between the treatments for the phrasing. The researchers found no differences between physical practice and mental practice with listening, but they did find that both physical practice and mental practice with listening did a better job over mental practice alone.¹²⁰²

After examining the results from the practice conditions, the researchers then reported the results from the imagery tests and interviews. First, they found that all but one preferred physical practice.¹²⁰³ Next, while almost all of them preferred physical practice, they all did report that they wished they had learned about mental practice earlier and thought teachers should teach the skills associated with mental practice at an early age.¹²⁰⁴ Finally, the participants reported that they wanted more control over the

¹¹⁹⁸ Ibid., 25-26.

¹¹⁹⁹ Ibid., 27.

¹²⁰⁰ Ibid., 27.

¹²⁰¹ Ibid., 27.

¹²⁰² Ibid., 27.

¹²⁰³ Ibid., 28.

¹²⁰⁴ Ibid., 29.

mental practice sessions, similar to that of their own physical practice sessions.¹²⁰⁵ This probably would result in several individual variations where the participants would make mental practice work for them like the way they did for physical practice.¹²⁰⁶ Overall, , the researchers found data that suggested not only did the participants do better with physical practice, but they also preferred it.

Don D. Coffman wrote the article, “Effects of Mental Practice, Physical Practice, and Knowledge of Results on Piano Performance,” in the journal, *Journal of Research in Music Education*.¹²⁰⁷ In his article’s introduction and literature review, he reviewed the literature on mental practice, but found that some literature did not go far enough in looking at all the variables.¹²⁰⁸ For this study, the researcher wanted to examine whether or not an individual could improve their piano playing through three types of practicing.¹²⁰⁹

Coffman recruited eighty participants enrolled at a university as music education or music therapy major, and who did not play keyboard as their primary instrument.¹²¹⁰ For this study, the researcher used an eight measure chordal piano piece in B-flat and contained fifteen chords.¹²¹¹ The researcher also had a recorded metronome beat available to some of the experimental groups.

The researcher then divided the participants into one of the four practice groups: Physical Practice, Mental Practice and Alternating Practice and Mental, and No

¹²⁰⁵ Ibid., 29.

¹²⁰⁶ Ibid., 29.

¹²⁰⁷ Don D. Coffman. “Effects of Mental Practice, Physical Practice, and Knowledge of Results on Piano Performance.” *Journal of Research in Music Education* 38, no. 3 (Autumn 1990): 187-196. <http://www.jstor.org/stable/3345182> (May 30, 2012).

¹²⁰⁸ Ibid., 189.

¹²⁰⁹ Ibid., 189.

¹²¹⁰ Ibid., 189.

¹²¹¹ Ibid., 190.

Practice.¹²¹² The researcher then divided the participants into one of the eight experimental groups: Group A (physical practice who heard themselves play and heard the metronome), Group B (physical practice that could not hear themselves play notes, but did hear a metronome), Group C (mental practice who heard a recording of the piece, could not move, did not hear a metronome and had to imagine the movements), Group D (mental practice who did not hear a recording of the piece, heard a metronome, could not move and had to imagine themselves playing), Group E (alternating three trials of physical performance-hearing themselves play with a metronome-, and three trials of mental practice where they heard a recording), Group F (alternating three trials of physical performance- not hearing themselves play with a metronome-, and three trials of mental practice where they did not hear a recording, but did hear metronome clicks throughout), Group G (no practice, read and heard six posttests of other groups performing the sight reading piece) and Group H (no practice, read and only heard metronome clicks).¹²¹³

After dividing the participants into the experimental groups, the researcher had each participant (except the no practice groups, sight-read the piece) did six practice trials and completed a posttest.¹²¹⁴ The no practice groups simply sight-read the composition as a posttest. Also, if the researcher administered a Betts Imagery Test to everyone who completed some type of mental practice in their experimental session.¹²¹⁵ The researcher also videotaped all the participants' hands (to help keep everything anonymous) so they could evaluate three items: their performance time, number of pitch errors, and the

¹²¹² Ibid., 189.

¹²¹³ Ibid., 190-191.

¹²¹⁴ Ibid., 191.

¹²¹⁵ Ibid., 190.

number of rhythmic errors.¹²¹⁶ Finally, Coffman had independent judges evaluate the items.¹²¹⁷

After tabulating the results, the researcher found several results. First, he found that all the participants in Physical Practice, Mental Practice or Alternating Physical and Mental significantly improved more than the no practice group.¹²¹⁸ Coffman, however, did not find that one practicing group proved more significantly better than the other in improving.¹²¹⁹ Next, they found that the different experimental groups helped brought the music closer to the actual tempo.¹²²⁰ Third, the researcher found no significant difference for reducing errors among practice groups, and it also did not matter whether or not the participants heard themselves.¹²²¹ Finally, he found that while practice proved superior to no practice, the results suggested that physical practice proved superior in developing motor skills.¹²²²

Zebulon Highben and Caroline Palmer wrote the article, “Effects of Auditory and Motor Mental Practice in Memorized Piano Performance,” in the journal, *Bulletin of the Council for Research in Music Education*.¹²²³ In their article’s introduction and literature review, Highben and Palmer noted previous studies that examined both mental and physical practice and how the two contrasted with each other.¹²²⁴ For this study, the researchers wanted to determine the differences between mental and physical practice

¹²¹⁶ Ibid., 193.

¹²¹⁷ Ibid., 193.

¹²¹⁸ Ibid., 194.

¹²¹⁹ Ibid., 194.

¹²²⁰ Ibid., 194.

¹²²¹ Ibid., 194.

¹²²² Ibid., 195.

¹²²³ Zebulon Highben and Caroline Palmer. “Effects of Auditory and Motor Mental Practice in Memorized Piano Performance.” *Bulletin of the Council for Research in Music Education* no. 159 (Winter 2004): 58-65 <http://www.jstor.org/stable/40319208> (accessed July 12, 2012).

¹²²⁴ Ibid., 58-59.

from the viewpoint of auditory and motor as they had participants practice unfamiliar music.¹²²⁵

Highben and Palmer recruited sixteen adult pianists who had at least six years of piano instruction to participate in the study.¹²²⁶ In addition to the participants, the researchers selected four, two measure selections for the study and had four different treatment conditions: normal practice (participants heard and moved their fingers over the keys), motor (participants could move their fingers, but did not hear themselves), auditory only (the participants could not move their hands, but heard a recording of the selection), and covert (the participants could not move their hands nor hear anything).¹²²⁷ The participants used an electric keyboard that could record their pretests and posttests.¹²²⁸

For the experiment, the researchers had each participant fill out a questionnaire that asked them about their musical backgrounds.¹²²⁹ Next, researchers had each of the participants complete a sightreading component where they each played a musical excerpt similar to the treatments, five times and then three times from memory.¹²³⁰ Once the participants completed this exercise, the researcher gave them the first selection, read the specific instructions for the treatment and then had them practice the two measure excerpt three times.¹²³¹

¹²²⁵ Ibid., 59.

¹²²⁶ Ibid., 59.

¹²²⁷ Ibid., 59-61.

¹²²⁸ Ibid., 60-61.

¹²²⁹ Ibid., 61.

¹²³⁰ Ibid., 61.

¹²³¹ Ibid., 61.

When the participants finished, the researchers had the participants perform the selection four times from memory.¹²³² The researchers and participants repeated this routine three more times in order to cover all the treatments.¹²³³ Third, the researchers gave each participant two different imagery tests.¹²³⁴ Finally, at the end, gave each participant a self-report asking them how they thought did on the different sections of the experiment.¹²³⁵

After they completed the experiment and analyzed the data, Highben and Palmer reported their results. First, the researchers found that the normal treatment condition yielded the highest recall scores whereas the cover treatment condition had the worst recall scores.¹²³⁶ On the other hand, the researchers found no significant differences between the normal and auditory treatment conditions.¹²³⁷

Along with the recall scores from the treatment conditions, the researcher also found that the participants had significantly lower scores on their auditory image posttests than they did their motor tests.¹²³⁸ Although they did not find any significant correlations between the motor imagery posttest and any of the experimental conditions, they did find that auditory image scores did significantly relate to the recall scores on the covert and motor conditions.¹²³⁹ This means that aural skills levels could predict how well the participants would do on the treatment conditions that did not allow the person to hear what they did.¹²⁴⁰

¹²³² Ibid., 61.

¹²³³ Ibid., 61.

¹²³⁴ Ibid., 61.

¹²³⁵ Ibid., 61.

¹²³⁶ Ibid., 62.

¹²³⁷ Ibid., 62.

¹²³⁸ Ibid., 62.

¹²³⁹ Ibid., 62.

¹²⁴⁰ Ibid., 63.

Furthermore, they found that a person's aural skills aided them in the memorization process.¹²⁴¹ Finally, the researchers suggested that an individual should focus on the sound of the piece rather the movements they make during the piece to in order to better help them aid in the memorization process.¹²⁴²

Peter Miksza wrote the article, "The Effect of Mental Practice on the Performance Achievement of High School Trombonists," in the journal, *Contributions to Music Education*.¹²⁴³ In his article's introduction and literature review, Miksza noted several different studies that examined mental practice and studies that examined the behavioral aspects of practicing music.¹²⁴⁴ For this study, the researcher wanted to observe three different types of mental practice and also wanted to know if "locus of control and music audiation related to the effectiveness of mental practice."¹²⁴⁵

Miksza recruited twenty high school participants from two different high schools who played trombone to participate in a two-day study.¹²⁴⁶ Next, the researcher composed three one-minute etudes that had an appropriate level of difficulty for this level of musicianship.¹²⁴⁷ In addition, Miksza piloted the etude to make sure that it proved appropriate for high school students with six trombones from another school.¹²⁴⁸ He also required a signed consent form in order to participate in the experiment.¹²⁴⁹ After

¹²⁴¹ Ibid., 63.

¹²⁴² Ibid., 64.

¹²⁴³ Peter Miksza. "The Effect of Mental Practice on the Performance Achievement of High School Trombonists." *Contributions to Music Education* 32, no. 1 (June 2005): 75-93. <https://iiiprxy.library.miami.edu/login?url=http://search.proquest.com/docview/1303781?accountid=14585> (accessed September 30, 2010).

¹²⁴⁴ Ibid., 75-77.

¹²⁴⁵ Ibid., 78.

¹²⁴⁶ Ibid., 79.

¹²⁴⁷ Ibid., 79.

¹²⁴⁸ Ibid., 79.

¹²⁴⁹ Ibid., 84.

recruiting the participants and preparing the etudes, Miksza administered two surveys to measure locus of control, and tonal and rhythmic audiation.¹²⁵⁰

On the second day he assigned the participants to one of the four treatment groups: “control (regular physical practice), goal representation (imagine the sound with as much detail as possible), production representation group (imagine yourself physically playing the instrument with as much detail as possible) and current representation (listen to yourself performing with as much detail as possible).¹²⁵¹” In the control group, Miksza administered a pretest that allowed the participant to practice each etude for 13.5 minutes and then administered a posttest.¹²⁵² Finally, the participants repeated this process two more times (with different etudes), and the participant rested for a minute or two in between each of the trials.¹²⁵³ The researcher audio recorded all the trials for further analyses.¹²⁵⁴

The mental practice groups differed from the control group. First, the mental practice groups were really a combination of physical and mental practice.¹²⁵⁵ Like the control group, Miksza administered each mental group a pretest.¹²⁵⁶ Next, the researcher would read instructions for 1.5 minutes on how to mentally practice the music as the participant would follow along on their part, and then the participant would play for a minute and a half.¹²⁵⁷ This alternating pattern continued for 13.5 minutes, and then the researcher administered a posttest.¹²⁵⁸ Finally, like the control group, the participant

¹²⁵⁰ Ibid., 79.

¹²⁵¹ Ibid., 80-81.

¹²⁵² Ibid., 82.

¹²⁵³ Ibid., 82.

¹²⁵⁴ Ibid., 82.

¹²⁵⁵ Ibid., 82.

¹²⁵⁶ Ibid., 82.

¹²⁵⁷ Ibid., 82.

¹²⁵⁸ Ibid., 82.

repeated the process two more times (with different etudes), and the participant rested for a minute or two in between each of the trials.¹²⁵⁹ The researcher audio recorded all the trials for further analyses.

In order to score these results the researcher used two different scales. First, he used an objective performance scale from prior research that analyzed the notes, rhythms, articulations and dynamics.¹²⁶⁰ Next, he used prior research to create four categories to examine the subjective musical elements: “interpretation/musical effects, tone/intonation and technique/articulation.”¹²⁶¹

After examining the results, the researcher made several observations. First, Miksza found no significant differences between any of the groups.¹²⁶² Next, he did not find any significant relationships between audiation and achievement scores.¹²⁶³ Then he did not find any significant relationships between locus of control and performance achievement or any significant relationship between locus of control and audiation.¹²⁶⁴ In addition, Miksza also suggested that many of the participants had low locus of control scores, which probably helped them succeed in using the mental strategies for this study.¹²⁶⁵ Finally, Miksza suggested that mental practice may help for high school trombone players practice more effectively.¹²⁶⁶

Dan Cahn wrote the article, “The effects of varying ratios of physical and mental practice, and task difficulty on performance of a tonal pattern,” in the journal, *Psychology*

¹²⁵⁹ Ibid., 82.

¹²⁶⁰ Ibid., 79.

¹²⁶¹ Ibid., 79.

¹²⁶² Ibid., 85.

¹²⁶³ Ibid., 90.

¹²⁶⁴ Ibid., 90.

¹²⁶⁵ Ibid., 90.

¹²⁶⁶ Ibid., 90.

of Music.¹²⁶⁷ In his chapter's introduction and literature review, Cahn noted several studies that examined mental practice.¹²⁶⁸ For this study, the researcher wanted to examine how effective certain types of practice methods could help in improvising over two, different chord progressions.¹²⁶⁹

Cahn recruited sixty participants from three different Israeli schools, who had completed a semester of jazz improvisation and who each played an instrument to participate in the study.¹²⁷⁰ First, the researcher screened each of the participants to determine if they met the criteria, and after the screening, the researcher eliminated nine participants from the study since they did not demonstrate the necessary skills to participate in the study.¹²⁷¹ The researcher also obtained consent from the participants.¹²⁷² Next, the researcher divided the participants into four experimental treatments: physical practice, mental practice, combine mental (66%) and physical practice (33%) and combine mental (33%) and physical practice (66%).¹²⁷³

Once the researcher had recruited and eliminated certain participants, Cahn first gave each of the participants a set of instructions that explained the practice treatment.¹²⁷⁴ Next, he recorded each of the participant's initial performance.¹²⁷⁵ Third, while the researcher remained in the room (to ensure the participants followed the instructions), Cahn had each of the participants practice the music as the instructions dictated, and

¹²⁶⁷ Dan Cahn. "The effects of varying ratios of physical and mental practice, and task difficulty on performance of a tonal pattern." *Psychology of Music* 36, no. 2 (2008): 179-191 <http://www.pom.sagepub.com/content/36/2/179> (accessed July 11, 2012).

¹²⁶⁸ *Ibid.*, 179-180.

¹²⁶⁹ *Ibid.*, 180.

¹²⁷⁰ *Ibid.*, 180-181.

¹²⁷¹ *Ibid.*, 182.

¹²⁷² *Ibid.*, 181.

¹²⁷³ *Ibid.*, 181.

¹²⁷⁴ *Ibid.*, 182.

¹²⁷⁵ *Ibid.*, 182.

when the practice time finished, the researcher recorded the participant's performance to act as a posttest.¹²⁷⁶ Following completion of the first chord progression, the participant used the same procedure for the second chord progression. Finally, the research had two independent judges score the recordings for note errors, and then Cahn analyzed the data.¹²⁷⁷

After examining the results, Cahn made several observations. First, Cahn reported that all the practice groups did improve from the pretest to the posttest.¹²⁷⁸ Next, the researcher found that mental practice group and the combined mental (66%) with physical (33%) groups did better on the easier chord progression than they did on the hard chord progression.¹²⁷⁹ Yet, when the researcher examined the harder chord progression, he found that the participants who had higher amounts of physical practice did significantly better on that progression than did participants who had higher amounts of mental practice in their practice session after he had combined the four groups into two bigger groups.¹²⁸⁰ He later explained in his discussion that combing the groups also increased the number per participants, and that could have altered his results.¹²⁸¹ Other researchers, on the other hand, had not tried this before, and this could have changed other data had those researchers tried this idea of combing the groups.

The researcher noted that while some differences did occur, his data did not show any differences between the three groups and further found that the participants did better on the easier progressions than on the harder progressions.¹²⁸² In short, Cahn did suggest

¹²⁷⁶ Ibid., 182.

¹²⁷⁷ Ibid., 182-183.

¹²⁷⁸ Ibid., 183.

¹²⁷⁹ Ibid., 184.

¹²⁸⁰ Ibid., 184, 186, and 188.

¹²⁸¹ Ibid., 188.

¹²⁸² Ibid., 186.

that combining mental practice with physical practice can help increase effective practice.¹²⁸³

Abigail McHugh-Grifa wrote the article, “A Comparative Investigation of Mental Practice Strategies Used by Collegiate-Level Cello Students,” in the journal, *Contributions in Music Education Research*.¹²⁸⁴ In her article’s introduction and literature review, McHugh-Grifa noted studies that examined the importance of self-evaluation and different studies that have tested mental practice in music and then further defined mental practice as “any practice strategies that are performed without producing sound on an instrument.¹²⁸⁵” For this study, the researcher wanted to observe whether or not different types of mental practice would prove beneficial or just as beneficial as regular practicing.¹²⁸⁶

McHugh-Grifa recruited twelve undergraduate cellists to participate in her pretest-practice-posttest design experiment.¹²⁸⁷ The researcher then divided the participants into four different experimental groups: silent motionless practice, singing/vocalizing without any movement, playing air cello while vocalizing, and traditional physical practice (control group).¹²⁸⁸ Next, the researcher wrote six cello duets where the participant would play four of them along with the second part that the researcher played from a stereo.¹²⁸⁹ In addition, McHugh-Grifa trained the participants on their respective area of mental practice so they could use the different methods during

¹²⁸³ Ibid., 186.

¹²⁸⁴ Abigail McHugh-Grifa. “A Comparative Investigation of Mental Practice Strategies Used by Collegiate-Level Cello Students.” *Contributions in Music Education Research* 38, no. 1 (May 2011): 65-79. can’t find the stable link. (accessed June 1, 2012).

¹²⁸⁵ Ibid., 69.

¹²⁸⁶ Ibid., 69.

¹²⁸⁷ Ibid., 70.

¹²⁸⁸ Ibid., 69.

¹²⁸⁹ Ibid., 70.

treatment.¹²⁹⁰ Finally, all the participants completed a researcher created, practice attitude questionnaire.¹²⁹¹

After recruiting and handing out materials, each participant completed four trials of the experiment. First, she distributed a sheet with specifics of the music (key signature, time signature, tempo) to ensure that none of the participants would mentally rehearse the duets before the pretest. Next, she had each of the participants record and sight-read the pretest of the etude given to them. The researcher left the room, and then allowed the participant to practice for three minutes using the appropriate mental or physical practice strategies they had been assigned to use for the experiment.¹²⁹²

Finally, McHugh-Grifa had all the participants complete a posttest and then had the participant repeat the procedure three more times.¹²⁹³ Once they completed the four trials, the researcher had the participants fill out a questionnaire.¹²⁹⁴ The researcher recorded all of the pretests and posttests using GarageBand (a computer-recording program) and had four judges independently score the recordings for tone, rhythm, and musicality.¹²⁹⁵

After examining the results, McHugh-Grifa determined she could make several observations based on the results. First, she found that while the traditional physical practice group did significantly better than the singing/vocalizing and the air cello groups it did not prove significantly more effective than the silent-motionless mental practice group.¹²⁹⁶ She did find, however, no significant difference between any of the mental

¹²⁹⁰ Ibid., 70.

¹²⁹¹ Ibid., 71.

¹²⁹² Ibid., 71.

¹²⁹³ Ibid., 71.

¹²⁹⁴ Ibid., 71.

¹²⁹⁵ Ibid., 71.

¹²⁹⁶ Ibid., 72.

practice groups.¹²⁹⁷ Next, using video data, she found that several of the participants, regardless of their experimental group, had problems following the practice guidelines. For example, she found that some of the traditional physical practice group participants stopped playing, and found that overall the air cello group had problems actually simulating air cello movements (lots of them simply conducted the etude).¹²⁹⁸

McHugh-Grifa also found that while all of the participants had used the traditional physical practice strategies, several of the students had employed mental strategies in their practice sessions prior to the experiment.¹²⁹⁹ While most of the participants did not correctly use the air cello technique, ten out of twelve participants reported using singing and vocalizing technique in their sessions.¹³⁰⁰

Furthermore, the researcher made more discoveries from the participant's questionnaires. First, they reported that they believed physical practice proved more effective than mental practice, and also stated that their teachers had also recommended doing a different form of practice other than physical practice.¹³⁰¹ Next, she found that only two of the twelve participants had any experience with using the air-cello method and she later suggested that this lack of experience along with the time constraints could have explained why the participants did not explore the full potential of this practice method.¹³⁰² Finally, she found that with the data collected, future research should continue to explore mental practice and how to make it more effective.¹³⁰³

¹²⁹⁷ Ibid., 74.

¹²⁹⁸ Ibid., 72.

¹²⁹⁹ Ibid., 72.

¹³⁰⁰ Ibid., 72.

¹³⁰¹ Ibid., 74.

¹³⁰² Ibid., 76.

¹³⁰³ Ibid., 76.

Models

In addition to researchers who tested the effectiveness of mental practice, other researchers have investigated whether or not individuals (most notably students) could use models to help develop and define their own skills. Vito Puopolo wrote the article, “The Development and Experimental Application of Self Instructional Practice Materials for Beginning Instrumentalists,” in the journal, *Journal of Research in Music Education*.¹³⁰⁴ In his article’s introduction and literature review, Pupolo noted the need to help younger, developing musicians achieve success at the beginning to encourage future growth.¹³⁰⁵ For this study, Puopolo had four research questions he tried to answer. First, he wanted to create tapes self-instructional tapes based on assigned lesson material.¹³⁰⁶ Next, he wanted to determine whether or not beginning instrumentalists could use this method as they develop their basic skills.¹³⁰⁷ Third, he wanted to observe whether or not relationships existed between music achievement, social status and I.Q.¹³⁰⁸ Finally, he wanted to examine the effects that programmed practice had on musical achievement, social status and I.Q.¹³⁰⁹

Puopolo recruited fifty-two, fifth graders who played trumpet.¹³¹⁰ The researcher then divided the participants into two different groups (experiment and control).¹³¹¹ Next, the researcher tested the participant’s musical achievement, social status, and I.Q.

¹³⁰⁴ Vito Puopolo. “The Development and Experimental Application of Self Instructional Practice Materials for Beginning Instrumentalists.” *Journal of Research of Music Education* 19, no. 3 (Autumn 1971): 342-349. <http://www.jstor.org/stable/3343770> (accessed June 1, 2012).

¹³⁰⁵ Ibid., 343.

¹³⁰⁶ Ibid., 343.

¹³⁰⁷ Ibid., 343.

¹³⁰⁸ Ibid., 343.

¹³⁰⁹ Ibid., 343.

¹³¹⁰ Ibid., 344.

¹³¹¹ Ibid., 344.

(obtained from school records).¹³¹² In addition, the researcher provided the participants in the experimental group with tapes that included: a performance model of the material, a piano accompaniment, and instructions and explanations of all the material on the tape.¹³¹³ The participants in the control group received the music.¹³¹⁴

After recruiting, pretesting and handing out materials to the participants, it took Puopolo ten weeks to complete the study.¹³¹⁵ Each week the student reported to their practice session to practice the weekly band assignment. First, the students left class with their instrument (the experimental group also brought their tape and tape recorder from class) and music to practice at their designated practice.¹³¹⁶ A practice monitor ensured that they practiced the correct amount of time (20-25 minutes), take attendance, and if necessary, make up missed practice sessions.¹³¹⁷

The experimental group practiced with their models and the control group practiced without a model.¹³¹⁸ At the end of the ten weeks, the researcher had all the participants complete a recorded posttest.¹³¹⁹ In addition, Puopolo administered a questionnaire to the participants in the experimental group.¹³²⁰ Finally, the researcher had an independent judge score all the tapes and then researcher analyzed all the results.¹³²¹

After examining the results, Puopolo made several observations. First, he found that the experimental group did significantly better than the control group in terms of

¹³¹² Ibid., 344.

¹³¹³ Ibid., 344.

¹³¹⁴ Ibid., 344.

¹³¹⁵ Ibid., 344.

¹³¹⁶ Ibid., 345.

¹³¹⁷ Ibid., 345.

¹³¹⁸ Ibid., 345.

¹³¹⁹ Ibid., 345.

¹³²⁰ Ibid., 345.

¹³²¹ Ibid., 345.

performance achievement.¹³²² Next, when he examined the control group, the researcher found that participants who had above-average music achievement did better than participants who illustrated below-average music achievement.¹³²³ Unlike the control group, however, the researcher noticed distinct a difference between above and below average music achievement participants.¹³²⁴

Puoplo also noticed no significant differences between students who had either above or below average social status for either treatment.¹³²⁵ After examining the social status, the researcher found that participants who had an above-average I.Q. scored higher in the control than participants who had a below-average I.Q.¹³²⁶ Furthermore, when the researcher examined the experimental group, he found that participants with a below-average I.Q. score scored just as well as those who had an above-average I.Q.¹³²⁷

Finally, the researcher made several discoveries to the questionnaire he administered to the experimental group. First, Puoplo found that the entire experimental group preferred this method to a traditional practice method.¹³²⁸ Next, most of the participants in this group thought their practice sessions moved too slow, and they wanted to play and listen to the model instead of listening someone give explanations.¹³²⁹ Finally, everyone believed that they improved as a result of using this method, and the researcher suggested that this type of thinking would lead to higher standards.¹³³⁰

¹³²² Ibid., 345.

¹³²³ Ibid., 346.

¹³²⁴ Ibid., 346.

¹³²⁵ Ibid., 346.

¹³²⁶ Ibid., 347.

¹³²⁷ Ibid., 348.

¹³²⁸ Ibid., 348.

¹³²⁹ Ibid., 348.

¹³³⁰ Ibid., 348-349.

Michael J. Wagner wrote the chapter, “The Effect of a Practice Report on Practice Time and Musical Performance,” in the book, *Research in Music Behavior: Modifying Music Behavior in the Classroom*.¹³³¹ In his article’s introduction and literature review, Wagner noted several studies that examined the importance of practice and made two assumptions regarding practice.¹³³² First, an individual should get better as a result of practicing. Second, an individual can only assess practice time improvement, if he keeps accurate practice records.¹³³³ For this study, the researcher wanted to determine whether or not time, (observed through practice reports) indicated whether or not the participants improved over the course of eight weeks.¹³³⁴

Wagner recruited forty-eight participants who possibly played various wind instruments.¹³³⁵ First, the researcher had each of the participants perform and record a minute and a half of a musical selection that illustrated their best performing attributes for the beginning of the academic term (this acted like the pretest).¹³³⁶ Next, after their initial performance, the researcher assigned twelve participants to each of the four different experimental groups: Group 1 filled out practice reports for the entire eight week study, Group 2 filled out practice reports for weeks, one, two, five and six, Group 3 filled out practice reports for weeks five and six, and Group 4 did not fill out any reports (control group).¹³³⁷ After the participants had completed the eight week study, they

¹³³¹ Michael J. Wagner. “The Effect of a Practice Report on Practice Time and Musical Performance.” In *Research in Music Behavior: Modifying Music Behavior in the Classroom*, edited by Clifford K. Madsen, R. Douglas Greer, and Charles H. Madsen Jr., 125-130. New York: Teachers College Press, 1975.

¹³³² *Ibid.*, 126.

¹³³³ *Ibid.*, 126.

¹³³⁴ *Ibid.*, 126-127.

¹³³⁵ *Ibid.*, 127.

¹³³⁶ *Ibid.*, 127.

¹³³⁷ *Ibid.*, 127.

played another selection that represented their playing eight weeks later.¹³³⁸ Finally, the judges analyzed the pre and posttest tapes and compared them with the practice reports.¹³³⁹

After examining the results, Wagner made several observations. First, he found no significant differences between any of the groups.¹³⁴⁰ Next, the researcher did not find significant differences between any of the groups even though he mentioned all the participants did improve over the eight-week term.¹³⁴¹ On the other hand, Wagner did report that Group 3 did practice more than either Group 1 or Group 2.¹³⁴² Finally, the researcher noted that while he did not find any significant differences between the group, Wagner mentioned that the data suggested that as individuals increase their use of practice reports, they spend less time practicing (he found an inverse correlation between the two).¹³⁴³

David E. Wolfe wrote the chapter, “The Use of Behavioral Contracts in Music Instruction,” in the book, *Research in Music Behavior: Modifying Music Behavior in the Classroom*.¹³⁴⁴ In his chapter’s introduction and literature review, Wolfe noted several different studies that examined contingency contracts and previous studies that used

¹³³⁸ Ibid., 128.

¹³³⁹ Ibid., 128.

¹³⁴⁰ Ibid., 128.

¹³⁴¹ Ibid., 128-129.

¹³⁴² Ibid., 129.

¹³⁴³ Ibid., 130.

¹³⁴⁴ David E. Wolfe. “The Use of Behavioral Contracts in Music Instruction.” *Journal of Research in Music Education*. In *Research in Music Behavior: Modifying Music Behavior in the Classroom*, edited by Clifford K. Madsen, R. Douglas Greer, and Charles H. Madsen Jr., 125-130. New York: Teachers College Press, 1975.

them.¹³⁴⁵ For this study, the researcher wanted to examine whether or not behavioral contracts helped students improve daily practice.¹³⁴⁶

Wolfe recruited three, elementary level youth conservatory participants who played piano to participate in a thirteen week study.¹³⁴⁷ The researcher then obtained parental consent from the participant's parents and the parents agreed to monitor the participant's practice sessions.¹³⁴⁸ Next, the researcher met with each of the participants and their teacher to discuss the terms of the contract and what they individually had to do each week.¹³⁴⁹ While Wolfe had each of the participants record their daily practice, the researcher discussed the need for individual contracts to help tailor the practice sessions to what they needed, instead of trying to fit them into a one-size fits all paradigm.¹³⁵⁰ If the participant completed the contract's terms, then they received a reward for their work.¹³⁵¹

In addition to creating individual contracts, each of the participants came in week after week throughout the experiment and presented the contracts to their instructor.¹³⁵² The participants received a reward if they fulfilled their contractual obligations and an additional reward if their weekly performance demonstrated the quality of their practice session.¹³⁵³ Finally, the researcher made recordings of the first participant at two weeks, the second participant at three weeks and the third participant at four weeks.¹³⁵⁴

¹³⁴⁵ Ibid., 44-45.

¹³⁴⁶ Ibid., 43 and 45.

¹³⁴⁷ Ibid., 45.

¹³⁴⁸ Ibid., 46.

¹³⁴⁹ Ibid., 46.

¹³⁵⁰ Ibid., 46.

¹³⁵¹ Ibid., 46.

¹³⁵² Ibid., 47.

¹³⁵³ Ibid., 47.

¹³⁵⁴ Ibid., 47.

After examining the results, Wolfe made several observations. First, Wolfe found that, the participants did fulfill their contractual obligations throughout the study.¹³⁵⁵ Next, the researcher did a follow-up with the participants four months after completing the study and found that the first and third participants continued to meet their practice goals without using a contract or rewards.¹³⁵⁶ The second participant, on the other hand, continued using the contract and had adjusted the contract so it could accurately reflect the other activities of the participant's daily life.¹³⁵⁷ Overall, Wolfe found that this exploratory study had benefits in helping the studio teacher tailor individual curriculums to the student's needs, clearly identify understandable musical objectives to the student, and create a concise method to evaluate students.¹³⁵⁸

James N. Anderson wrote the article, *Effects of Tape-Recorded Aural Models on Sight-Reading and Performance Skills*, in the journal, *Journal of Research in Music Education*.¹³⁵⁹ In his article's introduction, Anderson noted that most of the research he had reviewed did not explore the use of taped models for home practice.¹³⁶⁰ For this study, the researcher wanted to explore and examine whether or not sixth grade clarinet students would perform better on sight-reading and other performance measures if they used taped models in their practice sessions at home.¹³⁶¹

¹³⁵⁵ Ibid., 49.

¹³⁵⁶ Ibid., 50.

¹³⁵⁷ Ibid., 50.

¹³⁵⁸ Ibid., 50.

¹³⁵⁹ James N. Anderson. "Effects of Tape-Recorded Aural Models on Sight-Reading and Performance Skills." *Journal of Research in Music Education* 29, no. 1 (Spring 1981): 23-30. <http://www.jstor.org/stable/3344676> (accessed June 1, 2012).

¹³⁶⁰ Ibid., 25.

¹³⁶¹ Ibid., 25.

Anderson conducted his research at two schools (School A and School B) and recruited eighty, sixth grade clarinet students for an eight week study.¹³⁶² After selecting the participants, he divided them into two groups for each school (School A-control group, School A-experiment group, School B-control group and School B-experiment group), and administered Form B from the Watkins-Farnum Performance Scale as a pretest to determine equivalency two weeks before the participants started the study.¹³⁶³ Anderson then gave everyone in both experiment groups a cassette tape that contained models of all the performances, a tuning note before each one (concert B-flat) and had limited instructions of: announcing the title, the tuning note and a measure of preparatory beats.¹³⁶⁴

Once the researcher administered the pretest and handed out the materials he started the study. The participants rehearsed the music in their band rehearsals in addition to working on the examples at home, and the researcher asked the participants to turn in weekly practice charts.¹³⁶⁵ Anderson asked 20% of the students to record their practice sessions to determine if a relationship existed between practice time and achievement.¹³⁶⁶ In the last week of the study, the researcher gave the students their practice performance evaluation test to practice. Along with this test, the researcher gave Form A from the Watkins-Farnum Scale for sight-reading.¹³⁶⁷ The researcher compared both measures with the pretest scores to evaluate achievement over the eight-week period.¹³⁶⁸

¹³⁶² Ibid., 25.

¹³⁶³ Ibid., 25.

¹³⁶⁴ Ibid., 25.

¹³⁶⁵ Ibid., 26.

¹³⁶⁶ Ibid., 26.

¹³⁶⁷ Ibid., 26.

¹³⁶⁸ Ibid., 26.

After collecting the results, Anderson made several observations. First, the research found no significant differences between either group, nor did he find any significant differences between both schools after he examined the pitch-reading skills.¹³⁶⁹ Afterwards, he found no difference between the experimental group, nor did he find any significant difference between schools.¹³⁷⁰ The researcher also found no significant differences for tempo, intonation or the number of exercises complete.¹³⁷¹ Anderson did notice a significant difference in the number to minutes practiced between both schools (School B practiced more than School A).¹³⁷²

Overall, Anderson found no significant differences between those who used the tape-recorded models at home and those who did not, even though the researcher predicted that the model group would perform better based on his observation of other literature that experimented with models.¹³⁷³ Additionally, the researcher commented that a possible reason for none to low gains in tempo and intonation could have resulted from the participants trying to concentrate on correct notes and rhythms.¹³⁷⁴ Finally, while School B did significantly score higher from the pretest to posttest over School A, the researcher stated that influences, outside the use of models, affected their score.¹³⁷⁵

Clifford K. Madsen and John M. Geringer wrote the article, “The Effect of a Distraction Index on Improving Practice Attentiveness and Musical Performamnce,” in the

¹³⁶⁹ Ibid., 27.

¹³⁷⁰ Ibid., 27.

¹³⁷¹ Ibid., 27.

¹³⁷² Ibid., 27.

¹³⁷³ Ibid., 24 and 27.

¹³⁷⁴ Ibid., 28.

¹³⁷⁵ Ibid., 29.

journal, *Bulletin of the Council for Research in Music Education*.¹³⁷⁶ In their article's introduction and literature review, Madsen and Geringer examined reasons for practice and some experiments that tested practice.¹³⁷⁷ For this study, the researchers wanted to determine whether or not a distraction index would help students practice more effectively.¹³⁷⁸

Madsen and Geringer recruited forty-eight undergraduate music majors to participate in this eight-week study.¹³⁷⁹ The researchers based their pretest-posttest experiment off of Wagner's 1975 model¹³⁸⁰ and divided the participants into two groups: control and experimental.¹³⁸¹ Each participant played and recorded a self-selected musical selection as a pretest.¹³⁸²

After the pretest, the researchers, however, asked the control and experimental group to keep a detailed log of their practice sessions that included how much time they practice and then rate the productivity of that lesson.¹³⁸³ Furthermore, the researchers had the experimental group complete a distraction index in the third, fourth, seventh and eighth weeks.¹³⁸⁴ This index instructed the participants to notate each distraction and then continued working.¹³⁸⁵

¹³⁷⁶ Clifford K. Madsen and John M. Geringer. "The Effect of a Distraction Index on Improving Practice Attentiveness and Musical Performance." *Bulletin of the Council for Research in Music Education* no. 66/67 (Spring-Summer 1981): 46-52 <http://www.jstor.org/stable/40317665> (accessed July 11, 2012).

¹³⁷⁷ *Ibid.*, 46.

¹³⁷⁸ *Ibid.*, 46.

¹³⁷⁹ *Ibid.*, 47.

¹³⁸⁰ See Wagner 1975.

¹³⁸¹ Madsen and Geringer, 47.

¹³⁸² *Ibid.*, 47.

¹³⁸³ *Ibid.*, 47.

¹³⁸⁴ *Ibid.*, 48.

¹³⁸⁵ *Ibid.*, 48.

Furthermore, the researchers had trained observers visit the participants to ensure they followed the directions in regards to the practice logs and the distraction index.¹³⁸⁶ Finally, once the participants completed the experiment, they played and recorded a posttest of the musical selection they used for the pretest.¹³⁸⁷ After the posttest, the researchers analyzed the data for the amount of time spent practicing, ratings of productivity, ratings of attentiveness, and the pretest-posttest scores.¹³⁸⁸

After they completed the experiment and analyzed the data, Madsen and Geringers reported their results. First, they did not find any significant differences between either group for the pretest scores.¹³⁸⁹ However, they did find after analyzing the posttest scores, even though both groups practiced the same amount, the experimental group did have significantly higher scores than the control group.¹³⁹⁰ This lead them to suggest that the distraction index did help individuals focus during the practice session and that helped lead to better performances.¹³⁹¹

Roseanne Kelly Rosenthal wrote the article, “The Relative Effects of Guided Model, Model Only, Guide Only, and Practice Only Treatments on the Accuracy of Advanced Instrumentalists’ Musical Performance,” in the journal, *Journal of Research in Music Education*.¹³⁹² In her article’s introduction and literature review, Rosenthal noted several different studies that examined the effects of modeling and different studies that

¹³⁸⁶ Ibid., 48.

¹³⁸⁷ Ibid., 48.

¹³⁸⁸ Ibid., 48.

¹³⁸⁹ Ibid., 49-50.

¹³⁹⁰ Ibid., 49-50.

¹³⁹¹ Ibid., 50.

¹³⁹² Roseanne Kelly Rosenthal. “The Relative Effects of Guided Model, Model Only, Guide Only, and Practice Only Treatments on the Accuracy of Advanced Instrumentalists’ Musical Performance.” *Journal of Research in Music Education* 32, no. 4 (December 1984): 265-273. <http://jrm.sagepub.com/content/32/4/265> (accessed October 3, 2010).

tested models in practice sessions.¹³⁹³ For this study, the researcher wanted to compare the effectiveness of four different practice methods (Guided Model, Model Only, Guided Only and Practice Only).¹³⁹⁴

Rosenthal recruited forty-four graduate or upper-level undergraduate wind players enrolled in Bachelors or Masters of Music Education degree.¹³⁹⁵ Rosenthal assigned each participant to one of the four treatments: Guided Model (heard both scripted explanation and performance of the etude), Model (only heard a performance), Guide (only heard a scripted explanation), and Practice (did not heard anything, but instead practiced for ten minutes).¹³⁹⁶ Next the researcher adapted an etude that had different technical aspects, provided enough challenge and difficulty for different instruments.¹³⁹⁷

After recruiting and handing out materials to the participants, she first escorted each the participants to a practice room and asked if they knew the etude, and all the participants said no.¹³⁹⁸ Next, each participant listened to their corresponding tapes and then practiced for three minutes.¹³⁹⁹ The researcher had the practice only group practice for ten minutes.¹⁴⁰⁰ Rosenthal then returned to the room, turned on the recording device, identified the participant with their respective id number, and the participants recorded the etude for a posttest score.¹⁴⁰¹ Finally, the researcher scored the tapes for notes,

¹³⁹³ Ibid., 265-266.

¹³⁹⁴ Ibid., 267.

¹³⁹⁵ Ibid., 267.

¹³⁹⁶ Ibid., 267.

¹³⁹⁷ Ibid., 267.

¹³⁹⁸ Ibid., 267.

¹³⁹⁹ Ibid., 268.

¹⁴⁰⁰ Ibid., 268.

¹⁴⁰¹ Ibid., 268.

rhythm, phrase, and articulation, and then two independent judges reviewed a portion of the tapes for reliability.¹⁴⁰²

Once she scored the tapes, the researcher made several observations. First, she found that the participants in the Model Only group consistently scored higher in every group, while the Practice and Guided only groups consistently scored low in every area.¹⁴⁰³ Rosenthal then suggested that while she constructed Guided Model to help focus the attention on the important areas of etude, it did not help significantly improve their performance.¹⁴⁰⁴ Next, she found that Practice Only Group scored better on notes and rhythms, but the Guide Only Group did better on the musical aspects, such dynamics and tempo.¹⁴⁰⁵ She also suggested that verbal instruction proved no more effective in helping a person perform accurately than regular practice.¹⁴⁰⁶ Finally, the researcher suggested that different modeling conditions could have a significant impact on the precision of a person's performance.¹⁴⁰⁷

Roseanne Kelly Rosenthal et. al wrote the article, "Effects of Different Practice Conditions on Advanced Instrumentalists' Performance Accuracy," in the journal, *Journal of Research in Music Education*.¹⁴⁰⁸ In their article's introduction and literature review, they noted several different studies that stated singing, and silent analysis proved effective if used properly.¹⁴⁰⁹ For this study, the researcher wanted to examine how five

¹⁴⁰² Ibid., 269.

¹⁴⁰³ Ibid., 269.

¹⁴⁰⁴ Ibid., 269.

¹⁴⁰⁵ Ibid., 268.

¹⁴⁰⁶ Ibid., 272.

¹⁴⁰⁷ Ibid., 272.

¹⁴⁰⁸ Roseanne Kelly Rosenthal, Mary Wilson, Madeline Evans, and Larry Greenwalt. "Effects of Different Practice Conditions on Advanced Instrumentalists' Performance Accuracy." *Journal of Research in Music Education* 36, no. 4 (December 1988): 250-257.

<http://jrm.sagepub.com/content/36/4/250> (accessed October 20, 2010)

¹⁴⁰⁹ Ibid., 250-251.

different practice conditions (modeling, singing, silent analysis, free practice, and control) can help an advanced instrumentalist's performance of a composition.¹⁴¹⁰

Rosenthal recruited sixty graduate or upper-level undergraduate wind players.¹⁴¹¹ Rosenthal assigned each one of the participants to a treatment: Modeling (participants listened to a recording of the etude while examining a copy of it), Singing (participants sang the composition instead of practicing), Silent Analysis (silently studied the music), Practice (played their instruments constantly), and Control (played an unrelated composition and then sight-read the etude).¹⁴¹² Next the researchers adapted an etude that had different technical aspects, provided a challenge, and had an equal difficulty for different instruments.¹⁴¹³

After recruiting and handing out materials to the participants, the monitor escorted each participant to the practice room, greeted them, asked them if they had questions and then left.¹⁴¹⁴ Next, she had each participant follow the instructions for their group, and practiced for three minutes.¹⁴¹⁵ Finally, the monitor returned to the room, turned on the recording device, identified the participant with their respective id number, gave them six beats on the metronome and had the participants record the etude as a posttest score.¹⁴¹⁶ In order to score the tapes, a trained musician scored the tapes for notes, rhythm, phrase, dynamics and articulation, and an independent judged reviewed a portion of the tapes for reliability.¹⁴¹⁷

¹⁴¹⁰ Ibid., 251.

¹⁴¹¹ Ibid., 251.

¹⁴¹² Ibid., 252.

¹⁴¹³ Ibid., 251.

¹⁴¹⁴ Ibid., 252.

¹⁴¹⁵ Ibid., 252.

¹⁴¹⁶ Ibid., 253.

¹⁴¹⁷ Ibid., 253.

After tabulating the results, the researchers made several observations. First, they discovered no significant difference between any of the practice groups when they analyzed which group accurately played the notes.¹⁴¹⁸ Next, the researchers observed that rhythmic accuracy, however, proved significantly higher in the silent analysis group than the singing and control groups.¹⁴¹⁹ The researchers believe that silent analysis gave the participants time to work out the complex rhythms.¹⁴²⁰

Then the researchers found that none of the practice methods proved superior in helping the participant master the etude's articulation.¹⁴²¹ This study also confirmed the researcher's prior research that listening to a model alone can prove as effective as actually practicing the instrument; the research also found that singing does not prove effective as a practice method.¹⁴²² Finally, the modeling group had the highest scores across the all the groups (except rhythmic accuracy) after analysis, and this led the researchers to suggest that models prove helpful in achieving effective practice.¹⁴²³

Patrick M. Fortney wrote the article, "The Effect of Modeling on Silent Analysis on the Performance Effectiveness of Advanced Elementary Instrumentalists," in the journal, *Research Perspectives in Music Education*.¹⁴²⁴ In his article's introduction and literature review, Fortney noted several different studies that examined and tested modeling, mental practice and silent analysis.¹⁴²⁵ For this study, the researcher wanted to determine whether or not advanced elementary instrumentalists could benefit from using

¹⁴¹⁸ Ibid., 254.

¹⁴¹⁹ Ibid., 254.

¹⁴²⁰ Ibid., 254.

¹⁴²¹ Ibid., 254.

¹⁴²² Ibid., 255

¹⁴²³ Ibid., 256

¹⁴²⁴ Patrick M. Fortney. "The Effect of Modeling and Silent Analysis on the Performance Effectiveness of Advanced Elementary Instrumentalists." *Research Perspectives in Music Education* no. 2 (Fall 1992): 18-21.

¹⁴²⁵ Ibid., 18-19.

modeling and silent analysis if they integrated it into their practice sessions.¹⁴²⁶ The researcher compared these two practice methods with free practice, and additionally looked at the differences of modeling and silent analysis.¹⁴²⁷

Fortney recruited forty, advanced sixth-grade participants who played different wind instruments.¹⁴²⁸ The researcher then divided the participants into four different experimental groups: Modeling (participants listened to a recording of the etude, waited two minutes and then performed the etude), Silent Analysis (participants mentally rehearsed the etude for two minutes, then performed it), Free Practice (subjects practiced the etude for two minutes then performed it) and Control (students practiced an unrelated etude, then sight-read the experimental etude).¹⁴²⁹ Next, the research assistant brought each participant into a small room, greeted them, thanked them for their participation, had the participant sight read the etude, read their specific practice instructions to them, and then allowed the participants to practice the etude according to their treatment instructions.¹⁴³⁰ After two minutes, the researcher turned on the recording device, spoke an identification number, allowed the participant to hear four metronome clicks and then they played.¹⁴³¹ Once all the participants completed the experiment, the researcher analyzed the data and had the research assistant score ten of the recordings to check reliability.¹⁴³²

After analyzing all the data, Fortney made several observations. First, the researcher pointed out that his sample represented most beginning bands in terms of

¹⁴²⁶ Ibid., 18.

¹⁴²⁷ Ibid., 18.

¹⁴²⁸ Ibid., 19.

¹⁴²⁹ Ibid., 19.

¹⁴³⁰ Ibid., 19.

¹⁴³¹ Ibid., 19.

¹⁴³² Ibid., 19.

instrumentation, but he did not have an equal representation of gender (72% female and 28% male).¹⁴³³ Next, the researcher found that participants in the modeling group made significant gains from their pretest to their posttest scores.¹⁴³⁴ He later suggested that this data helped lend support to previous research and also supported the notion that this age group can use modeling as an effective practice tool.¹⁴³⁵

Furthermore, the researcher found no significant differences between silent analysis and free practice or silent analysis and the control group.¹⁴³⁶ He later suggested on the page, that while silent analysis may help older subjects, educators should probably avoid using this technique with younger students.¹⁴³⁷ Although the researcher does not provide a reason, it simply may mean that younger music students do not have all the necessary tools in order to utilize silent analysis to the full potential that an older student could. Finally, the researcher suggested that any type of practice proved more effective than sight-reading a piece of music.¹⁴³⁸

Fraser Linklater wrote the article, “Effects of Audio- and Videotape Models on Performance Achievement of Beginning Clarinetists,” in the journal, *Journal of Research in Music Education*.¹⁴³⁹ In his article’s introduction and literature review, Linklater noted several studies that examined different types of models for learning in music; and stated that while researchers generally agree models can help in the learning process, that does not mean that one should quickly jump to promote imitation as the most effective

¹⁴³³ Ibid., 19.

¹⁴³⁴ Ibid., 19.

¹⁴³⁵ Ibid., 20.

¹⁴³⁶ Ibid., 20.

¹⁴³⁷ Ibid., 20.

¹⁴³⁸ Ibid., 20.

¹⁴³⁹ Fraser Linklater. “Effects of Audio- and Videotape Models on Performance Achievement of Beginning Clarinetists.” *Journal of Research in Music Education* 45, no. 3 (Autumn 1997): 402-414. <http://jstor.org/stable/3345535> (accessed June 1, 2012).

measure of learning.¹⁴⁴⁰ For this study, the researcher wanted to observe how beginning clarinet students would respond to incorporating videotape and audio recordings into their practicing.¹⁴⁴¹

Linklater recruited 146 fifth and sixth grade beginning clarinet students who did not take private lessons or had previous experience playing clarinet.¹⁴⁴² The researcher then divided the participants into three different experimental groups: visual and aural (video and audio recording), aural (only audio recording), and a control group (neither video nor audio recording provided).¹⁴⁴³ Next, the researcher used a clarinet textbook that contained the posttest etudes and pictures of someone demonstrating aspects of the clarinet.¹⁴⁴⁴ The researcher had the participants and their parents complete and sign practice logs that documented the participant's practice time over the eight weeks.¹⁴⁴⁵

In addition, some participants received other materials depending on their experimental group. For example, the video and audio modeling group received a video tape that had two sections: a demonstration of the textbook's beginning and a demonstration of all etudes from the textbook performed three different ways.¹⁴⁴⁶ The participants in the non-video audio group did have cassette tapes that demonstrated all the etudes from the textbook performed three different ways, and the researcher only provided the textbook to the students in the control group.¹⁴⁴⁷ Although the participants

¹⁴⁴⁰ Ibid., 402-403.

¹⁴⁴¹ Ibid., 404.

¹⁴⁴² Ibid., 404.

¹⁴⁴³ Ibid., 404-405.

¹⁴⁴⁴ Ibid., 405.

¹⁴⁴⁵ Ibid., 406.

¹⁴⁴⁶ Ibid., 405.

¹⁴⁴⁷ Ibid., 406.

in the study said they did not trade materials, Linklater admitted the possibility that the participants could have traded materials.¹⁴⁴⁸

For this study, Linklater only used a posttest design, meaning he only compared posttest scores. The researcher gave the first posttest at the end of the eight weeks (November) and included two of the etudes from the text, a researcher composed etude to the student a week before the posttest, and a sight-reading etude.¹⁴⁴⁹ Linklater gave two more posttests (using similar material to the first posttest) later in February and then again in April.¹⁴⁵⁰ Finally, the researcher video-recorded and tape-recorded all the participant's posttests.

After examining the results, the researcher made several observations. First, Linklater found no significant differences between grade-level, gender, teachers, musical background and student achievement.¹⁴⁵¹ Next, from the practice logs, the researcher found that the video and audio modeling group averaged twelve more minutes a week practicing than the other groups.¹⁴⁵²

The researcher also found that the video-audio modeling group had the highest posttests scores, and the control group had the lowest.¹⁴⁵³ In addition the test scores, Linklater found higher parental involvement in the video-audio modeling group.¹⁴⁵⁴ He suggested that parents proved more effective in helping their child in the video-audio

¹⁴⁴⁸ Ibid., 406.

¹⁴⁴⁹ Ibid., 407.

¹⁴⁵⁰ Ibid., 407.

¹⁴⁵¹ Ibid., 408.

¹⁴⁵² Ibid., 410.

¹⁴⁵³ Ibid., 411.

¹⁴⁵⁴ Ibid., 412.

modeling group, but he later stated that parental involvement and student achievement did not relate statistically.¹⁴⁵⁵

Finally, Linklater stated the dangers in using models. First, he suggested that while the models proved beneficial to the participants, they did not use these models all the time, and based on informal feedback from the participants, once the students learned the music, they stopped working on it and moved onto the next item.¹⁴⁵⁶ Next, Linklater warned that without the ability to evaluate while practicing, the models do not help the individuals. So, the individual must demonstrate the ability to discriminate his performance for positive and negative aspects.¹⁴⁵⁷

Paul T. Henly wrote the article, “The Effects of Modeling, Self-Evaluation, and Self-Listening on Junior High Instrumentalists’ Music and Performance and Practice Attitude,” in the journal, *Journal of Research in Music Education*.¹⁴⁵⁸ In his article’s introduction and literature review, Henly noted several different studies that examined the importance of motor learning and others that tested models in practice sessions.¹⁴⁵⁹ For this study, the researcher wanted to determine how modeling and practice techniques that involved tempo effected high school students.¹⁴⁶⁰

Henly recruited sixty high school participants who played various wind instruments.¹⁴⁶¹ The researcher then divided the participants into six different

¹⁴⁵⁵ Ibid., 412.

¹⁴⁵⁶ Ibid., 412.

¹⁴⁵⁷ Ibid., 412.

¹⁴⁵⁸ Paul T. Henly. “Effects of Modeling and Tempo Patterns as Practice Techniques on the Performance of High School Instrumentalists.” *Journal of Research in Music Education* 49, no. 2 (Summer 2001): 169-180. <http://www.jstor.org/stable/3345868> (accessed June 1, 2012).

¹⁴⁵⁹ Ibid., 170.

¹⁴⁶⁰ Ibid., 171.

¹⁴⁶¹ Ibid., 171.

experimental groups.¹⁴⁶² Next, the researcher had three band directors pick an etude from twelve different etudes that different instruments could play.¹⁴⁶³ In addition, the researcher provided some of the participants with models of the performance etude.¹⁴⁶⁴

For the experiment, the researcher had all the participants record a pretest, practice the etude six times according to their experimental group instructions, and recorded a posttest.¹⁴⁶⁵ The participants recorded the pretest and posttest on separate recordings so the researcher could judge them for correct pitch, rhythms and articulations; and then a separate judge listened to a portion of the recordings to determine reliability.¹⁴⁶⁶

After examining the results, Henly made several observations. First, he found that the participants in the model group made more significant gains than those who did not use a model.¹⁴⁶⁷ Next, the researcher found that tempo, regardless of experimental group, did not have any significant effect.¹⁴⁶⁸ Third, Henly found that the modeling condition had a significant effect on rhythmic accuracy and he suggested that the students who heard the model tried to imitate the rhythm.¹⁴⁶⁹

Then, the researcher found that at least fourteen of the participants were oblivious to metronome clicks that the researchers provided in some of the experimental groups.¹⁴⁷⁰

Most importantly, while the researcher found that model did help improve gain scores for

¹⁴⁶² Ibid., 171.

¹⁴⁶³ Ibid., 171.

¹⁴⁶⁴ Ibid., 171.

¹⁴⁶⁵ Ibid., 172 and 177.

¹⁴⁶⁶ Ibid., 172.

¹⁴⁶⁷ Ibid., 173.

¹⁴⁶⁸ Ibid., 175.

¹⁴⁶⁹ Ibid., 176.

¹⁴⁷⁰ Ibid., 177.

all the participants in those groups since the researcher did not know if they imitated the model or produced the music on their own terms.¹⁴⁷¹

Michael P. Hewitt wrote the article, “Effects of Modeling and Tempo Patterns as Practice Techniques on the Performance of High School Instrumentalists,” in the journal, *Journal of Research in Music Education*.¹⁴⁷² In his article’s introduction and literature review, Hewitt noted several different studies that examined the importance of self-evaluation and others that tested models in practice sessions.¹⁴⁷³ For this study, the researcher wanted to observe whether or not models, listening to a recording of themselves, and self-evaluation could effect a junior high school student’s performance or attitude.¹⁴⁷⁴

Hewitt recruited eighty-two, junior-high school participants who played various wind instruments for a nine-week study.¹⁴⁷⁵ The researcher then divided the participants into eight different experimental groups.¹⁴⁷⁶ Next, the researcher picked a three-minute etude that had different technical aspects, provided a challenge, and different instruments could play it.¹⁴⁷⁷ In addition, the researcher provided some of the participants with models of the performance etude.¹⁴⁷⁸ Finally, all the participants completed a researcher-created practice attitude questionnaire.¹⁴⁷⁹

¹⁴⁷¹ Ibid., 177.

¹⁴⁷² Michael P. Hewitt. “The Effects of Modeling, Self-Evaluation, and Self-Listening on Junior High Instrumentalists’ Music and Performance and Practice Attitude.” *Journal of Research in Music Education* 49, no. 4 (Winter 2001): 307-322 <http://www.jstor.org/stable/3345614> (accessed June 1, 2012).

¹⁴⁷³ Ibid., 307-310.

¹⁴⁷⁴ Ibid., 310.

¹⁴⁷⁵ Ibid., 310.

¹⁴⁷⁶ Ibid., 310.

¹⁴⁷⁷ Ibid., 310.

¹⁴⁷⁸ Ibid., 311.

¹⁴⁷⁹ Ibid., 313.

After recruiting and handing out materials to the students, he first distributed a copy of the etude to the students, led three performances of the etude, and gave instructions about the music in the first week.¹⁴⁸⁰ Next, each participant recorded a performance or pretest in the second week. In the third week, the participants continued to practice the etude, and received instructions on how to practice for each experimental group: model group, self-listening group, model and self-listening group, and the control group.¹⁴⁸¹ Finally, in the eighth week, all the participants recorded the etude (posttest) and in the ninth week, he randomly selected twenty-four participants and interviewed them with the Practice attitude questionnaire while recording them on a video camera.¹⁴⁸²

After examining the results, Hewitt made several observations. First, he found that the experimental groups with models improved more than the experimental groups without models.¹⁴⁸³ Next, he found that all the participants, regardless of their experimental group, had a positive attitude through the entire experience.¹⁴⁸⁴ This led him to suggest that he thought most of the students enjoyed themselves.¹⁴⁸⁵ Third, Hewitt found that while the participants could self-evaluate, they may not know what do with the results of their self-evaluation.¹⁴⁸⁶ Finally, the researcher stated that when using self-evaluation, teachers should include models with the evaluations so students might have trouble self-evaluating could use the model as a guide.¹⁴⁸⁷

¹⁴⁸⁰ Ibid., 313.

¹⁴⁸¹ Ibid., 313.

¹⁴⁸² Ibid., 314.

¹⁴⁸³ Ibid., 318.

¹⁴⁸⁴ Ibid., 315.

¹⁴⁸⁵ Ibid., 319.

¹⁴⁸⁶ Ibid., 318.

¹⁴⁸⁷ Ibid., 319.

Memorizing as a Tool for Practicing

In addition to all the tools created for practicing, many researchers have also investigated what individuals do as they practice and memorize music at the same time. The researcher did not include this in the other groups since prior research has considered this its' own field of research.

Grace Rubin-Rabson wrote the article, "Studies in the psychology of memorizing piano music: II. A comparison of massed and distributed practice." In her article's introduction and literature review, Rubin-Rabson noted different studies that examined motor skill learning and different studies that have tested memorizing.¹⁴⁸⁸ For this study, the researcher wanted to observe the effects of massed or distributed practice in relation to memorizing piano music.¹⁴⁸⁹

Rubin-Rabson recruited nine participants who she classified as either students at a high college level or an experienced professional.¹⁴⁹⁰ The researcher picked nine and unfamiliar eight-bar etudes that would represent different eras and styles.¹⁴⁹¹ In addition, the researcher did not tell the participants which experimental group she would place them until after the first five trials and she did not use a control group.¹⁴⁹²

For the experiment, the researcher had each of candidates (regardless of experimental group) first study each etude away from the piano for seven minutes first.¹⁴⁹³ Next, Rubin-Rabson had each participant practice the music with the goal in mind that they would perform each of the etudes from memory with the right hand alone,

¹⁴⁸⁸ Ibid., 270-271.

¹⁴⁸⁹ Ibid., 272.

¹⁴⁹⁰ Ibid., 274.

¹⁴⁹¹ Ibid., 274.

¹⁴⁹² Ibid., 273-274.

¹⁴⁹³ Ibid., 273-274.

the left hand alone, and both hands together.¹⁴⁹⁴ The participants had to practice the etude with the following rotation: right hand alone first, left hand alone second and then finally both hands together.¹⁴⁹⁵ Finally, the researcher stated that while the participants had ten trials to get the etude memorized for each practice rotation, but the researcher stated the participant could go past the ten trials if they needed to continue working on a certain aspect (right hand, left hand, both hands).¹⁴⁹⁶ She called these trials over-learning trials.¹⁴⁹⁷

The mass practice group (Group A) practiced ten trials of each rotation in one setting.¹⁴⁹⁸ The first distributed practice group (Group B) practiced five practice trials on each rotation and then rested an hour before finishing the remaining five trials.¹⁴⁹⁹ The other distributed practice group (Group C), on the other hand, practiced five trials for each “learning sequence” and then waited twenty-four hours before they continued practicing the remaining trials.¹⁵⁰⁰

Once the participants completed all the trials, Rubin-Rabson asked each of them not to play the etudes again.¹⁵⁰¹ Two weeks later, the participants came back and completed a “relearning” stage where the researcher instructed them to play the pieces from memory or work them back up to memory.¹⁵⁰² Once the participants could play the

¹⁴⁹⁴ Ibid., 273.

¹⁴⁹⁵ Ibid., 273.

¹⁴⁹⁶ Ibid., 273.

¹⁴⁹⁷ Ibid., 273.

¹⁴⁹⁸ Ibid., 273.

¹⁴⁹⁹ Ibid., 273.

¹⁵⁰⁰ Ibid., 273.

¹⁵⁰¹ Ibid., 273.

¹⁵⁰² Ibid., 273.

compositions from memory the researcher had them transcribe as much of the piece as they could.¹⁵⁰³

After the researcher completed the experiment and analyzed the data, she found several results. First, she found that while it took the participants in the massed practice group longer to relearn the music than in either of the distributed groups (especially the two-day distributed practice group), she did not find a difference in relearning between either of the distributed practice groups.¹⁵⁰⁴ Next, she found that none of the practice methods proved superior in helping the participants transcribe the music from memory.¹⁵⁰⁵ Furthermore, she suggested that the less-able learner would benefit from either of the distributed practice methods.¹⁵⁰⁶ Finally, Rubin-Rabson suggested that individuals would have greater efficiency in their practice sessions if they use a distributed practice method.¹⁵⁰⁷

Grace Rubin-Rabson also wrote the article, “Studies in the psychology of memorizing piano music: III A comparison of the whole and the part approach.”¹⁵⁰⁸ In her article’s introduction and literature review, Rubin-Rabson noted different studies that examined the effects of learning whole versus part.¹⁵⁰⁹ For this study, the researcher wanted to observe the effects of whole and part learning on memorizing piano music.¹⁵¹⁰

¹⁵⁰³ Ibid., 273.

¹⁵⁰⁴ Ibid., 283.

¹⁵⁰⁵ Ibid., 283.

¹⁵⁰⁶ Ibid., 283.

¹⁵⁰⁷ Ibid., 284.

¹⁵⁰⁸ Grace Rubin-Rabson. “Studies in the psychology of memorizing piano music: III. A comparison of the whole and the part approach.” *The Journal Of Educational Psychology* 31, no. 6 (September 1940): 460-476.

¹⁵⁰⁹ Ibid., 460-462 and 474.

¹⁵¹⁰ Ibid., 464.

Rubin-Rabson recruited nine participants who she described as either students at a high college level or an experienced professional.¹⁵¹¹ The researcher picked nine, unfamiliar eight-bar etudes that would represent different eras and styles, and be unfamiliar to the participants.¹⁵¹² In addition, the researcher had each participant participate in each treatment (each participant played three etudes for each treatment).¹⁵¹³ Furthermore, the researcher did not use a control group in this experiment.

For the experiment, each participant (regardless of experimental group) first studied each etude away from the piano for seven minutes first not knowing which practice method they would use.¹⁵¹⁴ Next, Rubin-Rabson had each participant practice the music with the goal to play each of the etudes from memory with the right hand alone, the left hand alone, and both hands together.¹⁵¹⁵ The participants had to practice the etude with the following rotation: right hand alone first, left hand alone second and then finally both hands together until they could play an error-free, memorized performance.¹⁵¹⁶

Although the participants used the same practice agenda, they did not always use the same practice method. The whole practice group (Group 1) practiced the entire eight-bar without dividing it into smaller sections.¹⁵¹⁷ The two large part practice group (Group 2) divided the etude into two sections and learned the first section before learning the second section.¹⁵¹⁸ The other part practice group (Group 3) practiced the etude into

¹⁵¹¹ Ibid., 465.

¹⁵¹² Ibid., 465.

¹⁵¹³ Ibid., 466.

¹⁵¹⁴ Ibid., 467.

¹⁵¹⁵ Ibid., 467.

¹⁵¹⁶ Ibid., 467.

¹⁵¹⁷ Ibid., 465.

¹⁵¹⁸ Ibid., 465.

four smaller sections, and like the two part etude group, the participants had to learn the first section before they could continue to next section.¹⁵¹⁹

Once the participants completed all the trials, Rubin-Rabson asked each of them not to play the etudes again. Two weeks, later the participants came back and completed a “relearning” stage where the researcher instructed them to play the pieces from memory or work them back up to memory.¹⁵²⁰ After the participants could play the compositions from memory, the research had each participant transcribe as much of the piece as they could from memory.¹⁵²¹

After the researcher completed the experiment and analyzed the data, she found several results. First, she found no significant differences between practice groups.¹⁵²² Next, she found that none of the practice methods proved superior in helping the participants transcribe the music from memory.¹⁵²³ Finally, Rubin-Rabson suggested, that while no data supported either method, a person should increase the amount they practice and memorize based on their self-evaluation of their self-capacity.¹⁵²⁴

Grace Rubin-Rabson wrote the article, “Studies in the psychology of memorizing piano music. IV. The effect of incentive,” in the journal, *The Journal Of Educational Psychology*.¹⁵²⁵ In her article’s introduction and literature review, she noted that the literature in the 1930’s and the 1940’s had not thoroughly examined why individuals

¹⁵¹⁹ Ibid., 465.

¹⁵²⁰ Ibid., 467.

¹⁵²¹ Ibid., 467.

¹⁵²² Ibid., 474.

¹⁵²³ Ibid., 474.

¹⁵²⁴ Ibid., 475.

¹⁵²⁵ Grace Rubin-Rabson. “Studies in the psychology of memorizing piano music. IV. The effect of incentive.” *The Journal Of Educational Psychology* 32, no. 1 (January 1941): 45-54.

have fruitful and barren work periods.¹⁵²⁶ For this study, the researcher wanted to observe how the effects of incentives influenced memorizing music.¹⁵²⁷

Rubin-Rabson recruited nine participants who she classified as either students at a high college level or an experienced professional.¹⁵²⁸ The researcher picked nine, eight-bar etudes that would represent different eras and styles, and be unfamiliar to the participants.¹⁵²⁹ In addition, the researcher had each participant participate in each treatment (each participant played three etudes for each treatment).¹⁵³⁰ Furthermore, the researcher did not use a control group in this experiment.

For the experiment, each participant (regardless of experimental group) first studied each etude away from the piano for seven minutes first not knowing which practice method they would use.¹⁵³¹ Next, Rubin-Rabson, had all the participants practice work on three etudes the first day with just memorizing as the main objective (Group 1).¹⁵³² On the second day, the researcher had all the participants practice/memorized three different etudes, but this time, she told them that learning these etudes quickly at tempo (Group 2).¹⁵³³ Finally, the researcher had all the participants practice three different etudes with memorizing as the concern; but this time, she told them that the faster they memorized the etudes, the more money they could earn.¹⁵³⁴

Once the participants completed all the trials, Rubin-Rabson asked each of them not to play the etudes again. Two weeks, later the participants came back and completed

¹⁵²⁶ Ibid., 45.

¹⁵²⁷ Ibid., 46.

¹⁵²⁸ Ibid., 47.

¹⁵²⁹ Ibid., 47.

¹⁵³⁰ Ibid., 47.

¹⁵³¹ Ibid., 47.

¹⁵³² Ibid., 48.

¹⁵³³ Ibid., 48.

¹⁵³⁴ Ibid., 48.

a “relearning” stage where the researcher instructed them to play the pieces from memory or work them back up to memory.¹⁵³⁵ After the participants could play the compositions from memory, the research had each participant transcribe as much of the piece as they could from memory.¹⁵³⁶

After the researcher completed the experiment and analyzed the data, she found several results. First, she found no significant differences between practice groups, but the researcher did note that she found a small difference between both motivated groups and the unmotivated group.¹⁵³⁷ Next, she also found that none of the practice groups helped in relearning, retention or transcribing.¹⁵³⁸ Finally, the researcher suggested, that personal pride and other intrinsic motivation outweighed any incentive or extrinsic reward.¹⁵³⁹

Cyril C. O’Brien wrote the article, “Part and Whole Methods in the Memorization of Music,” in the journal, *Journal of Educational Psychology*.¹⁵⁴⁰ In his article’s introduction, O’Brien noted that three different types of memories influenced the memorization of piano music: visual, auditory, and tactile.¹⁵⁴¹ For this study, the researcher wanted to discover whether the part or whole methods of practicing saved individuals time while practicing.¹⁵⁴²

¹⁵³⁵ Ibid., 48.

¹⁵³⁶ Ibid., 48.

¹⁵³⁷ Ibid., 53.

¹⁵³⁸ Ibid., 53.

¹⁵³⁹ Ibid., 53.

¹⁵⁴⁰ Cyril C. O’Brien. “Part and Whole Methods in the Memorization of Music.” *Journal of Educational Psychology* 34, (1943): 552-560 *PsycARTICLES*, EBSCOhost (accessed July 11, 2012).

¹⁵⁴¹ Ibid., 552.

¹⁵⁴² Ibid., 552.

O'Brien recruited four, graduate-level, conservatory participants who played piano to participate in two experiments.¹⁵⁴³ While using a stopwatch to keep an accurate record of the practice time, the researcher had the participants learn and memorize two different pieces where each piece used either the part or whole method while using a metronome.¹⁵⁴⁴ Once the participant believed they had the piece memorized, the researcher stopped the stopwatch and had them perform the piece from memory.¹⁵⁴⁵ If they missed any notes, however, they had to continue practicing until they could perform it from memory.¹⁵⁴⁶ After looking at the data for this first experiment, O'Brien suggested that the part method helped the participants save practice time over the whole method.¹⁵⁴⁷

Next, in the second experiment, the researcher had the participants follow the same directions, but he changed the repertoire and they did not have an equal number of measures per score like the scores in the first experiment.¹⁵⁴⁸ In this case, O'Brien selected a piece for the part method that had twice as many measures as the piece he selected for the whole method.¹⁵⁴⁹

In addition to the length, the researcher had teachers rate the two pieces (for technical difficulty), and most of the teachers said the second piece (part method) contained more difficult music than the first (whole method).¹⁵⁵⁰ Again, the researcher used the same instructions in this experiment as he did for the first.¹⁵⁵¹ Once he finished

¹⁵⁴³ Ibid., 553.

¹⁵⁴⁴ Ibid., 553.

¹⁵⁴⁵ Ibid., 553.

¹⁵⁴⁶ Ibid., 553.

¹⁵⁴⁷ Ibid., 553.

¹⁵⁴⁸ Ibid., 553.

¹⁵⁴⁹ Ibid., 553.

¹⁵⁵⁰ Ibid., 555.

¹⁵⁵¹ Ibid., 555.

analyzing the data, O'Brien found that like in the first experiment, the part method helped individuals save time on memorizing music.¹⁵⁵²

Following the second experiment, O'Brien did another experiment where he had the participants read a score without playing it to see if they could after memorizing it write the score out onto manuscript paper.¹⁵⁵³ O'Brien used this experiment to see which method would help save time with only using visual memory. Both scores had an equal number of measures, and the directions for this experiment mirrored those of the first two experiments.¹⁵⁵⁴ After the researcher finished the experiment, he found that like the first two methods the part method significantly saved more of the individual's time.¹⁵⁵⁵

Following the third experiment, O'Brien did another experiment where he had the participants listen to two different compositions and write down the notes and rhythms that the researcher played on the piano using both the part and whole method of memorization.¹⁵⁵⁶ O'Brien used this experiment to see which method would help save time with only using auditory memory. Both scores had an equal number of measures, but this experiment had different instructions since the researcher only had each of the sixteen bars played only three times.¹⁵⁵⁷ After the researcher finished the experiment, he found that like the first three methods the part method significantly saved students time.

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¹⁵⁵² Ibid., 555.

¹⁵⁵³ Ibid., 556.

¹⁵⁵⁴ Ibid., 556.

¹⁵⁵⁵ Ibid., 557.

¹⁵⁵⁶ Ibid., 556.

¹⁵⁵⁷ Ibid., 557.

¹⁵⁵⁸ Ibid., 557.

Following the fourth experiment, O'Brien did another experiment where he had the participants learn the melody and words to two different compositions.¹⁵⁵⁹ O'Brien predicted that the participants would do better on the whole method since it would help the focus on the song as a whole instead of parts.¹⁵⁶⁰ Both scores had an equal number of measures.¹⁵⁶¹ After the researcher concluded the experiment, he found that unlike the first four methods, neither one of the methods showed superiority in helping individuals save time.¹⁵⁶²

Finally, in the sixth experiment, O'Brien did another experiment where he had the participants learn two compositions following the same instructions as the first experiment, but they could not hear themselves while they played. O'Brien used this experiment to see which method would help save time with only using kinesthetic memory.¹⁵⁶³ Both scores had an equal number of measures, and followed the same instructions as the first experiment.¹⁵⁶⁴ After the researcher concluded the experiment, he found that like the first three methods, the part method significantly saved students time.¹⁵⁶⁵ Overall, O'Brien suggested that the part method helped saved time over the whole method.¹⁵⁶⁶

Jane Ginsborg wrote the article, "Classical Singers Learning and Memorizing a New Song: An Observational Study," in the journal, *Psychology of Music*.¹⁵⁶⁷ In her

¹⁵⁵⁹ Ibid., 558.

¹⁵⁶⁰ Ibid., 558.

¹⁵⁶¹ Ibid., 558.

¹⁵⁶² Ibid., 558.

¹⁵⁶³ Ibid., 558.

¹⁵⁶⁴ Ibid., 558.

¹⁵⁶⁵ Ibid., 559.

¹⁵⁶⁶ Ibid., 560.

¹⁵⁶⁷ Jane Ginsborg. "Classical Singers Learning and Memorizing a New Song: An Observational Study." *Psychology of Music* 30, no. 1 (2002): 58-101. <http://pom.sagepub.com/content/30/1/58> (accessed July 11, 2012).

article's introduction and literature review, Ginsborg noted several studies that examined memorizing music and studies that explored how singers memorized music.¹⁵⁶⁸ For this exploratory study (as the researcher noted), the researcher wanted to determine how singers utilized memorizing strategies, compare methods of memorizing music and finally wanted to investigate whether incidental or strategic memorizing gave rise to more achievement gains.¹⁵⁶⁹

Ginsborg recruited thirteen (originally the researcher recruited fifteen, but had to discard two of the final tapes) sopranos or mezzo-sopranos to participate in this study who the researcher classified in three levels: "students, amateur singers and professional singers."¹⁵⁷⁰ Next, the researcher wanted each of the participants to record six, fifteen-minuted practice sessions, so Ginsborg sent them a cover letter with instructions, the required sheet music, blank record sheets and a blank cassette tape.¹⁵⁷¹

Once the researcher received the tapes and record sheets, the researcher carried out a few different analyzing procedures.¹⁵⁷² First, she transcribed comments from the tapes as they related to practicing or memorizing music.¹⁵⁷³ Next, she categorized all the comments either as words only, music only or both the words and music together.¹⁵⁷⁴ Then she examined the practice sessions for the number of errors in words, music and words and music together.¹⁵⁷⁵ Finally, after going through all the tapes, the researcher

¹⁵⁶⁸ Ibid., 58-62.

¹⁵⁶⁹ Ibid., 59, 60 and 61.

¹⁵⁷⁰ Ibid., 62.

¹⁵⁷¹ Ibid., 65.

¹⁵⁷² Ibid., 63-65.

¹⁵⁷³ Ibid., 65.

¹⁵⁷⁴ Ibid., 66.

¹⁵⁷⁵ Ibid., 66-67.

noted that not everyone completed all six sessions, so she only analyzed the tapes for the first, second, third-fifth and the final sections.¹⁵⁷⁶

After examining the results, Ginsborg made several observations. First, the researcher found that professional singers did not significantly use more practice strategies than students or amateur singers.¹⁵⁷⁷ Next, the researcher found that fast, accurate singers did significantly use a greater variety of practice strategies to help them over those who the researcher classified as slow and inaccurate memorizers.¹⁵⁷⁸ In fact, most of the fast, accurate singers did count aloud more often and started memorizing the music earlier than did the slow inaccurate group.¹⁵⁷⁹ Third, while piano proficiency did not show any significant differences, the researcher found that professionals did accompany themselves more often than students or amateurs.¹⁵⁸⁰

After examining the practice strategies used, the researchers examined the errors and the groups who made them. First, Ginsborg observed that fast, accurate memorizers may have made errors, but quickly corrected them and did not continue practicing the errors.¹⁵⁸¹ Next, the researcher found that slow learners still had problems fitting the words to the music (she called these underlay errors) even as the sessions continued.¹⁵⁸² In addition to the underlay errors, Ginsborg also found that student and amateur musicians frequently made more pitch and rhythmic errors than professionals did.¹⁵⁸³

Following the number of errors the researcher calculated, she then examined the data to determining whether or not the data upheld her third and fourth hypotheses. First,

¹⁵⁷⁶ Ibid., 67.

¹⁵⁷⁷ Ibid., 68-69.

¹⁵⁷⁸ Ibid., 69.

¹⁵⁷⁹ Ibid., 74 and 75.

¹⁵⁸⁰ Ibid., 74.

¹⁵⁸¹ Ibid., 76.

¹⁵⁸² Ibid., 86.

¹⁵⁸³ Ibid., 86.

she found that the attempts of combining words and music together increased over the sessions and this data upheld her third hypothesis.¹⁵⁸⁴ The data, on the other hand, did not confirm her fourth hypothesis when she found that starting with words and music separately and then combining them did not illustrate an effective strategy.¹⁵⁸⁵

After discovering the results of her third and fourth hypotheses, the researcher then examined the data for her last two hypotheses. First, for the fifth hypothesis, she found that as time increased, the participants increased the number of bars they performed from memory.¹⁵⁸⁶ Next, for the sixth hypothesis, the researcher found that the fast, accurate memorizers could sing more bars from memory earlier on in their practice sessions than the slower, in accurate memorizers.¹⁵⁸⁷

Aaron Williamon and Elizabeth Valentine wrote the article, “The Role of Retrieval Structures in Memorizing Music,” in the journal, *Cognitive Psychology*.¹⁵⁸⁸ In their article’s introduction and literature review, Williamon and Valentine noted several different studies that examined chunking theory, hierarchy organization, skilled memory theory, long term working memory and then how these different theories and cognitive principles related to music.¹⁵⁸⁹ For this study, the researcher’s wanted to examine how pianists organized their practice, they then examined their practice sessions to see if they actually did segment their practice sessions according to their interview, and wanted to

¹⁵⁸⁴ Ibid., 87.

¹⁵⁸⁵ Ibid., 90.

¹⁵⁸⁶ Ibid., 92.

¹⁵⁸⁷ Ibid., 92.

¹⁵⁸⁸ Aaron Williamon and Elizabeth Valentine. “The Role of Retrieval Structures in Memorizing Music.” *Cognitive Psychology* 44 (2002): 1-32.

¹⁵⁸⁹ Ibid., 1-11.

know how these pianist's practice sessions related to the quality of their final performances.¹⁵⁹⁰,

Williamon and Valentine looked at twenty-two participants (they dismissed fifteen other participants who did not accurately follow directions) who played piano for their study, but the researchers did mention that the participant's piano teachers did encourage them to participate the study so the participants could further develop their musical skills.¹⁵⁹¹ The researchers divided the participants into four different groups based on the Associated Board of the Royal Schools of Music.¹⁵⁹² Next, the researchers instructed the participants that they could practice as much as they wanted, but they had to record all their practice sessions done at the piano and away from the piano.¹⁵⁹³

Third, Williamon and Valentine instructed the participants that they had to memorize the required pieces, but the researchers also explained that the participants had to memorize music as part of their regular curriculum.¹⁵⁹⁴ Furthermore, the researchers had all the participants perform the work from memory on a recital that Williamon and Valentine videotaped to collect more data.¹⁵⁹⁵ The researchers then interviewed and recorded all the participant's responses after they finished performing the recital.¹⁵⁹⁶ Finally, the researchers had three judges rate the video tape performances, and then they coded and analyzed the data.¹⁵⁹⁷

After examining the results, Williamon and Valentine made several observations. First, they found that after reviewing the data that as ability increased, so too did the

¹⁵⁹⁰ Ibid., 11-12.

¹⁵⁹¹ Ibid., 12.

¹⁵⁹² Ibid., 13.

¹⁵⁹³ Ibid., 13.

¹⁵⁹⁴ Ibid., 13.

¹⁵⁹⁵ Ibid., 13.

¹⁵⁹⁶ Ibid., 13.

¹⁵⁹⁷ Ibid., 13-14.

likelihood that participants would use structural music elements to start and stop in practice sessions.¹⁵⁹⁸ The researchers assert that their data illustrates that higher level pianists (in this case the Level 4 pianists) start mapping their practice segments around these structural elements almost at the beginning of learning a piece of music. Furthermore, they believe that this has to do with their ability to recognize these structural elements, where lower level pianists (in this case, the Level 1 and Level 2 participants) depended on their teacher to tell them the location of the structural elements in the music.¹⁵⁹⁹

They also found that one could predict the quality of a performance based on whether or not a participant started using structural elements to guide their practice sessions.¹⁶⁰⁰ In addition, the researchers found that regardless of level, all the participants worked less frequently on the “difficult” parts of the music.¹⁶⁰¹ Third, the researchers found that these structural boundaries not only helped the practice sessions, but they also believe that these structural cues also served as retrieval cues when the participants started memorizing the music.¹⁶⁰²

In addition, the researchers found after interviewing the participants that only three of them had knowledge of the musical structures of the piece they performed.¹⁶⁰³ They provided no explanation as to how the participants created starts and stops based on the musical structures, but they did assert that future research investigate how different levels identify musical structures in the piece with or without the knowledge of them.¹⁶⁰⁴

¹⁵⁹⁸ Ibid., 23.

¹⁵⁹⁹ Ibid., 15 and 23.

¹⁶⁰⁰ Ibid., 23 and 24.

¹⁶⁰¹ Ibid., 24.

¹⁶⁰² Ibid., 25.

¹⁶⁰³ Ibid., 26.

¹⁶⁰⁴ Ibid., 26.

Without a doubt, however, the researcher's data suggested the idea that these participants generally segmented the music into individual meaningful sections and high quality performances resulted from the participants using the structure from the very early stages of their practice.¹⁶⁰⁵

Jennifer Mishra and William Blacklin wrote the article, *The Effects of Altering Environment and Instrumental Context on the Performance of Memorized Music*, in the journal, *Psychology of Music*.¹⁶⁰⁶ In their article, Mishra and Blacklin wanted to observe whether or not memorizing music was context dependent through a series of three experiments involving college age students.¹⁶⁰⁷ For this study they used a context-dependent memory test procedure from prior research. In their study, they used two environments, and for the experiments in this study, Mishra and Blacklin also used two different environments (with the exception of experiment 2).¹⁶⁰⁸

The researchers kept a consistent method throughout the experiments. First, the researchers had each of the participants practice and memorize the required exercise as they saw fit. The researchers gave the performers as much time as they needed to memorize the exercise and once the participants could play the exercise they performed it for the researchers to validate they could play it from memory.¹⁶⁰⁹ If they made any errors, the researchers pointed out the errors to the participant and asked participants to address and fix the error.¹⁶¹⁰

¹⁶⁰⁵ Ibid., 26-27.

¹⁶⁰⁶ Jennifer Mishra and William Blacklin, "The Effects of Altering Environment and Instrumental Context on the Performance of Memorized Music," *Psychology of Music* 35, no. 3 (2007): 453-472. <http://pomsagepub.com/content/35/3/453> (accessed May 29, 2012).

¹⁶⁰⁷ Ibid., 457.

¹⁶⁰⁸ Ibid., 457 and 469.

¹⁶⁰⁹ Ibid., 457.

¹⁶¹⁰ Ibid., 457.

Once the fixed the errors and the participant could give an accurate performance, the researchers removed them to neutral environment and allowed them to rest for ten minutes.¹⁶¹¹ After that period, the researchers then asked the participants to move into the original environment in which they learned or a new environment. Finally, Mishra and Blacklin asked the participants to give a final performance from memory doing the best job they could. The participants did not know about this final memorized performance so the researchers could stop any of the performers from doing silent practicing between the learning context and recall context.¹⁶¹²

In the first experiment, the researchers had ten music education majors participate who either played an instrument (except piano) or sang.¹⁶¹³ The researchers gave the participants a sixteen bar exercise to practice and memorize. For this experiment, the researchers put the participants into an atypical musical environment: an auditorium lobby (environment A) and a conference room (environment B).¹⁶¹⁴ Once the participants memorized the exercise, they rested and then recalled the exercise in the same environment or in a different environment.¹⁶¹⁵

Once the researchers scored the participants, the researchers made several observations. First, they found that context did affect memory; yet, they did know which environmental aspects affected the participants.¹⁶¹⁶ They deduced the possibility that the conference room provided a familiar setting to the students than the auditorium's lobby in trying to memorize and perform a piece of music.¹⁶¹⁷ Moreover, Mishra and Blacklin

¹⁶¹¹ Ibid., 457.

¹⁶¹² Ibid., 457.

¹⁶¹³ Ibid., 457.

¹⁶¹⁴ Ibid., 458.

¹⁶¹⁵ Ibid., 458.

¹⁶¹⁶ Ibid., 459 and 460.

¹⁶¹⁷ Ibid., 459 and 460.

stated that although musicians do not perform in either an auditorium's lobby or conference room one could posit that moving from one environment to another can affect memory.¹⁶¹⁸

Following the first experiment, the researchers then did a second experiment with sixty undergraduate and graduate musicians who played a variety of instruments (no vocalists and no pianists).¹⁶¹⁹ For this experiment, the researchers asked the participants to memorize thirty-six bars of music that had a higher level of difficulty than experiment 1; but the researchers both explained that undergraduate and graduate students could still memorize the piece of music.¹⁶²⁰

Like Experiment 1, the researchers had the participants learn and memorize the music in one environment, followed with an interval of rest, and then instructed them to perform the memorized music in either the original place they learned the music or placed them in a new environment. They used the practice room (environment A), a professor's studio (environment B) and the auditorium (environment C) for the environment in this experiment.¹⁶²¹ The participants for this experiment either stayed in the practice room or went to a different environment since the researchers found that it highly unusual to go from learning a piece of music in an auditorium to performing it in a practice room.¹⁶²²

In order to score the participants' performance achievement in the second experiment, Mishra and Blacklin, recorded both sessions.¹⁶²³ The researchers gave two

¹⁶¹⁸ Ibid. 460.

¹⁶¹⁹ Ibid., 460.

¹⁶²⁰ Ibid., 460.

¹⁶²¹ Ibid., 461.

¹⁶²² Ibid., 462.

¹⁶²³ Ibid., 462.

points for every measure, not beat: 1 point for rhythm and 1 point for melodic accuracy (a total of 72 points).¹⁶²⁴ The researchers found no significant differences practice and recall scores in any of the groups.¹⁶²⁵ Mishra and Blacklin explained that the participants' familiarity with the auditorium, practice room and the professor's studio might have influenced recall in this experiment.¹⁶²⁶

After noticing no significant differences in Experiment 2, the researchers conducted a final experiment just using pianists. Mishra and Blacklin recruited thirty-two pianists in either their first or second year at the university. They noted earlier in the article that they did not use pianists since that would mean some of the participants would not only switch rooms, but would also switch instruments whereas other instrumentalists and vocalists would not.¹⁶²⁷

For this experiment, the participants did not switch rooms, but instead just switched pianos in a professor's studio at the university. The pianists performed one of Blacklin's original compositions and the researchers scored them similar to Experiment 2 (2 points per bar instead of 2 points per beat as in Experiment 1).¹⁶²⁸ Mishra and Blacklin found that changing instruments negatively affected recall among piano students.¹⁶²⁹

Roger Chaffin et. al wrote the article, "Preparing for memorized cello performance: the role of performance cues," in the journal, *Psychology of Music*.¹⁶³⁰ In their article's introduction and literature review, Chaffin et. al noted several studies that

¹⁶²⁴ Ibid., 462.

¹⁶²⁵ Ibid., 462.

¹⁶²⁶ Ibid., 463.

¹⁶²⁷ Ibid., 463.

¹⁶²⁸ Ibid., 464.

¹⁶²⁹ Ibid., 466.

¹⁶³⁰ Roger Chaffin, Tania Lisboa, Topher Logan, Kristen T. Begosh. "Preparing for memorized cello performance: the role of performance cues." *Psychology of Music* 38, no. 1 (2009): 3-30. <http://www.jrm.sagepub.com/content/50/3/215> (accessed July 11, 2012).

examined expert memory, music performance retrieval cues and memorizing music.¹⁶³¹

For this study, the researchers wanted to examine the types of performance retrieval cues that a string instrumentalist would use when memorizing and recalling music, and whether or not a person's practicing changed as they worked through the process.¹⁶³²

Furthermore, the researchers predicted that the participant would use a hierarchal organization, use performance cues to help them in their practicing, and that changes would occur throughout practicing and the memorization process.¹⁶³³

Chaffin et. al. recruited the Brazilian born cellist, Tania Lisboa and she voluntarily participated in this study since she saw the benefits of this study to help her prepare the Bach's Sixth Cello Suite, from the Six Suites for solo cello for her upcoming concerts.¹⁶³⁴

Throughout the study, the researchers had the participant record all her practice sessions and public performances until she finished her tenth public performance of the cello suites, which lasted a total of seventy-five practice sessions over almost three and a half years.¹⁶³⁵ In each of the sessions, the researchers encouraged the participant to explain what did throughout her practice.

In addition to her performances of the suite, the researchers also asked the participant to write out the suite ten months after her eighth public performance to see if she could recall the score from memory.¹⁶³⁶ Along with recalling the score, the researchers also had the participant give reports on basic technique, interpretation, performance cues, and the musical structure.¹⁶³⁷ When they finished the study, the

¹⁶³¹ Ibid., 3-5.

¹⁶³² Ibid., 6-8.

¹⁶³³ Ibid., 6 and 8.

¹⁶³⁴ Ibid., 9.

¹⁶³⁵ Ibid., 9.

¹⁶³⁶ Ibid., 9-10.

¹⁶³⁷ Ibid., 10.

researchers analyzed and coded the data from the videotapes and the participant's reports.¹⁶³⁸

After examining the results, Chaffin et. al made several observations about the participant's practice sessions and learning stages. First, they found three main learning periods over the three year and a-half years of working and performing the cello suite: initial learning, first re-learning and second re-learning.¹⁶³⁹ Next, the researchers discovered that the participant identified five stages of learning in her own sessions: "explore, smooth out, listen, rework technique, and prepare performance."¹⁶⁴⁰ Furthermore, while the researchers found that the participant used expressive cues to guide not only her practicing, but also her memorizing, they also found that the participant worked differently on the piece in each of the learning periods.¹⁶⁴¹ Finally, the researchers suggested that many experienced musicians may use stages of learning similar to this in their own practice sessions.¹⁶⁴²

In addition to the different stages of learning, the researchers also examined the different comments on performance cues. First, the researchers defined performance cues as a message that "tell(s) a musician what to do as the performance unfolds, reminding him/her of the actions, musical gestures, and expressive goals chosen during practice, and helping him/her to shape a performance that meets his/her aesthetic goals."¹⁶⁴³ The researchers also found that the participant started using performance cues to guide her practice and segment that into different sections from the very first stage of

¹⁶³⁸ Ibid., 10.

¹⁶³⁹ Ibid., 11.

¹⁶⁴⁰ Ibid., 13.

¹⁶⁴¹ Ibid., 15-16 and 20.

¹⁶⁴² Ibid., 21.

¹⁶⁴³ Ibid., 20.

learning which Chaffin and colleagues inferred that she created a hierarchy of musical priorities.¹⁶⁴⁴ Next, the researchers suggested that from the participant's practice comments, performance cues can help aid in memory and that one needs to practice them to ensure what they called "a smooth operation."¹⁶⁴⁵ Third, the researchers found that during the recall section of the study, the participant did a better job of recalling the piece through the use of expressive cues over using basic cues.¹⁶⁴⁶

Unlike other studies, the researchers did find that this participant did wait until near the end of the practice sessions to work out the music's technical difficulties.¹⁶⁴⁷ Aside from this difference, the researchers found that performance and expressive cues can help aid in memory and also have shown that expressive cues can help aid in a person's ability to recall over basic musical cues.

¹⁶⁴⁴ Ibid., 13, 15, 17, and 20.

¹⁶⁴⁵ Ibid., 17.

¹⁶⁴⁶ Ibid., 18.

¹⁶⁴⁷ Ibid., 20.

CHAPTER THREE: THE MODEL

Overview

Nancy Barry suggested in an earlier study that individuals can make more achievement gains over those who follow and implement a structured practice session.¹⁶⁴⁸ Zimmerman also stated that in addition to a structured practice session that self-regulating musicians should record themselves in order to have accurate, beneficial and positive self-evaluations when trying to diagnose their playing.¹⁶⁴⁹ It would seem plausible then that the practice method based on research should contain two components: a procedure that promotes a structured practice session, as well as some type of recording element to help facilitate an accurate, beneficial, healthy and positive self-evaluation. This chapter will present a list of materials needed and the procedure for practicing and recording.

Tools

McPherson and Zimmerman suggested that individuals need different apparatuses for different types of self-evaluation and for different points of the practice session.¹⁶⁵⁰ This researcher has provided a list of necessary tools for this practice method based on a review of the literature. This researcher also gives an explanation of each of the tools and why the individual will need them for the practice method. These tools include music, colored pens and pencils, metronome, and a recording device.

¹⁶⁴⁸ Barry 1992, 116.

¹⁶⁴⁹ Zimmerman 1998, 76.

¹⁶⁵⁰ McPherson and Zimmerman, 152.

Music

- i. Only the music needed for this particular practice session.
- ii. Helps focus the attention on the task at hand Music should represent the current level of student's musical and technical ability. Oare (2012),¹⁶⁵¹ Duke et. al (2006),¹⁶⁵² Brown (1933),¹⁶⁵³ Barry (1990),¹⁶⁵⁴ Barry (1992),¹⁶⁵⁵ Williamon and Valentine (2000),¹⁶⁵⁶ Miksza (2006),¹⁶⁵⁷ Leon-Guerrero (2008),¹⁶⁵⁸ Miksza (2012),¹⁶⁵⁹ and Ross (1985)¹⁶⁶⁰ have all shown that individuals could make achievement gains if the music provided enough challenge, but did not overwhelm the student. Clearly, individuals can make achievement gains (and quickly) when the music they select accurately portrays their musical abilities.

Extra Copies of the Music

- i. Used for scoring pretest and posttest sessions.
- ii. The individual will need extra copies of the music so that they will not write all over the original music. The individual will also file this extra copy so it may serve as a reminder of common problems in the music and how to fix them when they have to repeat the piece on a future concert or teach the piece to a future student.

¹⁶⁵¹ Oare., 66.

¹⁶⁵² Duke et. al (2006), 6.

¹⁶⁵³ Brown., 437.

¹⁶⁵⁴ Barry (1990), 6..

¹⁶⁵⁵ Barry (1992), 114..

¹⁶⁵⁶ Williamon and Valentine (2000), 358-359..

¹⁶⁵⁷ Miksza (2006), 310.

¹⁶⁵⁸ Leon-Guerrero, 96.

¹⁶⁵⁹ Miksza (2012), 54.

¹⁶⁶⁰ Ross, 223.

- iii. Researchers, like Christensen and Hallam (2001),¹⁶⁶¹ have already found that practice logs do not necessarily provide accurate information regarding a person's practice session.¹⁶⁶²

Pencil

1. Individuals will use this for marking the original music. These markings will include accidentals, fingerings and any other mental cue that the individual may need.
2. Barry 1992¹⁶⁶³, and Duke et. al (2009)¹⁶⁶⁴ for example gave pencils to the participant to use while practicing and expected the participants to mark fingerings, accidentals and anything other additional cue they may need while they play. Barry 1992¹⁶⁶⁵, and Duke et. al (2009)¹⁶⁶⁶ for example gave pencils to the participant to use while practicing.

Colored Pen

- a. Individuals will use these colored pens/pencils for scoring writing notes on the extra copies of music.
- b. The individual does not mark their original music in a colored pen for two reasons:
 - i. Musical errors are temporary, and the individual does not want to impose an error on the original score as a permanent fixture of the

¹⁶⁶¹ Christensen, 26-29.

¹⁶⁶² Hallam 2001, 10.

¹⁶⁶³ Barry 1992, 115.

¹⁶⁶⁴ Duke et. al 2009, 6.

¹⁶⁶⁵ Barry 1992, 115.

¹⁶⁶⁶ Duke et. al 2009, 6.

music. Marking the error simply provides reinforcement to what happened.

- ii. Marking in a colored pen allows the individual to quickly find the error instead of laboriously searching for each transgression.
- c. This material would seem novel since none of the researchers had the participants mark with a colored pen.

Metronome

- a. Individuals will use this as a concrete measure for keeping the pulse of the music.
- b. Several researchers did have the participants learn with the metronome (Brown 1933¹⁶⁶⁷, O'Brien 1943¹⁶⁶⁸ and Barry 1992¹⁶⁶⁹), have certain trials learn with a metronome (Coffman 1990¹⁶⁷⁰), found that teachers recommend using a metronome (Barry 2007,¹⁶⁷¹ Barry and MacArthur 1994¹⁶⁷²), observed a student use a metronome (Christensen 2011,¹⁶⁷³ Barry 2007,¹⁶⁷⁴ Rohwer 2005,¹⁶⁷⁵ Nielsen 1999¹⁶⁷⁶) or at least provided the participants with a metronome while they learned a selection for the study (Barry 1992¹⁶⁷⁷ and Duke et. al 2009¹⁶⁷⁸).

¹⁶⁶⁷ Brown, 435-437.

¹⁶⁶⁸ O'Brien, 553.

¹⁶⁶⁹ Barry 1992, 115.

¹⁶⁷⁰ Coffman, 190-191.

¹⁶⁷¹ Barry 2007, 60.

¹⁶⁷² Barry and MacArthur, 52.

¹⁶⁷³ Christensen, 25

¹⁶⁷⁴ Barry 2007, 61.

¹⁶⁷⁵ Rohwer, 50 and 51.

¹⁶⁷⁶ Nielsen 1999, 281.

¹⁶⁷⁷ Barry 1992, 115.

¹⁶⁷⁸ Duke et. al 2009, 6.

Recording Device-

- a. Individuals can use any recording that device that provides Aural, or visual and aural. It does not matter, as long as
- b. This provides the individual with a concrete example of their performance so they can accurately gauge the performance and accurately measure achievement gains. This also provides the individual with a digital practice log, and they do not have to write anything.
- c. Bergee and Cicconi-Roberts warn that if individuals use recording devices, they should use a recording device that will allow for good sound quality feedback.¹⁶⁷⁹ Several individuals in that study reported not liking the sound quality and that it possibly factored into their judgment.¹⁶⁸⁰

Procedure

When testing practicing, many researchers employ a pretest-practice-posttest method for measuring achievement gains. Researchers like Lim and Lippman (1991),¹⁶⁸¹ McHugh-Grifa (2011),¹⁶⁸² Cahn (2008),¹⁶⁸³ Madsen and Geringer (1981),¹⁶⁸⁴ Miksza (2005),¹⁶⁸⁵ Miksza (2006),¹⁶⁸⁶ Barry (1992),¹⁶⁸⁷ Barry (1990),¹⁶⁸⁸ Hewitt (2001),¹⁶⁸⁹ and Henly (2001)¹⁶⁹⁰ have all used this methodology to measure achievement gain. Clearly, several studies have used this process, and this framework has allowed for achievement

¹⁶⁷⁹ Bergee and Lecica Cecconi-Roberts, 265.

¹⁶⁸⁰ Ibid., 265.

¹⁶⁸¹ Lim and Lippman, 24.

¹⁶⁸² McHugh-Grifa, 70.

¹⁶⁸³ Cahn, 182.

¹⁶⁸⁴ Madsen and Geringer, 47-48.

¹⁶⁸⁵ Miksza 2005, 82.

¹⁶⁸⁶ Miksza 2006, 313.

¹⁶⁸⁷ Barry 1992, 116.

¹⁶⁸⁸ Barry 1990, 6.

¹⁶⁸⁹ Hewitt 2001, 313.

¹⁶⁹⁰ Henly, 172 and 177.

gains, and provided a structured framework for those individuals to make achievement gains whether the results suggested a significant gain or not. This section will outline the procedure for each section and provide examples of where prior research has used a similar methodology. Furthermore, McPherson and Zimmerman have reported that self-regulating individuals self-evaluate throughout their practice sessions.¹⁶⁹¹

PRETEST

This section allows the individual to give a performance of the piece and construct a concrete assessment of their current level of progress on a particular selection.

1. Secure the practice environment and get comfortable. Mishra and Blacklin (2007),¹⁶⁹² McPherson and Zimmerman (2006),¹⁶⁹³ Pitts and Davidson (2000),¹⁶⁹⁴ MacNamara et. al. (2006),¹⁶⁹⁵ Austin and Berg (2006),¹⁶⁹⁶ Maynard (2006),¹⁶⁹⁷ Welch (1985),¹⁶⁹⁸ and McPherson and Renwick (2001)¹⁶⁹⁹ all suggest that suggest that environment can affect an individual's ability to work and perform.
2. When ready, turn on the recording equipment, and then play through the section from beginning to end with a metronome. This step is novel, as none of the researchers had participants record a pretest with a metronome.
3. When finished, turn off the recording equipment and the metronome.

¹⁶⁹¹ McPherson and Zimmerman, 152.

¹⁶⁹² Mishra and Blacklin., 462.

¹⁶⁹³ McPherson and Zimmerman., 154.

¹⁶⁹⁴ Pitts and Davidson., 49.

¹⁶⁹⁵ MacNamara et. al., 298-300.

¹⁶⁹⁶ Austin and Berg., 544.

¹⁶⁹⁷ Maynard., 64.

¹⁶⁹⁸ Welch., 246.

¹⁶⁹⁹ McPherson and Renwick., 182.

REFLECTION

Although the reflection section provides an opportunity for self-evaluation, it might also provide the opportunity for individuals to use mental practice since the individual will review the music without any overt physical movement, and further allows the individual to think how they might address a particular problem encountered during the initial performance. Lundin speaks about score study in his book, and speaks about placing it in the middle of the practice session based on his observations of the research.¹⁷⁰⁰ Future research should investigate at what point the individual should place score study.

1. Listen to the recording while reading the music, and do not score the performance. Individuals should use this time to not only listen to the performance, but also allow a period of relaxation after giving this initial performance. None of the current researchers have observed or measured the adrenalin levels of students after they have performed a pretest and then listened to themselves.
2. Listen to the performance again and then score for two items, correct notes and rhythm. Mark each error for every incorrect note and every incorrect rhythm on the extra copy of the performance for the entire piece. Physically circle or slash notes where the infraction occurred with the pen. Barry (1990),¹⁷⁰¹ Killian and Henry (2005),¹⁷⁰² Mishra and Blacklin (2007),¹⁷⁰³ Anderson (1981),¹⁷⁰⁴ Coffman (1990),¹⁷⁰⁵ Fortney (1992),¹⁷⁰⁶ Henly (2001),¹⁷⁰⁷ Kostka (2000),¹⁷⁰⁸ Linklater

¹⁷⁰⁰ Ibid., 140-141 and 144-145.

¹⁷⁰¹ Barry 1990, 7.

¹⁷⁰² Killian and Henry, 55.

¹⁷⁰³ Mishra and Blacklin, 462.

¹⁷⁰⁴ Anderson, 26.

¹⁷⁰⁵ Coffman, 191.

¹⁷⁰⁶ Fortney, 19.

¹⁷⁰⁷ Henly, 172.

(1997),¹⁷⁰⁹ Rsoenthal et. al (1988),¹⁷¹⁰ Rosenthal (1984),¹⁷¹¹ Ross (1985)¹⁷¹²,
 Stambaugh and Demorest (2010),¹⁷¹³ Lim and Lippman (1991),¹⁷¹⁴ and Zurcher
 (1972) used a similar methodology when looking at achievement gains..¹⁷¹⁵

- a. Every error counts as a single error.
- b. The researcher provides this equation for future researchers to explore: If the individual commits more than three note or rhythmic errors they must lower the metronome tempo one tempo indication.
- c. Notes and rhythms provide the basic structure of the piece and cannot be argued in a subjective measure.

3. If the individual feels comfortable and confident in their ability, listen to the performance for a third time and then score it for other musical markings (quality of articulation, dynamics, phrase markings, metric and harmonic inflections).
 When marking, make sure to mark each error for these musical errors. Barry (1990),¹⁷¹⁶ Killian and Henry (2005),¹⁷¹⁷ Mishra and Blacklin (2007),¹⁷¹⁸ Anderson (1981),¹⁷¹⁹ Coffman (1990),¹⁷²⁰ Fortney (1992),¹⁷²¹ Henly (2001),¹⁷²² Kostka (2000),¹⁷²³ Linklater (1997),¹⁷²⁴ Rsoenthal et. al (1988),¹⁷²⁵ Rosenthal

¹⁷⁰⁸ Kostka 2000, 118.

¹⁷⁰⁹ Linklater, 407.

¹⁷¹⁰ Rsoenthal et. al 1988, 253.

¹⁷¹¹ Rosenthal, 268-269.

¹⁷¹² Ross, 224.

¹⁷¹³ Stambaugh and Demorest, 24.

¹⁷¹⁴ Lim and Lippman, 25-26.

¹⁷¹⁵ Zurcher, 135-137.

¹⁷¹⁶ Barry 1990, 7.

¹⁷¹⁷ Killian and Henry, 55.

¹⁷¹⁸ Mishra and Blacklin, 462.

¹⁷¹⁹ Anderson, 26.

¹⁷²⁰ Coffman, 191.

¹⁷²¹ Fortney, 19.

¹⁷²² Henly, 172.

¹⁷²³ Kostka 2000, 118.

(1984),¹⁷²⁶ Ross (1985)¹⁷²⁷, Stambaugh and Demorest (2010),¹⁷²⁸ Lim and Lippman (1986),¹⁷²⁹ Hallam (2001),¹⁷³⁰ and Zurcher (1972).¹⁷³¹ Miksza's studies (2005¹⁷³², 2006,¹⁷³³ and 2007¹⁷³⁴) have developed and adapted self-created scales and scales that prior research had created for measuring subjective musical elements.

- a. Every error counts as a single error.
 - b. The researcher provides this equation for future researchers to explore: If the individual commits more than five musical errors the individual should lower the metronome tempo.
 - c. Any musical indication (dynamics, articulation, pitch, ect.) on the page explicitly expresses the wishes of the composer. If the individual, for example, does not hear a crescendo and the composer has marked it, then the individual must mark it as error.
4. Do not the discard the copy of the music. The individual will use this again in the posttest and place this in the practice journal. The previously mentioned studies that use the pretest-posttest method have kept these pretest records so they can compare them with them posttest records.

¹⁷²⁴ Linklater, 407.

¹⁷²⁵ Rosenthal et. al 1988, 253.

¹⁷²⁶ Rosenthal, 268-269.

¹⁷²⁷ Ross, 224.

¹⁷²⁸ Stambaugh and Demorest, 24.

¹⁷²⁹ Lim and Lippman, 25-26.

¹⁷³⁰ Christensen, 26-29.

¹⁷³¹ Zurcher, 135-137.

¹⁷³² Miksza 2005, 78.

¹⁷³³ Miksza 2006, 312.

¹⁷³⁴ Miksza 2007, 363.

5. After reviewing the pretest scores, individuals should now plan out their practice sessions, the goals they wish to accomplish and the appropriate strategies needed to overcome the challenges they found while giving this initial performance. Zimmerman (1998)¹⁷³⁵ and McPherson and Zimmerman (2006)¹⁷³⁶ have emphasized the need for goal planning as a means to establish a clear vision of what and how the individual will practice, and they stated how goal planning is an integral part of their self-regulation models.

PRACTICE SESSION

This section allows the individual to focus on specific obstacles apparent in the pretest.

1. In this section, individuals should use physical practice. Ross (1985),¹⁷³⁷ Lim and Lippman (1986),¹⁷³⁸ Coffman (1990),¹⁷³⁹ Cahn (2008),¹⁷⁴⁰ and McHugh-Grifa (2011) would suggest that physical practice allows for higher achievement gains than say mental or other type of practice.¹⁷⁴¹
2. The individual should only practice the items that they need to address. The scoring from the pretest provides the individual with a concrete document with items that the individual should address so they may capitalize on the practice time they have available. No prior researchers gave the participants their pretest scores.
3. Use the appropriate learning styles and strategies to correct the errors made in the pretest.

¹⁷³⁵ Zimmerman, 74, 76-78.

¹⁷³⁶ McPherson and Zimmerman, 159.

¹⁷³⁷ Ross, 226.

¹⁷³⁸ Lim and Lippman, 27.

¹⁷³⁹ Coffman, 195.

¹⁷⁴⁰ Cahn, 184, 186, and 188.

¹⁷⁴¹ McHugh-Grifa, 72.

4. Prior researchers have not specified a practice time limit, but most sessions that researchers have observed last anywhere from fifteen minutes to an hour. This researcher provides an equation for the individual and future researchers to explore: The number of infractions committed during the pretest plus the time it takes to correct them should equal the length of an individual's practice session.

POSTTEST

This allows for the individual to obtain a concrete example of whether or not they made achievement gains.

1. When ready, turn on the recording equipment, and then play through the selection from beginning to end with a metronome. Unlike the pretest, some researchers have provided a metronome click for the participants in the posttest, but it did not go on for very long: Rosenthal et. al (1988)-six beats given to the participant¹⁷⁴²- and Fortney (1992)- four beats given to the participant¹⁷⁴³ - did allow the participants to hear a metronome click before they performed the posttest, but they did not get to play with it.
2. When finished, turn off the recording equipment and the metronome.

REFLECTION

The second reflection allows the individual to gauge the practice session as a whole and allows the individual to think about their progress on the musical selection they have selected to learn.

1. Listen to the recording while watching the music and do not score the performance. Individuals should use this time to not only listen to the

¹⁷⁴² Rosenthal et. al., 253.

¹⁷⁴³ Fortney, 19.

performance, but also allow them to calm down after giving this performance.

Again, this step would seem novel since none of the researchers have observed or measured the adrenalin levels of students after they have given a pretest and then listened to themselves.

2. Listen to the performance again and then score for two items, correct notes and rhythm. Mark every incorrect note and every incorrect rhythm on the extra copy of the performance. Physically circle or slash notes where the infraction occurred with the pen. Barry (1990),¹⁷⁴⁴ Killian and Henry (2005),¹⁷⁴⁵ Mishra and Blacklin (2007),¹⁷⁴⁶ Anderson (1981),¹⁷⁴⁷ Coffman (1990),¹⁷⁴⁸ Fortney (1992),¹⁷⁴⁹ Henly (2001),¹⁷⁵⁰ Kostka (2000),¹⁷⁵¹ Linklater (1997),¹⁷⁵² Rsoenthal et. al (1988),¹⁷⁵³ Rosenthal (1984),¹⁷⁵⁴ Ross (1985)¹⁷⁵⁵, Stambaugh and Demorest (2010),¹⁷⁵⁶ Lim and Lippman (1991),¹⁷⁵⁷ and Zurcher (1972) have used a similar methodology when looking at achievement gains:¹⁷⁵⁸
 - a. Every error counts as a single error.
 - b. The researcher provides this equation for future researchers to explore: If the individual commits more than three note or rhythmic errors they must lower the metronome tempo one tempo indication.

¹⁷⁴⁴ Barry 1990, 7.

¹⁷⁴⁵ Killian and Henry, 55.

¹⁷⁴⁶ Mishra and Blacklin, 462.

¹⁷⁴⁷ Anderson, 26.

¹⁷⁴⁸ Coffman, 191.

¹⁷⁴⁹ Fortney, 19.

¹⁷⁵⁰ Henly, 172.

¹⁷⁵¹ Kostka 2000, 118.

¹⁷⁵² Linklater, 407.

¹⁷⁵³ Rsoenthal et. al 1988, 253.

¹⁷⁵⁴ Rosenthal, 268-269.

¹⁷⁵⁵ Ross, 224.

¹⁷⁵⁶ Stambaugh and Demorest, 24.

¹⁷⁵⁷ Lim and Lippman, 25-26.

¹⁷⁵⁸ Zurcher, 135-137.

- c. Notes and rhythms provide the basic structure of the piece and cannot be argued in a subjective measure.
3. If the individual feels comfortable and confident in their ability, listen to the performance for a third time and then score it for other musical markings (quality of articulation, dynamics, phrase markings, metric and harmonic inflections). Several studies have used a similar methodology when looking at achievement gains: Barry (1990),¹⁷⁵⁹ Killian and Henry (2005),¹⁷⁶⁰ Mishra and Blacklin (2007),¹⁷⁶¹ Anderson (1981),¹⁷⁶² Coffman (1990),¹⁷⁶³ Fortney (1992),¹⁷⁶⁴ Henly (2001),¹⁷⁶⁵ Kostka (2000),¹⁷⁶⁶ Linklater (1997),¹⁷⁶⁷ Rosenthal et. al (1988),¹⁷⁶⁸ Rosenthal (1984),¹⁷⁶⁹ Ross (1985),¹⁷⁷⁰ Stambaugh and Demorest (2010),¹⁷⁷¹ Lim and Lippman (1991),¹⁷⁷² Hallam (2001),¹⁷⁷³ and Zurcher (1972).¹⁷⁷⁴ Miksza's studies (2005¹⁷⁷⁵, 2006,¹⁷⁷⁶ and 2007¹⁷⁷⁷) have developed and adapted self-created scales and scales that prior research had created for measuring subjective musical elements. After scoring, compare these results with the pretest. Once the

¹⁷⁵⁹ Barry 1990, 7.

¹⁷⁶⁰ Killian and Henry, 55.

¹⁷⁶¹ Mishra and Blacklin, 462.

¹⁷⁶² Anderson, 26.

¹⁷⁶³ Coffman, 191.

¹⁷⁶⁴ Fortney, 19.

¹⁷⁶⁵ Henly, 172.

¹⁷⁶⁶ Kostka 2000, 118.

¹⁷⁶⁷ Linklater, 407.

¹⁷⁶⁸ Rosenthal et. al 1988, 253.

¹⁷⁶⁹ Rosenthal, 268-269.

¹⁷⁷⁰ Ross, 224.

¹⁷⁷¹ Stambaugh and Demorest, 24.

¹⁷⁷² Lim and Lippman, 25-26.

¹⁷⁷³ Christensen, 26-29.

¹⁷⁷⁴ Zurcher, 135-137.

¹⁷⁷⁵ Miksza 2005, 78.

¹⁷⁷⁶ Miksza 2006, 312.

¹⁷⁷⁷ Miksza 2007, 363.

individual has compared the two results, they should then cross reference that with the results from earlier practice sessions.

- a. Every error counts as a single error.
 - b. The researcher provides this equation for future researchers to explore: If the individual commits more than five musical errors the individual should lower the metronome tempo.
 - c. Any musical indication (dynamics, articulation, pitch, ect.) on the page explicitly expresses the wishes of the composer. If the individual, for example, does not hear a crescendo and the composer has marked it, then the individual must mark it as error.
 - d. Consistency of articulation, consistency of tone, musical inflections
4. The individual should ask a few questions and answer with harsh honesty:
- a. Did I correct the errors committed during the pretest? If not, why?
 - b. Does my learning style or the strategies I used in this practice session benefit me while I worked on this piece? If not, why?
 - c. Did I make positive achievement gains? If not, why?
 - d. Am I happy with this practice session? If not, why?
5. Either write or state aloud the goals for the next pretest-practice-posttest session.

CHAPTER FOUR: APPLICATIONS

Overview

Now that this researcher has reviewed the literature and created a new paradigm for practicing, the researcher will apply his practice method to several examples of the prior research he reviewed. First, the research will state the original purpose of the article. Next, the researcher will create a new purpose each article using the paradigm so that the future researcher can replicate those studies using this proposed paradigm. Furthermore, the researcher will also create a new hypothesis for each of the studies. The researcher believes that this format will help show the reader and how past/future researchers can easily adopt this paradigm to their prior research and redo the study to collect more data on the original subject. While this idea may seem novel, prior literature reviews (like Hallam and Barry (2002)¹⁷⁷⁸ and Miksza (2011)¹⁷⁷⁹) have employed the idea of how researchers can adopt their ideas.

Like prior research, the researcher will show how future research can apply the model, but he will show how each study can repeat itself using the researcher's proposed paradigm. In order to make the chapter easier to read, the researcher will simply go in alphabetical order. Going in this order will allow future researchers to quickly scan for the researcher's recommendations on their study. The researcher then hopes that researcher(s), or future researchers, can replicate the study

¹⁷⁷⁸ Barry and Hallam, 2002.

¹⁷⁷⁹ Peter Miksza, 2011.

Applications

Anderson, James N. "Effects of Tape-Recorded Aural Models on Sight-Reading and Performance Skills." *Journal of Research in Music Education* 29, no. 1 (Spring 1981): 23-30. <http://www.jstor.org/stable/3344676> (accessed June 1, 2012).

Original Purpose: Anderson wanted to explore and examine whether or not sixth grade clarinet students would perform better on a sight-reading measure and other performance measures if they used taped models in their practice sessions at home.¹⁷⁸⁰

New Purpose: Using the new practice method the researcher will examine whether or not sixth grade clarinets student perform better on sigh-reading and performance measures if they used taped models during their practice sessions at home using this practice method that encouraged them to make model identical to the one they received.

New Hypothesis: The researcher hypothesizes that sixth-grade clarinet students would make more achievement gains using this model and this new method to help give them indisputable evidence that they have played the selection exactly like the model.

Barry, Nancy H. "The Effects of Different Practice Techniques Upon Technical Accuracy and Musicality in Student Instrumental Performance." *Research Perspectives in Music Education* 44, no. 1 (Fall 1990): 4-8.

Original Purpose: Nancy H. Barry wanted to examine how different practice designs affected student achievement.¹⁷⁸¹

Original Hypothesis: Barry predicted she would not find any significant differences between the following experimental groups: number of correct pitches played, correct rhythms played, rating for technical accuracy or musicality.¹⁷⁸²

¹⁷⁸⁰ Anderson, 25.

¹⁷⁸¹ Barry 1990, 6.

¹⁷⁸² Ibid., 6.

New Purpose: The researcher will redo Barry's 1990 study and this time add another treatment (the newly proposed paradigm) to the experiment to see how these different practice techniques affect technical accuracy and musicality.

New Hypothesis: The researcher predicts that they will find differences between the groups for correct pitches, correct rhythms, technical accuracy and musicality. Furthermore, the researcher predicts that the participants who use the newly proposed method will do significantly better than those who do not use it.

Barry, Nancy. "The Effects of Practice Strategies, Individual Differences in Cognitive Style, and Gender upon Technical Accuracy and Musicality of Student Instrumental Performance." *Psychology of Music* 22, no. 1 (October 1992): 112-123. <http://pom.sagepub.com/content/20/2/112> (accessed October 20, 2010).

Original Purpose: Barry wanted to examine how structured and free practice sessions, field dependence/independence, and gender would all affect technical accuracy.¹⁷⁸³

New Purpose: Using this new method the researchers will determine how structured and free practice sessions, field dependence/independence, and gender would all affect technical accuracy in this new method, Barry's original method and free practice sessions.

New Hypothesis: The researcher hypothesizes that the results will show a difference in gender and that females who use this new method will make the highest achievement gains over their male counterparts in any of the groups.

¹⁷⁸³ Barry 1992., 114.

Byo, James L. and Jane W. Cassidy. "An Exploratory Study of Time Use in the Practice of Music Majors: Self-Report and Observation Analysis." *Update - Applications of Research in Music Education* 27, no.1 (November 2008): 33-40. <http://upd.sagepub.com/content/27/1/33> (accessed September 30, 2010).

Original Purpose: Byo and Cassidy wanted to gather survey and observational data on the behaviors of music education majors in the practice room.¹⁷⁸⁴

New Purpose: Using a methodology similar to Byo and Cassidy's 2008 study, the researchers will gather survey and observational data about the different behaviors that music education majors use while they use this new method.

New Hypothesis: The researcher predicts that music education majors will not spend as much time in the practice room and will use higher level strategies instead of repetition, and trial and error.

Cahn, Dan. "The effects of varying ratios of physical and mental practice, and task difficulty on performance of a tonal pattern." *Psychology of Music* 36, no. 2 (April 2008): 179-191. <http://pom.sagepub.com/content/36/2/179> (accessed July 11, 2012).

Original Purpose: Dan Cahn wanted to examine how effective certain types of practice methods could help in improvising over two, different chord progressions.¹⁷⁸⁵

New Purpose: Using a methodology similar to Dan Cahn's 2008 study, the research will examine whether or not this new paradigm helps strengthen the effectiveness of mental practice in comparison to physical practice.

New Hypothesis: The researcher predicts that this new method will help make mental practice just as effective as physical practice, and the combination of mental and physical practice treatments will illustrate a higher efficiency rate than the prior research.

¹⁷⁸⁴ Byo and Cassidy, 33.

¹⁷⁸⁵ Cahn, 180.

Cash, Carla Davis. "Effects of Early and Late Rest Intervals on Performance and Overnight Consolidation of a Keyboard Sequence." *Journal of Research in Music Education* 57, no. 3 (October 2009): 252-266.
<http://jrm.sagepub.com/content/57/3/252> (accessed October 3, 2010).

Original Purpose: Cash wanted to examine how early, middle or late intervals of rest in the practice session would affect beginning keyboard players.¹⁷⁸⁶

New Purpose: Using a similar thought process to Cash, the researcher will examine how early, middle or late intervals of rest in the practice session would affect individuals who use this new paradigm.

New Hypothesis: The researcher predicts that a person who does well in the practice session, should put a rest interval early in the session so it can help continue and improve the amount of achievement gains.

Daniel, Ryan. "Self-assessment in performance." *British Journal of Music Education* 18, no. 3 (2001): 215-226.

Original Purpose: Ryan Daniel wanted to explore how music students self-evaluated their performances.¹⁷⁸⁷

New Purpose: Using this new method, the researcher, like Ryan Daniel, wants to explore how well individuals self-evaluate using this new method. Does this method help with self-evaluation and is the method of evaluating easier than other studies?

New Hypothesis: The researcher predicts that students will accurately and easily self-evaluate themselves using this practice method, and like Daniel, asserts that individuals will find more mistakes after hearing themselves than they can while they actually the instrument.

¹⁷⁸⁶ Cash, 114.

¹⁷⁸⁷ Daniel, 215.

Duke, Robert A. and Carla Davis. "Procedural Memory Consolidation in the performance of Brief Keyboard Sequences." *Journal of Research in Music Education* 54, no. 2 (Summer 2006): 111-124.

Original Purpose: Robert Duke and Carla Davis Cash wanted to observe the effects that consolidation would have on a simple musical task such as performing a keyboard sequence.¹⁷⁸⁸

New Purpose: The researcher wants to observe the effects that consolidation would have on this method using a similar methodology to Duke and Davis.

New Hypothesis: The researcher believes that like Duke Davis, he will also find that the participants who train on one day and get tested twenty fours later will have an increase in the correct number of notes and rhythms, which he believes will demonstrate overnight consolidation-based enhancements.

Duke, Robert A., Amy L. Simmons, and Carla Davis. "It's Not How Much; It's How: Characteristics of Practice Behavior and Retention of Performance Skills." *Journal of Research in Music Education* 56, no. 4 (January 2009): 310-321. <http://jrm.sagepub.com/content/56/4/310> (accessed September 25, 2010).

Original Purpose: Robert Duke et. al. wanted to assess the quality of a pianist's performance twenty-four hours after learning a difficult passage, and whether or not the practice behaviors could predict how the performance would turn out.¹⁷⁸⁹ In addition, the researchers would explain the practice behaviors of the top performers.¹⁷⁹⁰

New Purpose: The researcher wants to replicate Duke et. al's study but with different instrumentalists and with this new method and compare that with instrumentalists who do not use this method. Do different practice behaviors occur between the two different

¹⁷⁸⁸ Duke and Cash, 115.

¹⁷⁸⁹ Duke, Simmons and Davis., 114.

¹⁷⁹⁰ Ibid., 114.

methods? Do practice behaviors predict the performance outcome or does the method predict the performance outcome?

New Hypothesis: The researcher predicts that practice behaviors alone will predict the outcome of the performance and that the researcher will find no significant differences between the two methods.

Fortney, Patrick M. "The Effects of Modeling and Silent Analysis on the Performance Effectiveness of Advanced Elementary Instrumentalists." *Research Perspectives in Music Education* no. 2 (Fall 1992): 18-21.

Original Purpose: Fortney wanted to determine whether or not advanced elementary instrumentalists could benefit from using modeling and silent analysis if they integrated it into their practice sessions.¹⁷⁹¹

New Purpose: The researcher wants to determine whether or not adding a model or silent analysis to this practice paradigm would help advanced elementary instrumental students practice more effectively as opposed to those who just used the practice method.

New Hypothesis: The researcher predicts that those sixth graders who add a model to the new practice paradigm will make significant achievement gains over those students who just add silent analysis to the new practice method.

Geringer, John M. and Marilyn J. Kostka. "An Analysis of Practice Room Behavior of College Music Students." *Contributions to Music Education*, 11 (1984): 24-27.

Original Purpose: Geringer and Kostka observed how much time college level students actually spent practicing and not practicing while they sat in the practice room, and they

¹⁷⁹¹ Fortney., 18.

also compared their observations with results from a survey they administered to 100 music students at the University of Texas-Austin.¹⁷⁹²

New Purpose: The researcher wants to observed how much time college level students actually spent practicing and not practicing while they sat in the practice room and use this method, and then compare those observations with results from a survey they will administered to 100 music students at place of investigation.

New Hypothesis: The researcher predicts that the students will spend just as time engaged in practice activities as the results from Geringer and Kostka's study.

Ginsborg, Jane. "Classical Singers Learning and Memorizing a New Song: An Observational Study." *Psychology of Music* 30, no. 1 (2002): 58-101. <http://pom.sagepub.com/content/30/1/58> (accessed July 11, 2012).

Original Purpose: Ginsborg wanted to determine how singers utilized memorizing strategies, compare methods of memorizing music and finally wanted to investigate whether incidental or strategic memorizing gave rise to more achievement gains.¹⁷⁹³

New Purpose: The researcher wants to determine how singers utilized memorizing strategies, compare whether the new practice method or an individual's own practice method can help lead to better memorization and will investigate whether incidental or strategic memorizing will help give rise to more achievement gains.

New Hypothesis: The researcher predicts that the individuals who use the new practice method will memorize strategically and learn the music faster over those who create their own method.

¹⁷⁹² Geringer and Kostka., 24.

¹⁷⁹³ Ginsborg, 59-61.

Henley, Paul T. "Effects of Modeling and Tempo Patterns as Practice Techniques on the Performance of High School Instrumentalists." *Journal of Research in Music Education* 49, no. 2 (Summer 2001): 169-180. <http://www.jstor.org/stable/3345868> (accessed June 1, 2012).

Original Purpose: Henly wanted to determine how modeling and practice techniques that involved tempo effected high school students.¹⁷⁹⁴

New Purpose: The researcher wants to determine how modeling and practice techniques that involved tempo will affect the effectiveness of the newly proposed practice when high school instrumentalists use it in their practice sessions.

New Hypothesis: The researcher predicts that modeling will help high school instrumentalists have a more effective session while using this method and that the model will help give a guide to high school instrumentalists when they self-evaluate.

Hewitt, Michael P. "The Effects of Modeling, Self-Evaluation, and Self-Listening on Junior High Instrumentalists' Music and Performance and Practice Attitude." *Journal of Research in Music Education* 49, no. 4 (Winter 2001): 307-322. <http://www.jstor.org/stable/3345614> (accessed June 1, 2012).

Original Purpose: Hewitt wanted to observe whether or not models, listening to a recording of themselves, and self-evaluation could effect a junior high school student's performance or attitude.¹⁷⁹⁵

New Purpose: The researcher wants to observe whether or not models, listening to a recording of themselves, and self-evaluation can affect a junior high school student's performance or attitude.

¹⁷⁹⁴ Henly,, 171.

¹⁷⁹⁵ Hewitt 2001, 310.

New Hypothesis: The researcher predicts that this practice method with its' simpler self-evaluation method and lots of self-listening will help students make greater achievement gains over those students who do not use this method and just use a model to guide them.

Hewitt, Michael P. "Self Evaluation Tendencies of Junior High Instrumentalists." *Journal of Research in Music Education* 50, no. 3 (2002): 215-226.
<http://jrm.sagepub.com/content/50/3/215> (accessed July 11, 2012).

Original Purpose: Hewitt wanted to examine the self-evaluation tendencies of junior high musicians over a period of time, whether or not using a model could affect those self-evaluation tendencies and "if a relationship existed between self-evaluation accuracy and music performance achievement."¹⁷⁹⁶

New Purpose: The researcher wants to examine the self-evaluations of junior high musicians using this newly proposed model to determine if he could find a relationship between self-evaluation accuracy and music performance achievement like Hewitt.¹⁷⁹⁷

New Hypothesis The researcher predicts that in using a simpler self-evaluation method, junior high musicians can self-evaluate their performances after they have learned how to do it.

Leon-Guerrero, Amanda. "Self-Regulation strategies used by student musicians during music practice," *Music Education Research* 10, no. 1 (2008): 91-06.

Original Purpose: Leon-Guerrero wanted to find the verbalized practice strategies of adolescents as they practiced in front of a video camera recorder.¹⁷⁹⁸

New Purpose: The researcher wants to observe the practice strategies of adolescents as they practiced using this new method in front of a video camera recorder.

¹⁷⁹⁶ Hewitt 2002., 217.

¹⁷⁹⁷ Ibid., 217.

¹⁷⁹⁸ Leon-Guerrero, 95.

New Hypothesis: The researcher predicts that the adolescent participants will use high level practice strategies to help maximize their practice time.

Lim, Serene and Louis G. Lippman. "Mental Practice and Memorization of Piano Music." *The Journal of General Psychology* 118, no. 1 (January 1991): 21-30. Academic Search Premier, EBSCOhost (accessed July 11, 2012).

Original Purpose: Lim and Lippman wanted to explore how musicians could use mental practice as physical skill that involved the components of auditory, kinesthetic and visual when they played piano.¹⁷⁹⁹ Furthermore, they posited that the auditory component would make mental practice more effective.¹⁸⁰⁰

New Purpose: The researcher wants to observe whether or not Lim and Lippman's types of mental practice will prove beneficial or just as beneficial as regular practicing using this new method of practicing.

New Hypothesis: The researcher predicts that the types of mental practicing that Lim and Lippman describe in their 1991 study can prove just as beneficial as all physical practice.

Linklater, Fraser. "Effects of Audio- and Videotape Models on Performance Achievement of Beginning Clarinetists." *Journal of Research in Music Education* 45, no. 3 (Autumn 1997): 402-414. <http://jstor.org/stable/33455535>. (accessed June 1, 2012).

Original Purpose: Linklater wanted to observe how beginning clarinet students would respond to incorporating videotape and audio recordings into their practicing.¹⁸⁰¹

New Purpose: The researcher wants to determine whether or not adding an audio or videotape model to this practice paradigm would help students practice more effectively as opposed to those who just used the practice method.

¹⁷⁹⁹ Lim and Lippman., 22.

¹⁸⁰⁰ Ibid., 22.

¹⁸⁰¹ Linklater, 404.

New Hypothesis: The researcher predicts that he will not find any significant differences between the two.

Madsen, Clifford K. and John M. Geringer. "The Effect of a Distraction Index on Improving Practice Attentiveness and Musical Performance." *Bulletin of the Council for Research in Music Education*, no. 66/67 (Spring-Summer 1981): 46-52. <http://www.jstor.org/stable/40317665> (accessed July 11, 2012).

Original Purpose: Madsen and Geringer wanted to determine whether or not a distraction index would help students practice more effectively.¹⁸⁰²

New Purpose: The researcher wants to determine whether or not adding a distraction index to this practice paradigm would help students practice more effectively as opposed to those who just used the practice method.

New Hypothesis: The researcher predicts that he will not find any significant differences between the two.

McHugh-Grifa, Abigail. "A Comparative Investigation of Mental Practice Strategies Used by Collegiate-Level Cello Students." *Contributions in Music Education Research* 38, no. 1 (May 2011): 65-79. can't find the stable link. (accessed June 1, 2012).

Original Purpose: McHugh-Grifa wanted to observe whether or not different types of mental practice would prove beneficial or just as beneficial as regular practicing.¹⁸⁰³

New Purpose: The researcher wants to observe whether or not McHugh-Grifa's types of mental practice will prove beneficial or just as beneficial as regular practicing using this new method of practicing.

¹⁸⁰²Madsen and Geringer, 46.

¹⁸⁰³ McHugh-Grifa, 69.

New Hypothesis: The researcher predicts that the types of mental practicing that McHugh-Grifa describes in her 2011 study can prove just as beneficial as all physical practice.

Miksza, Peter. "The Effect of Mental Practice on the Performance Achievement of High School Trombonists." *Contributions to Music Education* 32, no. 1 (June 2005): 75-93.

Original Purpose: Miksza wanted to observe three different types of mental practice and also wanted to know if "locus of control and music audiation related to the effectiveness of mental practice."¹⁸⁰⁴

New Purpose: The researcher will observe the effectiveness three different types of mental practice found in Miksza's 2005 study and whether or not locus of control and music audiation relate to mental practice used with this new paradigm.

New Hypothesis: The researcher predicts that the three types of mental practice will have a more significant effect on an individual's practice session and that locus of control and music audiation will not relate to mental practice, even with this new paradigm.

Miksza, Peter. "Relationships Among Impulsiveness, Locus of Control, Sex, and Music Practice." *Journal of Research in Music Education* 54, no. 4 (Winter 2006): 308-323. <http://www.jstor.org/stable/4139753> (accessed September 30, 2010).

Original Purpose: Miksza wanted to observe how locus of control, impulsiveness and gender affected the effectiveness of practice sessions for college-level brass players.¹⁸⁰⁵

Miksza also wanted to observe the practice behaviors college-level brass players exhibited when they practiced an etude.¹⁸⁰⁶

¹⁸⁰⁴ Miksza 2005, 78.

¹⁸⁰⁵ Miksza 2006., 310.

¹⁸⁰⁶ Ibid., 310.

New Purpose: Like Miksza, the researcher would like to know how this new paradigm would affect locus of control, impulsiveness and gender among college-level brass players.

New Hypothesis: The researcher predicts that the practice paradigm will help higher impulsive individuals and females will use this method more effectively than men.

Oare, Steve. "Decisions Made in the Practice Room: A Qualitative Study of Middle School Students' Thought Processes While Practicing." *Update: Applications of Research in Music Education* 30, no. 2 (2012): 63-70.
<http://www.upd.sagepub.com/content/30/2/63> (accessed June 1, 2012).

Original Purpose: For this study, Oare wanted to know how middle school students set and use goals during their practice sessions.¹⁸⁰⁷ Next, he wanted to know what practice strategies middle school students employed while practicing.¹⁸⁰⁸ Third, the researcher wanted to examine how middle school students assessed their practice sessions and how their personal assessment influenced future goals they might set for themselves.¹⁸⁰⁹ Finally, he wanted to observe how their perceptions of self-efficacy effected the decisions they made while practicing.¹⁸¹⁰

New Purpose: The researcher will use a methodology similar to Oare and observe what strategies middle school students will use after listening to their initial performance and how reflecting on their practice sessions/performances affect their self-efficacy.

New Hypothesis: The researcher predicts that the paradigm will allow middle school students to use higher level practice strategies, and that listening and reflecting on their

¹⁸⁰⁷ Oare, 64.

¹⁸⁰⁸ Ibid., 64.

¹⁸⁰⁹ Ibid., 64.

¹⁸¹⁰ Ibid., 64.

practice sessions will allow them to maximize the practice time they set aside to work on their musical selections.

O'Neill, Susan A. "The role of practice in children's early musical performance achievement." In *Does Practice make perfect? Current theory and research on instrumental music practice*, edited by Harald Jørgensen and Andreas C. Lehmann, 54-67. Oslo: Norges musikkhogskole, 1997.

Original Purpose: Susan A. O'Neill wanted to explore why some children succeed in learning an instrument and while others do not, even though they have similar levels of ability and potential.¹⁸¹¹

New Purpose: The researcher wants to know whether or not this new paradigm can help students with similar levels of ability or potential achieve success despite differences in motivational patterns.

New Hypothesis: The researcher predicts that this new paradigm can help students will achieve success despite their motivational patterns. Furthermore, the researcher predicts that this new paradigm will help students with a maladaptive motivational pattern achieve success and possibly gain a more positive outlook on the success they achieve.

Rohwer, Debbie. "A Case Study of Adult Beginning Instrumental Practice." *Contributions to Music Education* 32, no. 1 (2005): 45-58.

Original Purpose: Debbie Rohwer wanted to observe and transcribe practice sessions of adult beginners in order to gain a better understanding of what they do and how to help them practice more efficiently.¹⁸¹²

¹⁸¹¹ O'Neill, 57.

¹⁸¹² Rohwer 2005., 47

New Purpose: The researcher wants to observe and transcribe the practice sessions of adult beginners as they use this new method to determine whether or not it helps them practice more efficiently.

New Hypothesis: The researcher predicts that this new method will help adult beginners practice more efficiently and gain an overall positive experience as they begin to learn their respective instruments.

Rosenthal, Roseanne Kelly, Mary Wilson, Madeline Evans, and Larry Greenwalt. "Effects of Different Practice Conditions on Advanced Instrumentalists' Performance Accuracy." *Journal of Research in Music Education* 36, no. 4 (December 1988): 250-257. <http://jrm.sagepub.com/content/36/4/250> (accessed October 20, 2010).

Original Purpose: Rosenthal et. al wanted to examine how five different practice conditions (modeling, singing, silent analysis, free practice, and control) can help an advanced instrumentalist's performance of a composition.¹⁸¹³

New Purpose: The researcher will reexamine these five different practice conditions using the newly proposed practice paradigm and determine whether or not those practice conditions prove effective in helping an advanced instrumentalist's performance of a composition.

New Hypothesis: The researcher predicts that modeling, silent analysis, and free practice will benefit from this new paradigm, but singing will not help an advanced instrumentalist perform a particular composition.

¹⁸¹³ Rosenthal et. al, 251.

Ross, Stewart L. "The Effectiveness of Mental Practice in Improving the Performance of College Trombonists." *Journal of Research in Music Education* 33, no. 4 (Winter 1985): 221-230. <http://jrm.sagepub.com/content/33/4/221> (accessed October 3, 2010).

Original Purpose: Stewart Ross wanted to observe the effectiveness of mental practice in relation to other forms of practice.¹⁸¹⁴

New Purpose: Following a methodology similar to Ross' 1985 study, the researcher will observe the effectiveness of mental practice in relation to other forms of practice using this new practice paradigm.

New Hypothesis: The researcher predicts that while using this new proposed method, the participants will effectively use different forms of mental practice as well as they do physical practice.

Simmons, Amy L. and Robert A. Duke. "Effects of Sleep on Performance of a Keyboard Melody." *Journal of Research in Music Education* 54, no. 3 (Autumn 2006): 257-269. <http://www.jstor.org/stable/4151346> (accessed July 11, 2012).

Original Purpose: Robert Duke and Amy Simmons wanted to determine whether or not experienced learners and their performances benefited from sleep-enhanced consolidation.¹⁸¹⁵ Furthermore, Duke and Simmons hypothesized that sleep-enhanced consolidation would help "speed, accuracy and evenness of motor skill."¹⁸¹⁶

New Purpose: Following a methodology similar to Duke and Simmons 2006 study, the researcher wants to determine whether or not sleep-enhanced consolidation can benefit experienced learners who use the newly proposed paradigm.

¹⁸¹⁴ Ross, 223.

¹⁸¹⁵ Duke and Simmons., 259.

¹⁸¹⁶ Ibid., 259.

New Hypothesis: Like Duke and Simmons, the researcher also predicts that sleep-enhanced consolidation, along with the method, will help speed accuracy and evenness of an individual's motor skill.

Wagner, Michael J. "The Effect of a Practice Report on Practice Time and Musical Performance." In *Research in Music Behavior: Modifying Music Behavior in the Classroom*, edited by Clifford K. Madsen, R. Douglas Greer, and Charles H. Madsen, Jr., 125-130. New York: Teachers College Press, 1975.

Original Purpose: Wagner wanted to determine whether or not time, (observed through practice reports) indicated whether or not the participants improved over the course of eight weeks.¹⁸¹⁷

New Purpose: The researcher wants to know whether or not time (observed through the number of pretest and posttest recording they make) indicate whether or not an individual will improve over the course of eight weeks.

New Hypothesis: The researcher predicts that time will not indicate improvement, but rather the pretest and posttest recordings will help the individual indicate whether or not they improve.

From this chapter, one can see how prior researchers can use this practice model to retest their theories and determine whether or not the data they collect in the new study contributes to the current trend or starts a new trend. Without proposing new, research-based practice models for future researchers to test, the research will undoubtedly stagnate. New research-based practice models will not only allow researchers to retest their theories, but will also allow for the exploration of new trends in the data that might exist but cannot be seen due to the limitations of the models.

¹⁸¹⁷ Wagner, 126-127.

CHAPTER FIVE: DISCUSSION

The primary purpose of this essay was to review the literature on practicing and distill certain techniques to create a research-based model that would help individuals practice. Now that the researcher has accomplished both of those tasks, certain questions still remain. What purpose does this model serve? Who can use this method? Can this model increase our understanding of how individuals practice? This chapter explores these questions and theoretically answers them since the researcher has not yet tested the model.

This researcher created the proposed model from the perspective of an actively performing musician examining the research instead of an academic creating a practice model for musicians. Furthermore, this researcher created a model that could help eliminate wasted time in the practice room and give an accurate assessment of what the individual(s) just did instead of resorting to speculation. In the research, one consistently observed how beginning musicians waste time, younger adult musicians resort to harsh (and sometimes unjustified or unwarranted) self-criticism, and how more experienced musicians express concern that they do not have enough practice time due to other external obligations. The practice model addressed all these concerns since it promotes not only a highly organized practice time, but also promotes a method of self-reflection that allows the individual to stay highly objective and create constructive criticism as opposed to resorting to becoming subjective and creating a destructive form of criticism.

In addition to establishing the model's purpose, the bigger question remains as to who can this practice paradigm. In theory, anyone (from begging musician and onwards) can use this model. This researcher has intended this model to help any individual practice and create a positive practice session. Yet, one must still exercise caution since research has shown that not all individuals can do critical and effective self-evaluations (see Hewitt 2002). So research will have to investigate at what age or at what stage of musical development does the individual start adopting a rigorous and strict practice paradigm for their practice sessions.

Furthermore, another question remains, however, "when should they use it?" This researcher believes individuals should use it all the time to help save time and energy while practicing. On the opposite side, however, one could posit that individuals who subject themselves to this intense labor could lose their intrinsic motivation due to the constant reflection and strict discipline that this model proposes. Clearly both possibilities can occur and researchers will have to investigate whether or not individuals should use this method all the time or only during certain occasions.

Along with who and when, this researcher also believes that this model can help future research increase our understanding of how individuals practice music. While Chapter 4 clearly demonstrates how researchers can revisit and collect more data using this method, new questions arise for researchers to explore. Future researchers, for example, should investigate what happens when individuals have different pieces of music on the stand instead just the music they originally intend to practice. How do different musical selections on a music stand affect the individual's ability to focus?

Does this create practice behaviors in the individual that may not normally occur if they only have one piece of music on the stand?

In addition to the music for the practice session, future researchers should ask several questions about the extra copies of music needed for the model. For example, future researchers should compare the differences between those who see a constant reminder of their errors and those who acknowledge their error in music but do not see a constant reminder of the error. Furthermore, future researchers should also investigate how keeping a record of the pretest-posttest score sheets can affect someone's outlook on their progress or lack of progress. Finally, researchers should also investigate if keep track of the results in a practice log affects motivational patterns. Can this possibly help someone who has a maladaptive motivational orientation switch to a mastery motivational orientation?

Following the exploration of how individuals use the music in this model, researchers will also have to investigate how several of the other tools can affect the practice session. First when examining the colored pen/pencil Future researchers will have to examine whether or not using a colored pen to mark on an extra piece of music could help musicians waste less time when trying to remember which errors they need to fix? Next, future researchers should explore in the future if using a metronome can help regulate a person's biological responses to the music. For instance, can someone's ability to take good breaths or use good bow strokes get affected if they do not use a metronome? Also, does the metronome also help provide an automatic focus to a practice session? Furthermore, how does the metronome affect the focus of a practice session? Finally, Future researchers should investigate whether or not sound recorded

digital practice logs paint a more accurate picture of an individual's practice sessions than written practice logs.

After examining the possibilities with the materials and how they effectively or ineffectively help the model, researchers should also investigate several areas of the procedure. First in the Pretest section, future researchers should examine how using a metronome in this section of their experiments affects the overall outcome of the experiment. Does this tool help the evaluator stay objective and concrete? Next, in the reflection section of both the pretest and the posttest, none of the current researchers have observed or measured the adrenalin levels of students after they have performed a pretest and then listened to themselves. Future research should determine whether or not this step allows individuals to relax so they can make accurate decisions or if they find the step unnecessary.

Most importantly, future research should investigate how giving the pretest results to the participant can influence their learning style and strategy selection for their practice session. One can only speculate that knowing the results of the pretest can overwhelmingly benefit the person in the practice session. Yet, researcher will have to investigate whether or not too much information can help or hinder the individual in their practice session.

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APPENDIX A

Theoretical Individual Practice Model

Tools

Music	Extra Music	Pencil
Colored Pencil	Metronome	Recording Device

Procedure

PRETEST

1. Secure the practice environment and get comfortable.
2. When ready, turn on the recording equipment, and then play through the section from beginning to end with a metronome. This step is novel, as none of the researchers had participants record a pretest with a metronome.
3. When finished, turn off the recording equipment and the metronome.

REFLECTION

1. Listen to the recording while reading the music, and do not score the performance. Individuals should use this time to not only listen to the performance, but also allow a period of relaxation after giving this initial performance.
2. Listen to the performance again and then score for two items, correct notes and rhythm. Mark each error for every incorrect note and every incorrect rhythm on the extra copy of the performance for the entire piece. Physically circle or slash notes where the infraction occurred with the pen.
 - a. Every error counts as a single error.
 - b. The researcher provides this equation for future researchers to explore: If the individual commits more than three note or rhythmic errors they must lower the metronome tempo one tempo indication.

- c. Notes and rhythms provide the basic structure of the piece and cannot be argued in a subjective measure.
- 3. If the individual feels comfortable and confident in their ability, listen to the performance for a third time and then score it for other musical markings (quality of articulation, dynamics, phrase markings, metric and harmonic inflections).
When marking, make sure to mark each error for these musical errors.
 - a. Every error counts as a single error.
 - b. The researcher provides this equation for future researchers to explore: If the individual commits more than five musical errors the individual should lower the metronome tempo.
 - c. Any musical indication (dynamics, articulation, pitch, ect.) on the page explicitly expresses the wishes of the composer. If the individual, for example, does not hear a crescendo and the composer has marked it, then the individual must mark it as error.
- 4. Do not the discard the copy of the music. The individual will use this again in the posttest and place this in the practice journal. The previously mentioned studies that use the pretest-posttest method have kept these pretest records so they can compare them with them posttest records.
- 5. After reviewing the pretest scores, individuals should now plan out their practice sessions, the goals they wish to accomplish and the appropriate strategies needed to overcome the challenges they found while giving this initial performance

PRACTICE SESSION

This section allows the individual to focus on specific obstacles apparent in the pretest.

1. In this section, individuals should use physical practice.
2. The individual should only practice the items that they need to address. The scoring from the pretest provides the individual with a concrete document with items that the individual should address so they may capitalize on the practice time they have available.
3. Use the appropriate learning styles and strategies to correct the errors made in the pretest.
4. Prior researchers have not specified a practice time limit, but most sessions that researchers have observed last anywhere from fifteen minutes to an hour. The number of infractions committed during the pretest plus the time it takes to correct them should equal the length of an individual's practice session.

POSTTEST

This allows for the individual to obtain a concrete example of whether or not they made achievement gains.

1. When ready, turn on the recording equipment, and then play through the selection from beginning to end with a metronome.
2. When finished, turn off the recording equipment and the metronome.

REFLECTION

The second reflection allows the individual to gauge the practice session as a whole and allows the individual to think about their progress on the musical selection they have selected to learn.

1. Listen to the recording while watching the music and do not score the performance. Individuals should use this time to not only listen to the performance, but also allow them to calm down after giving this performance.

Again, this step would seem novel since none of the researchers have observed or measured the adrenalin levels of students after they have given a pretest and then listened to themselves.

2. Listen to the performance again and then score for two items, correct notes and rhythm. Mark every incorrect note and every incorrect rhythm on the extra copy of the performance. Physically circle or slash notes where the infraction occurred with the pen.
 - a. Every error counts as a single error.
 - b. The researcher provides this equation for future researchers to explore: If the individual commits more than three note or rhythmic errors they must lower the metronome tempo one tempo indication.
 - c. Notes and rhythms provide the basic structure of the piece and cannot be argued in a subjective measure.

3. If the individual feels comfortable and confident in their ability, listen to the performance for a third time and then score it for other musical markings (quality of articulation, dynamics, phrase markings, metric and harmonic inflections). After scoring, compare these results with the pretest. Once the individual has compared the two results, they should then cross reference that with the results from earlier practice sessions.
 - a. Every error counts as a single error.
 - b. The researcher provides this equation for future researchers to explore: If the individual commits more than five musical errors the individual should lower the metronome tempo.

- c. Any musical indication (dynamics, articulation, pitch, ect.) on the page explicitly expresses the wishes of the composer. If the individual, for example, does not hear a crescendo and the composer has marked it, then the individual must mark it as error.
 - d. Consistency of articulation, consistency of tone, musical inflections
4. The individual should ask a few questions and answer with harsh honesty:
- a. Did I correct the errors committed during the pretest? If not, why?
 - b. Does my learning style or the strategies I used in this practice session benefit me while I worked on this piece? If not, why?
 - c. Did I make positive achievement gains? If not, why?
 - d. Am I happy with this practice session? If not, why?
5. Either write or state aloud the goals for the next pretest-practice-posttest session.