Mental Practice and Motor Imagery Techniques: A Practical Method for the Modern Flutist

By

Heidi M. Keener

A written project submitted in partial fulfillment of

the requirements for the degree of

Doctor of Musical Arts

(Flute Performance)

at the

UNIVERSITY OF WISCONSIN-MADISON

2023

Date of final oral examination: 5/03/2023

The written project is approved by the following members of the Final Oral Committee:

Conor Nelson, Associate Professor, Flute
Jeanne Swack, Professor Emerita, Musicology
Alicia Lee, Assistant Professor, Clarinet
Scott Teeple, Professor, Music

Acknowledgments

The completion of this project would not be possible without the support and assistance of the following individuals. I am deeply grateful for the tireless efforts of my professor and committee chair, Dr. Conor Nelson, who went above and beyond to advise, guide, challenge, encourage, and assist me through each step and challenge of the process. I want to thank my Doctoral Research Project Committee members, Professors Jeanne Swack, Alicia Lee, Scott Teeple, and former member, Charles Dill for serving generously with their time, enriching my work with pertinent questions, comments, and edits, and for extending uncommon patience and flexibility.

Many thanks to the participants of the survey for giving of their time to inform the project by sharing thoughtful answers, questions, perspectives, and experiences.

My former, current, and future students have contributed immeasurable insight and inspiration to the fruition of this method. I would not be the musician and teacher I am today without their constant sharpening of my ideas, causing me to dig deeper into concepts, explore creative solutions, and consider different perspectives.

I am grateful for the loyal support of my family through each endeavor. I am indebted to both my sister and significant other for endlessly listening to my conundrums, helping me process thoughts, providing timely synonyms, and sitting in silence on the phone through long nights of editing.

This project is dedicated to the memory of Dr. Stephen L. Gage, who showed me what it means to make an impact as a musician, challenged me to reimagine my future, and dared me to believe in the impossible.

Above all, I give thanks to God, the ultimate creator and sustainer, who provides me with daily strength and courage to develop the gifts and abilities He has given me.

Abstract

The profound benefits of mental practice and motor imagery techniques have been and continue to be explored in many different contexts to build skills and strengthen the mind-body connection. Studies on the efficacy of mental training and discoveries about brain plasticity show the exciting potential of non-physical practice. The idea of mental practice for musicians has been gaining more traction since the popularization of books including *The Inner Game of Tennis* by Timothy Gallwey (1974), *The Inner Game of Music* by Barry Green (1986), and *The Musician's Way* by Gerald Klickstein (2009). As a supplement to other existing resources, this project culminates in a practical method book designed specifically for flutists. In preparation for the project, I conducted a survey to discover some of the current attitudes and trends involving the use and teaching of mental practice among flutists. The results of the survey showed a large discrepancy between the knowledge and ideal utilization of techniques, as well as interest for a practical guide for flutists. This method seeks to provide approachable, step-by-step exercises that are designed specifically for flutists who are interested in incorporating non-physical practice methods. It poses responses to the following questions: Can mental practice techniques be taught? What are the basic elements involved in mental practice and how can they be targeted through a series of exercises? Through the application of specific exercises isolating and combining different techniques, flutists can deepen awareness, practice transitioning between external and internal music making, build confidence, and create an individualized routine through experience.

Table of Contents

Introduction

There is a wealth of research available on the subject of mental practice and its applications. Relevant discoveries regarding the neuroscientific basis of mental practice have been explored and applied through various techniques in many fields, including sports psychology, surgical training, neurological rehabilitation, and music performance.With all of the evidence supporting how mental practice enhances physical practice, it is surprising how many musicians do not fully understand the benefits or lack practical knowledge of how to consistently incorporate mental training strategies in daily practice sessions and performance situations. What are the current attitudes, trends, and techniques involving mental training among flutists? How are future performers and teachers learning about and incorporating mental practice? Is there an optimal ratio of mental practice in relation to physical practice?

My goal through this project is to explore these questions and present concepts, strategies, and exercises designed specifically for flutists who are interested in applying motor imagery techniques to their practice routines. To discover the level of interest in the flute community, I designed an anonymous, online survey. The responses provided an overview of the attitudes toward mental practice and its applications among current flute teachers at universities across the U.S. This project centers around a method book focused on mental practice and motor imagery techniques. In this method, I will describe and demonstrate strategies for incorporating mindfulness and awareness through a variety of exercises and concepts that can be applied to flute repertoire and adapted for performers and students of all levels.

Most musicians have heard of or have been exposed to mental practice ideas and strategies, yet the acceptance of this knowledge does not necessarily result in regular application. One theory for this disconnect is that physical practice is the default mode and new habits are not

easily formed. Even if the evidence points to increased efficiency in the long-term, learning new techniques takes extra time and may not feel practical at the moment. It is notable that the use of mental practice often begins out of necessity when an injury or circumstance makes physical practice difficult or impossible. Some might find that the concepts or terminology relating to mental practice are ambiguous, leading to uncertainty about how to apply these ideas in their practice routine.

The overall vision of this project is to show the profound value, power, and versatility of mental practice and motor imagery and to encourage creativity, innovation, joy, play, and flow in the process of music making. This will open doors for awareness and curiosity and provide tools for musicians who are neurodiverse, live with mental illness, or have physical limitations. Through the presentation of ideas and techniques that are congruent with current research on the brain, how we learn, retain knowledge, and build skills, a clear path will be created for building confidence, trusting instincts, and envisioning growth. A deeper understanding of learning and mastery, as supported by neuroscience, will develop through the synthesis of current knowledge with practical application. Clear explanations of motor imagery will further legitimize mental practice in the flute community, leading to more acceptance and confidence in applying strategies. This project will build on many of the excellent traditions we hold regarding the development of fundamentals.

The potential outcomes from “Mental Practice and Motor Imagery Techniques: A Practical Guide for The Modern Flutist” include a demonstration of practical applications of current knowledge about motor imagery and neuroplasticity. Readers will also gain an expanded view of the potential impact and versatility of mental practice. Strategies detailed in the method book will address tendencies, habits, and issues that most flutists experience. The application of

ideas, concepts, strategies, and exercises will lead to an increase in efficiency, creativity, and results in practice and performance as well as a decrease in tension and obstacles in the learning process. Performers who adopt these strategies in daily practice will gain tools for increasing confidence, consistency, and sharper intuition through cultivating awareness and a deeper internalization of musical concepts. Teachers will gain valuable tools to use with students who are struggling. These concepts also have the potential to help teachers develop a deeper perception of how their students are approaching sound, technique, and phrasing as well as how to address root issues. The method will provide students with strategies for improving both technique and aural skills through the experience of mental practice.

Summary of Literature Review

The first step in planning for this project involved reviewing literature on psychoneuromuscular theory, neuroplasticity, and the application of new discoveries about motor imagery in different treatments and therapies. The history of mental practice can be traced from the initial studies to recently published research exploring its application in sports training, surgical training, neurological rehabilitation, psychology, and music. Psychoneuromuscular theory, the idea that neural pathways can be strengthened through motor imagery, was originally suggested by the British physiologist William Benjamin Carpenter in 1874.[1] Research involving mental practice and neuromuscular theory has been gaining momentum since the 1960's. Neuromuscular theory proposes that visualization activates the same motor pathways as if the skill were physically performed, but at a sub-threshold level. Studies using EMG equipment have demonstrated this activation, which is comparable to physical movement but at a lower level.[2] Imagining an action in detail stimulates responses in the brain, muscles, and tendons that are similar to the responses

[1] William Benjamin Carpenter, *Principles of Mental Physiology, with Their Applications to the Training and Discipline of the Mind, and the Study of Its Morbid Conditions* (New York: D. Appleton and company, 1874) 11-14.

[2] Álvaro Pascual-Leone, "The Brain That Plays Music and Is Changed by It." *Annals of the New York Academy of Sciences* 930 (June 2001): 315–29.

that occur with actual physical movement. The brain sends signals to the muscles that are powerful enough to strengthen the neural pathways for specific movements without actually causing the muscles to contract. Cognitive theory suggests that imagery speeds up the acquisition of mental elements required for the performance of a skill. The athlete can also devise strategies and test solutions without the risk of injury or fatigue.[3]

We have evidence that Johannes Brahms, Arthur Rubinstein, Vladimir Horowitz, Glenn Gould, Walter Gieseking, and Fritz Kreisler all relied on mental practice techniques to hone their craft.[4] Many musicians have been impacted by books such as *The Inner Game of Tennis* (1974) by Timothy Gallway, *The Inner Game of Music* (1986) by Barry Green, and *The Musician's Way* by Gerald Klickstein (2009). In 1999, violinist Malva Fremuth authored a practical guide entitled *Mental Practice and Imagery for Musicians.* Dissertations and theses on the topic of mental practice and its applications for musicians include "Mental Representations in Clarinet Performance: Connections Between Auditory Imagery and Motor Behaviors" by David Allen Reed (2007), "The Use of Mental Imagery and Mental Rehearsal Techniques for Optimal Performance in String Players" by Ané du Toit (2015), and "Mental Practice in Music Performance: A Literature-Based Glossary and Taxonomy" by Susan Mielke (2016).
While these guides share a similar vision and demonstrate many excellent insights, they do not fulfill the need for a flute-specific guide. "Mental Practice and Motor Imagery Techniques: A Practical Method for the Modern Flutist" is the first resource specifically for flutists with a focus on this method of mastery. Its experimental nature is meant to challenge teachers, students, and performers to open their minds to future possibilities. The method book will provide teachers

[3] Caroline Palmer, "The nature of memory for music performance skills." In *Music, Motor Control and the Brain,* edited by Eckart Altenmüller, Mario Wiesendanger, and Jürg Kesselring (Oxford, New York: Oxford University Press, 2006), 39-53.

[4] Gerald Klickstein, *The Musician's Way: A Guide to Practice, Performance, and Wellness* (Oxford; New York: Oxford University Press, 2009), 35.

with additional tools for empowering students and guiding them through challenges. It will be a valuable resource for performers who are seeking practical strategies for increasing awareness and efficiency, preventing overuse injuries, and maintaining and increasing skills during situations where physical practice is not possible.

Explanation/Summary of Survey

In the second stage of preparation for the method book, I designed a survey for current university flute instructors for the purpose of gathering information, measuring interest, and discovering current beliefs about mental practice. This questionnaire was circulated to assess attitudes toward mental practice and strategies employed in practice, performance, and teaching. The survey, titled "Current Attitudes and Trends around Mental Practice," included both tenured and non-tenure track faculty currently teaching applied flute courses at universities in the U.S. This subject pool was chosen because of their role in mentoring the next generation of flute teachers and performers. Participants were invited to share information about their practice habits and those of their students. Questions focused on the knowledge and application of mental practice techniques for the purpose of gaining insight into how the flute community is engaging with the topic. The survey was conducted in February 2022 and resulted in 126 respondents out of 475 invitations.

Survey responses showed a high level of interest in mental practice. Many individuals are aware of the benefits of mental practice and mindfulness techniques and are already incorporating them. Some are not familiar and want to learn more. The majority of respondents who indicated a strong grasp of the material also admitted a lack of corresponding application. It is encouraging to see shifts in how teaching is approached. There is an openness and desire for more evidence-based techniques and sustainable practices. The survey results

highlighted terms and ideas that needed to be clearly defined and explained. They also showed an overwhelming amount of interest and need for a resource. Participants had the opportunity to ask questions and give comments. A high percentage indicated that a technique guide would potentially be valuable for them and their students. The survey provides valuable insight into how open the flute community is to exploring different methods as well as helping to narrow down which techniques might have the most impact for flutists in the future.

Summary of Method Book

The method book will focus on mental practice strategies for flute players in practice, performance, and teaching. Techniques and exercises are organized by difficulty into two groups: 1) hybrid techniques creating a link between physical and mental practice and 2) purely mental techniques. The scope of this project is narrow to reflect experience and knowledge as it pertains to flutists and to provide greater depth and specificity as opposed to a generalized guide for musicians. Focusing the project in this way has the potential to yield transferable concepts that non-flutists can apply using their unique knowledge and expertise.

The introduction provides definitions for key terms that will be used throughout the book. It continues to explore why mental practice is relevant and describes how flutists in various stages and career paths might benefit from employing the strategies presented through the method. The first chapter of the method book explores beliefs that can affect our approach to growth and learning, and how deeper awareness can bring freedom and healing. It is necessary to strengthen the potential impact of this method by challenging harmful ideas that are strongly rooted in Western culture. Some of these ideas are employed with good intentions, but they can easily be misinterpreted and misused. Classical music as an art form cannot exist without placing

a high value on history and tradition, but its future security depends on recognizing when change is necessary and which traditions no longer serve us.

Chapter two begins laying the foundation with hybrid techniques. These simple, yet powerful exercises are designed to focus awareness on the most basic movements. As these movements become more efficient, there is more energy available for musical expression. Both the body and mind become more free to sense subtle variations in how the air is engaged and how movement affects sound. The exploration of hybrid techniques is continued in the third chapter, where the activities and exercises are designed to bring awareness to the body as the instrument. Understanding how to engage the air during inhalation and exhalation and sensing where the sound resonates helps the reader to internalize the experience of music making and prepares them to explore practice strategies without the instrument in hand.

Chapter four introduces strategies for becoming more comfortable with motor imagery practice. A variety of exercises are presented for technique, audiation and transposition, sight-reading and memorization. The fifth and final chapter demonstrates how mental practice and motor imagery techniques can be employed to sharpen awareness, creativity, and imagination through everyday encounters with both music and sound in general.

Mental Practice and Motor Imagery Techniques: A Practical Method for the Modern Flutist

PREFACE

The goal of this method book is to equip the reader with tools for gaining fluency and consistency in mental practice techniques. These practical, flute-specific ideas and exercises are designed for application at any level, and present a model for breaking down concepts in teaching. Far from being comprehensive, this guide provides a starting point or a revitalization for your individual journey of exploration, creativity, freedom, and growth and serves to spark further conversation and interest in the flute community.

INTRODUCTION

What is mental practice? This simple, powerful, yet often vague concept requires some explanation before discussing possible applications. There isn't one authoritative definition for the term. It could refer to several different meanings or include a variety of techniques. It is clear however that there is special attention on the mind and our internal experience as opposed to habitual practice where the mind is disengaged and the body is merely going through the motions. With this understanding, all practice should be mental practice.

While mindset, mindful practice, and awareness are certainly discussed throughout this guide, the primary focus will involve strategies for becoming confident with non-physical practice techniques. This process begins by using modified or minimal approaches to physical practice. It slowly progresses to practice techniques that do not require an instrument or even physical movement. The following list includes definitions for mental practice as well as the different components involved, including kinesthetic motor imagery, visual motor imagery, visualization, audiation, and mindfulness.

Mental practice: "The mental rehearsal of a specific task in the absence of actual physical movement."[5]

Kinesthetic motor imagery: The ability to imagine the physical sensation of a movement without any muscle movement or engagement.[6]

Visual motor imagery: The ability to visualize a movement in the mind's eye.

Visualization: The ability to combine memory and imagination to create a mental picture or scenario of a future event.

---

[5] Palmer, 43.

[6] Th. Mulder, "Motor imagery and action observation: cognitive tools for rehabilitation," *Journal of Neural Transmission* 114, no. 10 (2007): 1265-78.

Audiation: “The hearing of music in one’s mind when the sound is not physically present.”[7]

Mindfulness: “Mindfulness is the process of actively noticing new things.”[8]

Why mental practice?

The benefits of mental practice have numerous applications in sports psychology, surgical training, neurological rehabilitation, and music performance. While mental practice cannot fully replace physical practice, it does offer many benefits in situations where normal practice is not possible due to location, time of day, or physical limitations. Studies show that mental practice combined with physical practice is as effective, and often more effective than physical practice alone. Although mental practice is useful in the beginning stages of learning a skill, its effects become even more powerful as our skill increases.[9]

The goals for this method book include exploring ideas on mental practice and mindfulness to discover and develop techniques for increased efficiency in practice, improving focus and awareness, strengthening confidence, enhancing performance experiences, delaying the point of diminishing returns, reducing tension, and avoiding injury. There are unlimited possibilities for improving awareness and mindfulness through experimenting with mental practice techniques in teaching, practice, and performance. There are many applications for pure mental practice techniques as well as hybrid techniques that link physical and mental practice.

Why is this important now?

Flutists celebrate a rich history that includes the development of the modern flute, world-class performers, influential pedagogues, thorough methodology, and a vast, quickly growing collection of repertoire. As the quality, flexibility, and expressive capabilities of the flute have steadily advanced, performers have been challenged by increased demands in the repertoire and the standard of playing has risen significantly. The challenges musicians face today are very different from those experienced twenty years ago. We are more connected than ever and have greater access to resources and technology, yet building a career has become increasingly complicated. Uncertainty, overstimulation, external and internal pressure to achieve can lead to higher levels of low self-esteem, stress, anxiety, depression, and burnout.

Although there has been a greater emphasis on mental health and mindfulness in some circles, the way classical musicians are trained has remained fundamentally the same for the past century. Many professional musicians and students learn or practice some form of mindfulness, meditation, yoga, body mapping, the Alexander Technique, or the Feldenkrais Method, but

---

[7]Edwin Gordon, “Research studies in audiation: I,” *Bulletin of the Council for Research in Music Education* 84, (1985): 34-50.

[8]Harvard Business Review, “Mindfulness In the Age of Complexity: an interview with Ellen Langer by Alison Beard,” in *Mindfulness* (Boston, Massachusetts: Harvard Business Review Press, 2017), 4.

[9]Palmer, 43.

struggle to apply concepts that could create a lasting impact on their practice, performance, and teaching methods. The process of “unlearning” harmful habits and toxic mindsets is particularly difficult in a field when certain values and beliefs seem to be in opposition.

Who is this book for?

Flutists (and other musicians)

As indicated in the title, this method is primarily designed for people who interact with the flute at some level. The community of flutists is diverse. Teachers, students, performers, and flute enthusiasts alike can apply these concepts and exercises to elevate their experience and enjoyment of the instrument. This invitation to explore mental practice techniques is meant to include those who have physical, sensory, cognitive, psychological, or invisible disabilities, those who are neurodivergent, and those who are dealing with injury, chronic pain, occasional discomfort, or performance anxiety. The scope of this guide is intentionally narrow to provide greater depth and specificity as opposed to a generalized guide for musicians. Because of the many innate similarities across instrumental techniques and music making in general, other musicians may also benefit from adapting some of these ideas to fit specific needs.

Teachers

This method book will provide flute teachers with additional tools for empowering students and guiding them through individual challenges and learning differences. Teachers will gain valuable strategies to use with students who are struggling, frustrated, have limited endurance, or experience limited success with typical methods. These concepts also have the potential to help teachers develop a deeper sense and more accurate perception of how students are approaching sound, technique, and phrasing as well as how to address root issues.

Students

Students will gain strategies for improving both technique and aural skills through the experience of mental practice. This method addresses tendencies, habits, and issues that many flutists experience. Increased efficiency, creativity, and results in practice and performance as well as a decrease in tension and obstacles in the learning process, are all possible outcomes from the application of mental practice techniques.

Performers

Performers of all levels and goals including professionals, doublers, amateurs, and students, can benefit from the application of mental practice. The activities, exercises, and concepts presented in this book are designed to be used at any pace or experience level. Flutists who adopt strategies

in daily practice will gain tools for increasing confidence, consistency, and sharper intuition through cultivating awareness and a deeper internalization of musical concepts. This method is also a resource for performers who are seeking practical strategies for increasing awareness and efficiency, preventing overuse injuries, or maintaining and increasing skills during situations where physical practice is not possible. Widespread exploration of these and other mental practice techniques has great potential in leading to a decrease in overall fatigue, tension, pain, overuse injuries, performance anxiety, plateaus, and burnout.

Disclaimer

While it is reasonably safe to say nearly everyone can benefit from increased awareness and the ability to internalize skills, it is important to understand that results are individual. Not everyone will experience the same type, level, or speed of development. We all come from different backgrounds, are on different journeys, and have different ways of experiencing the world. These differences can affect our level of awareness with our internal, physiological, and sensory experience. Not everyone can visualize/audiate as clearly. Some of us are primarily verbal thinkers, visual thinkers, or a mix of both. We don't experience the same level of kinesthetic awareness. Certain ideas will resonate with some musicians more than others. Flutists who are disabled, neurodivergent, or have mental health challenges may find some of these strategies to be extremely useful, in need of modification, or only slightly relevant. The challenge here is to adjust this method to work for you. Alter the concepts and activities as needed. Use your strengths and abilities and cultivate openness to develop areas of weakness. Allow the process to be imperfect, uncomfortable, and messy. Recognize that being skeptical is normal and often healthy.

CHAPTER ONE
WHAT DO YOU BELIEVE?

Five Basic Attitudes

There are five basic attitudes toward mental practice.

1. Unfamiliar with techniques and benefits.
2. Familiar with techniques and dubious of benefits.
3. Familiar with techniques and benefits, but application is inconsistent.
4. Familiar with techniques and benefits, but application is insufficient.
5. Knowledge of techniques and benefits is applied consistently and efficiently.

Which attitude do you most identify with most? Which would you like to identify with? No matter which category you find yourself in, it is always possible to gain more confidence, incorporate more techniques, and move to the next level. Our experiences are shaped by a combination of belief matched with action. What do you currently believe about the benefits of mental practice? In *Mindset: The New Psychology of Success,* Carol Dweck explores the impact of approaching life with a fixed mindset versus a growth mindset. Individuals with a fixed mindset believe that their abilities and capacity to learn are stable and do not change once the brain is fully developed. Those with a growth mindset believe that potential is unlimited and can be shaped throughout life.[10] With any method or strategy, results differ on an individual level. In most cases, there is also a correlation between mindset and results. If we believe in something or approach it with an open mind, we have a much higher likelihood of investment/engagement as well as a higher level of intention.

The following list represents some of the possible benefits of exploring mental practice.

1. Reduced tension
2. Increased efficiency
3. Improved focus and mind-body awareness
4. Enhanced creativity
5. Accuracy/efficiency with diagnosing issues
6. Versatility and mobility in practice
7. Application at any skill level
8. Further growth as skills are acquired[11]
9. Sharper listening and aural skills
10. Management or reduction of performance anxiety

---

[10]Carol S. Dweck, *Mindset: The New Psychology of Success* (New York: Ballantine Books, 2016), 12-13.

[11]Palmer, 43.

11. Healthier relationship with practicing
12. Greater enjoyment in the learning process
13. Patience and acceptance
14. Deeper knowledge of the score, including formal, harmonic, and rhythmic analysis
15. Improved technique, rhythm, musicality, and delivery

Limiting Beliefs

Why do we limit ourselves and how does belief interact with our experience? Sometimes fear of disappointment causes us to lower our expectations. We naturally use our memory and past experience to solve problems and make decisions. However, it is important to recognize and question assumptions and mindsets. Our past experience does not have to dictate the future, and growth is not always linear.

Harmful Beliefs

It is necessary to challenge specific harmful ideas that are strongly rooted in Western culture. Some of these ideas are used with good intentions, but they can easily be misinterpreted and misused. It is important to explore how these beliefs affect our approach to growth and learning and how deeper awareness can bring freedom and healing.

Examples of Harmful Beliefs:

No pain, no gain.

> Discomfort is often necessary for experimentation and progress, but pain is the body's signal that something is wrong, we have pushed past a healthy boundary, or it is time to rest/recover.

What doesn't kill you makes you stronger.

> New research shows that instead of generating resilience, stress is more likely to cause even greater sensitivity to future trauma.[12] Instead of glorifying the stress or trauma as the catalyst for strength and growth, why not recognize the importance of the response to the difficulty instead?

[12]Cristina A. Fernandez, Karmel W. Choi, Brandon D. L. Marshall, Benjamin Vicente, Sandra Saldivia, Robert Kohn, Karestan C. Koenen, Kristopher L. Arheart, and Stephen L. Buka, "Assessing the Relationship between Psychosocial Stressors and Psychiatric Resilience among Chilean Disaster Survivors," *The British Journal of Psychiatry* 217, no. 5 (2020): 630–37.

More/bigger/faster = better.

There is a time for expanding our limits, but there will always be someone who can play xyz better than us. Instead of falling into the trap of comparison, why not focus on and cultivate our unique strengths?

Activity = productivity.

Filling our schedules to the maximum without intentionality and going through the motions of constant activity day after day is like running on a treadmill. It takes a lot of energy and looks impressive, but we aren't actually moving forward.

Productivity = value.

What we are able to accomplish, achieve, or contribute is not linked in any way to our intrinsic worth. It is unlikely that anyone would admit to believing the alternative, but why do we hold on to internal and external pressures and expectations that seem to perpetuate this mindset? When we fully realize and embrace our value, we naturally become more motivated, creative, and effective.

Practice makes perfect.

Perfection is a lie. There is no amount of practice or preparation that can completely shield us from mistakes. Imperfection comes with being human. Perhaps there are more meaningful reasons to practice and prepare, such as improving communication and connection through music.

You should be ashamed if you're not practicing x hours per day.

Shaming ourselves or others about practice habits can be effective - until it isn’t. General guidelines can be helpful, but quantity does not equal quality, and each individual has different needs and challenges.

Someone else is working harder than you.

Perhaps this is true, but you could work more efficiently and end up being just as successful if not more so.

You have to work harder and longer than your competition to be successful.

In a competition environment, everyone has different strengths and weaknesses. Some have more competition experience. Some are more prepared, but have more difficulty in performance situations. Of course, careful preparation over time is essential, but the idea that working longer than anyone else will yield the best results is unrealistic and harmful.

Growth should be linear.

Yes, the shortest distance between two points is a straight line, but human development and growth is complex and individual. What may look like a setback to us could very well be an opportunity for valuable insights and discoveries.

Failure should be avoided.

There are so many stories involving massive amounts of failure leading to moments of discovery and success. Discovering every strategy that does not work is just as useful as discovering the answer. Children learn with staggering efficiency during their first few years because they approach the world like a giant playground. There is no self-judgment, only curiosity and play.[13]

Failure is the result of not trying hard enough.

As mentioned previously, there is no way to fully prevent disappointments or errors from occuring, even at the highest levels of experience and mastery. The intentional avoidance of rejection or mistakes can often play a role in sabotaging our true potential.

Negative emotions should be avoided.

The advice to focus on the positives and avoid voicing doubts, fears, or insecurities may be well-intentioned, but it is much more helpful to acknowledge and validate these feelings, accepting them as a normal part of being human.

Never show weakness.

Acknowledging weakness and showing vulnerability is a sign of great strength and self-compassion. The people we look up to the most are often those who are courageous enough to be honest about their own experiences, struggles, and shortcomings.[14]

Struggling is a sign of low intellect or ability.

Struggling is a healthy, normal part of development. Though most of us would never voice our feelings of frustration or impatience in regards to someone else's struggle, we must practice being aware of our assumptions about what is easy or difficult or how long it should take to learn something.

You can sleep when you're dead.

Knowing what we do about the importance of sleep for overall physical and mental health, it is time we stop joking about sacrificing essential sleep or bragging about how

---

[13] Samuel H. Nelson and Elizabeth L. Blades, *Singing with Your Whole Self: A Singer's Guide to Feldenkrais Awareness through Movement* (Lanham, Maryland: Rowman & Littlefield, 2018), 2-3.

[14] Brené Brown, *Daring Greatly: How the Courage to Be Vulnerable Transforms the Way We Live, Love, Parent, and Lead* (New York, NY: Gotham Books, 2012), 33-37.

> effective we can be with very low levels of sleep. These attitudes are also damaging to those who live with chronic sleep issues. All the productivity and mindfulness techniques combined will not have the desired effect if we are sacrificing essential sleep, nutrition, exercise, and relationships. As a culture, we are obsessed with activity, and because of this, sleep tends to be the first area to suffer. In his book, *Why We Sleep: Unlocking the Power of Sleep and Dreams*, Matthew Walker writes, "Sleep is the single most effective thing we can do to reset our brain and body health each day." and "our lack of sleep is a slow form of self-euthanasia."[15]

Fake it until you make it.

> Yes, there is psychological support for certain external cues, such as smiling to feel a boost of positivity, or standing in a way that exudes confidence. However, these strategies do not adequately address the deep-seated insecurities that come with imposter syndrome. If we feel that we are lacking, inauthentic, or do not belong in certain situations or environments, acting out a role can be effective for a while, but it ignores and shuts down uncomfortable emotions, leading to increased anxiety and burnout. Instead, why not focus on one or two truths that validate our belonging, no matter how small? Some examples could include, "I want to be here," "I am doing my best," or "I have the courage to face challenges."

These and many other unhelpful phrases are often used with good intentions. The first step in challenging these ideas is to notice when and how we use them. Questioning the context of these statements and clarifying what we actually mean is the next step in shifting our thinking.

Another important area to address is the destructive thoughts we experience. Many of us experience obtrusive, toxic thoughts when we fail to meet internal or external expectations. A helpful practice is to notice these thoughts and take an extra step of courage by writing them down. A few hours or days later, read through the thoughts, but imagine that your student, friend, partner, or family member is saying these things about themselves. How would you respond? What would you say to validate the emotion behind the thought while encouraging a healthier approach?

In order to begin challenging habitual thought patterns, an attitude shift is necessary. In *Mindset: The New Psychology of Success,* Carol Dweck describes the ramifications of nurturing a fixed mindset or a growth mindset. Approaching life with a fixed mindset involves the belief that an individual's abilities and intelligence are decided from birth, and there are set limits to learning and development. The growth mindset is foundational to the belief that individual potential is

---

[15]Matthew P. Walker, *Why We Sleep: Unlocking the Power of Sleep and Dreams* (New York, NY: Scribner, an imprint of Simon & Schuster, Inc., 2017), 12.

unknown, without set limits, and skills can be developed significantly beyond natural aptitudes.[16] One factor that indicates our mindset in a given situation is how we view challenges. Do we become too focused on outcomes and external indicators of success, becoming frustrated and impatient when difficulties arise, or do we become more fully engaged in the process, remaining curious and flexible to explore out-of-the-box solutions? Moshe Feldenkrais champions a childlike approach to learning in the Feldenkrais Method, using gentle movement to access the innate wisdom of the body.[17] The method invites the deconstruction of ideas surrounding failure, success, perfection, frustration, and attaching morality to our learning experience or outcomes.

Embracing the discomfort that comes with challenge leads to more frequent experiences in the flow state. Mihaly Csikszentmihalyi defines flow as, "A state in which people are so involved in an activity that nothing else seems to matter; the experience is so enjoyable that people will continue doing it, even at great cost, for the sheer sake of doing it."[18] It involves a careful balance of enjoyment with challenge. It is important to recognize the point of diminishing returns in this process as openness to discomfort and struggle must not be confused with habitually pushing past physical, mental, and emotional limits. In the flow state, we can ask outrageous questions, imagine new possibilities, and play with variables instead of being overly concerned with doing things the correct way. Mistakes become opportunities to discover unexpected options.[19]

Fears, doubts, and internal/external expectations are a natural part of the human experience. Instead of avoiding or dismissing them, what if we were to sit with the fears, name them for what they are, and be honest with ourselves about what is at stake?[20]

---

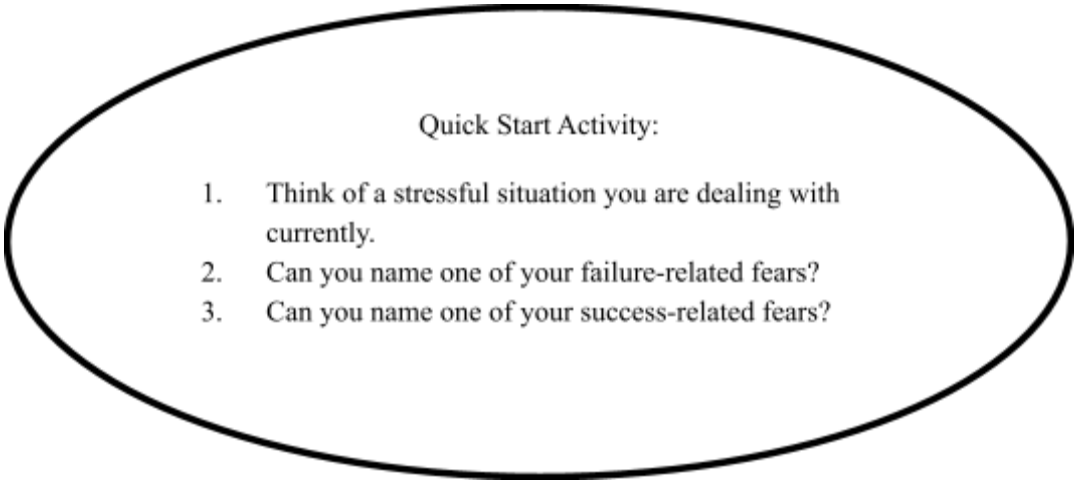
[16]Carol S. Dweck, *Mindset*, 13-15.

[17]Moshe Feldenkrais, *The Elusive Obvious: or, Basic Feldenkrais* (Cupertino, CA: Meta Publications, 1981), 29-31.

[18]Mihaly Csikszentmihalyi, *Flow: the Psychology of Optimal Experience* (New York: Harper Perennial, 2008), 4.

[19]William Westney, *The Perfect Wrong Note: Learning to Trust Your Musical Self* (Pompton Plains, N.J.: Amadeus Press, 2003), 72-73.

[20]Brené, Brown, *Atlas of the Heart: Mapping Meaningful Connection and the Language of Human Experience.* (New York: Random House, 2021), 83-84.



Additional Questions for Reflection:

Can you name your deepest fear?
What are your internal expectations?
What are some expectations you feel from external sources?
What might success look like in this situation?
How would you define failure in this situation?
What do you have to lose if things do not turn out as planned?

CHAPTER TWO
HYBRID TECHNIQUES - PREPARING FOR MENTAL PRACTICE PART 1

Slowly Letting Go of the Flute

What are hybrid techniques? The term suggests a mixture or a gray area between engaging in physical practice and mental practice occuring in the imagination alone. The following techniques provide a starting point for shifting awareness away from the flute to our internal experience. With the flute in hand, we deliberately alter our approach to highlight specific areas in need of attention. The flute is merely the tool of choice for executing our skill and expressing and interpreting music.

Gentle practice techniques act as a link or bridge between physical practice and pure motor imagery. As we become more comfortable with altered, hands-on approaches to the instrument, physical practice will be reinforced and mental practice will become more attainable. Several of these strategies will be very familiar. Often, they involve removing one or more variables to test and strengthen another variable. What are some new ways to apply these techniques?

Finger Pressure Calibration

At any point in the development and maintenance of technique, it is crucial to address the most fundamental elements of movement. The approach to finger movement affects tone/resonance, technique, air control, and flexibility. Regularly checking in and recalibrating finger pressure and range with simple finger-motion exercises is an effective way to prevent future issues, begin to correct current issues, and increase accuracy and quality.

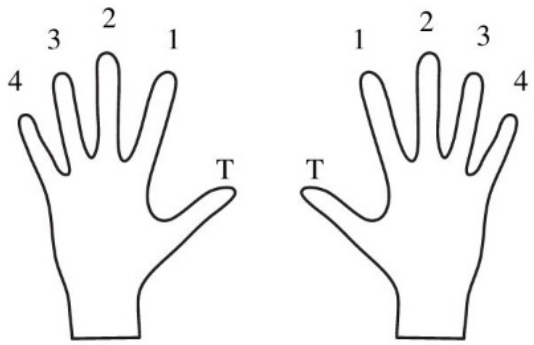
These exercises are essential for beginning students and can be used and adapted at any level to improve digital facility and sharpen awareness of tension. Our work in this area is never finished. Refinement is an ongoing process at any level of experience. As our bodies and brains develop and change, we must continually make adjustments in our approach to technique. It is important to address issues with extra movement and pressure before and during any exploration of motor imagery practice to avoid transferring any unnecessary or harmful habits. The goal of these exercises is to first become aware of your current level of tension and to slowly reduce the tension as you retrain your finger motion.

Quick Start Activity:

1. Rest the fingertips of your dominant hand on a flat surface.
2. Support the wrist with your other hand.
3. Lightly and slowly tap one finger at a time.

Explanation of Finger System:

The calibration exercises adopt the finger number system in the following image, as it provides clarity and simplicity while practicing with and without the flute. As there isn't a universal number system among flutists and many of us are familiar with using the numbers one through five for piano fingerings, make sure to give yourself ample time to adjust if this is difficult. The thumb is indicated by "T", and the numbers one through four are used for the remaining fingers.



Instructions for Finger Pressure Calibration Exercises:

1. Rest your fingertips on a flat surface with the wrist and elbow slightly elevated.
2. While practicing the pattern with one hand, gently hold the wrist with your other hand.
3. Lightly and slowly tap each finger four times in a row following the patterns.
4. Any digits not engaged in movement will be in resting position and remain as motionless as possible.
5. Abbreviations: LH = left hand, RH = right hand, and LH+RH = both hands together.

6. Imagine a seesaw motion between finger changes. The last tap of the thumb acts as a springboard, passing energy and leverage to lift the first finger, etc.
7. Imagine a suspension of gravity where the fingers float spontaneously from the table or surface.

Goals for Exercises 1-4:

1. Practice slowly and deliberately, repeating each step once.
2. Notice any finger tension, unevenness, inconsistency, or extra movement.
3. Notice any tension in the wrists.

Exercise 1 - Contrary Motion

1. LH: TTTT-1111-2222-3333-4444-3333-2222-1111-TTTT
2. RH: TTTT-1111-2222-3333-4444-3333-2222-1111-TTTT
3. LH+RH: TTTT-1111-2222-3333-4444-3333-2222-1111-TTTT

Exercise 2 - Parallel Motion

1. LH: TTTT-1111-2222-3333-4444-3333-2222-1111-TTTT
   RH: 4444-3333-2222-1111-TTTT-1111-2222-3333-4444
2. LH: 4444-3333-2222-1111-TTTT-1111-2222-3333-4444
   RH: TTTT-1111-2222-3333-4444-3333-2222-1111-TTTT

Exercise 3 - Contrary Skips

1. LH: TTTT-2222-4444-2222-TTTT-3333-1111-3333-TTTT
2. RH: TTTT-2222-4444-2222-TTTT-3333-1111-3333-TTTT
3. LH+RH: TTTT-2222-4444-2222-TTTT-3333-1111-3333-TTTT

Exercise 4 - Contrary Skips Continued

1. LH: TTTT-2222-4444-2222-3333-1111-2222-TTTT
2. RH: TTTT-2222-4444-2222-3333-11112222-TTTT
3. LH+RH: TTTT-2222-4444-2222-3333-1111-2222-TTTT

Questions for Exercises 1-4:

1. Is there additional tension or pressure during the transition from one finger to the next?
2. What adjustments were you able to make while repeating each step?
3. Where does the motion begin anatomically?

Tips for Exercises 1-4:

1. You may notice movement or tension in neighboring digits while moving weaker fingers. If this occurs, rest for a few seconds, then resume the pattern with slower, smaller, and softer movements. It is normal to experience at least some extraneous movement. Focus on reducing this movement rather than eliminating it completely.

2. Try repeating the contrary patterns with the fingertips resting against each other, in midair, and using motor imagery.

3. A few minutes of patient attention to these movement patterns can yield surprising results. Once the patterns are memorized, try combining them with a relaxing or passive activity in your routine (watching a show, listening to a podcast, etc.).

Additional Instructions for Exercises 5-8:

1. The next patterns involve combining two or three fingers in each hand.
2. The finger numbers in parentheses are to be moved simultaneously.
3. Try each hand individually, then combine both hands.

Goals for Exercises 5-8:

1. Practice slowly and deliberately, repeating each step once.
2. Notice any finger tension, unevenness, inconsistency, or extra movement.
3. Notice any tension in the wrists.

Exercise 5 - Combined Finger Movements

1. LH: (T1)(T1)(T1)(T1)-(12)(12)(12)(12)-(23)(23)(23)(23)-(34)(34)(34)(34)
2. RH: (T1)(T1)(T1)(T1)-(12)(12)(12)(12)-(23)(23)(23)(23)-(34)(34)(34)(34)
3. LH+RH: (T1)(T1)(T1)(T1)-(12)(12)(12)(12)-(23)(23)(23)(23)-(34)(34)(34)(34)

Exercise 6 - Combined Finger Movements Part 2

1. LH: (T1)(T1)(T1)(T1)-(23)(23)(23)(23)-(T4)(T4)(T4)(T4)-(13)(13)(13)(13)
2. RH: (T1)(T1)(T1)(T1)-(23)(23)(23)(23)-(T4)(T4)(T4)(T4)-(13)(13)(13)(13)
3. LH+RH: (T1)(T1)(T1)(T1)-(23)(23)(23)(23)-(T4)(T4)(T4)(T4)-(13)(13)(13)(13)

Exercise 7 - Combined Finger Movements Part 3

1. LH: (T24)(T24)(T24)(T24)-(13)(13)(13)(13)
2. RH: (T24)(T24)(T24)(T24)-(13)(13)(13)(13)
3. LH+RH: (T24)(T24)(T24)(T24)-(13)(13)(13)(13)

Exercise 8 - Combined Finger Movements Part 4

1. LH: (T3)(T3)(T3)(T3)-(14)(14)(14)(14)
2. RH: (T3)(T3)(T3)(T3)-(14)(14)(14)(14)
3. LH+RH: (T3)(T3)(T3)(T3)-(14)(14)(14)(14)

Questions for Exercises 5-8

1. Is there additional tension or pressure during the transition between finger combinations?
2. What adjustments were you able to make while repeating each step?
3. How is evenness maintained between fingers?

Tips for Exercises 5-8:

1. These patterns are not for the faint of heart and will challenge your coordination. Racing through the exercises is not recommended. Aim for slower, smaller, and softer movements.

2. If there is significant movement or tension in neighboring digits, notice any tension in the wrists, and gently roll or shake them. Rest for a few seconds, then resume the pattern with slower, smaller movements. It is normal to experience at least some extraneous movement. Focus on reducing this movement rather than eliminating it completely.

3. Try repeating the contrary patterns with the fingertips resting against each other, in midair, with your eyes closed, and using motor imagery.

Key Pressure Calibration

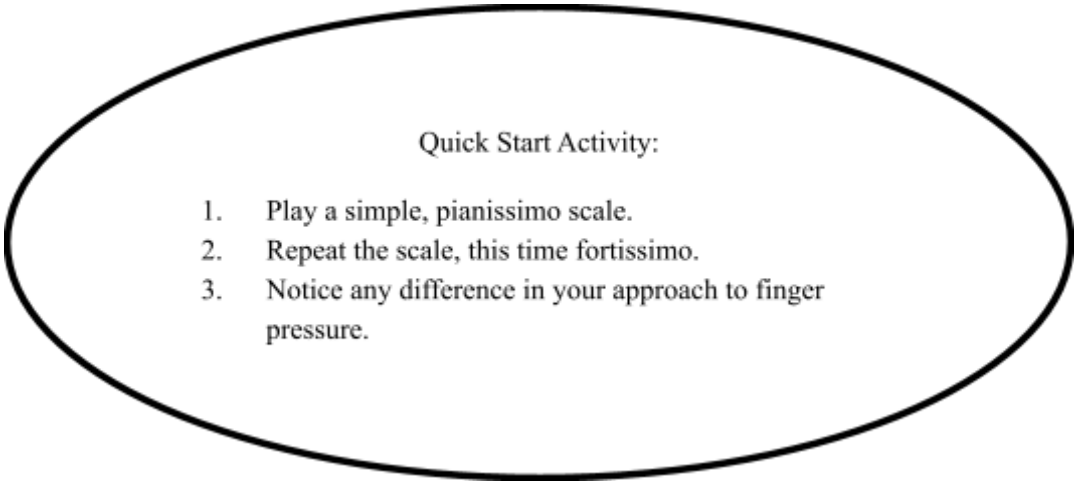
The next step is to transfer these patterns to the flute. We begin with the physical sensation of the keys. Notice how easily they move down and back up. For those of us who began our musical instruction on piano, there might be a conscious or subconscious connection between finger pressure, height, or energy and the resulting tone or dynamic. Care must be taken to separate the movement of the fingers from sound production and transfer energy back to the air and the powerful muscles that we engage in supporting and shaping the air. More control from a rigid standpoint leads to less control, reduced flexibility, and a lack of overall resonance.[21]

We want to establish or reestablish a baseline for motion. Efficiency of technique comes from finding a flow between movements. The body will try to take over, but the mind must guide the process. Are there moments where we want to slam or release the keys for dramatic effect or for percussive key clicks? Absolutely, but in general, more motion equals extra work, less efficiency, uneven rhythms, poor technique, and potential damage to the flute. If our flutes could give us feedback, what would it be?

[21]Samuel H. Nelson and Elizabeth L. Blades, *Singing with Your Whole Self: A Singer's Guide to Feldenkrais Awareness through Movement* (Lanham, Maryland: Rowman & Littlefield, 2018), 27-36.

In his book, *Music and the Flute*, Thomas Nyfenger gives a dramatic description for the phenomenon of overactive finger movements and their impact on the instrument.

> "Unfortunately, many wind instrumentalists have carried over their early piano exposure in approaching instruments where touch does not determine the resultant tonal quality. Fingers fly about wildly and smash down mercilessly upon delicate pads and mechanisms; they buckle in double-jointed contortions and wrap around the rods like boa constrictors. Nor are these digits equal in their fury; some are quicker, some stronger, some straighter, and some further removed from the keys as well as reality."[22]



Instructions for Key Pressure Calibration Exercises:

1. Start by gently closing all of the keys as if you are playing Eb3.

2. With all other keys gently depressed, each key is lightly tapped four times in a row starting with the left thumb and ending with the right pinky, then the process is reversed. Don't forget to include the right thumb in the exercises to check tension and balance.

3. It is helpful to allow the motion of the key to lift the finger as it returns to its original position. Keep contact with the key all the way through the process of lifting and depressing.

4. These exercises can be practiced with the flute resting on the chin or with the footjoint resting on the knee.

5. Move through these patterns as slowly as needed and use a metronome for accuracy.

[22] Thomas Nyfenger, *Music and the Flute* (Guilford Ct: T. Nyfenger, 1986), 12.

6. Begin to incorporate these exercises one at a time. For example, spend the first minute of each practice session with Exercise 1. After a week or two, rotate to Exercise 2.

Goals for Exercises 1-4:

1. Reshape your approach to key movement.
2. Practice slowly and deliberately to identify inconsistencies, tension, or balance issues.
3. Reduce inefficient movements and unintentional noise from the keys or mechanism.

Exercise 1 - Parallel Keys

1. LH: TTTT-1111-2222-3333-4444 RH: TTTT-1111-2222-3333-4444

2. RH: 4444-3333-2222-1111-TTTT LH: 4444-3333-2222-1111-TTTT

Exercise 2 - Parallel Keys Combined

1. LH: TTTT-1111-2222-3333-4444-3333-2222-1111-TTTT
   RH: TTTT-1111-2222-3333-4444-3333-2222-1111-TTTT

2. LH: 4444-3333-2222-1111-TTTT-1111-2222-3333-4444
   RH: 4444-3333-2222-1111-TTTT-1111-2222-3333-4444

Exercise 3 - Contrary Keys

1. LH: TTTT-1111-2222-3333-4444 RH: 4444-3333-2222-1111-TTTT

2. LH: 4444-3333-2222-1111-TTTT RH: TTTT-1111-2222-3333-4444

Exercise 4 - Contrary Keys Combined

1. LH: TTTT-1111-2222-3333-4444-3333-2222-1111-TTTT
   RH: 4444-3333-2222-1111-TTTT-1111-2222-3333-4444

2. LH: 4444-3333-2222-1111-TTTT-1111-2222-3333-4444
   RH: TTTT-1111-2222-3333-4444-3333-2222-1111-TTTT

Questions for Exercises 1-4:

1. How does your experience from finger pressure to key pressure calibration compare?

2. Are the wrists relaxed?

3. Is the instrument balanced?

4. Is the motion fluid or rigid?

5. Are the fingers overextending? Can you move through the patterns while keeping contact with the surface of the moving keys?

6. Are certain fingers operating at different speeds or hindered with extra pressure and heaviness? How can you equalize the speed and pressure?

7. Is there pressure or squeezing between the fingers and thumbs?

8. Is one finger causing movement in another?

Tips for Exercises 1-4:

1. As it is unnecessary to lift the fingers more than a few millimeters above the keys, practicing maintaining contact with the surface of the keys is a strategy for counterbalancing the tendency toward extra movement.

2. Imagine the energy of the key (or air behind the key) lifting the finger spontaneously. We don't have to work to lift the keys because of how the mechanism is designed.

3. If there is significant movement or tension in neighboring digits, notice any tension in the wrists, and gently roll or shake them. Rest for a few seconds, then resume the pattern with slower, smaller movements. It is normal to experience at least some extraneous movement. Focus on reducing this movement rather than eliminating it completely.

4. Watch for pressure or squeezing between non-moving fingers and thumbs. Address balance issues as needed.

5. Aim for fluid movement vs. rigid movement. The flute's keys are hard and sometimes cold. Consider using word associations to reshape your concept of the keys and finger movements. Ex. Key Sensations: Velvet, delicate, butterfly wings, squishy, jello, etc. Movement Sensations: Shaping the air, floating, caressing, dancing, etc.

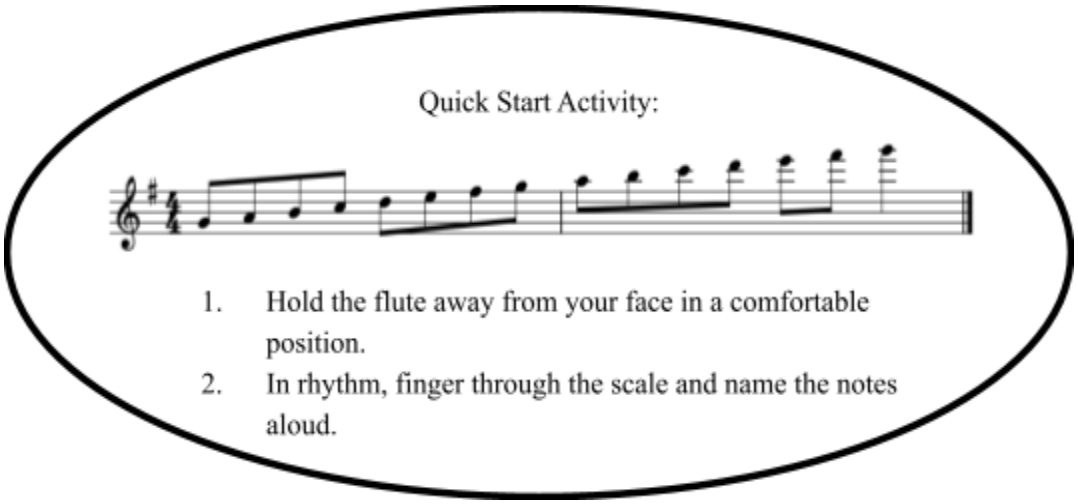
6. Try repeating the patterns using flute substitutes (pencil/pen, cleaning rod, kitchen utensils, etc.), with your eyes closed, and using motor imagery.

7. Once these patterns are comfortable, try some of the more challenging finger pressure calibration exercises on the flute (not for the faint of heart).

Finger and Name/Finger and Articulate

The next step is to test finger facility using various technique exercises. Moving between fingerings while balancing the instrument brings added complications and the temptation to apply extra pressure. The following mindful practice strategy involves strengthening coordination and focus by verbalizing the note names. It is a three-pronged approach involving reading the notated music, speaking note names aloud, and gently fingering through the passage.

This is a simple, yet powerful concept for improving both sight reading, technique, and memorization at any stage. Beginning flutists are taught to practice this way to build solid connections between note names, printed notation, and finger patterns. The practice is often abandoned once sight reading reaches an acceptable level. However arbitrary they may seem, note names hold the power of efficiently connecting and categorizing information. Verbalization creates an extra layer of focus as we are both speaking and hearing the letters, bolstering the neural pathways involved in hand/eye coordination. Alternating between vocalization and regular playing creates a shift in perspective and opportunities for heightened awareness.



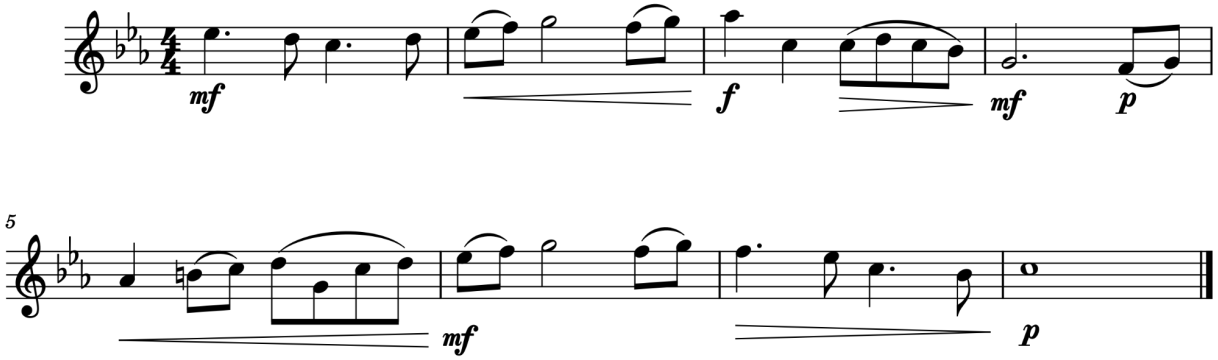
Instructions for Exercises 1-3: Finger and Name

1. Hold the flute away from your face in a comfortable position.
2. Choose a comfortable tempo.
3. In rhythm, finger through the examples and name the notes aloud.
4. The note names can be spoken, sung, or whispered.
5. Sustain the voice while speaking to feel the suspension of air - “Ab—C—G—Etc.”
6. Use slow, fluid movements as if the fingers are floating on the suspended air.

Specific Instructions for Exercise 1: Finger and Name

1. Smoothly coordinate each movement with the vocalization.
2. Repeat a few times if necessary to correct any issues.
3. Make sure to be accurate (Bb vs. B) when naming notes included in the key.
4. Repeat once again, this time vocalizing the articulations on “Taa,” “Too,” “Daa,” or “Doo.”

Exercise 1: Finger and Name



Questions for Exercise 1: Finger and Name

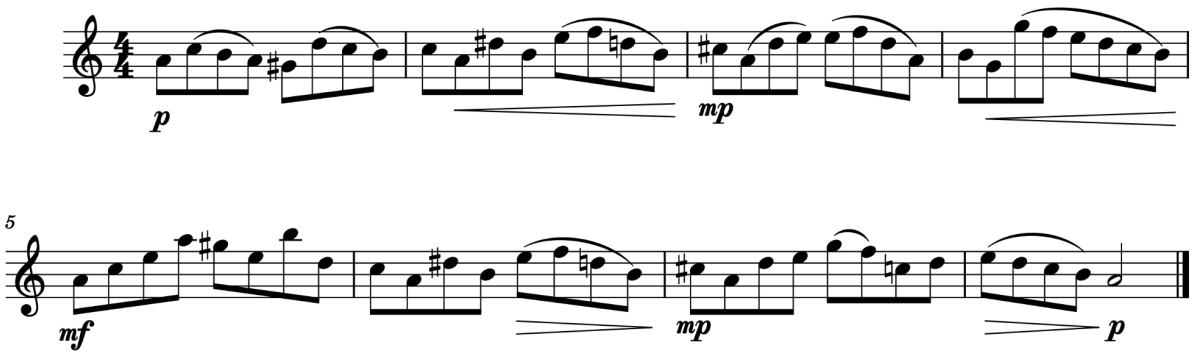
1. Is your breathing connected with the natural phrasing?
2. Are there any moments of tension or instability?
3. Do you notice a difference in your level of focus?
4. While vocalizing the articulations, are you changing your airflow to match the dynamics?

Specific Instructions for Exercise 2: Finger and Name

1. Choose your tempo with the goal of maintaining focus through the moving notes.
2. Try adding dynamics to your vocalization of the note names.
3. Make sure to be accurate when naming accidentals.

4. Repeat individual elements as needed until everything (note names, articulations, and dynamics) can be accomplished together.
5. Once the note names are comfortable, replace them with vocalized articulations.

Exercise 2: Finger and Name



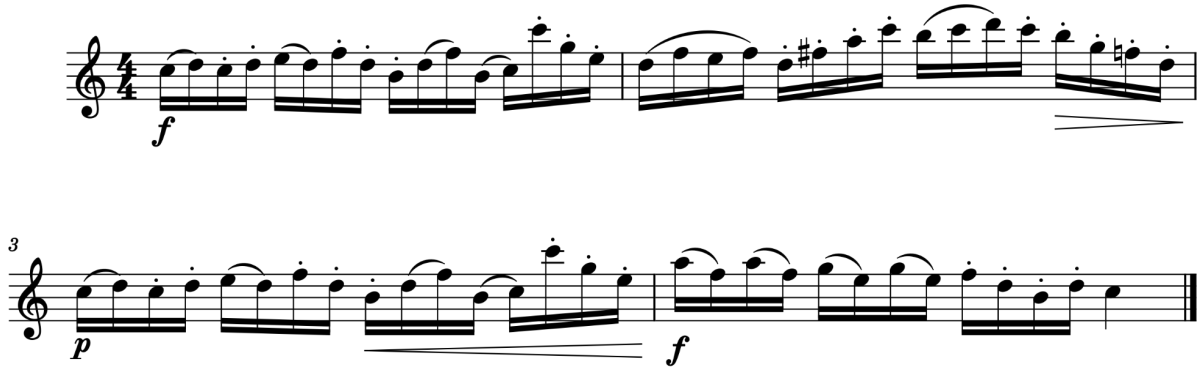
Questions for Exercise 2: Finger and Name

1. Is this example more or less difficult than you expected?
2. Does the beaming create any issues when reading notes in the middle of the staff?
3. Are you able to plan logical places to breathe on the spot?

Specific Instructions for Exercise 3: Finger and Name

1. Choose a manageable tempo.
2. Match the vocalization of the notes with the articulations, suspending and separating as notated.
3. Repeat as needed, vocalizing the articulations and dynamics when you are ready.

Exercise 3: Finger and Name



Questions for Exercise 3: Finger and Name

1. Is the balance of the flute shifting?
2. Does the perception of speed based on the notation cause any additional tension?
3. How do the contrasting articulations affect your experience?

Tips for Exercises 1-3:

1. Notice your level of calm or lack thereof and adjust the tempo accordingly.

2. Play the examples after working through the fingering and vocalization and notice any change in your level of confidence.

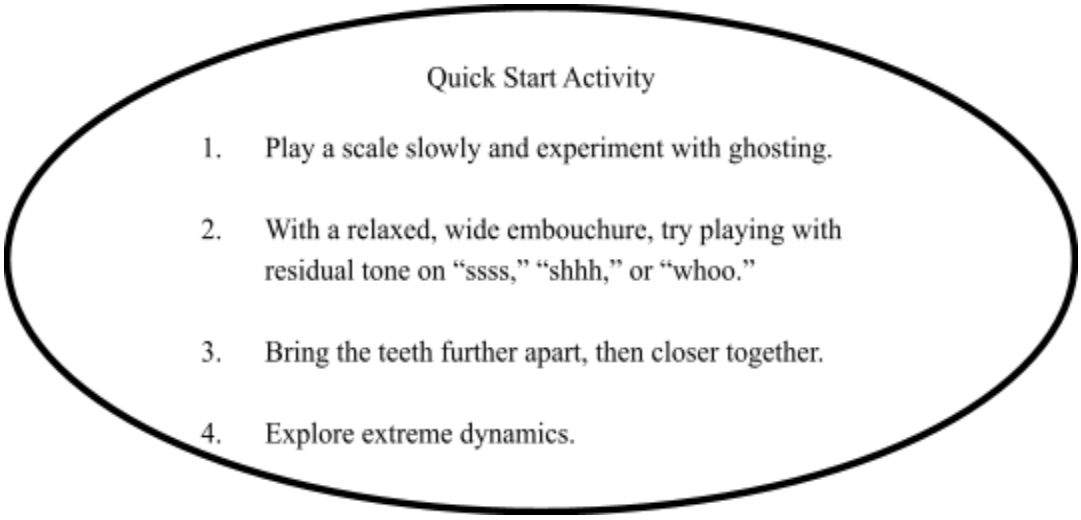
3. Use these concepts in preparation for sight reading, before tackling new music, and when working through complex or technically difficult passages.

Ghosting (Residual Tone)

As the name suggests, the ghosting technique involves playing the flute with only a shadow of our tone. A light, yet present sense of pitch remains. The internal engagement of muscles and manipulation of air and articulation remains intact while the embouchure is very loose/relaxed and the aperture is larger/more open than usual. Resistance is created by changing the position of the teeth and tongue. As an extended technique, playing with residual tone provides a unique expressive effect. The goal of residual tone in performance is to manipulate the air in a way that best expresses the written gesture. The position of the lips, teeth, and tongue is carefully chosen and adjusted in support of the musical idea. As a practice technique, the importance of the flute fades into the background while the power of our air as the source and shaping mechanism of our expression becomes more clear. Ghosting brings our attention from the tone to the air supporting the tone and gives additional focus to the point of origin rather than the point of release.

While uneven technique can often be traced back to an issue of hand balance or finger coordination, it is surprising to discover that it is just as often an issue of inconsistent air flow. When the air flow is inconsistent or insufficient, the resulting tone and technique is less-than-desired. We often remedy the situation by grasping the flute more firmly and moving deliberately through the finger patterns. This reinforces a false conception of input and output. Efficiency of technique comes from a light, gentle approach rather than a rigid, controlled approach. Ghosting builds our comfort with contradictory elements of air and fingers, allowing us to play with extreme dynamics and articulations while maintaining a very light, relaxed

technique. More control often equals less control,[23] and tension in the body is the enemy of energy and engagement in the sound. Another benefit of ghosting is the strengthening of the muscles involved in suspending the air internally while playing.



The following note-pair exercises highlight half steps and whole steps that often reveal significant balance issues, coordination issues, or a lack of sufficient air connection. Practicing these and similar passages using the ghosting technique helps to bring attention to the quality and engagement of the air and discrepancies in our technique. Our standard sense of tone is removed from the equation, and we have the opportunity to rebuild the sound of each note through an exploration of the underlying harmonic series.

Instructions for Exercises 1-2: Note Pairs

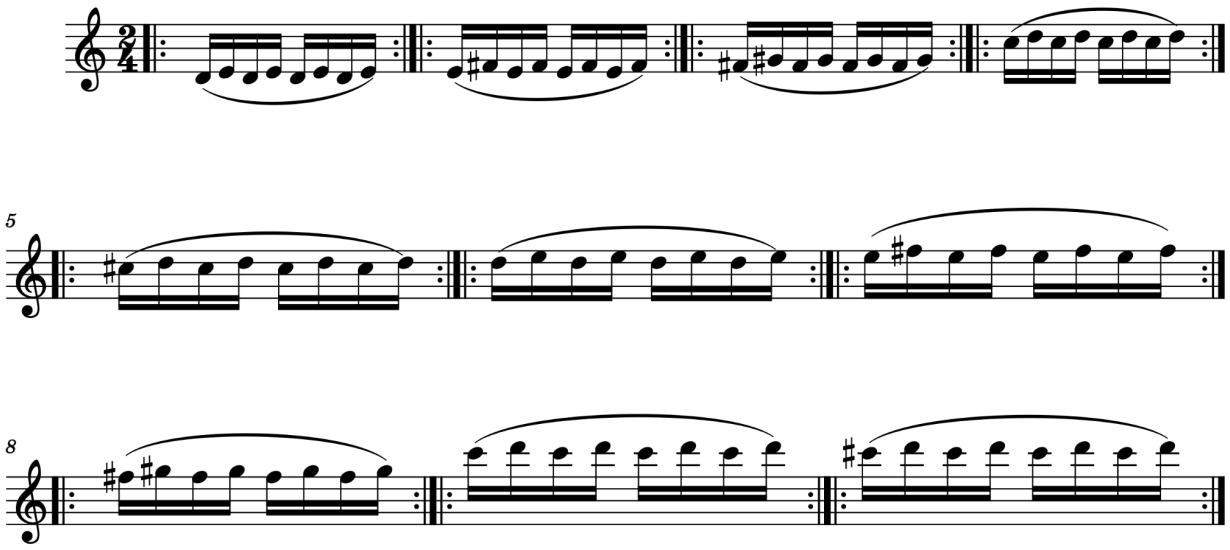
1. To begin, play these note pairs as written with a full tone.
2. Play the exercise again using the ghosting technique, repeating any measures as desired.
3. Alternate between a ghosted and full tone.
4. Finish by playing the exercise once more with a full tone.

Goals for Exercise 1: Note Pairs

1. Keep the fingers, hands, and wrists relaxed.
2. Focus on maintaining a consistent airstream between notes.
3. Notice any differences between normal playing and ghosting.

[23]Samuel H. Nelson and Elizabeth L. Blades, *Singing with Your Whole Self:A Singer's Guide to Feldenkrais Awareness through Movement* (Lanham, Maryland: Rowman & Littlefield, 2018), 27-29.

Exercise 1: Note Pairs



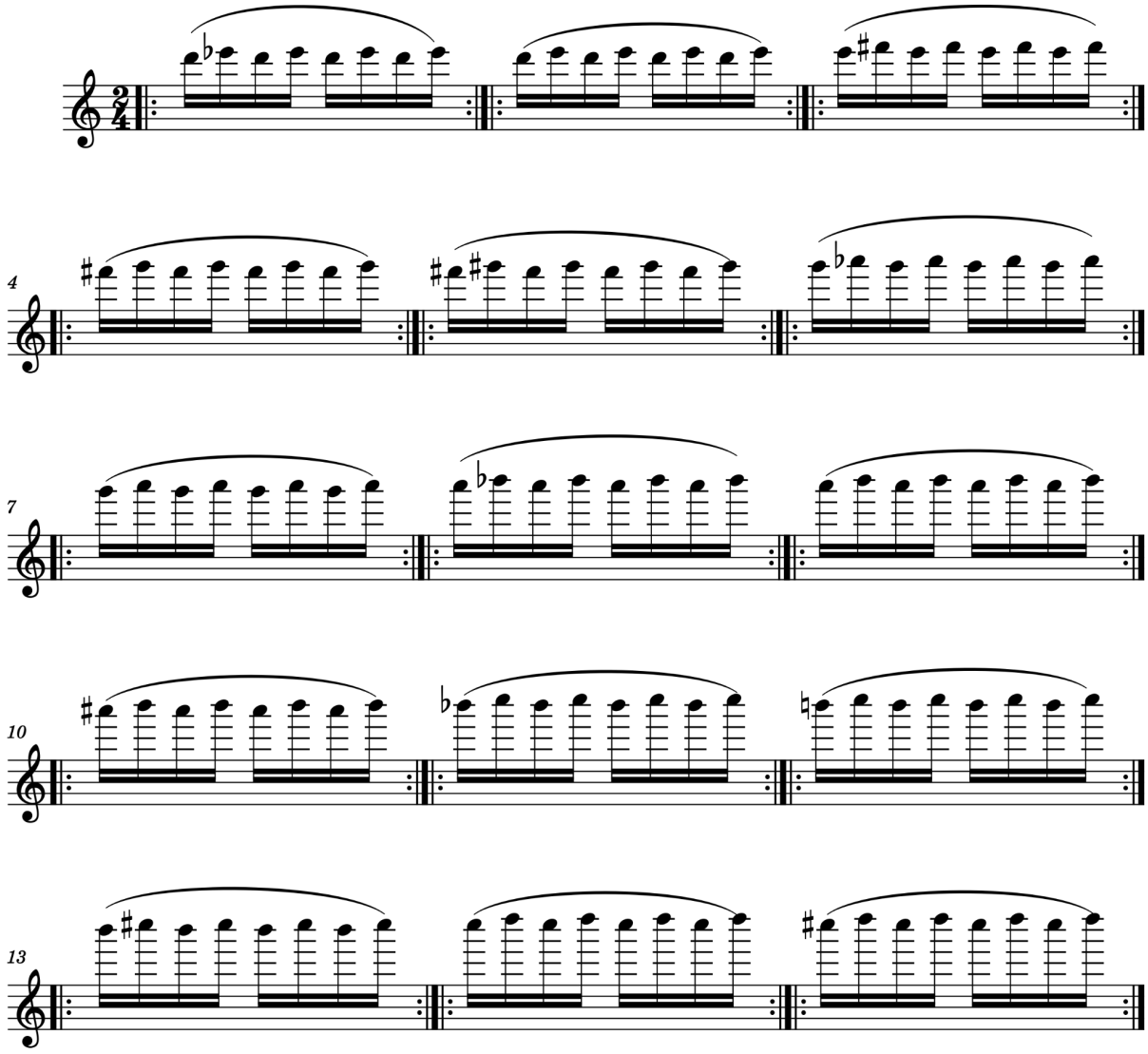
Questions for Exercise 1: Note Pairs

1. Which note pairs pose the greatest challenge?
2. Do you notice any imbalances or extra noise from the flute's mechanism while ghosting?
3. Do you find yourself running out of air more or less frequently?

Goals for Exercise 2: Note Pairs

1. Keep your finger movements/touch as light as possible.
2. Lean slightly on the lower note with your air right before moving to the next note.
3. Build new associations of relaxation and freedom in the top register of the flute.

Exercise 2: Note Pairs



Questions for Exercise 2: Note Pairs

1. Which note pairs pose the greatest challenge?
2. Are there areas of uneven technique?
3. Do you hear unintentional shifts in the airstream?
4. Are you able to conserve more or less air while ghosting?
5. Is your perception of movement more clear while ghosting through the top register?

Tips for Exercises 1-2: Note Pairs

1. Try different aperture sizes to experiment with more or less residual tone.
2. Play with different dynamics.
3. Notice any differences in embouchure and air angle with normal playing vs. ghosting.
4. Adjust your tempo as difficulty or awkwardness increases.
5. Notice where balance is shifting unnecessarily.
6. Notice how firmly you are holding the flute.
7. Notice any holding/clenching/tension in the wrists.
8. Notice any areas where you are squeezing the keys or overextending the fingers as keys are released.
9. Apply these concepts in your technique and repertoire practice, alternating between ghosting and full tone for comparison.
10. Use a mirror to identify where certain fingers are arriving too early or late.

Lower Partials

Most of us already use harmonics in our practice sessions to improve our manipulation of airstream pressure/volume/direction, increase flexibility, open up our tone, provide context for pitch center, etc. We typically explore the harmonic series above a given fundamental. For this technique, the focus is on the lowest or second lowest possible sounds available for each finger combination. In the low/mid registers this will, of course, manifest as the lowest octave. The most powerful application of the technique becomes apparent with the third and fourth octave.

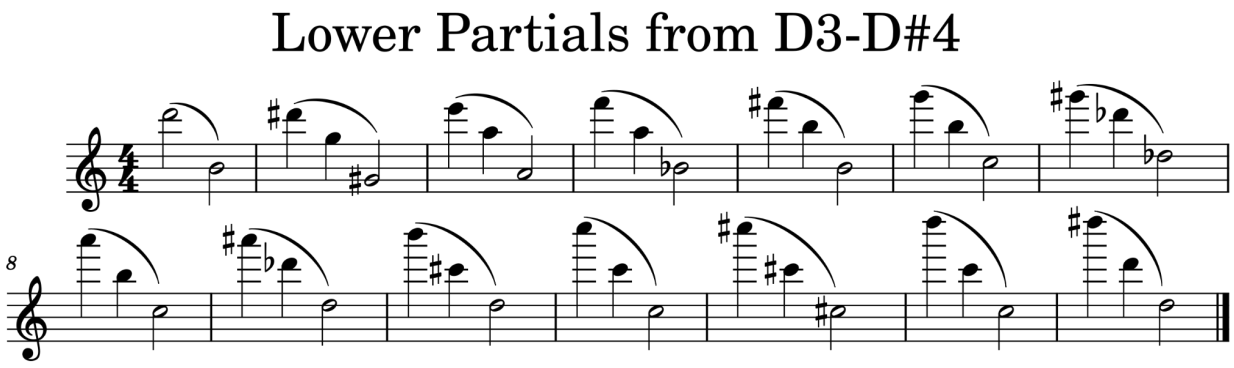
Why are technical passages in the high register more difficult? Obvious reasons include the complexity of the fingerings and the balance issues that occur while alternating between fingerings. As the high register is usually taught after the middle and low registers are comfortable, it seems more difficult in comparison simply because it is not quite as strong in our memory, even after decades of experience. An added factor to consider is the intensity and volume of air required. Our deep, subconscious instinct for survival becomes apparent as our body is deprived of oxygen much more quickly in the top register. This focus on survival takes attention away from the task at hand and can cause seemingly random mistakes and unnecessary tension. We often need to spend more time preparing technical passages in the high register because of this phenomenon. Prolonged practice in the top register quickly causes fatigue and sensory overload. Layers of tension and desperation can build quickly, from the muscles engaged in air control/tone production, to the throat/tongue/jaw/lips, to the arms/wrists/hands/fingers in a vicious cycle.

Practicing high register fingerings with lower partials sounding is disorienting at first. The pitches produced by underblowing are counterintuitive and some create microtonal intervals. Approaching the third and fourth octaves in this way can build confidence as the ear becomes accustomed to new associations. While practicing at pitch, the extremely high air speeds required can easily transfer to the embouchure muscles. When the lips become too firm in an effort to control the air speed and volume, flexibility is sacrificed. The slow air speed used for the lower partials creates new associations with the high register fingerings. The embouchure becomes more relaxed and flexible as the energy is contained in the suspension of air.

Quick Start Activity

1. Play D#3, starting with a full tone and letting the sound decay.
2. Instead of adjusting the lips and air to create a tapered release, let the sound crack on purpose and drop to the thin-sounding pitch beneath D#3.
3. Begin again, fingering D#3 and playing the lower pitch. Relax your air to reveal a third pitch below.

The following example shows the sounding pitches of the lower partials below each fingered note in a chromatic progression from D3 to D#4. Finger the first note in each measure (as high as you are comfortable/able) and reduce the air speed/pressure to find the lower pitch in the first measure and the lower two pitches in the following measures.



Disclaimer: The notated pitches of the lower partials are approximate. They may be flatter or sharper than the normal fingered pitches. You may experience different pitches due to the unique

tendencies of your flute, tone hole cut, and additions such as the split E or C# trill key. Play through the example one measure at a time fingering each pitch as written, then playing the lower partials of the top note for comparison. Make a note of any pitch discrepancies between this example and the pitches produced on your flute.

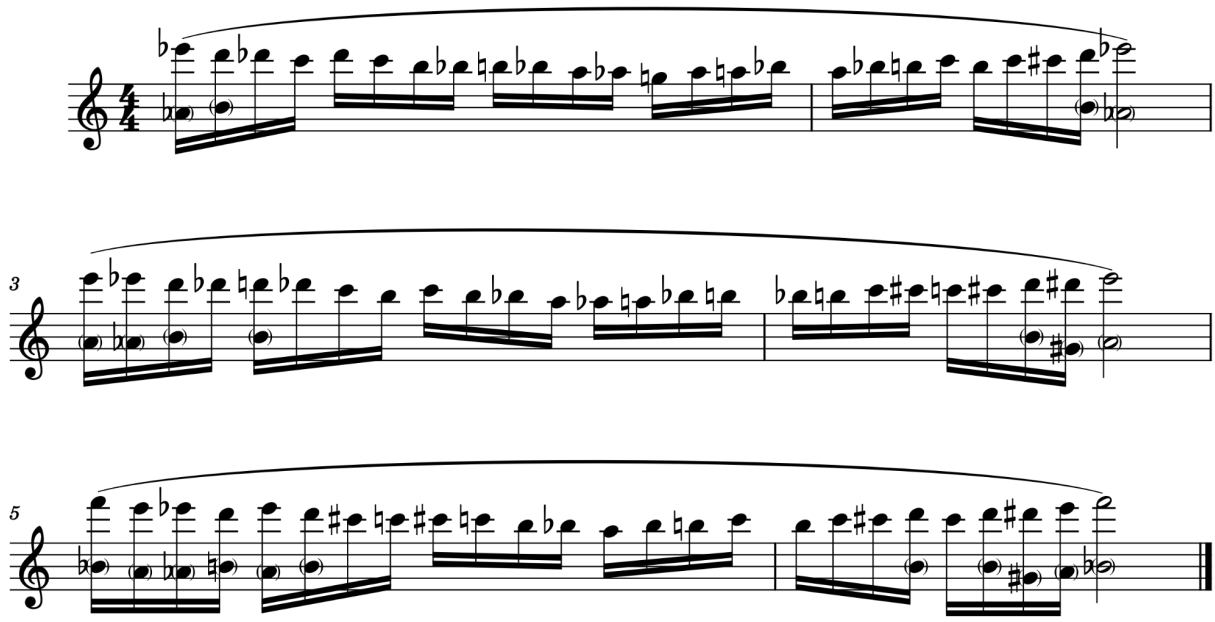
Instructions for Exercise 1: Lower Partials (adapted from Rimsky-Korsakov's "Flight of the Bumblebee")

1. First, play through the chromatic pattern at the notated pitch.
2. Play through the pattern again with the lowest partials sounding.
3. D3 and above have the lowest partials notated below in parentheses.
4. With the exception of the notes in parentheses, the lowest sounding pitch will be the lowest octave.
5. Continue to transpose the pattern chromatically through the upper register as desired.

Goals for Exercise 1: Lower Partials

1. Keep a consistent, gentle air flow through each transposition of the pattern.
2. Experience a grounded approach to the top register by improving the core of the tone.
3. Become familiar with the sounds of the lower partials.
4. Associate the top register with a looser, more flexible embouchure.

Exercise 1: Lower Partials



Questions for Exercise 1: Lower Partials

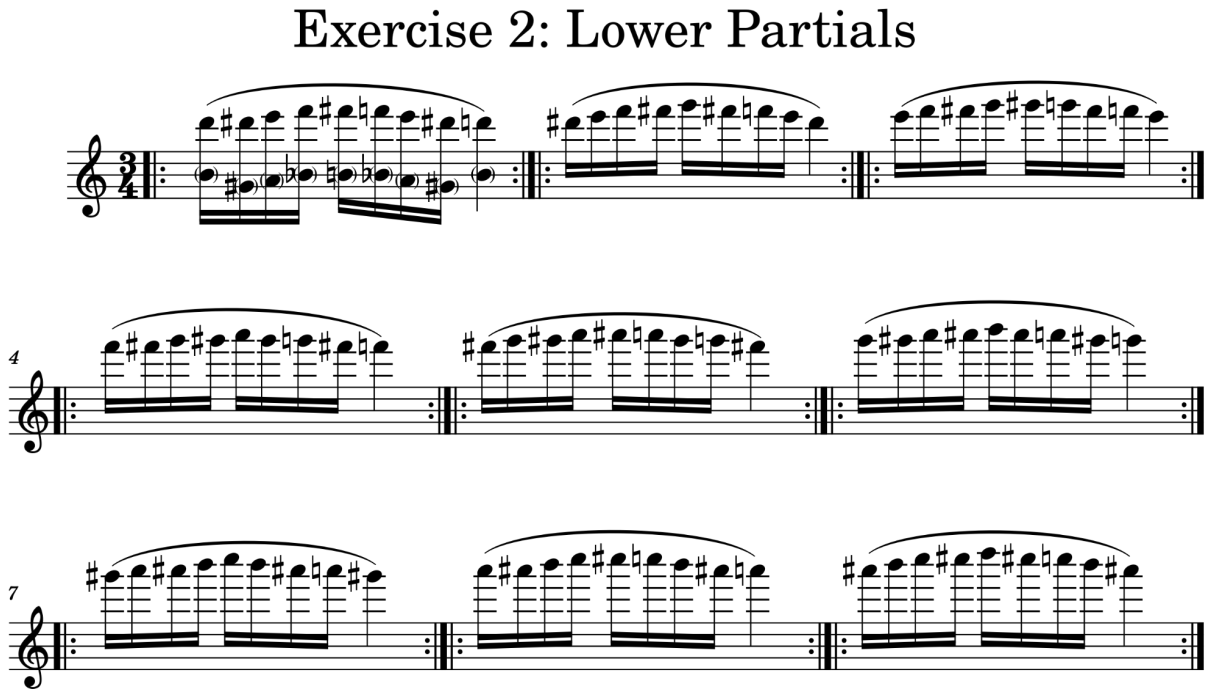
1. How does the embouchure/aperture adjust for the lowest partials?
2. Are the pitches of the lower partials somewhat disorienting?
3. What is the overall effect physically and/or mentally?

Instructions for Exercise 2: Lower Partials

1. Play one measure at a time, alternating between notated pitches and the lowest partials.
2. The lowest partials in the first measure are notated in parentheses.
3. Continue to transpose the pattern chromatically through the upper register as desired.

Goals for Exercise 2: Lower Partials

1. Keep a consistent, gentle air flow through each transposition of the pattern.
2. Experience a grounded approach to the top register by improving the core of the tone.
3. Become familiar with the chromatic progression of the lower partials.
4. Associate the top register with a looser, more flexible embouchure.



Questions for Exercise 2: Lower Partials

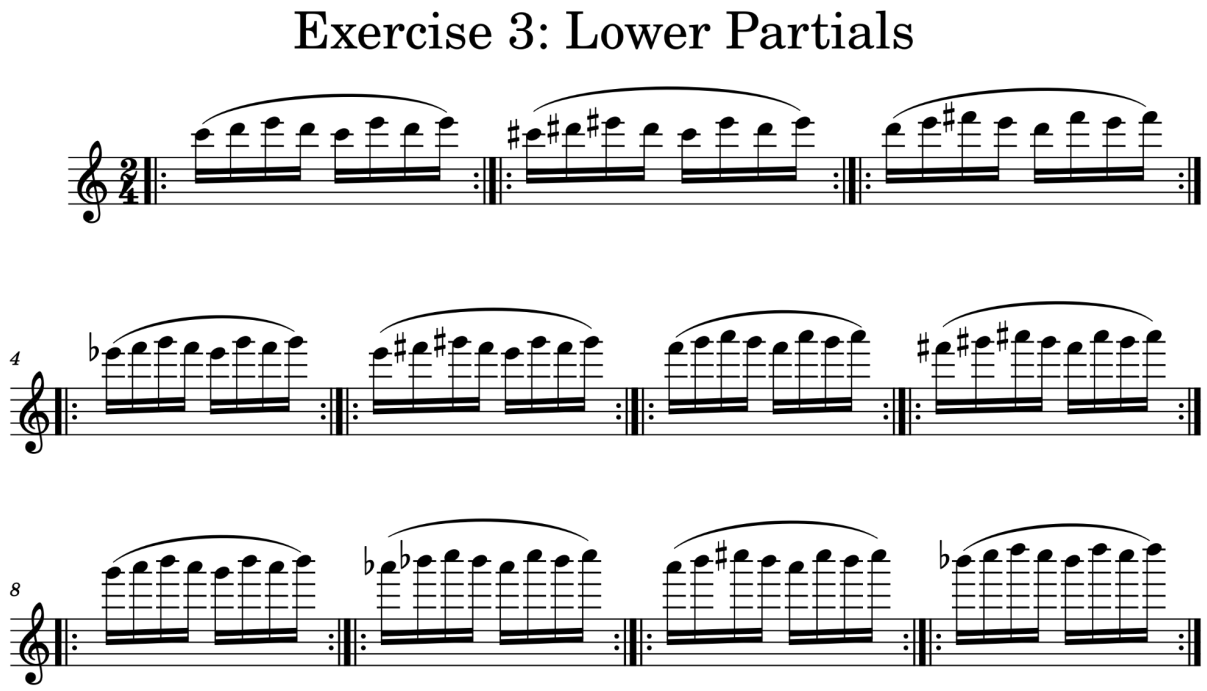
1. Do you hear a pattern emerging in the lower partials?
2. Are you maintaining the same level of engagement with the air internally while blowing less for the lowest partials?
3. Which fingers have the tendency to overextend?

Instructions for Exercise 3: Lower Partials

1. Play one measure at a time, alternating between notated pitches and the lowest partials.
2. Aim for forward direction and suspension through each gesture rather than anchoring on beat two.
3. Continue to transpose the pattern chromatically through the upper register as desired.

Goals for Exercise 3: Lower Partials

1. Experience a grounded approach to the top register by improving the core of the tone.
2. Become confident with lower partials while playing thirds..
3. Associate the top register with a looser, more flexible embouchure.
4. Bring more attention to the muscles engaged in tone production.



Questions for Exercise 3: Lower Partials

1. Where do you feel the lower partials resonating internally?
2. Do you feel any unintentional balance shifts or anchor points?
3. When alternating between the notated pitches and lowest partials, is there any difference in tension or finger pressure?
4. How might the intense air speeds required for the third and fourth octaves be affecting your ability to play with technical freedom?
5. Is it possible to separate the intensity of the air from the intensity of the fingers?

Tips for Exercises 1-3: Lower Partials

1. For best results, choose a slow tempo to begin.
2. Familiarity and confidence with the lower partials will increase with practice.
3. Over time, complex finger shifts in the third and fourth octaves will become more natural, fluid, and coordinated.
4. Use this technique frequently with difficult passages as a gentle practice strategy for encouraging awareness, openness, relaxation, and a grounded approach to the high register.

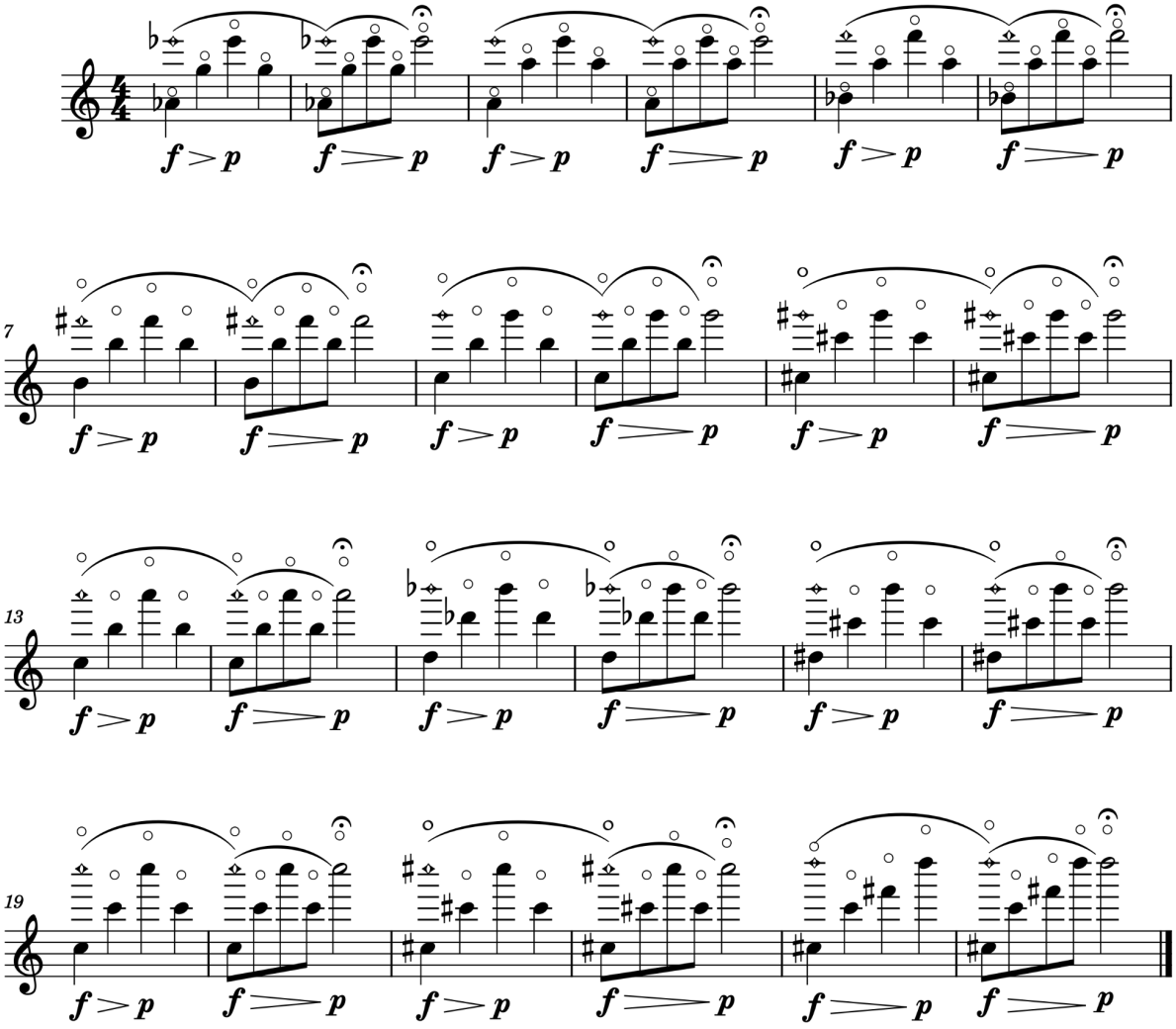
Instructions for Exercise 4: Lower Partials

1. This exercise uses all lower partials of each third and fourth octave note.
2. The whole notes indicate the fingering while the lower notes indicate the approximate pitch using the low and middle partials. Ex. The first two measures are played on Eb3.
3. While using the third and fourth octave fingerings, underblow to produce the lower pitches as indicated and slur through the pattern of quarter and eighth notes.
4. Begin the exercise at a comfortable dynamic.
5. Repeat each set of measures as needed.

Goals for Exercise 4: Lower Partials

1. Aim for a full, rich tone on the lower partials.
2. Keep the embouchure loose and flexible.
3. Gain flexibility and resonance in the high register.
4. Gradually work toward achieving the diminuendo.

Exercise 4: Lower Partials



Questions for Exercise 4: Lower Partials

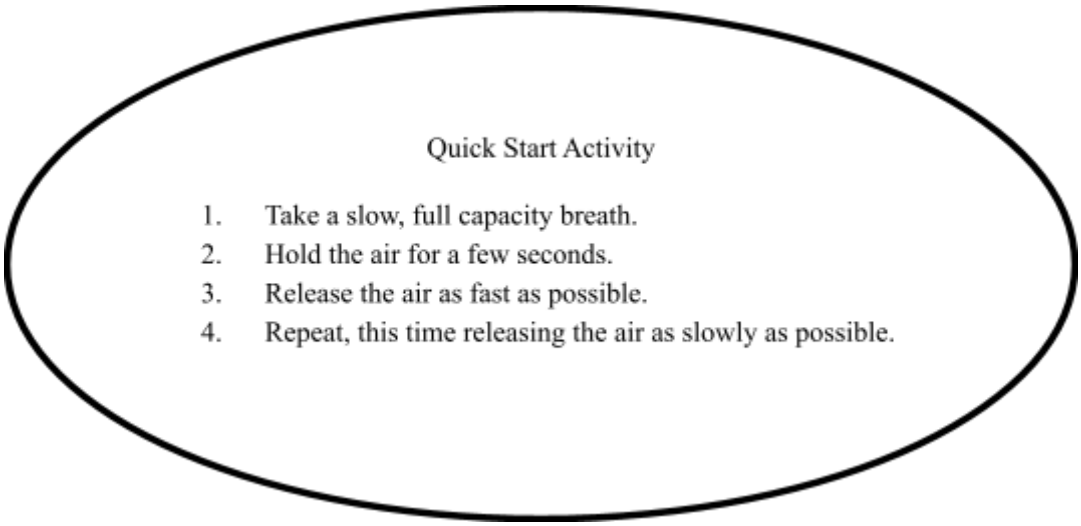
1. Where do you feel the lower partials resonating internally?
2. How does the embouchure/aperture adjust through the partials?

Tips for Exercise 4: Lower Partials

1. Practice slowly with a drone
2. Play in front of a mirror.
3. Breathe and take breaks as needed.
4. Continue the pattern through the fourth octave as desired (the approximate pitches will vary based on the fingerings used).

Whistle Tones

Whistle tones are extremely light, high-pitched tones based on the harmonic series within each fundamental. They are most often used to develop control and flexibility in the delicate muscles surrounding the lips. Like a microscope for breath control, they are indispensable for mastering very small shifts in air pressure and volume while maintaining a high level of internal air pressure. Composers occasionally call for whistle tones in their works as an extended technique or special effect. This technique is an excellent tool for low intensity practice, gentle warm ups, ear training, or in situations where it is not possible to play with a full tone. Because whistle tones are more focused on the internal side of flute playing, they demand a high level of focus, increased awareness, and provide a bridge to pure mental practice. Before experimenting with this technique, try the following exercises without the flute. (preview the goal of the exercise - explain the air percentages and relationships)



Suspension and Free Exhalation:

1. Place one hand on your chest and the other on your diaphragm area (right below the sternum).

2. Inhale slowly and imagine your lungs filling like a balloon to full capacity.

3. Before exhaling, suspend/hold the air for several seconds. The air will be frozen in place, yet highly energized, as if you are about to scream. Imagine holding the open end of a balloon shut, but make sure to keep the tongue from blocking the throat.

4. Exhale freely, letting the air go as if you are letting go of a balloon. Try releasing the air with the mouth open/relaxed, then repeat the release using a smaller aperture. Visualize how the balloon would fly around the room with no control before collapsing and dropping to the floor.

Suspension and Supported Exhalation:

1. Inhale slowly with one hand on your chest and the other on your diaphragm area.

2. Suspend the air for several seconds.

3. Form a relaxed embouchure and blow as you would on the flute. Make sure the chest does not collapse as you blow. Feel the air in your lungs creating a bit of pressure against your hands as you blow. Try faster and slower airstreams as you imagine playing soft vs. loud and high vs. low. Also, try blowing on the palm of your hand to feel the airstream.

4. What percentage of the air is being suspended/held and what percentage is blown? Is it around 50/50 or closer to 60/40? The actual numbers are arbitrary, but attaching some kind of percentage to held and blown air will be helpful in determining adjustments and feeling the difference in internal sensations. When playing in the low register or playing very softly, you will need to increase the ratio of held air in relation to the air you blow. You might suspend/hold 80% while blowing 20% or hold 95% while blowing 5%. This concept is useful in learning to engage the muscles surrounding the diaphragm to control exhalation while slowly blowing a very small amount of air.

Suspension and Whistle-tone Exhalation.

1. Inhale slowly, placing one hand on your chest and the other in front of your diaphragm area.

2. Suspend the air for several seconds.

3. Form a relaxed embouchure with a very small aperture. Blow a very slow, small stream of air. Suspend/hold about 99.999% while releasing about .001% If you bring your palm in front of the airstream, you will barely be able to feel it. After experimenting for several

seconds, the need to exhale will become increasingly strong. This is the level of suspension needed to play whistle tones.

Whistle Tones on the Flute:

1. Finger a low C or D.

2. Begin playing with a normal tone and gradually decrease the size of the aperture while slowing the airstream.

3. Try the opposite approach. Suspend the air completely, then form a tiny aperture and release the smallest amount of air, gradually increasing the aperture size and air speed until your full tone emerges.

4. Experiment with the percentage of held vs. blown air until soft, whistle-like tones appear.

5. Allow the whistle tones to jump freely around the harmonic series. Once this is comfortable, try sustaining a single pitch for a few seconds.

6. If the low register whistle tones are difficult, try middle or high-register fingerings. Each individual person and each individual flute has different tendencies.

Whistle-tone Exercises:

1. Chromatic scale - match the pitch of the whistle tone with the fingered pitch.

2. Harmonic series - move slowly through the harmonic series above the lowest possible whistle tone for each fingering.

3. Simple tunes - try playing Merrily We Roll Along, Hot Cross Buns, etc., matching the whistle tone with the fingered pitch.

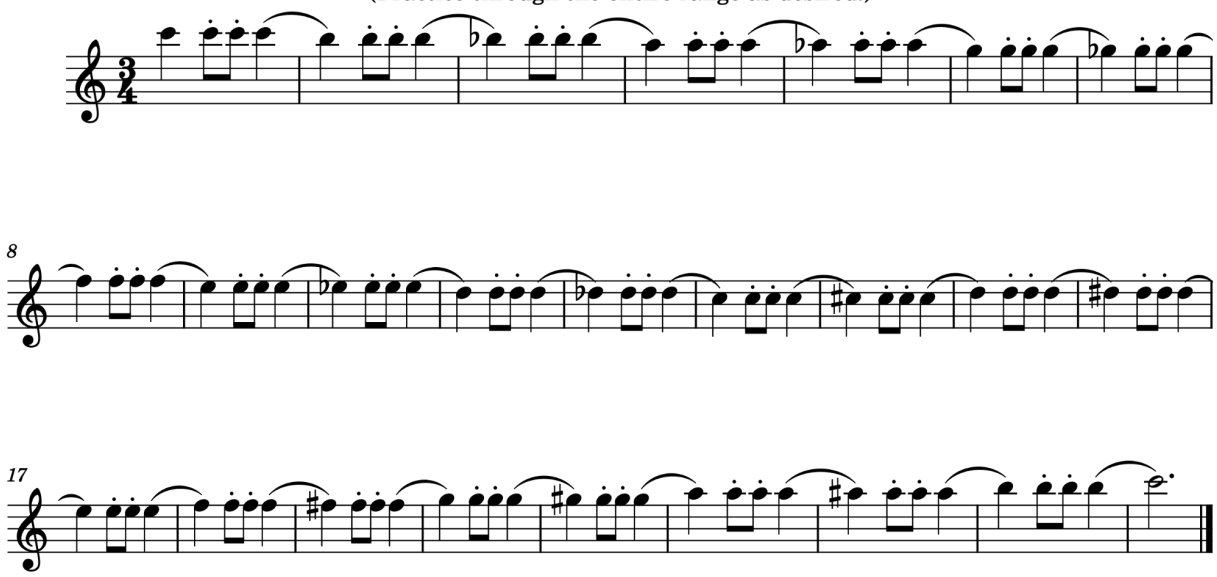
4. Articulations - once slurred whistle tone scales are possible, try very lightly tonguing each tone or using a staccato breath attack.

Advanced Exercises:

1. Try playing tone/technique exercises using whistle tones - Moyse, Trevor Wye, etc.
2. Practice etudes, excerpts, and repertoire using whistle tones.
3. Experiment with the following sample exercises.

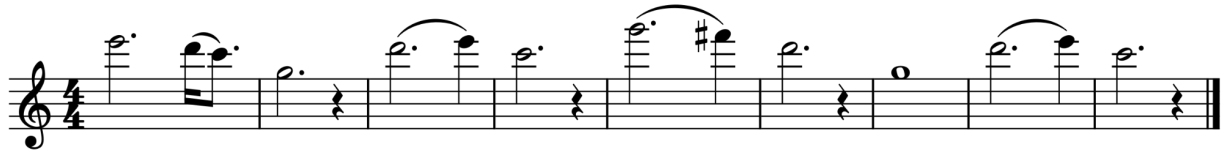
Chromatic Whistle Tone Warm Up

(Practice through the entire range as desired.)



Whistle Tone Warm Up (Brahms for Birds)

(Transpose this melody through the entire range as desired.)



Questions for Advanced Exercises:

1. How do these activities and exercises shift your awareness?

2. What causes the tones to become more or less stable?

3. How loose/relaxed is your whistle-tone embouchure in relation to your “normal” embouchure?

4. Does your “normal” embouchure need to be as firm/engaged, or could a better tone be achieved by engaging and energizing the suspended air?

Tips for Advanced Exercises:

1. If whistle tones are new or uncomfortable, do not practice them for more than a few minutes at a time to avoid fatigue.

2. Check your embouchure/aperture with a mirror to make sure the lip corners are loose/relaxed.

3. Notice how overactive fingers or shifts in the flute’s balance can easily disrupt the whistle tones.

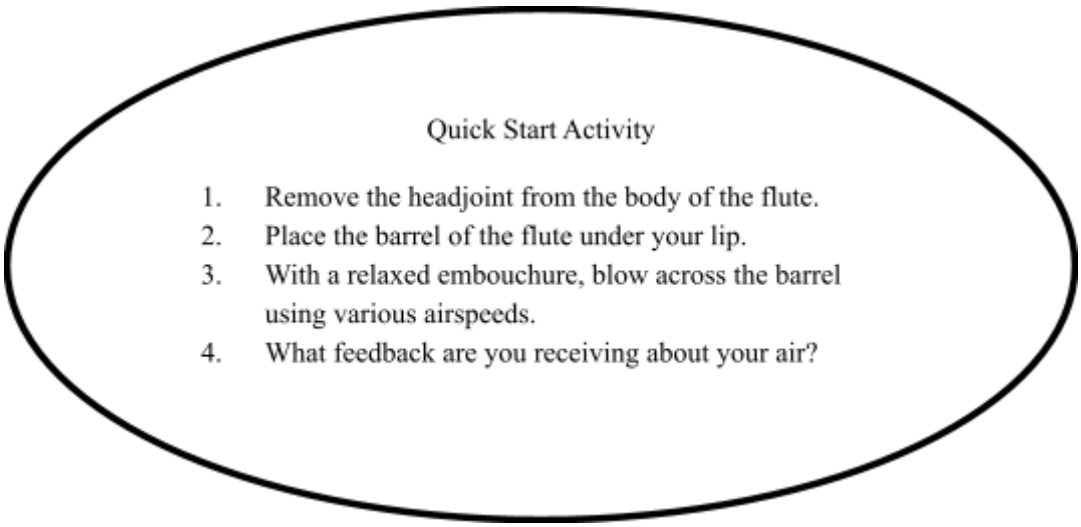
4. Adjust the angle of the air to blow straight across the strike edge of the embouchure hole or slightly above.

5. The goal of producing a clear whistle can get in the way of experiencing the benefits of the process. Practice patience and enjoy the process.

Removing the Headjoint

Removing the headjoint from the equation is another way to momentarily shift our focus away from the desired result to the process. Many of us are familiar with Kathy Blocki’s Pneumo Pro. This is an ingenious tool that can be used to focus and angle the airstream, increase air control and support, clear up articulation issues, and to practice silently. A similar strategy involves placing the barrel of the flute under the lip as if it is the lip plate. This can be achieved both with and without the headjoint. Related to ghosting/residual tone practice, this technique allows us to

feel the airstream without the normal feedback of our sound. The difference in feel, position, and weight can open up different areas of awareness.



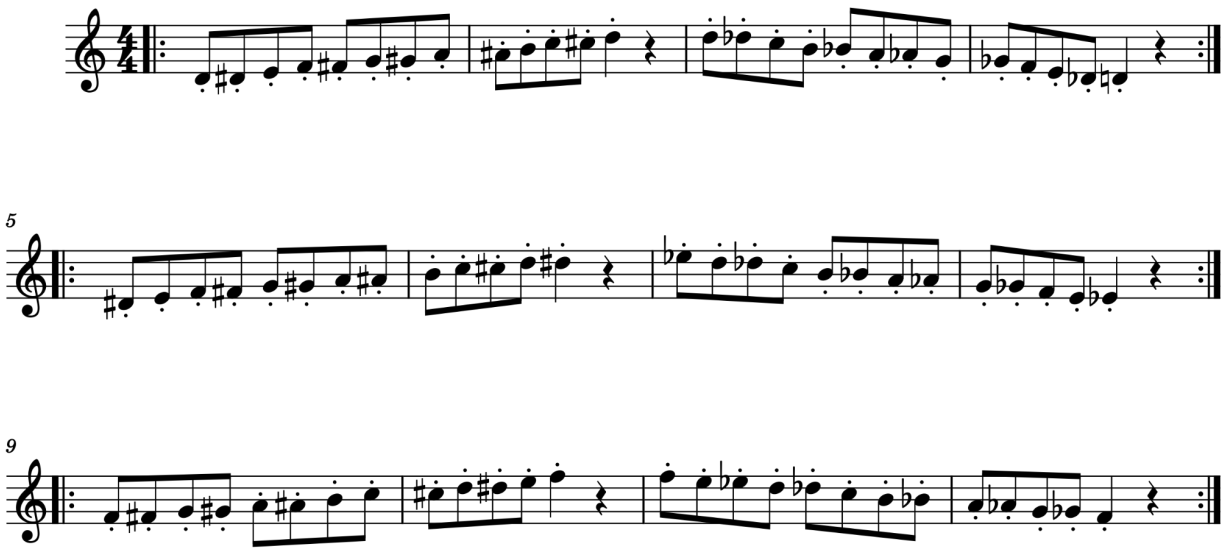
Instructions for Exercise 1: Articulation Warm Up

1. Place the barrel of the flute under the lip.
2. Repeat each section several times, alternating between the following articulations with each repetition: Ha-Ha, Ta-Ta, Pa-Pa, Ka-Ka, Cha-Cha (etc.).
3. Continue the chromatic pattern through the entire range of the flute.
4. Use a metronome for accuracy.

Goals for Exercise 1: Articulation Warm Up

1. Explore the internal process of articulation.
2. Listen to the attack and release of the air, tongue, lip, etc.
3. Gain clarity and consistency with each syllable.

Exercise 1: Articulation Warm Up



Questions for Exercise 1: Articulation Warm Up

1. How does your awareness of fingers and balance change with the shift in position and/or weight while the headjoint is removed?
2. How much does air preparation affect the quality of articulation?
3. What information or feedback do you hear from playing against the barrel?

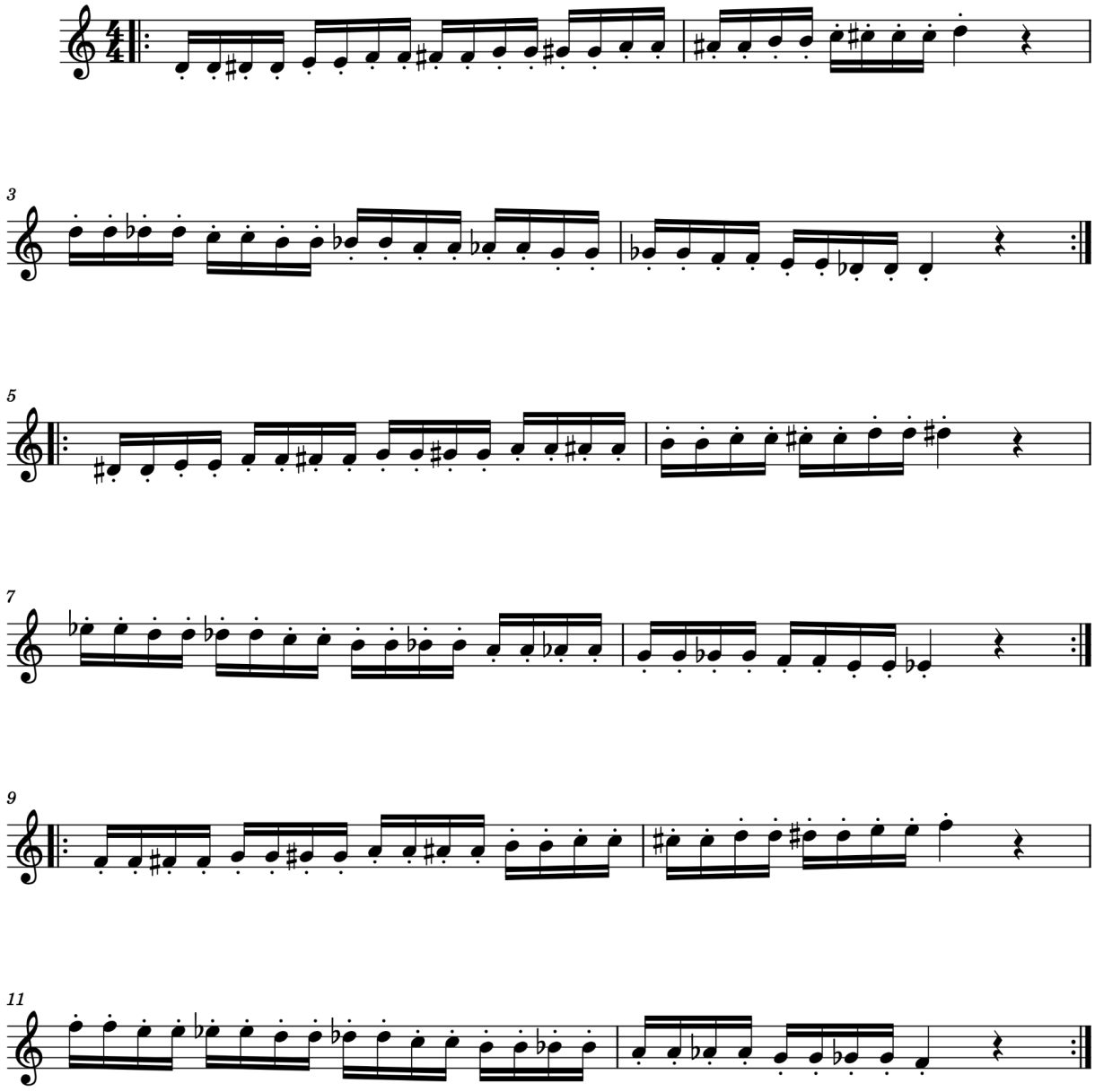
Instructions for Exercise 2: Articulation Warm Up

1. Place the barrel of the flute under the lip.
2. Repeat each section several times, alternating between the following articulations with each repetition: Ha-Ha, Ta-Ka, Ka-Ta, Pa-Cha, Cha-Pa (etc.). (Note: both light and more pronounced (beatboxing) versions of these syllables are fair game.)
3. Continue the chromatic pattern through the entire range of the flute.
4. Use a metronome for accuracy.

Goals for Exercise 2: Articulation Warm Up

1. Explore the internal process of articulation.
2. Listen to the attack and release of the air, tongue, lip, etc.
3. Gain clarity and consistency with each syllable.

Exercise 2: Articulation Warm Up



Questions for Exercise 2: Articulation Warm Up

1. Do you notice any instability or extra movement of the flute through the articulations?
2. Are certain syllables less clear or uneven than others?
3. Are certain articulation patterns more labored than others?

Tips for Exercises 1-2: Articulation Warm Up

1. Alternate between the barrel and headjoint to check progress.
2. Note that without the headjoint, the pitch will be altered significantly.
3. Experiment with tongue placement.

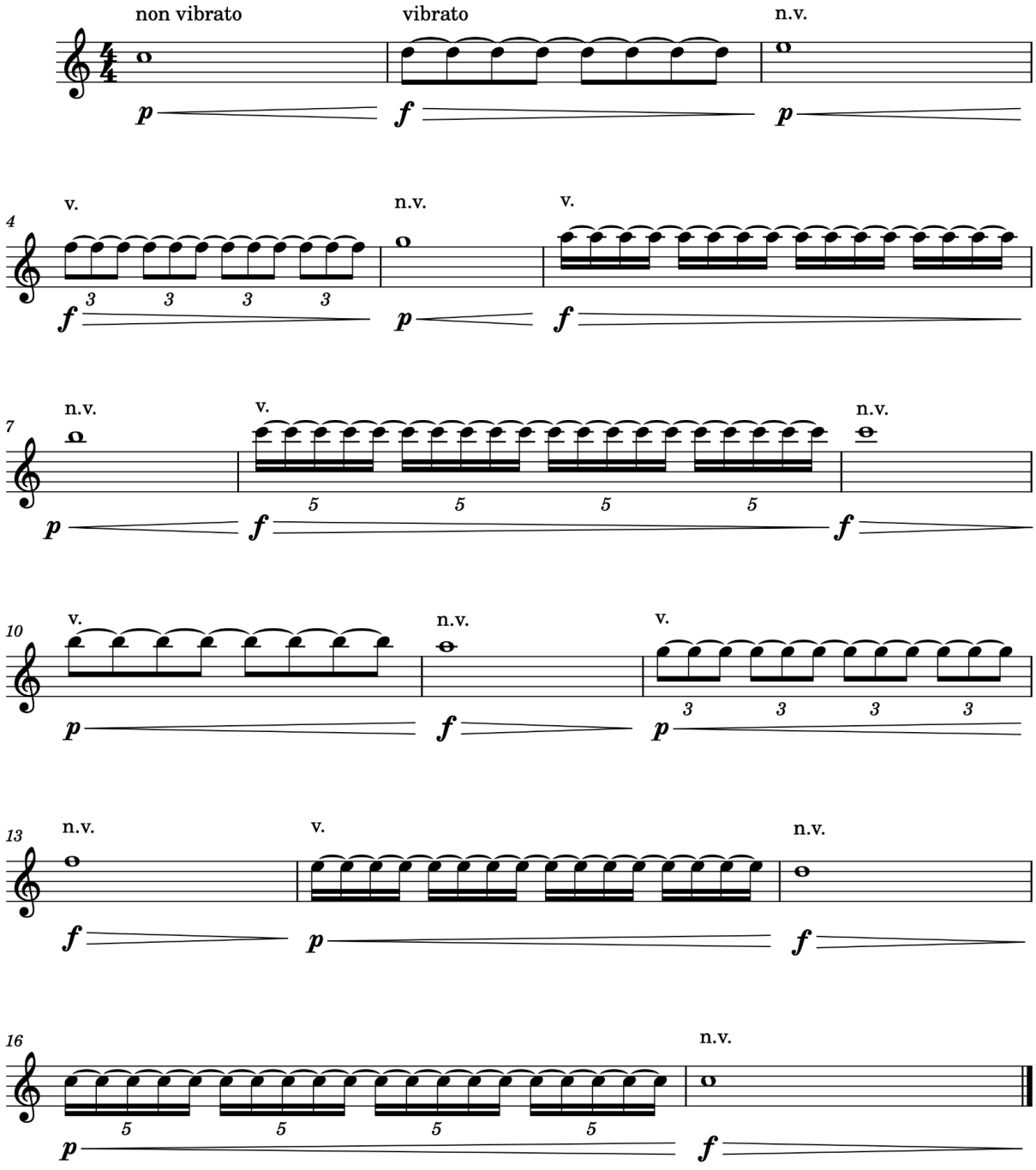
Instructions for Exercise 3: Vibrato Warm Up

1. Place the barrel of the flute under the lip.
2. The rhythms indicate the number of pulses in each beat.
3. Slur through the pulse pattern while following the dynamic contour.
4. Use a metronome for accuracy.
5. Continue the pulse pattern through the entire range of the flute.

Goals For Exercise 3: Vibrato Warm Up

1. Explore the internal process of vibrato production.
2. Vary the dynamic along with the velocity and amplitude of the pulses.
3. Gain consistency and air control.

Exercise 3: Vibrato Warm Up



Questions for Exercise 3: Vibrato Warm Up

1. Where do you feel the motion of the air?
2. What is the role of the throat in vibrato production?
3. Is there diaphragmatic involvement?
4. What internal and external variables play a role in shaping dynamics?

Tips for Exercise 3: Vibrato Warm Up

1. This exercise can be extended to include groups of six or seven pulses.
2. Try experimenting with different dynamic patterns.
3. Watch for unintentional accents on each beat.

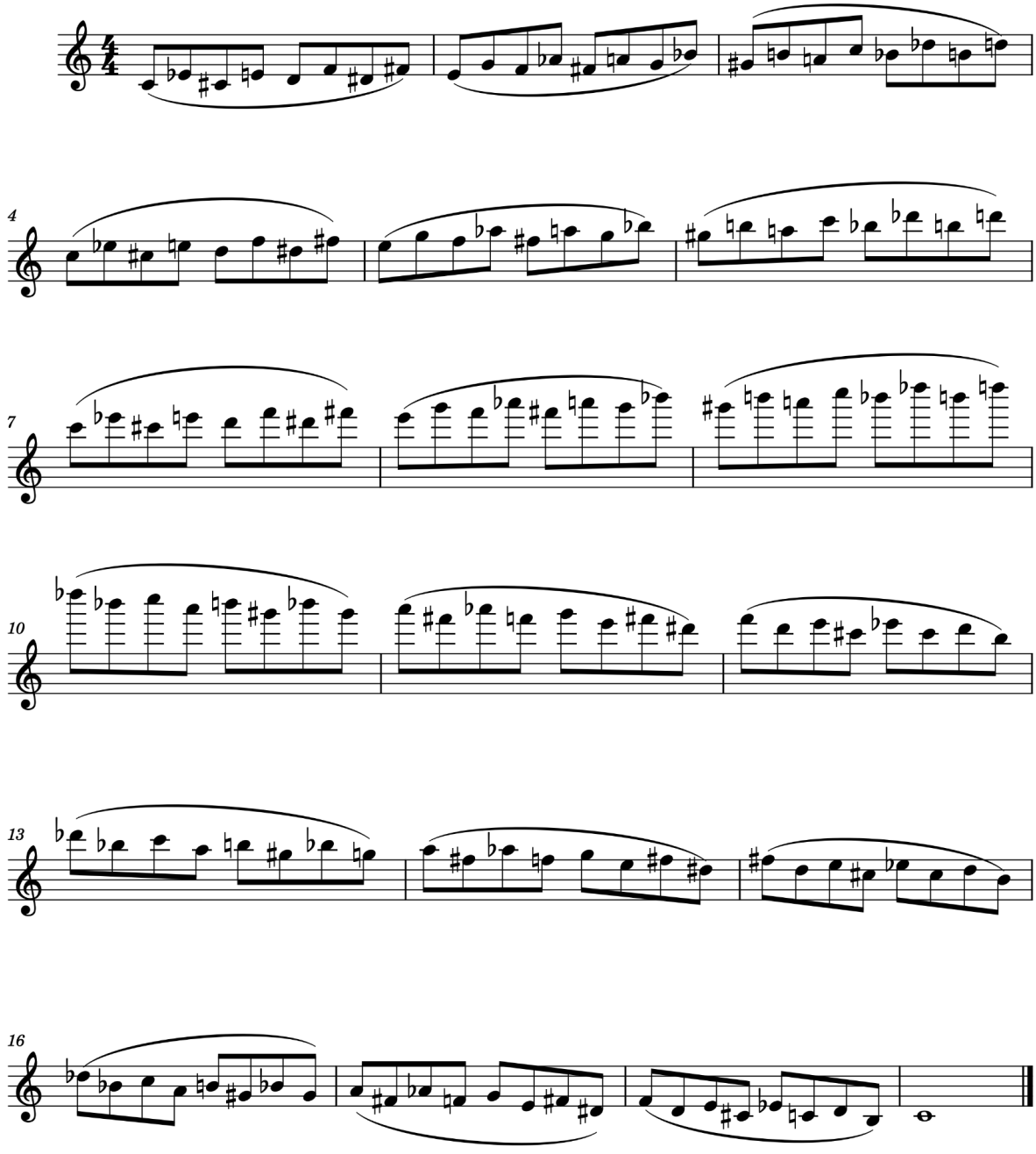
Instructions for Exercise 4: Technique Warm Up

1. Place the barrel of the flute under the lip.
2. Begin with a slow tempo for clarity and awareness.
3. Repeat individual measures or sections as needed.
4. Once you are comfortable with the exercise, try incorporating different dynamics and articulation patterns.

Goals For Exercise 4: Technique Warm Up

1. Identify balance issues.
2. Identify tension, pressure, and overextension tendencies with certain finger transitions.
3. Listen for inconsistencies in the airstream.

Exercise 4: Technique Warm Up



Questions for Exercise 4: Technique Warm Up

1. Can you identify specific transitions that pose the most difficulty?
2. How does the quality of your airstream affect the overall balance of the flute?
3. Does the altered pitch create confusion or decreased confidence with the third and fourth octave fingerings?
4. Can you audiate the correct pitches while hearing the altered pitches?

Tips for Exercise 4: Technique Warm Up

1. The shift in arm position provides variety and flexibility during practice that can be useful in sharpening awareness.
2. Practicing technique exercises without the headjoint can provide relief for arm and shoulder fatigue, especially for less experienced players.
3. Record the exercise (normal playing with the headjoint), then try playing along with the recording against the barrel.

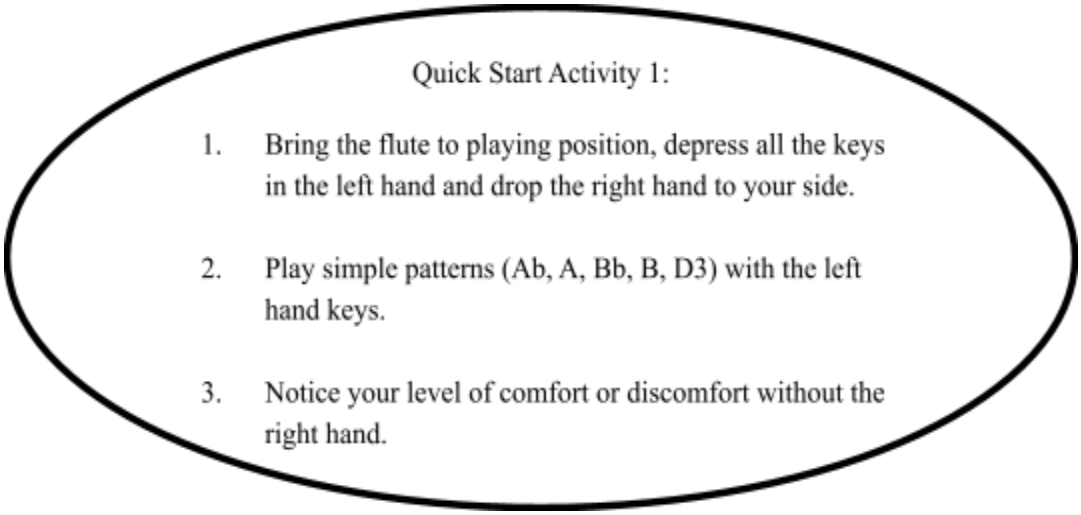
Thumbless Practice

How important is the right thumb and what is its role? Early on in our development as flutists, we learn about the three or three and a half points of balance between the hands/body and the flute, including the chin, base of the left hand index finger, right thumb, and at times, the right pinky.[24] Ideally, the weight of the instrument is balanced evenly among these points of contact. The emphasis on optimal hand position can lead us to believe that it is possible to find a system that will serve us long-term in all situations. In reality, this basic concept is fluid and subject to change throughout our development. Even in a single performance, whether consciously or unconsciously, we are constantly making slight shifts in how we balance the flute based on the technical demands. Are we aware of how, why, and when these shifts happen? What would happen if we were able to perceive these shifts more accurately? How can we practice being aware of this phenomenon?

Sometimes better balance and efficiency can be achieved by deliberately creating an imbalance. Issues of discomfort, tension, and fatigue can often be traced back to the opposing pressure between the right thumb and index finger. The tendency here is to overwork. In an effort to keep the flute from moving and control finger movement, the thumb presses up or forward against the tube of the flute. This is countered by added downward pressure on the right hand keys. The

[24]Michel Debost, *The Simple Flute: From A to Z* (New York: Oxford University Press, 2002), 37.

cycle of tension is difficult to break and transfers tension throughout the body. Some signs of too much thumb pressure can include a locked position, hand/wrist pain, collapsing right hand fingers, and deep imprints from the keys in the right hand fingers while playing. Other common symptoms of balance issues include uneven tone, rhythmic instability, and pervasive difficulty with technical passages. By temporarily removing the thumb from its position, we can assess possible issues and gain insight into our approach. There are a variety of ways to experiment with the "thumbless flute" technique. Thumbless practice should only be used for a few minutes at a time in the beginning stages to avoid tension and overcompensation in other balance points. Without the thumb, it will most likely be very difficult to produce optimal tone in the lowest notes as the sensation of coverage will be compromised. Instead of fixating on the sound quality and compensating with additional pressure, focus on improving your sense of coverage.



Instructions for Exercises 1-4: Thumbless Practice

1. Play through a measure or repeated section normally.

2. Remove the right hand and bring it back to the flute, adding the fingers one by one and noticing the shape of the hand and line of the arm/wrist in relation to the hand.

3. With the right thumb dropped below the flute, lightly depress each key one at a time and imagine the action of the key lifting the finger. Float the thumb back toward the flute and notice where it falls naturally.[25]

4. With the right thumb dropped below the flute, play the measure or repeated section a second time using ghosting/residual tone.

[25]Phyllis A. Louke and Patricia D. George, *Flute 101: Mastering the Basics: A Method for the Beginning Flutist with Teaching and Phrasing Guides* (N.p.: Theodore Presser, 2010), 13.

5. With the right thumb dropped below the flute, play the measure or repeated section a third time with a full tone.

6. Add the thumb back and play the section one more time to make note of any changes.

7. To reduce possible tension or increase time spent on thumbless exercises, try the following options.

   7a. Practice in a seated position while resting the footjoint on a table or flat surface.

   7b. Practice in a seated position while resting your elbows on a table or flat surface.

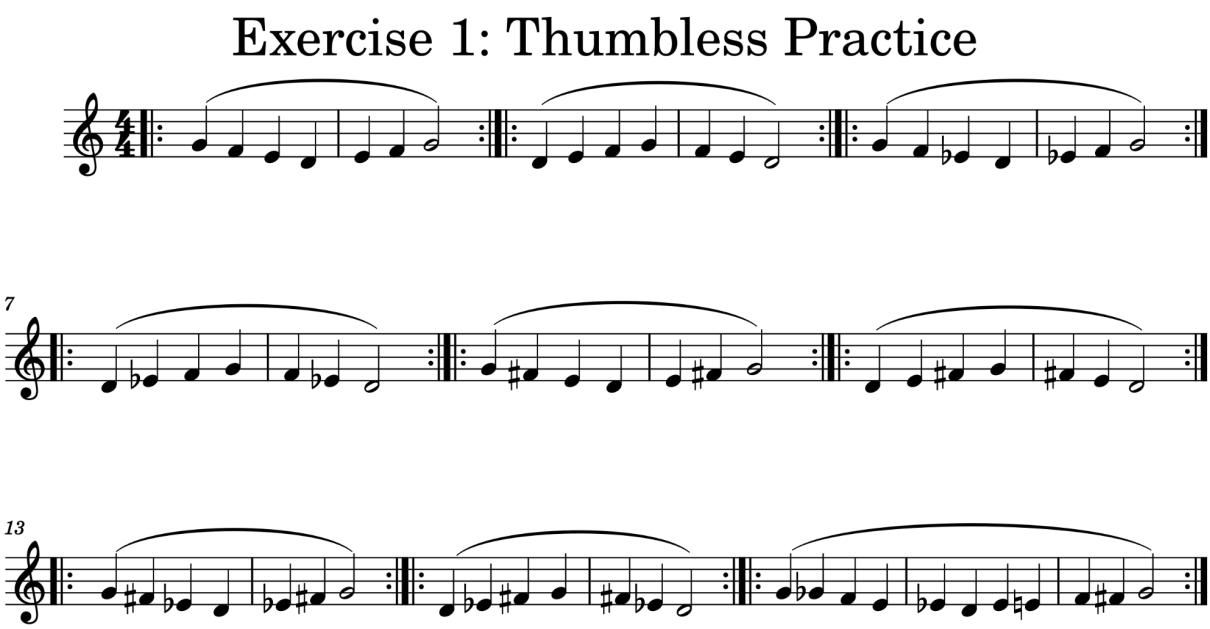
   7c. In a seated position, take the flute away from your face and rest it diagonally on your left shoulder and right knee to practice the fingerings only.

   7d. Teachers: Hold the end of the student's footjoint steady while they work through a passage.

   7e. Students: Ask your teacher to hold the footjoint steady as you work through a passage.

Goals for Exercise 1: Thumbless Practice

1. Allow the left hand position to remain as natural and relaxed as possible.
2. Maintain a light touch in the right hand to increase finger sensitivity and accuracy.
3. Focus on connecting each interval with air to support an energized, resonant tone.



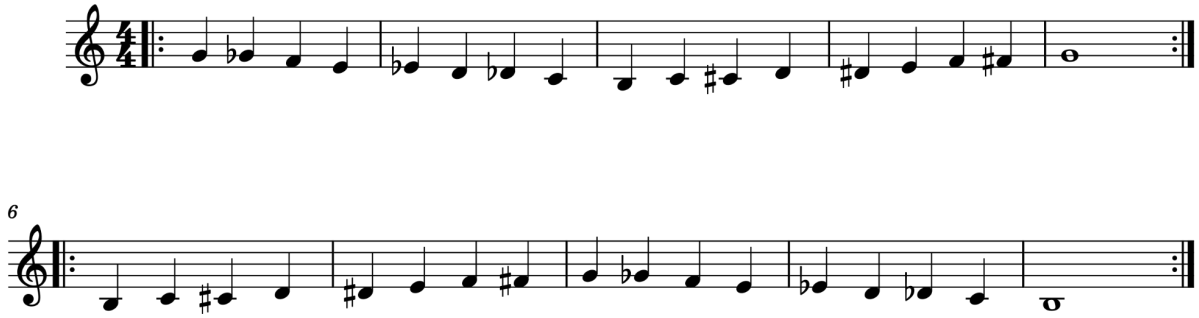
Questions for Exercise 1: Thumbless Practice

1. How sensitive are the right hand fingers without the support of the thumb?
2. Is the omission of the thumb causing gaps in finger coverage (for open-hole flutes)?
3. How does the temporary omission of the thumb impact perception?
4. Do you notice a difference in the flute's overall resonance?

Goals for Exercise 2: Thumbless Practice

1. Be patient with your tone and work toward small improvements rather than perfection.
2. Practice this both tongued and slurred.
3. Watch out for extra pressure from the right pinky.

Exercise 2: Thumbless Practice



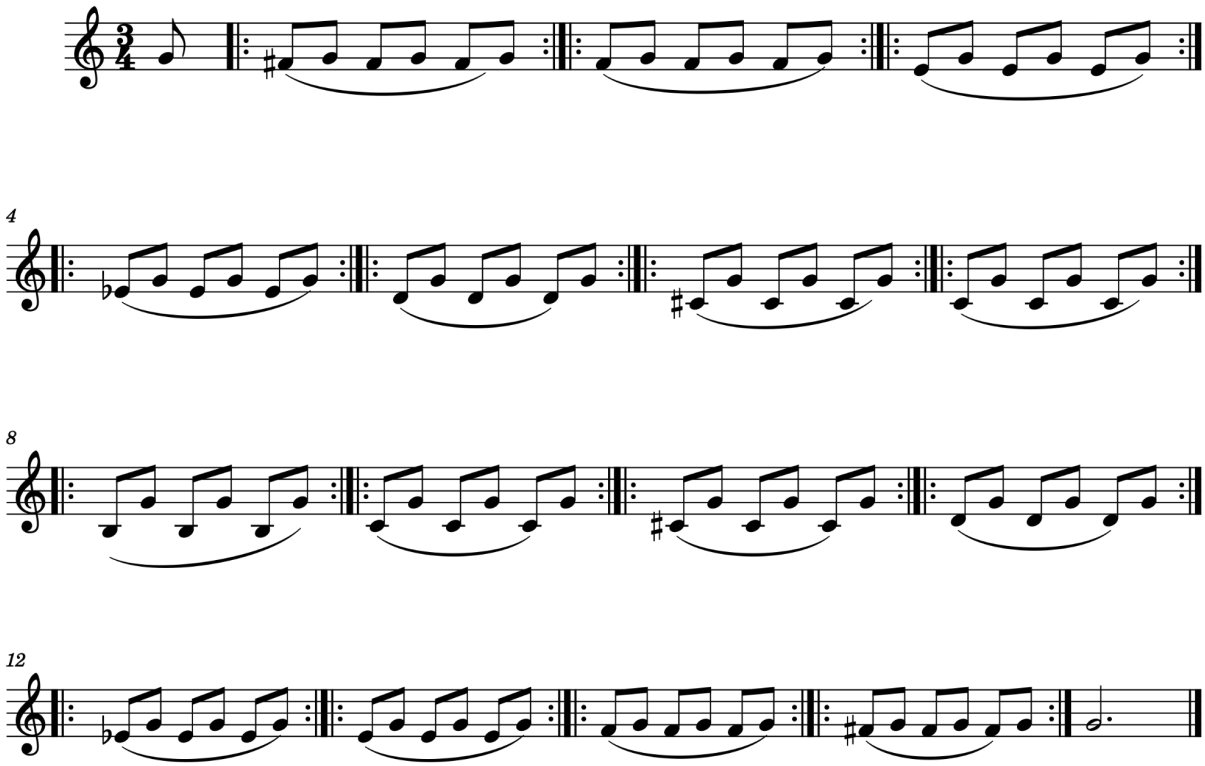
Questions for Exercise 2: Thumbless Practice

1. How does the balance of the flute shift between regular playing and thumbless playing?
2. Can you maintain coverage of the open holes without the contact of the thumb?
3. Which keys are more difficult to cover when playing below D1?

Goals for Exercise 3: Thumbless Practice

1. Play these interval pairs slowly to feel any shifting occurring between notes.
2. Keep your fingers close to the keys for smoother results.
3. Repeat each measure until it is comfortable, then play straight through without repeats.

Exercise 3: Thumbless Practice



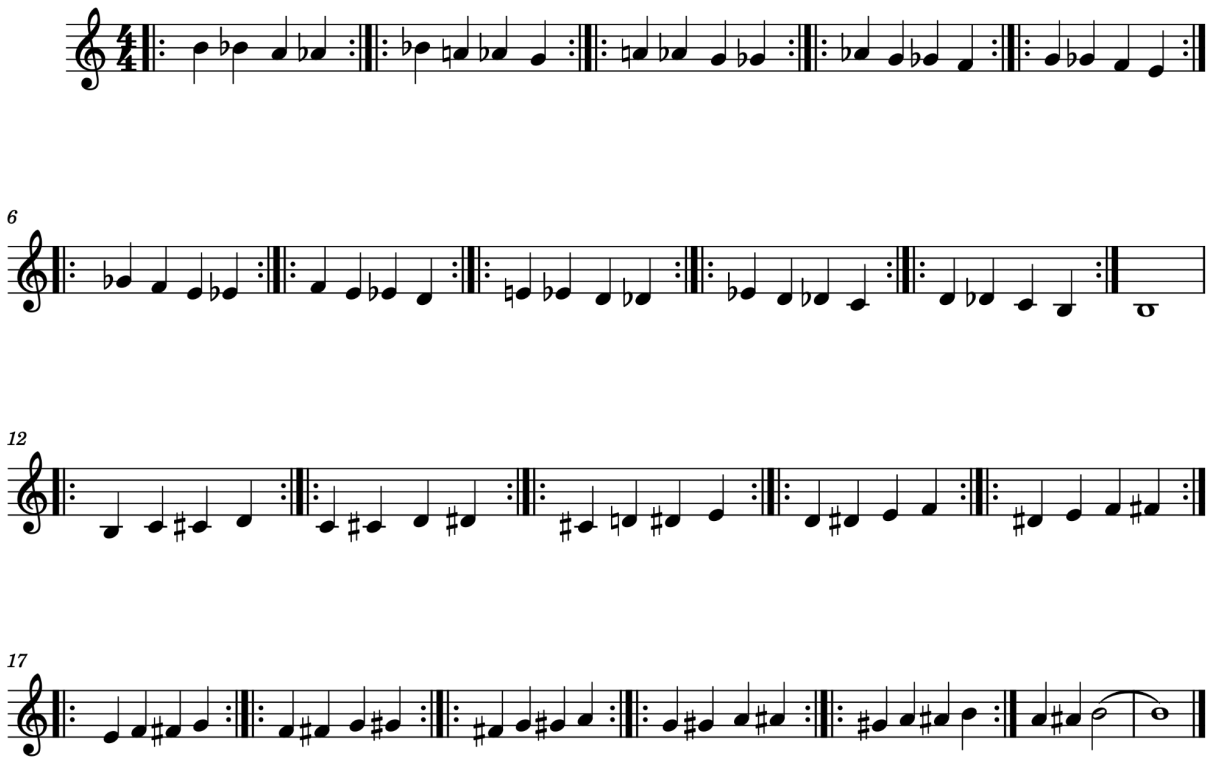
Questions for Exercise 3: Thumbless Practice

1. How do your perceptions of balance shift while removing the right thumb?
2. How does the balance of the flute shift for larger intervals?
3. Are the right hand fingers involved in balancing the instrument?
4. Can you transfer the responsibility of stabilizing the flute to the left hand?
5. Which intervals trigger more wrist tension?

Goals for Exercise 4: Thumbless Practice

1. Build confidence and stability in the contact between the flute, chin, and left index finger while playing both left and right hand patterns without the right thumb.
2. Practice this both tongued and slurred.
3. Repeat each measure until it is comfortable, then play straight through without repeats.

Exercise 4: Thumbless Practice



Questions for Exercise 4: Thumbless Practice

1. Is the balance between the chin and left index finger stable throughout?
2. Which keys are more difficult to cover when playing patterns below D1?
3. Do certain measures trigger more wrist tension?

Tips for Exercises 1-4: Thumbless Practice

1. For an extra challenge or to add variety, try transposing these exercises up an octave.

2. Transfer the concepts from these exercises to specific areas of your technique and repertoire practice as needed. Low register studies including those of Taffanel and Gaubert, Moyse, Kujala, Wye, etc. are a great place to start.

3. In the exercises above as well as in additional exercises and repertoire, try toggling back and forth between playing with and without the right hand thumb for short periods of time.

4. Alternate your focus between fingers and tone and note how your approach shifts.

5. Notice any inequality of balance points. Instability will increase while descending through the pattern because the right thumb is not present to counterbalance the contact of the fingers on top of the keys. Check to make sure your balance with the lip and left index finger is secure and make sure the left thumb is not overcompensating too much. Instead, spread the weight of the flute evenly between your left hand thumb and fingers.

6. If wrist tension is increasing, practice the thumbless exercises away from your face with the end of the flute resting on your knee.

7. Consider the idea of touching the keys vs. pressing. In addition to watching for excess downward pressure on the keys, notice how much effort is involved in releasing the keys.

CHAPTER THREE
HYBRID TECHNIQUES FOR MENTAL PRACTICE - PART 2

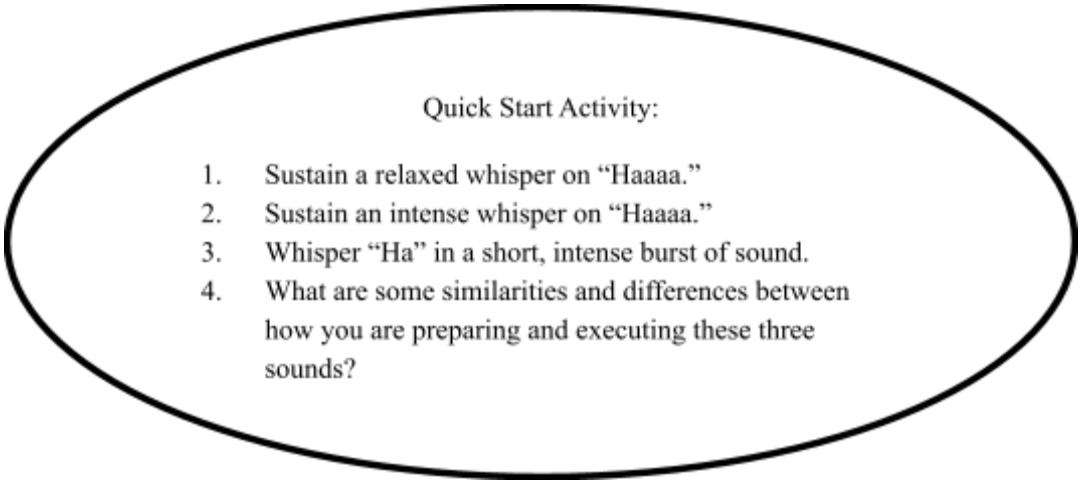
The Body as the Instrument

The second stage in exploring hybrid techniques involves learning from the natural ways the body produces sound through vocalizing and singing. While it is essential to have a high-quality instrument, the capacity for resonance, flexibility, and color starts with our internal setup. There are endless connections between optimal vocal technique and our approach to the flute.

An improved understanding of vocal techniques will not only influence our concept of sound production, but it will provide valuable information about phrasing, contour, syntax, and nuance. The flute, in all its imperfection and idiosyncrasies, teaches us habits that we would immediately recognize as unnatural or even ridiculous in song, yet we often keep following the same, unnecessary path of repetition without recognizing what isn't working or how to correct possible issues.

The following quick start activity and exercises are designed to heighten awareness around the role of the throat in exhalation and the process of constriction versus relaxation. How does this relate to flute playing? In the multifaceted pursuit of creating music through the flute, the simple processes of inhalation and exhalation often become overcomplicated. It is clear from recent research that the throat, specifically the larynx, is indeed involved in shaping dynamics, articulation, and vibrato.[26] In an effort to make up for a lack of internal air compression (support), control air speed, manipulate tone, create dynamic contrast, and support difficult releases, the throat often absorbs unnecessary tension and the windpipe narrows too much, leading to a lack of control, fatigue, intonation issues, and unintentional vocalization while playing. When prioritizing relaxation and expanding slightly as needed by lowering the jaw and creating more space between the back teeth, we gain the freedom to find sustainable solutions beyond overuse of the throat, leading to improved tonal resonance and flexibility.

[26]Erika Boysen and David Brown, "Mapping Anatomical Locators for Musicians: Laryngeal Vibrato Production in Flutists: A frank question from a curious student launched a study in search of better understanding how the pharynx and larynx physically create vibrato. Boysen and Brown's study produced data relevant to performers, educators, and students," *Flutist Quarterly*, Spring 2021, accessed March 15, 2023.



Instructions for Exercises 1-4:

1. Try the following exercise both while seated and standing.
2. Exercise 1-2 are whispered while Exercise 3-4 use vocalization/tone.
3. Place one or both hands on the front and/or sides of the throat to feel the process externally.
4. Use caution when experimenting with vocal fry as it can be taxiing on the voice.

Goals for Exercises 1-4:

1. Notice how it feels when only a small amount of air is escaping from the windpipe.
2. Visualize the role of the throat while singing or playing.
3. Explore the process of exhalation and air control.

Exercise 1: Opening the Throat

1. Take a deep breath and close your windpipe as if you are about to cough.
2. Open the windpipe very slowly and release the air without allowing the vocal cords to vibrate.
3. You might feel a slight sensation of vocal fry, followed by a tense, hissing whisper, followed by a relaxed whisper.

Exercise 2: Closing the Throat (Exercise 1 reversed)

1. Take a deep breath and begin a relaxed whisper.
2. Slowly transition to a tense, hissing whisper.
3. Gradually close the throat until no air escapes. You might experience vocal fry right before the sound stops.

Exercise 3: Opening the Throat While Vocalizing.

1. Take a deep breath and close your windpipe as if you are about to cough.
2. Open the windpipe very slowly and release the air while allowing the vocal cords to activate.
3. You will hear vocal fry that gradually slows and relaxes, followed by a forced/tight vocalization that becomes more open and resonant as the windpipe opens.

Exercise 4: Closing the Throat While Vocalizing (Exercise 3 reversed)

1. Take a deep breath and begin a relaxed vocalization.
2. Slowly transition to a forced/tight vocalization.
3. Gradually close the throat until no air escapes. You might experience vocal fry right before the sound stops.

Questions for Exercises 1-4:

1. At what point in this process did you recognize tension?
2. What were the subtle signs of tension?
3. What were the obvious signs of tension?
4. How can this be transferred to greater awareness during practice?

Singing and Playing

The process of alternating between singing and playing is helpful in allowing the body to energize the air naturally. In the following quick start activity and exercises, explore how your concept of vocal sound production is similar or different to sound production through the flute. How is sound impacted while thinking of the flute as an extension of the body and voice?

Quick Start Activity:

1. Vocalize or sing a sustained tone on “Haaaa.”
2. Repeat the same tone with a short burst of sound.
3. What are some similarities and differences between how you are preparing and executing these two sounds?

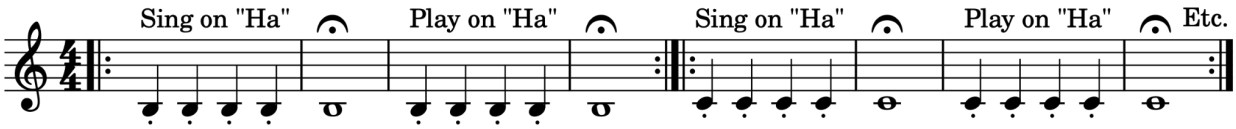
Instructions for Exercise 1: Pitch Matching

1. Alternate between the voice and flute for this exercise, using a tongueless attack.
2. Sing or vocalize in a comfortable range, matching the pitches as closely as possible.
3. Transfer the same throat shape from singing to playing.
4. Repeat each group of bars 2-3 times.
5. Extend the exercise throughout the range of the flute, singing at a lower octave as needed.

Goals for Exercise 1: Pitch Matching

1. Draw associations between pitches that are sung or played.
2. Internalize the preparation of air for both short and sustained attacks.
3. Notice how the throat and larynx are involved.

Exercise 1: Pitch Matching



Questions for Exercise 1: Pitch Matching

1. What are some similarities and differences between how you are preparing and executing these two sounds while singing and while playing?
2. Where does the energy of the sound originate internally?
3. Where does your attention tend to shift when playing the pattern on the flute?
4. How does the air speed, volume, and pressure change between singing and playing?
5. Did your manner of sound production on the flute change?

Tips for Exercise 1: Pitch Matching

1. Work through 2-5 notes a day using this pattern.
2. Try this exercise using a variety of vowel shapes, articulations and dynamics.

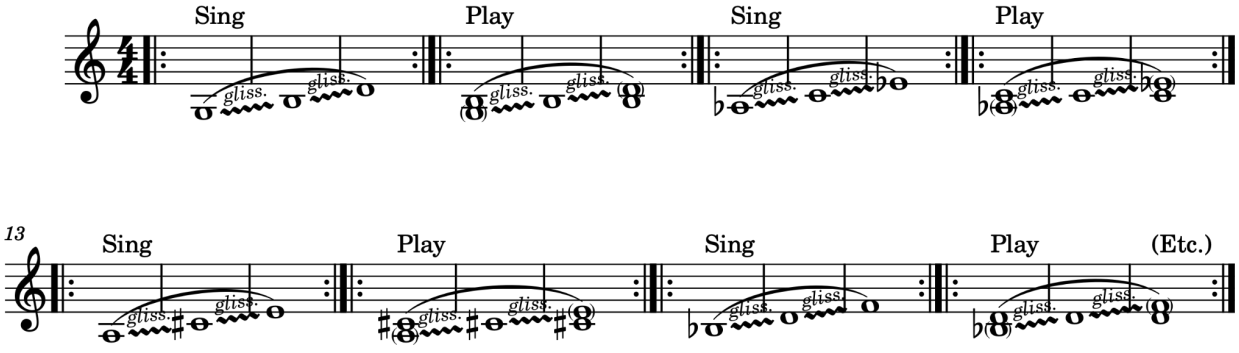
Instructions for Exercise 2: Glissando

1. Each set of repeated measures alternates between the voice and flute.
2. Use a tuner to keep track of pitch or play each arpeggio on a piano as a chord.
3. Sing in a comfortable range, matching the outer pitches as closely as possible.
4. In the measures marked “play,” hold the top note while internally feeling the glissando sung in the previous set of measures.
5. Transfer the same laryngeal movement from singing to playing (the larynx will rise and lower slightly along with the voice).
6. Extend the exercise throughout the range of the flute, singing at a lower octave as needed.

Goals for Exercise 2: Glissando

1. Feel the movement of the larynx, tongue, and soft palate while singing and playing.
2. Gain internal flexibility while remaining stable on long tones.
3. Gain pitch flexibility.
4. Practice separating laryngeal movement from vocalization.

Exercise 2: Glissando



Questions for Exercise 2: Glissando

1. At what point does the pitch tend to stabilize in the played measure groups?
2. Is it more challenging to raise or lower the internal pitch in relation to the held pitch?
3. Do you feel tension in the throat at any point?

Tips For Exercise 2: Glissando

1. Loosely hold a hand on your throat during the sung measure groups to feel the movement externally.
2. If you are comfortable with singing while playing, try adding this step between measure groups.
3. For an added challenge, try shaping the larynx for the pitch a fifth or octave below the held pitch.

Singing While Playing

Exploring the technique of simultaneous singing and playing is a transformative practice that brings increased awareness to the muscle groups involved in engaging the air. Potential results include improved tone quality and flexibility, pitch accuracy, additional resonance, air efficiency, and reduced effort in the throat and facial muscles. The exercises will begin with pitch matching and extend to vocal harmonization. It is normal to have difficulty in keeping the vocalized pitch stable. Try using a drone as reinforcement. As described in the quick start activity, singing while playing will feel very different from typical singing. This “turbo singing” may involve intense vibration and buzzing in the face and lips. Begin singing first and adding the flute tone, then reverse the process (as shown in Exercise 1).

Quick Start Activity:

1. Sing a comfortable pitch on “Ahh.”
2. Move the lips to form a relaxed embouchure.
3. Increase air speed and pressure until you feel intense vibration in and around the lips.

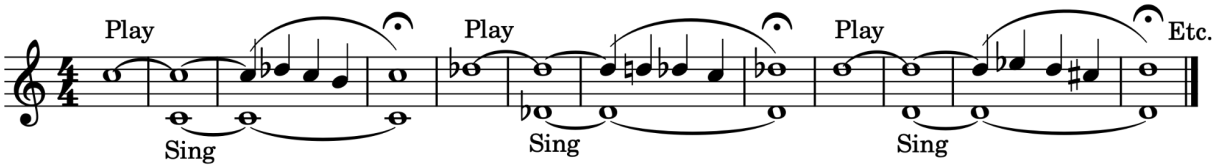
Instructions for Exercise 1: Vocalization Warm Up

1. When possible, sing at least an octave below the flute pitch.
2. Sustain the top notes on the flute while adding the voice as indicated below.
3. Choose a slow tempo and use a tuner or drone to stabilize the pitch.

Goals for Exercise 1: Vocalization Warm Up

1. Practice engaging the vocal chords while playing.
2. Keep the pitch and tone as stable as possible.
3. Feel a strong sense of gravity and powerful engagement of the air supporting the tone.

Exercise 1: Vocalization Warm Up



Questions for Exercise 1: Vocalization Warm Up

1. How does the air change to support the voice?
2. Is the voice moving or remaining stable?
3. Is the air escaping too fast?

Tips for Exercise 1: Vocalization Warm Up

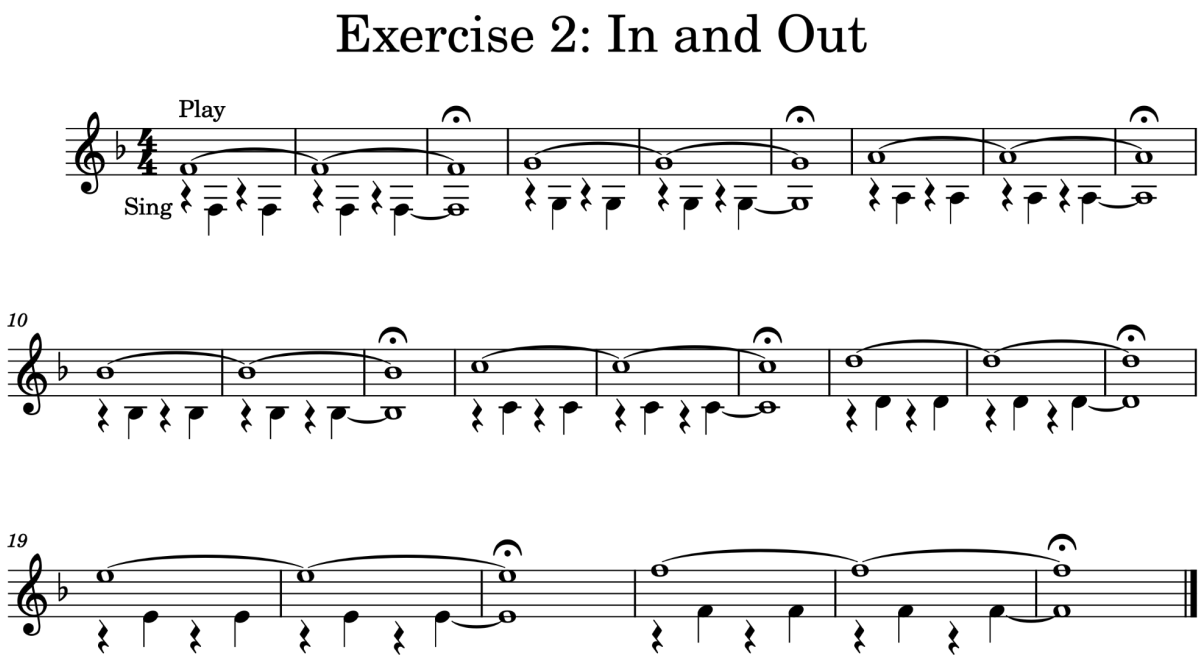
1. Be careful not to overwork the vocal cords.
2. Aim for a natural, loose embouchure.
3. Continue the pattern above and below the notated example.

Instructions for Exercise 2: In and Out

1. When possible, sing at least an octave below the flute pitch.
2. Sustain the top note on the flute while adding the voice as indicated below.
3. Choose a slow tempo and use a tuner or drone to stabilize the pitch.

Goals for Exercise 2: In and Out

1. Practice engaging and disengaging the vocal chords while playing.
2. Keep the pitch and tone as stable as possible.
3. Feel a strong sense of gravity and powerful engagement of the air supporting the tone.



Questions for Exercise 2: In and Out

1. Which elements are stable?
2. Which elements are shifting?
3. Is the tone or voice more present?

Tips for Exercise 2: In and Out

1. Be careful not to overwork the vocal cords.
2. Aim for a natural, loose embouchure.
3. Try the pattern using different scales and octaves, especially if F major is not in your optimal vocal range.

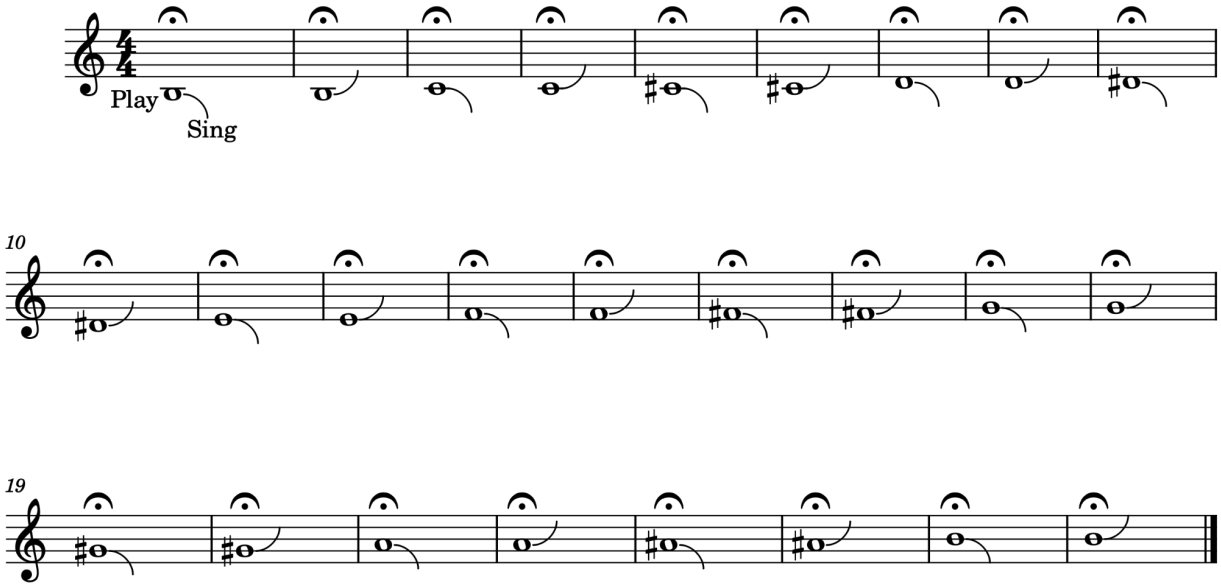
Instructions for Exercise 3: Vocal Pitch Bending

1. Sustain the notated pitch while singing in unison or singing an octave (or more) below.
2. Gradually sing a glissando as low and as high as you are comfortable while keeping the flute's pitch stable.
3. Use a drone to reinforce the notated pitch.
4. Continue the exercise throughout the range of the flute.

Goals for Exercise 3: Vocal Pitch Bending

1. Strengthen tonal and vocal independence.
2. Explore the optimal internal setup behind each sound.
3. Sharpen your ability to adjust pitch and color on a micro level.
4. Feel and explore the resonant chambers in the face, head, and chest.

Exercise 3: Vocal Pitch Bending



Questions for Exercise 3: Vocal Pitch Bending

1. Is it more challenging to bend the vocal pitch below or above the notated pitch?
2. How does the throat, larynx, tongue, soft palate, and jaw adjust?
3. How does the vocal pitch bend/glissando influence the tone and/or pitch?
4. Where do you feel resonance/vibration?

Tips for Exercise 3: Vocal Pitch Bending

1. Be careful not to overwork the vocal cords.
2. If it is difficult to sustain the low register while singing, try relaxing and opening the aperture.
3. Repeat the exercise, this time bending the flute and vocal pitch together.

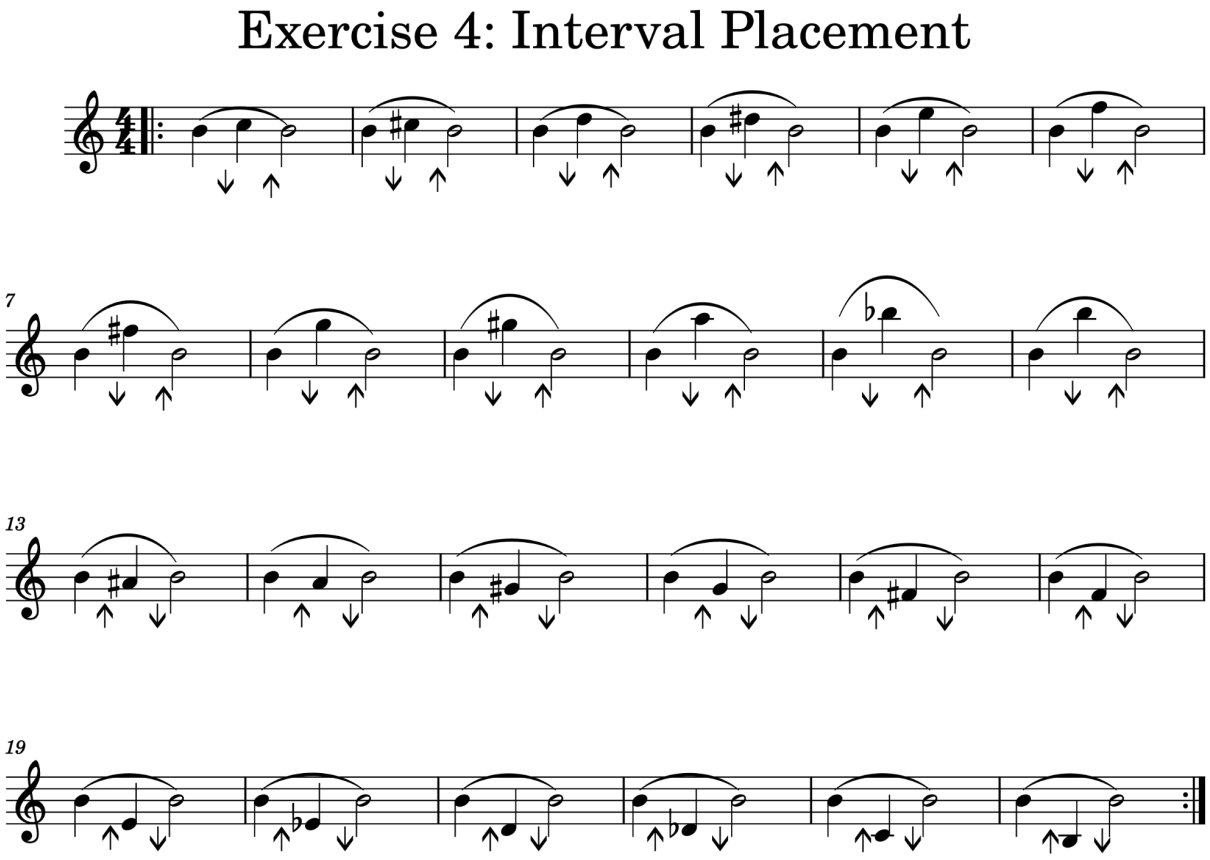
Instructions for Exercise 4:

1. Sing through the pattern with a tuner or drone in a comfortable range. Imagine singing the intervals once they are out of range.
2. Simultaneously play and sing the exercise, vocalizing only the B once the intervals are out of range.

3. Repeat a third time, playing normally.
4. Transpose the pattern throughout the range of the flute.

Goals for Exercise 4: Interval Placement

1. Notice where you feel each interval internally while singing or imagining singing.
2. Aim for opposites, imagining a lowered center of gravity while ascending and an elevated center of gravity while descending.
3. Keep the throat and embouchure relaxed and flexible.



Questions for Exercise 4: Interval Placement

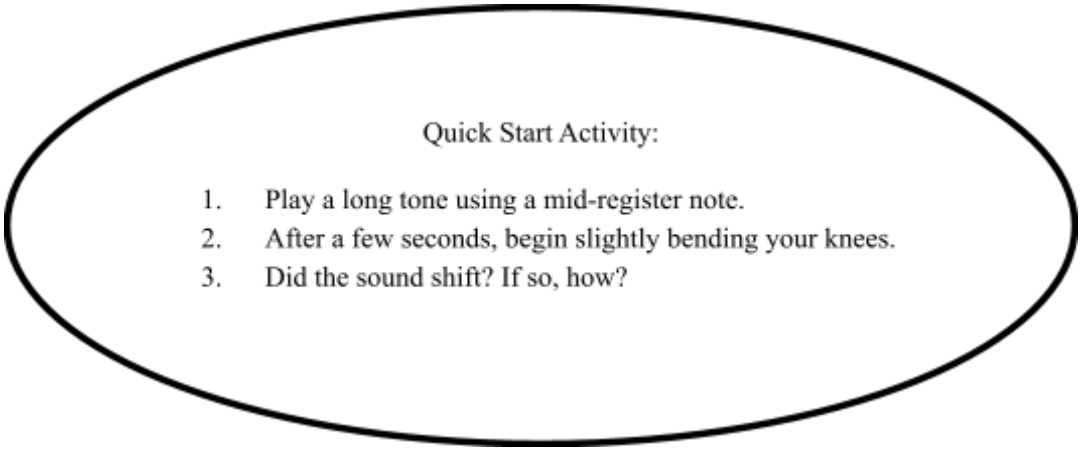
1. Is the air consistent through the intervals?
2. How are you preparing for each ascending or descending interval?
3. Do you feel tension at any point?
4. What stands out after going through the pattern three times?

Tips for Exercise 4: Interval Placement

1. Choose a slow tempo for the best results.
2. While singing, raise and lower your hand to reinforce the alternating center of gravity.
3. While singing and playing, focus on the internal sensation of the air rather than the quality of sound.

The Elevator

In reimagining tone, the body takes on the majority of the responsibility for sound production while the flute acts as a substitute/replacement for, or an extension of, the vocal cords. If we extend our resonant chamber beyond the tangible limits of the body, we can find additional power and support using the space surrounding us. From this standpoint, we can experiment freely with ratios and relationships. From early on in our development as flutists, we learn about the importance of the lips in angling the air. Generally, a lower angle is needed for the lower register and a higher angle is used for the higher register. Additionally, we adjust the pitch, dynamic, and tone color with the lips, lowering the air angle to flatten the pitch or add darkness to the tone and raising the air angle to bring the pitch higher or lighten the tone color. While these concepts are absolutely accurate from a physics standpoint, it is important to explore other avenues to support the production and release of sound and gain efficiency and flexibility with musical choices. The following activity and exercises target the awareness of how sound can be centered internally. While the lip and facial muscles are important, work on becoming more sensitive to the role of the core/abdominal muscles, intercostal muscles, and diaphragm. Much wisdom can be found through becoming more familiar with vocal technique and applying fundamental concepts to flute playing. As we rely more on our internal setup and the muscles involved in inhalation/exhalation to do the heavy lifting, the lip and facial muscles are free to relax and shape the finer details of our sound.



Visualization Exercise:

1. Find a relaxed standing position.

2. Close your eyes and slow your breathing.

3. Can you find your center of gravity?

4. Feel how gravity/the earth is holding you up.

5. Imagine the air in your lungs expanding into a cylindrical column, reaching down through your feet into the ground, up through the top of your head through the ceiling and growing horizontally until it surrounds you.

6. Once you are fully inside your column of air, imagine a buoyant sphere of energy that moves vertically through your center of gravity and balances on the column of air.

Try some vocalization experiments while visualizing the concept above.

1. Start on a comfortable pitch and sing an ascending scale or glissando.

2. Begin with your hand in the front/center of your body (around the diaphragm) and slowly move it downward as your voice moves higher.

3. Let your hand guide your center of gravity lower.

4. Start on a comfortable pitch and sing a descending scale or glissando.

5. Start with your hand in the front/center of your body and slowly move it upward as your voice moves lower.

6. Let your hand guide your center of gravity higher as your voice moves lower.

Apply these concepts on the flute to increase awareness in practice.

1. Play a simple scale while imagining and feeling your “air center” moving in the opposite direction.

2. Physical reinforcement can be helpful in the context of practice. Experiment with slowly bending your knees as you ascend through the scale and straighten to a proud stance (chest open/lifted) as you descend through the scale.

The purpose of the previous and following exercises is to turn our natural perceptions upside down. This gives us more choice and freedom in our approach to sound. In many cases, an opposite approach to different registers can help with pitch tendency issues and provide greater flexibility, ease, and confidence. There are always exceptions, and these tips are not meant to be a rigid set of instructions for playing. Instead, think of them as a general guide to approaching the flute as a vocalist.

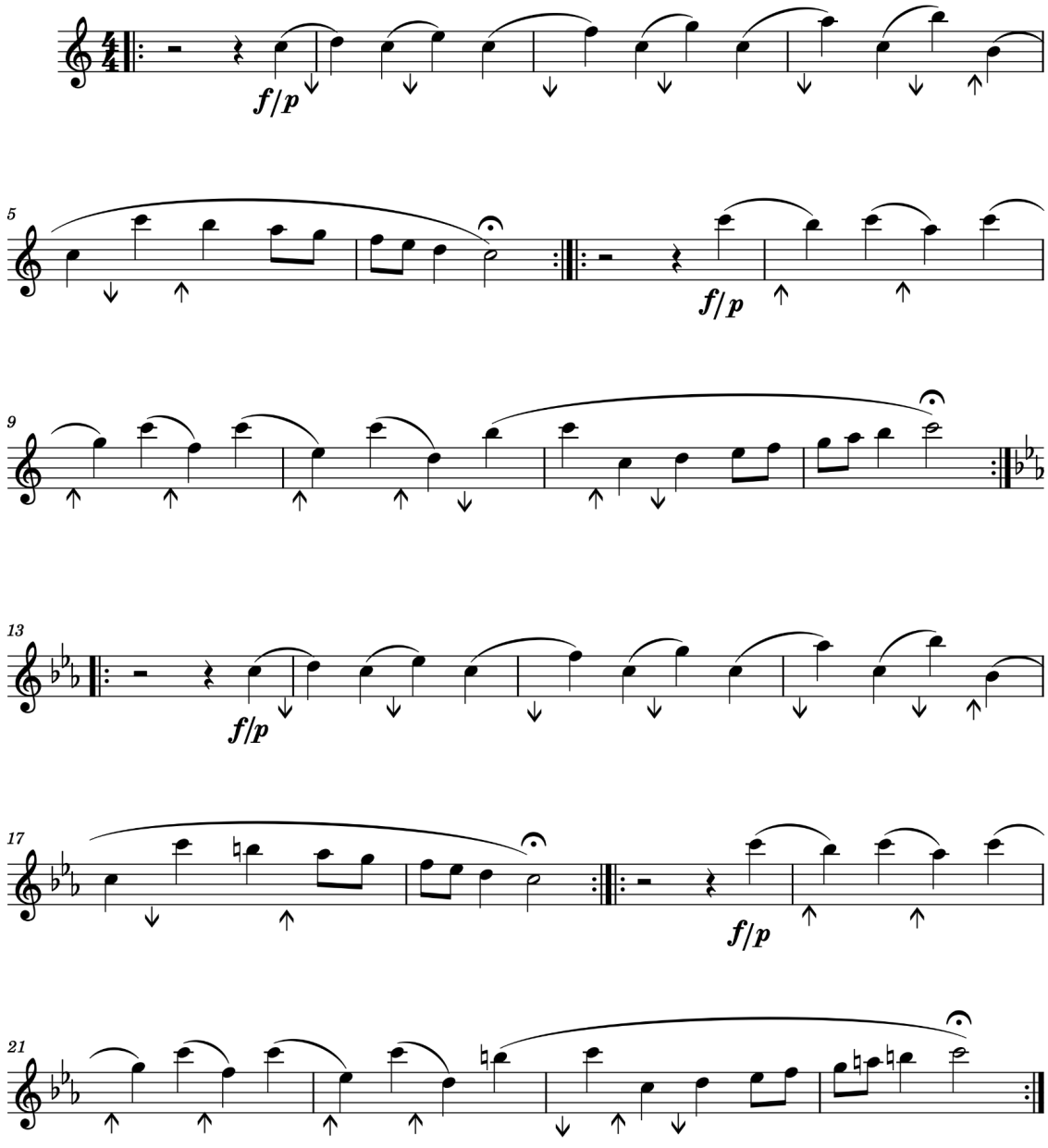
Instructions for Exercise 1: Air Center Calibration - “Over the Rainbow”

1. Alternate between forte and piano dynamics.
2. The arrows indicate where to shift/focus the center of gravity
3. Transpose the pattern throughout the range of the flute.

Goals for Exercise 1: Air Center Calibration - “Over the Rainbow”

1. Feel the intentional action of the air between intervals.
2. Allow the air to lead the fingers and lips.
3. Discover or reinforce a singing quality in your playing.

Exercise 1: Air Center Calibration - "Over the Rainbow"



Questions for Exercise 1: Air Center Calibration - “Over the Rainbow”

1. How does this exercise relate to or challenge your standard method of playing?
2. How does the internal shaping of air relate to the external angle/shaping with the lips?
3. Which variables are most effective in controlling dynamics?

Tips for Exercise 1: Air Center Calibration - “Over the Rainbow”

1. Sing or speak through the intervals while using your hand to reinforce the direction of the arrows in focusing the air.
2. Use small movements while playing to reinforce where to focus the air.
3. Play slowly with a tuner or drone.
4. Internalize and audiate the sound before playing it.

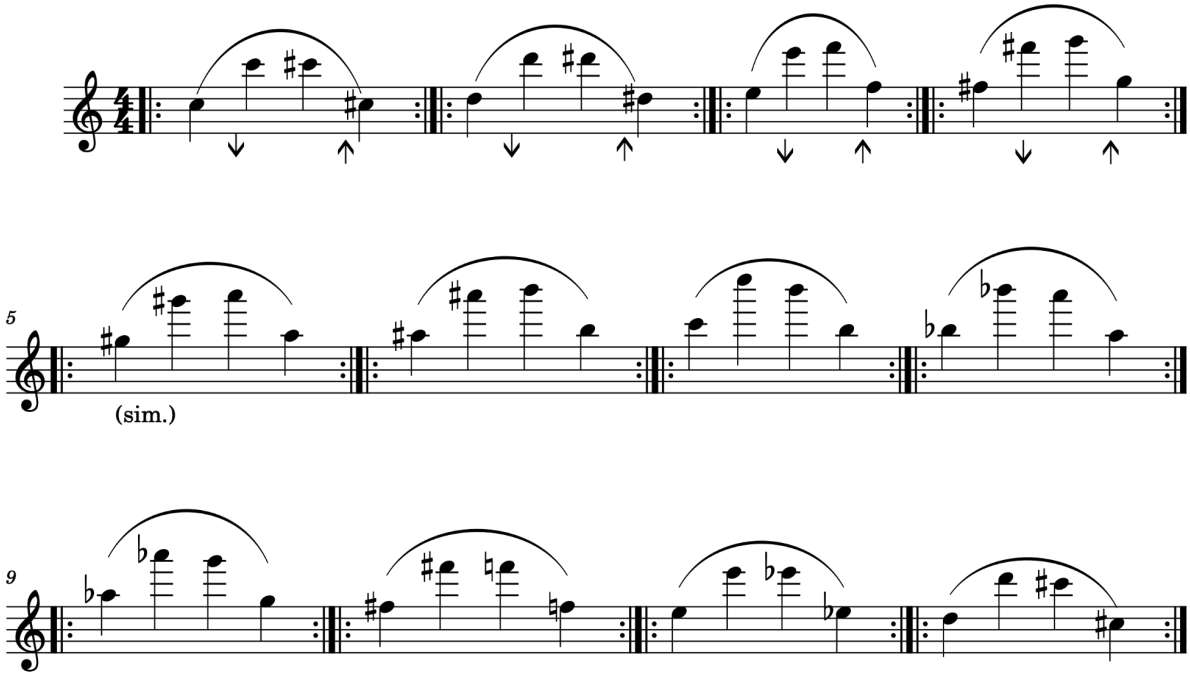
Instructions for Exercise 2: Air Center Calibration - Opposites

1. Shift your focus/center of gravity in the opposite direction while approaching each interval.
2. Repeat each measure as needed.
3. Transpose the pattern throughout the range of the flute.

Goals for Exercise 2: Air Center Calibration - Opposites

1. Feel the intentional action of the air between intervals.
2. Find more openness, resonance, and flexibility in your sound.
3. Gain confidence and stability with awkward intervals.

Exercise 2: Air Center Calibration - Opposites



Questions for Exercise 2: Air Center Calibration - Opposites

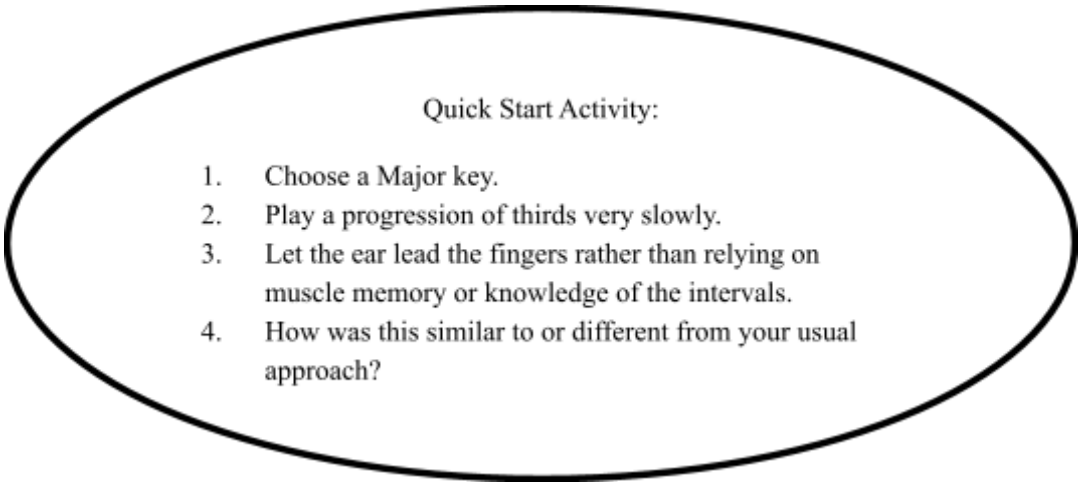
1. What is the role of the aperture in supporting these shifts?
2. Is it more challenging to prepare for an ascending or descending interval?
3. Which intervals contain the strongest lower partials?

Tips for Exercise 2: Air Center Calibration - Opposites

1. Alternate between different dynamic levels.
2. Play slowly with a tuner or drone.
3. Alternate between playing at pitch and using the lower partials.
4. Avoid unintentional crescendos and diminuendos.

Playing by Ear and Improvisation:

In addition to being a valuable skill in itself, playing by ear is linked to mental practice strategies as it combines audiation with interval/pattern awareness and finger coordination. Playing by ear involves hearing or imagining musical material and imitating the sound on the spot, making educated guesses in regards to specific pitches or gestures. These guesses are made so quickly that it may feel as though they are being led by the fingers, when in fact, the muscle memory and audiation originate and coordinate in the mind. The more technically comfortable a flutist is with interval patterns across different tonal centers, the better they will be able to navigate the guesswork with confidence. Improvisation introduces an additional challenge of creating musical material on the spot and externalizing it. A high level of mental organization is involved in expressing ideas formed in the imagination, operating within the chosen parameters, and collaborators. Developing more confidence with both of these skills while playing your instrument is the first step to unlocking the awareness and creativity you already possess while experimenting away from the instrument.



Goals for Exercise 1: Playing by Ear

1. Let the ear lead the process rather than overthinking intervals.
2. Coordinate the ear with muscle memory.
3. Be patient with yourself and have fun with the process.

Exercise 1: Playing by Ear

1. Choose a familiar song/tune.
2. Choose a key/starting pitch.
3. Play through the song slowly, correcting missed notes along the way.
4. Set a metronome to a realistic tempo.

5. Play through the song again without stopping to correct missed notes.
6. Repeat until you can play the song cleanly while keeping the rhythm intact.

Questions for Exercise 1: Playing by Ear

1. Is this exercise more or less difficult than you expected?
2. Did you base your song choice on the level of difficulty or the level of enjoyment?
3. Are you more comfortable leading with the ear or relying on muscle memory?

Tips for Exercise 1: Playing by Ear

1. As your comfort level increases, try playing along with a recording or a karaoke track instead of a metronome.
2. Try repeating the song in a different mode or key.
3. If you are already comfortable playing familiar songs by ear, try harmonizing by ear.

Goals for Exercise 2: Improvisation

1. Let the ear lead the improvisation rather than overthinking intervals or letting the fingers move randomly.
2. Coordinate the ear with muscle memory.
3. Have fun with the process and explore your creativity.

Exercise 2: Improvisation

1. Choose a key/tonal center.
2. Decide whether to improvise over a specific meter/tempo or to improvise more freely.
3. Think about a basic shape/form for the improvisation (ex: beginning, middle, and end).

Questions for Exercise 2: Improvisation

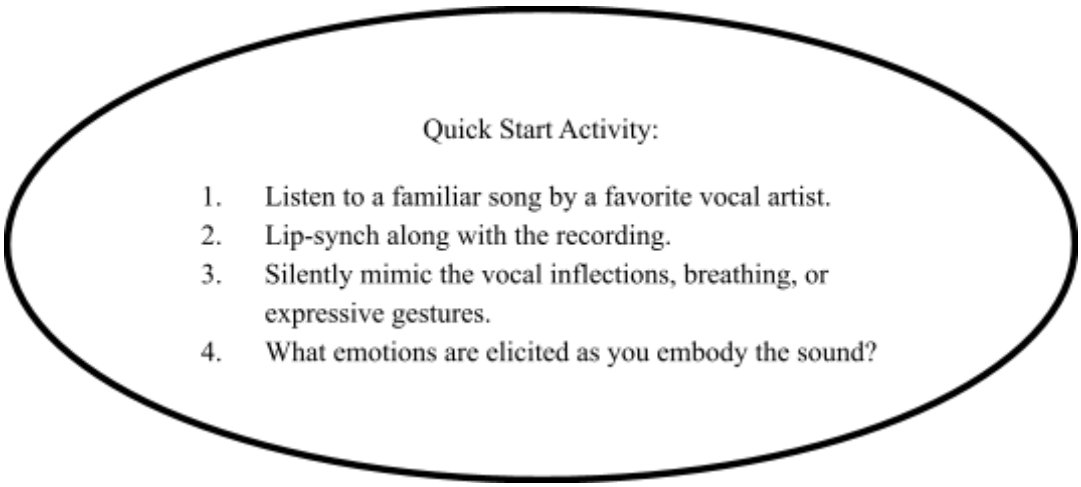
1. What mental or emotional associations come to mind when thinking about improvisation?
2. What factors affect your enjoyment of improvisation?
3. Do you prefer exploring improvisation alone or with a partner/group?
4. While improvising alone, are you more prone to boredom, self-judgment, or finding flow?

Tips for Exercise 2: Improvisation

1. Set a drone using a tuner/tuning app with a drone or a prerecorded drone/rhythmic loop from YouTube, etc. to emphasize the tonic and add some variety.
2. Experiment with different variables and limitations (ex: limit yourself to three or four notes, or improvise using a less familiar mode).[27]
3. For more ideas, check out Jeffrey Agrells books on improvisation games for classical musicians.

Miming

Miming or ghosting along with a recording is a valuable activity for increasing awareness while engaging in active listening. Many of us have teamed up to play one flute with a friend, teacher, or student. One player holds the flute and controls the mechanism while the other manages the headjoint and controls the air, and the two attempt to synchronize their efforts as one player. In these exercises, light ghosting (residual tone) or miming is used as the player synchronizes movements with recorded sound.



Instructions for Exercise 1:

1. Choose a work or section of a work from your current repertoire.
2. Select a high-quality audio or video recording of the work.
3. Use high-quality headphones or speakers if possible.

[27] Jeffery Agrell*, Improvisation Games for Classical Musicians,* (Chicago: GIA Publications, 2008), 31.

Goals for Exercise 1:

1. Gain insights into technique and interpretation through listening.
2. Imagine new possibilities for your sound.
3. Focus on the internalization of sound production and translate sound into physical sensations.

Exercise 1:

1. Begin by playing through the passage using light ghosting.
2. Listen to a recording of the passage while following along in the score.
3. Play along with the recording using light ghosting.

Questions for Exercise 1:

1. Does the recording have an effect on the way you prepare each breath?
2. Which elements are most similar to or different from your technique?
3. Which elements are most similar to or different from your interpretation?

Tips for Exercise 1:

1. Focus your attention on one layer at a time (breath control, articulation, vibrato, dynamics, fingers, etc.).
2. Adjust the speed of the recording if needed.
3. As a variation, blow against the flute's barrel or insert a cloth into the headjoint or tonehole to obstruct any sound while practicing embouchure control and flexibility.

Instructions for Exercise 2:

1. Choose a very familiar or memorized work or section of a work from your current repertoire.
2. Select a high-quality video recording of the work.
3. Play without a score if possible.

Goals for Exercise 2:

1. Gain insights into technique and interpretation through listening and watching.
2. Create connections between internal preparation and external results.
3. Imagine new possibilities for your preparation of sound, expressive gestures, and visual presence.
4. Focus on the external cues of sound production and translate sound into physical sensations.

Exercise 2:

1. Begin by playing through the passage using light ghosting.
2. Watch a video recording of the passage.
3. Play along with the recording using light ghosting.

Questions for Exercise 2:

1. What visual cues of sound preparation do you notice?
2. What visible indicators of sound do you notice?
3. Which movements feel more natural?
4. Which movements feel awkward?

Tips for Exercise 2:

1. Explore a variety of recordings.
2. Try miming through the passage with the recording without any ghosting/residual tone.
3. Without the flute, try imitating air use, breathing, and articulation.
4. As a variation follow along with the flute in playing position without moving your fingers.
5. Once experience and confidence are achieved with motor imagery, alternate between miming and full mental practice with recordings

Instructions for Exercise 3:

1. Choose a familiar folk tune, pop song, opera aria, etc.
2. Select a recording of a vocalist or another instrumentalist (non-flute) performing the selection.
3. Play by ear/memory if possible.

Goals for Exercise 3:

1. Expand your musical imagination beyond beliefs about the flute.
2. Experiment with internalizing new sounds and colors.
3. Strengthen your connection with the flute as your expressive voice.

Exercise 3:

1. Begin by playing or ghosting through the passage.
2. Listen and/or watch the recording of the selection.
3. Mime the sounds and gestures along with the recording while gently manipulating the keys.

Questions for Exercise 3:

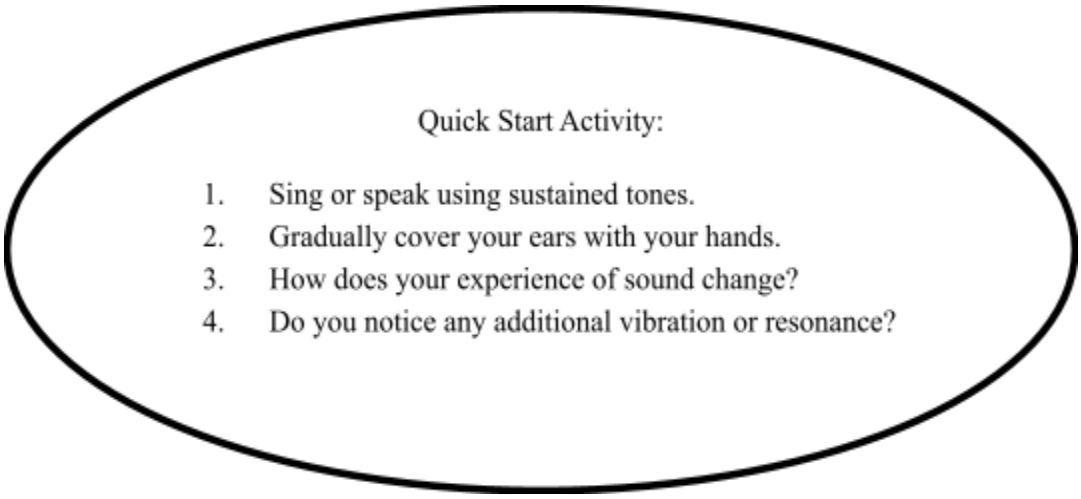
1. Which voice types and instruments feel most similar to your style as a flutist?
2. Which voice types and instruments are more difficult to internalize and embody?
3. What features of the sound or expression might invigorate your style?

Tips for Exercise 3:

1. Use tools/apps to adjust the speed of the recording for even more insights.
2. After gaining comfort miming with a recording, try playing the passage normally, recording yourself, and comparing the result with the original recording.
3. *Tone Development Through Interpretation* by Marcel Moyse or *Sing! Opera Arias for Flute and Piano* by John Wion are great resources for opera arias.

Manipulating Variables

In addition to miming where we are subtracting our sound from the equation, a strategy for becoming more mindful of what we hear is to limit what we hear, allowing more room for sensation. Using headphones or earplugs will dampen auditory feedback while playing and bring more focus to what is happening internally. We can become so obsessed with adjusting pitch to match the tuner or creating maximum resonance that we forget what it feels like to play in tune with resonance. It is common to dismiss physical cues of discomfort in service of optimal sound, even though this is not usually sustainable. When we deliberately deprive ourselves of one sense, we can discover different ways to compensate and increase awareness, learning to feel the sound in addition to hearing it. This is an invaluable skill for performance situations where the on-stage acoustics or the group volume create a barrier to hearing yourself clearly.

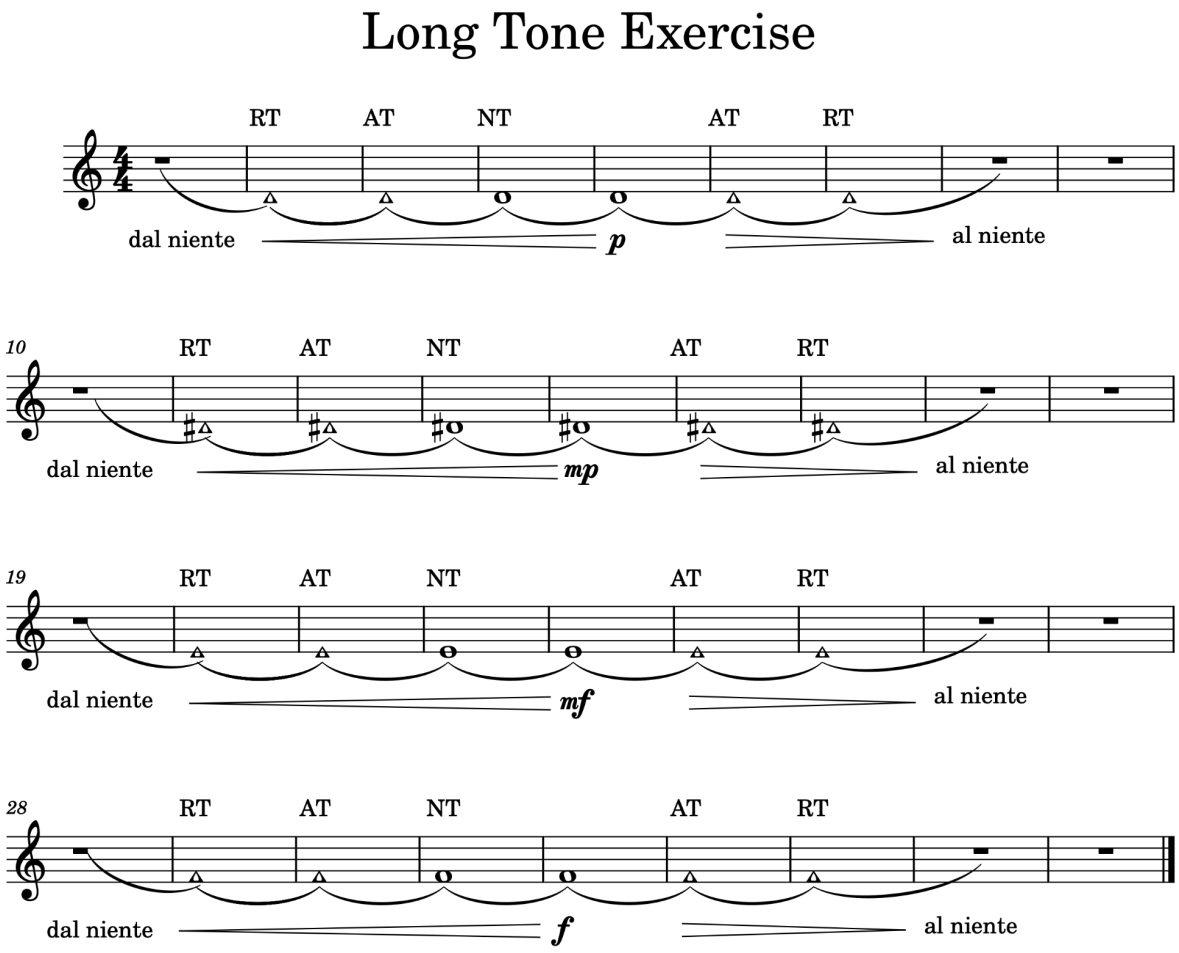


Instructions for Long Tone Exercise:

1. Practice this exercise while wearing earplugs or headphones.
2. RT: Gradually add residual tone (pitched air - no tone) from silence.
3. AT: Gradually add sound for an airy tone (about 50% air and 50% tone).
4. NT: gradually transition to normal tone.
5. Give careful attention to the process of internalizing sound production and embodying the tone like a vocalist.
6. Think about the preparation and release of sound.
7. Repeat the pattern throughout the low register, then experiment with the middle and high registers.

Goals for Long Tone Exercise:

1. Develop more awareness around the physical sensation of sound.
2. Shift from active listening to active sensing.
3. Limiting auditory feedback to shift awareness from external sound to internal resonance.
4. Become more sensitive to physical tension, locking, and effort that is opposed to resonance.



Questions for Long Tone Exercise:

1. Where do you feel vibrations or resonance internally?
2. Does the sensation shift through dynamic changes?
3. Are you aware of your center of gravity?
4. What do you notice about your internal experience of the sound in contrast with your typical experience of sound?
5. Can you identify any sound-production strategies that are not sustainable?

Tips for Long Tone Exercise:

1. Use different playing positions to discover new possibilities. Ex: Standing, bending the knees, sitting, standing against a wall, lying down, etc.
2. Play this long-tone pattern using left-hand notes while moving the right hand to the face, throat, chest, etc.
3. In this context, the quality of the sound is not as important as the quality of sensation.

CHAPTER FOUR
MOTOR IMAGERY TECHNIQUES

The goal of the previous chapters is to prepare the mind for pure motor imagery techniques. In contrast with physical practice and hybrid techniques, pure motor imagery will be practiced without the flute. While a musician can certainly hold or touch an instrument during motor imagery, it will not be actively manipulated. Motor imagery involves recreating physical and visual movement in the mind. It is often combined with audiation as imagined sound and visualization as imagined setting or scenario. The introduction covered the basic definitions for kinesthetic motor imagery, visual motor imagery, visualization, and audiation. These four elements can be incorporated in a variety of ways.

In simple terms, kinesthetic motor imagery is involved when we imagine the sensation of walking, including our balance, pace, gait, sense of effort or ease, breathing pattern, and the effects of gravity. With visual motor imagery, we imagine experiencing the movements visually. We can see our legs extending in front, look down at our feet, or see our arms swinging in our periphery. Audiation comes into play as we imagine the sound of our steps, our breathing, and the sounds of nature or traffic. Visualization creates the imaginary scene of moving through a crowded building or taking a hike in the woods.

In practice, there is infinite freedom to combine and accentuate different aspects of imagined practice. Here are a few examples of real-life applications.

Motor imagery can be applied:

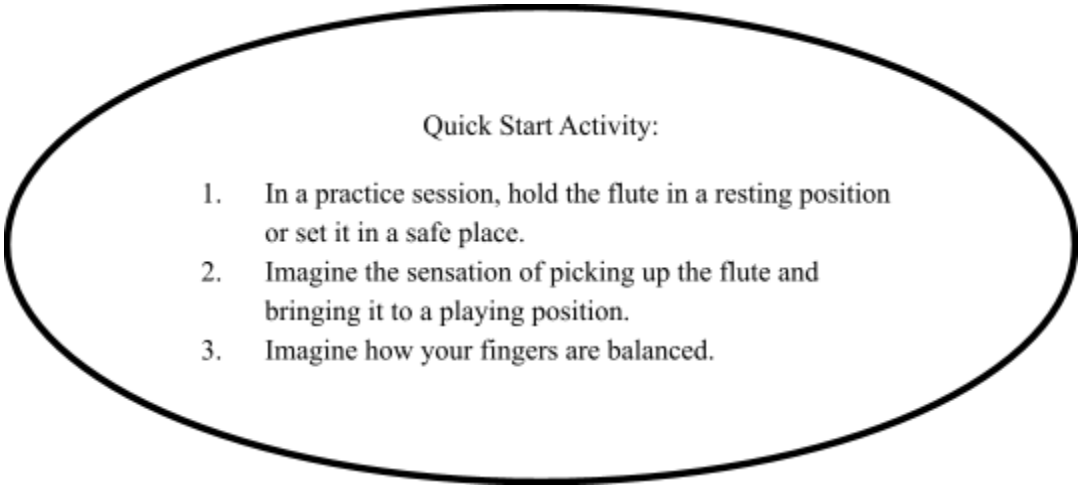
1. During a practice session while holding an instrument, viewing a score, and listening to a recording.
2. Using only a score.
3. While listening to a recording without a score.
4. In combination with unrelated physical activities, like walking, washing dishes, or showering.
5. During a commute (rehearsing memorized material while driving or incorporating score study on a bus, train, or flight).
6. While watching TV.

Note on external movement: It is common to experience some type of external movement during a mental practice session. Fingers may mimic the patterns or twitch slightly in coordination with the imagined movements. It might be difficult to mentally breathe and engage the air separately while employing a resting breath pattern. Articulating, shaping the air with the lips, or marking the tempo externally are also typical. The goal is to begin where you are comfortable in your

mental practice journey and slowly introduce new challenges and questions. When you notice external movements, it is important to ask yourself when, how, and why they occur. Are you consciously choosing to support the internal experience while you gain confidence, or do the movements seem spontaneous and uncontrollable? If the former is true, your choice is valid and an important part of the process. If the latter is true, choose one movement at a time to notice fully. Can the movement be diminished? By how much? For both scenarios, continue to question both intentional and habitual movement as you gain awareness and clarity.

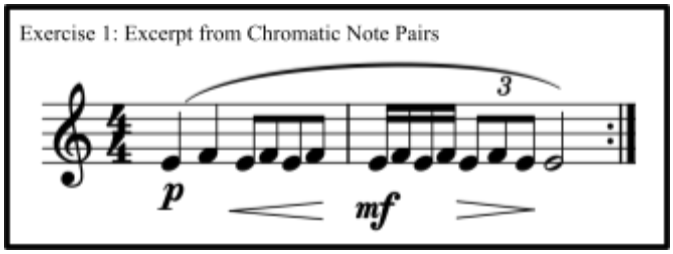
Chromatic Note Pairs:

Kinesthetic motor imagery is only as useful as our ability to imagine the most basic movements. Chromatic note pairs are essential in creating a foundation for growth and building context for motor-imagery sensations. If the sensations for the chromatic note pairs are unclear, even at a slow tempo, try revisiting the Finger Pressure Calibration Exercises in Chapter Two using motor imagery. These note pairs can be practiced in tandem with the calibration exercises or added as the next level once the basic sense of finger movement is more comfortable.



Instructions for Chromatic Note Pairs:

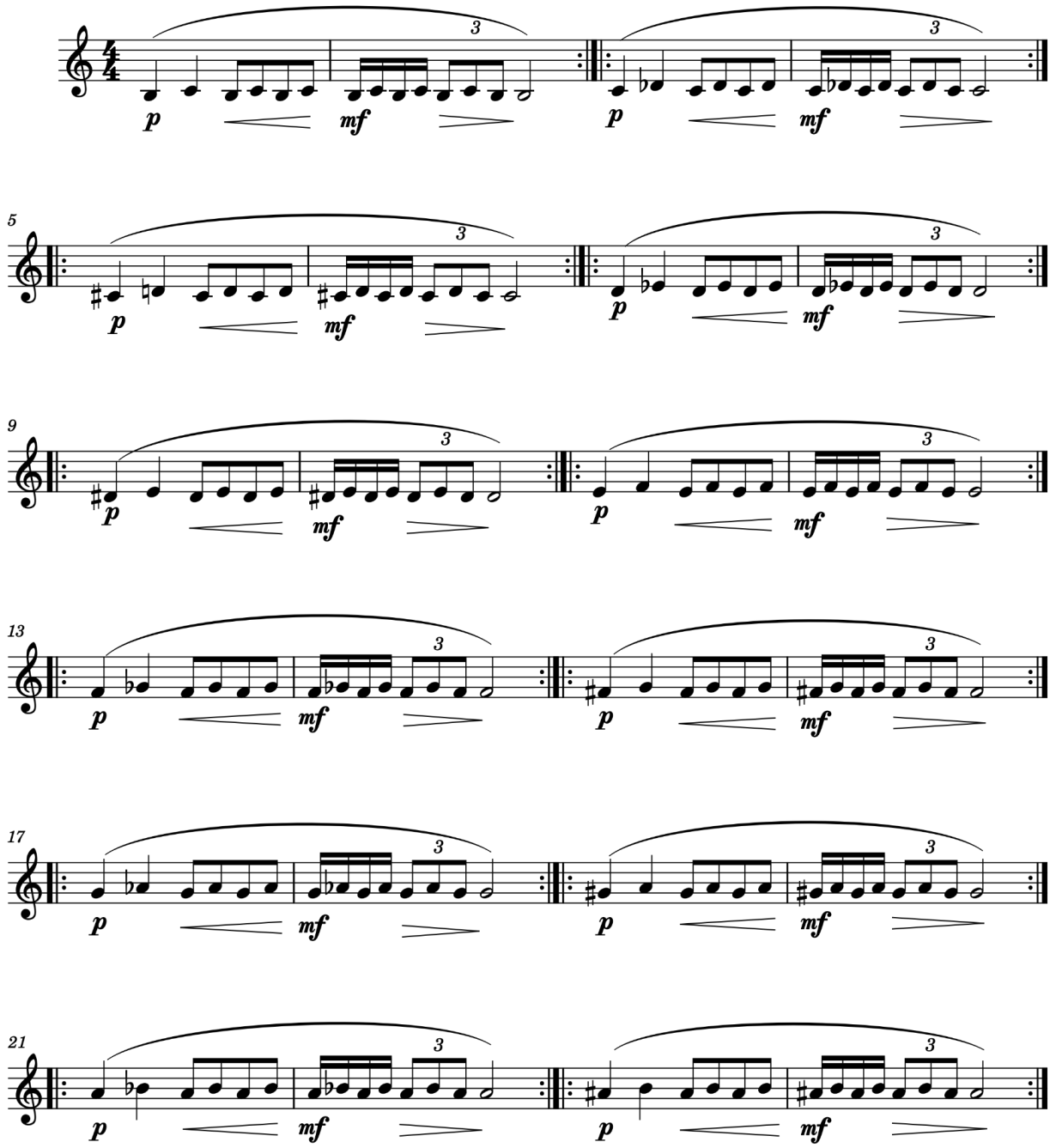
1. Imagine the preparation, suspension, and release of air.
2. Use motor imagery to slowly feel the movements.
3. Notice the balance of the imaginary flute as you slowly move the key(s).
4. Internalize the sound.
5. Imagine how the finger movements look from your perspective.
6. Imagine how the finger movements look from an outside perspective.
7. Transpose the exercise through the entire range of the flute.



Goals for Chromatic Note Pairs:

1. Build comfort using motor imagery with small intervals.
2. Improve accuracy and confidence with audiation.
3. Sharpen awareness by internalizing the process of sound production and finger movement.
4. Practice mental focus by deliberately suspending physical movement.

Chromatic Note Pairs



Questions for Chromatic Note Pairs:

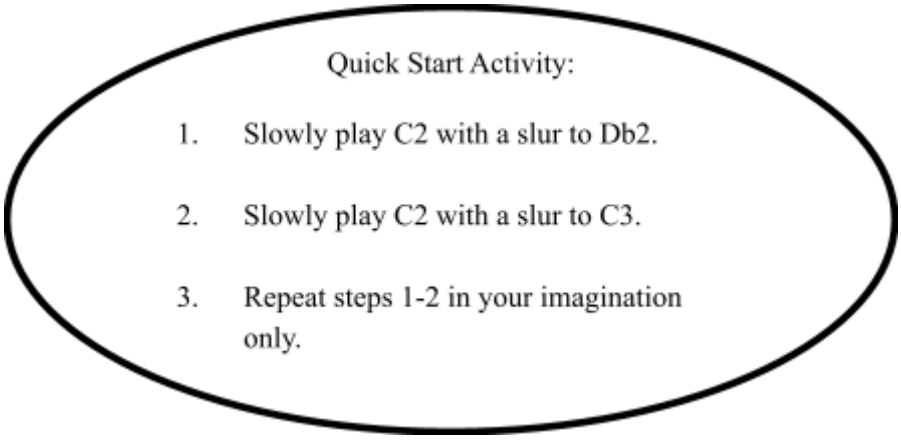
1. Which intervals feel more natural while using motor imagery?
2. Which intervals pose more of a challenge?
3. Is there any instability, rushing, or lack of clarity?
4. Where do you sense air speed or pressure shifts?
5. Where do you imagine lip movements in angling the air?

Tips for Chromatic Note Pairs:

1. Once the rhythmic pattern is memorized, try the exercise with your eyes closed.
2. Choose one of the easier note pairs and improvise your own rhythmic pattern or use the rhythm of a familiar tune.
3. If it is difficult to keep the pitch stable using audiation, alternate practice with a drone.

Intervals:

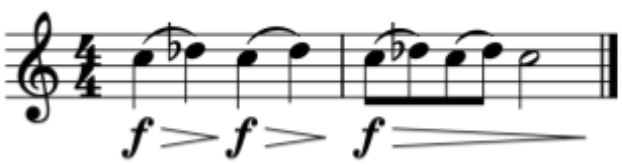
Building mental connections between different intervals will enhance our ability to move with efficiency and intention. Transitions from note to note in terms of finger coordination and air control become more complex as the intervals become larger. Take time to consider each interval and imagine how the air flow is shaped to support each shift. How does the internal suspension of air interact with the shape of the aperture and the angle of the release?



Careful motor-imagery practice helps bring greater awareness to coordination issues and the quality of air between notes. Removing the reassurance of constant auditory feedback as we engage in physical practice can be disorienting. Through the practice of deliberate audiation, the

inner ear will become more adept. The following exercise begins on C2 and gradually expands through each interval until concluding on the octave.

Exercise 2: Excerpt from Interval Exercises



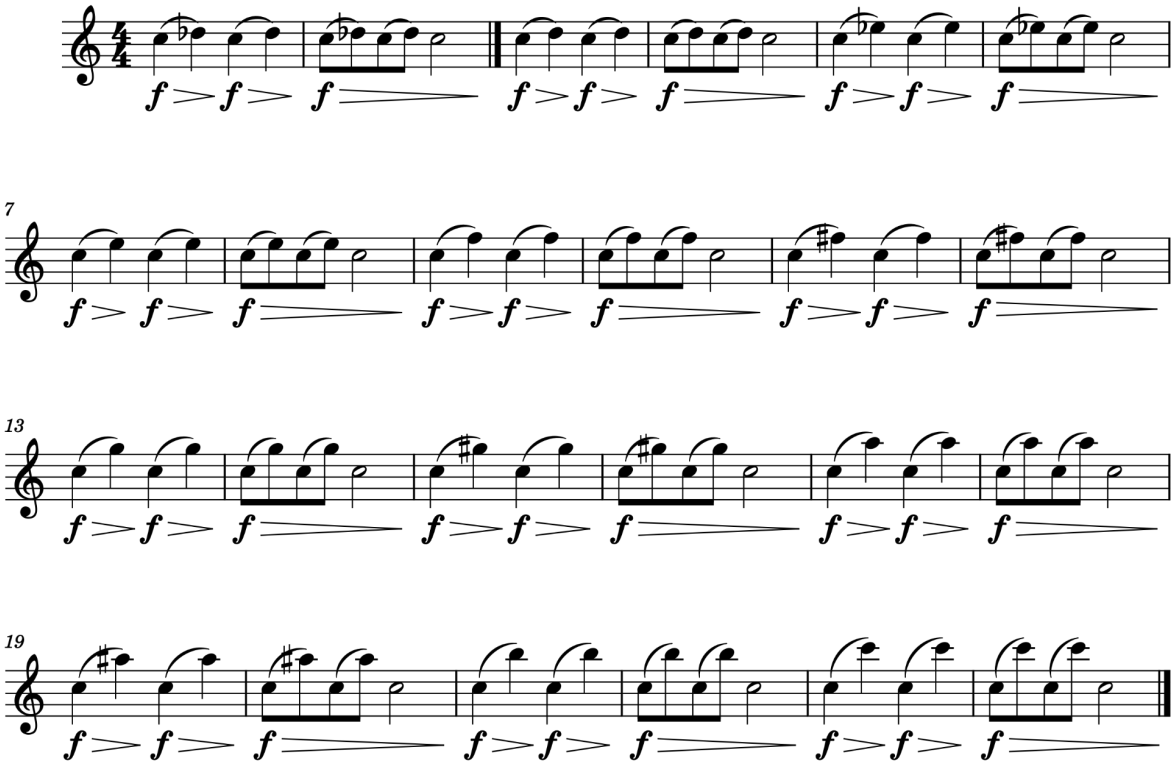
Instructions for Interval Exercise:

1. Imagine the sensation of picking up the flute and bringing it to a playing position.
2. Imagine the preparation, suspension, and release of air.
3. Internalize the sound and feel where each interval resonates.
4. Notice the balance of the imaginary flute as you slowly move the key(s) and feel the movements.
5. Imagine the optimal air pressure, speed, and aperture shape/size for each shift.
6. Dig into the imagined sound of C2, sustain the air pressure through the finger movements, and release as much as possible on the interval while keeping the pitch stable.
7. Choose 1-2 notes a day and transpose this exercise through the entire range of the flute.

Goals for Interval Exercise:

1. Build comfort using motor imagery with larger intervals.
2. Improve accuracy, confidence and intonation with audiation.
3. Sharpen awareness by internalizing the process of air engagement and flexibility.
4. Practice mental focus by deliberately suspending physical movement and auditory feedback.

Interval Exercise



Questions for Interval Exercise:

1. Which intervals are more difficult to audiate without external reinforcement?
2. In your physical practice, do you imagine the sound of an interval before playing it?
3. Are you able to keep contact with the imagined air flow?

Tips for Interval Exercise:

1. Repeat each two-measure group several times.
2. Try the interval pattern with your eyes closed.
3. If it is difficult to keep the pitch stable using audiation, alternate practice with a drone.
4. Experiment with motor imagery using your favorite interval exercises (Taffanel & Gaubert, Marcel Moyse, Walfrid Kujala, Trevor Wye, Paul Edmund-Davies, etc.).

Five-Note Scales:

As patterns expand and become more complex, it is essential to prioritize accurate kinesthetic perception and intervallic relationships over speed. Aim for a tempo that is slow enough to support a gentle, flowing approach to technique while allowing for tonal and dynamic subtleties and nuances. There are numerous possible reasons for a lack of clarity during mental practice. Many of these variables are individual or situational. Any clarity or focus issues that surface during physical practice may be even more magnified in mental practice. Even the most clear mental imagery will rarely be comparable to the physical experience. However, any gains made during physical practice can transfer to the overall motor-imagery experience and elevate practice as a whole. Among other things, attention to slow, deliberate work and awareness of habitual tension can be foundational elements in support of this process.

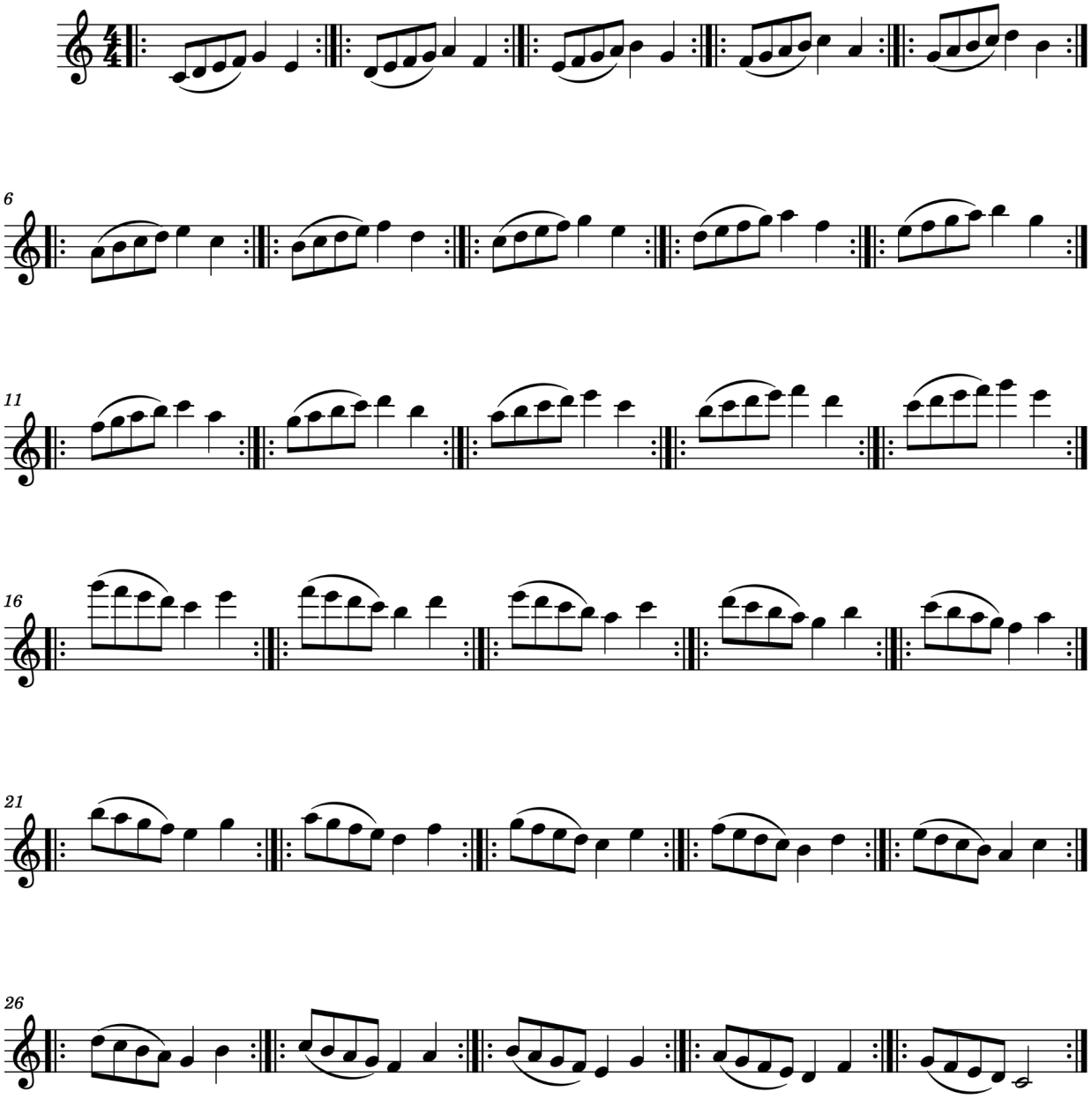
Instructions for Five-Note Scales:

1. Choose a slow tempo.
2. Use motor imagery to imagine and internalize as much auditory and physiological sensation as possible.
3. Transpose the pattern to different keys.

Goals Five-Note Scales:

1. Build motor-imagery skills using simple scale patterns.
2. Imagine movements that are deliberate, yet flowing and connected.
3. Cultivate enjoyment and curiosity in the process of motor imagery.

Five Note Patterns



Questions for Five-Note Scales:

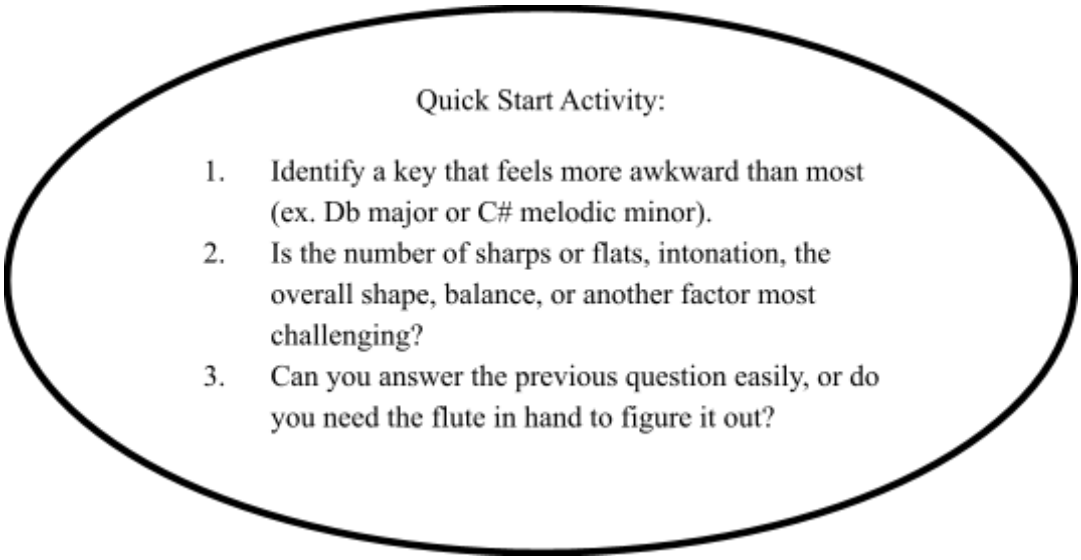
1. Do you have an awareness of balancing the flute while practicing motor imagery?
2. Which measures are more challenging to internalize?
3. Where do you feel coordination issues or unevenness?

Tips for Five-Note Scales:

1. If it is difficult to keep the pitch stable using audiation, alternate practice with a drone.
2. It is normal to experience a lack of clarity with certain fingerings, intervals, or the sensation of balancing the instrument. This awareness will grow with experience.
3. If certain fingerings or intervals feel unclear (ex: D-E), take extra time or add fermatas as needed.
4. Experiment with different dynamics and articulations during motor-imagery practice.
5. Experiment with motor imagery using your favorite five-note scale exercises. (Taffanel & Gaubert, Marcel Moyse, Walfrid Kujala, Trevor Wye, Paul Edmund-Davies, etc.)

Diatonic Scales:

Motor imagery with diatonic scales is a natural progression from the five-note patterns. It is likely that some scales will be more difficult to perceive clearly than others. Certain scales and keys tend to feel more natural, while others are more awkward for various reasons. Motor imagery has the potential to highlight some of these challenges and bring new insights and solutions for minimizing or resolving them.



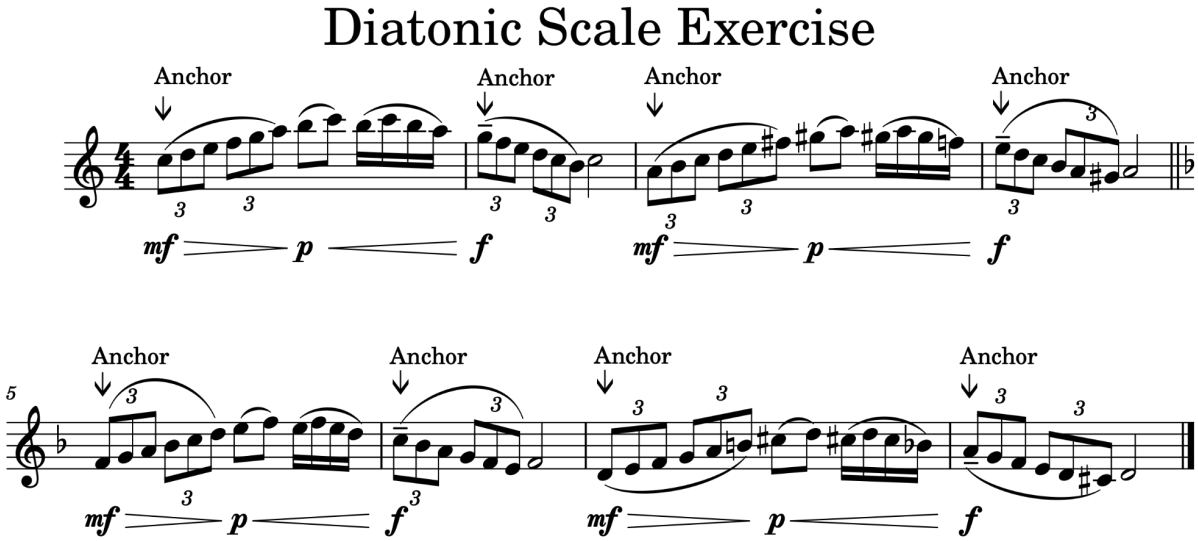
Instructions for Diatonic Scale Exercise:

1. Choose a slow tempo as you work through the pattern.
2. Use motor imagery to imagine and internalize as much auditory and physiological sensation as possible.

3. Transpose the pattern through all major and minor keys.

Goals for Diatonic Scale Exercise:

1. Build motor-imagery skills using diatonic scale patterns.
2. Imagine movements that are deliberate, flowing, and connected.
3. Follow the phrasing, imagining anchor points where marked and suspension between markings.
4. Build audiation skills by keeping track of the intervallic relationships.



Questions for Diatonic Scale Exercise:

1. Where do you notice shifts in the balance of your hands/fingers?
2. Which measures are more challenging to hear using audiation?
3. Where do you feel coordination issues, unevenness, or rushing?

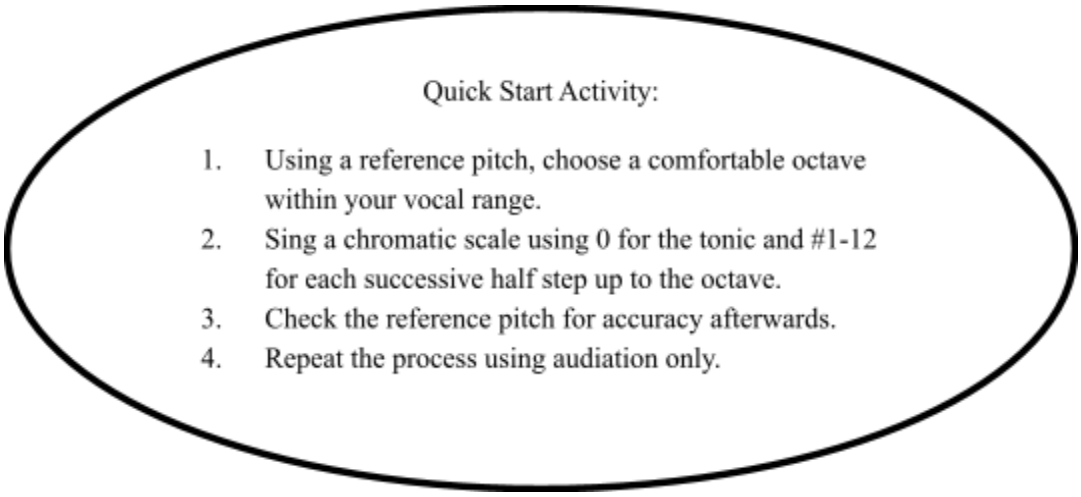
Tips for Diatonic Scale Exercise:

1. If it is difficult to keep track of the pattern and interval relationships using audiation, record the pattern slowly with a metronome and drone/tuner, then listen back while practicing motor imagery.
2. If it is difficult to keep the pitch stable using audiation, alternate practice with a drone.
3. If certain fingerings or intervals feel unclear, take extra time or add fermatas as needed.
4. Experiment with different dynamics and articulations during motor-imagery practice for an additional challenge.

5. Experiment with motor imagery using your favorite diatonic major and minor scale exercises (Taffanel & Gaubert, Marcel Moyse, Walfrid Kujala, Trevor Wye, Paul Edmund-Davies, etc.).

Chromatic Scales:

Chromatic scales patterns will challenge motor-imagery facility and audiation skills even further. This next level in mental practice involves keeping the tonal center stable while accurately placing each half step. Slow, deliberate practice is essential in coordinating the imagined sound with the imagined finger transitions. Wait until diatonic scale patterns feel comfortable before incorporating chromatic scale patterns.



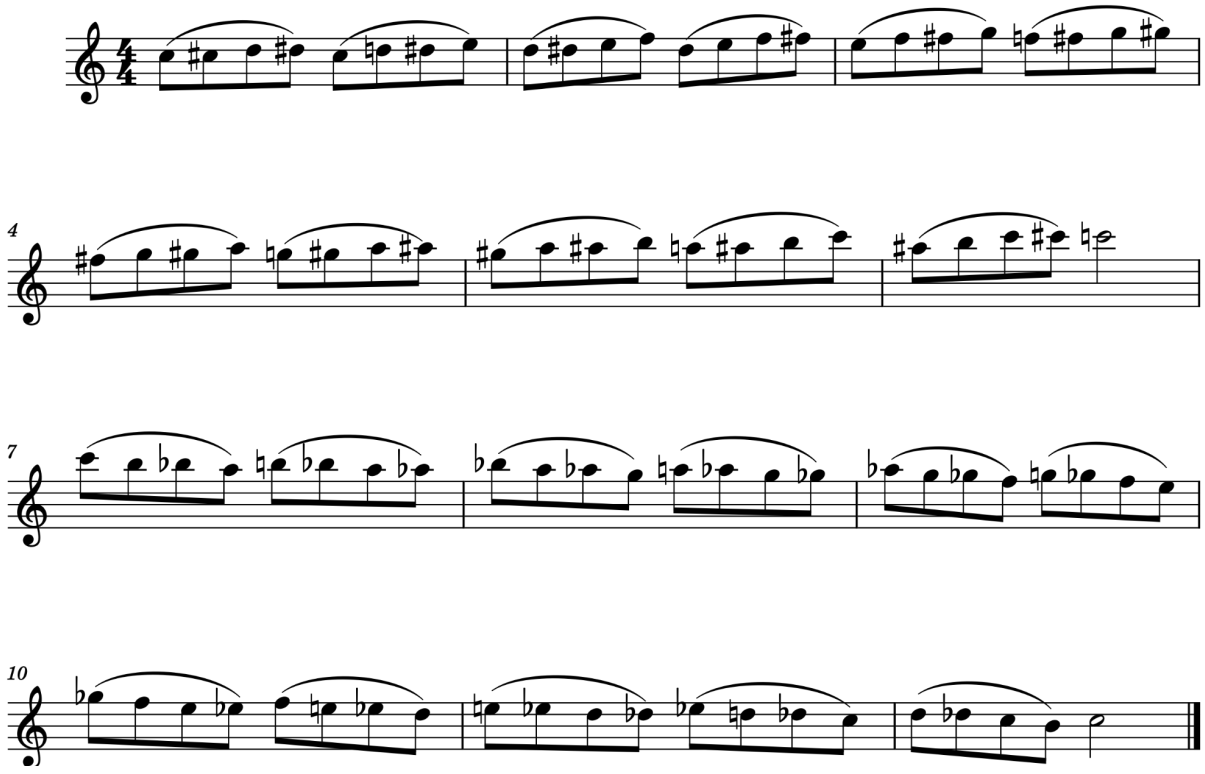
Instructions for Chromatic Scale Exercise:

1. Begin by physically playing through the pattern a few times.
2. Follow with motor imagery, imagining and internalizing as much auditory and physiological sensation as possible.
3. Alternate practice with a drone.
4. Once the pattern is comfortable, transpose it through the entire range of the flute.

Goals for Chromatic Scale Exercise:

1. Build motor-imagery skills using chromatic scale patterns.
2. Imagine movements that are deliberate, flowing, and connected.
3. Follow the phrasing, imagining anchor points at the beginning of each slur and suspension within each slur.
4. Build audiation skills by keeping track of the intervallic relationships.

Chromatic Scale Exercise



Questions for Chromatic Scale Exercise:

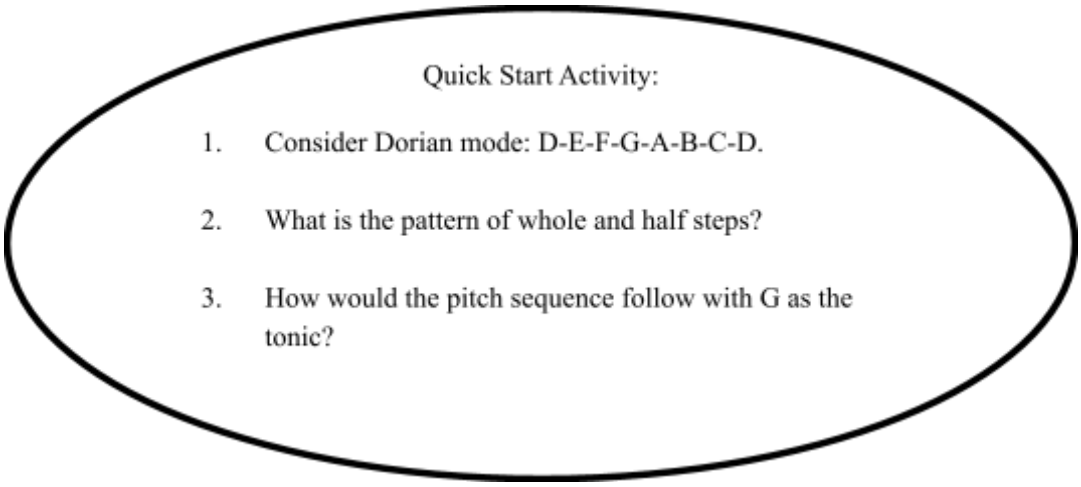
1. Where do you notice shifts in balance?
2. Where do you notice a lack of clarity?
3. Is it more challenging to keep track of accidentals carrying through the bar?
4. Where do you feel coordination issues, unevenness, or rushing?
5. How is the use of a drone helpful in stabilizing your sense of pitch and intervallic relationships during audiation?

Tips for Chromatic Scale Exercise:

1. If it is difficult to keep track of the pattern using audiation, record the pattern slowly with a metronome, then listen back while practicing motor imagery.
2. Mental emphasis on the first note of each slur can assist in keeping track of the overall structure.
3. Try speaking through the note names or using solfege during motor imagery.
4. If certain fingerings or intervals feel unclear, take extra time or add fermatas as needed.
5. Apply these motor-imagery techniques to your favorite chromatic scale exercises.

Modal Scales:

Modes beyond major and minor tend to be less familiar, providing an excellent opportunity for testing accuracy with muscle memory and audiation. The interval pattern and its distinct sound must be internalized before attempting motor imagery.



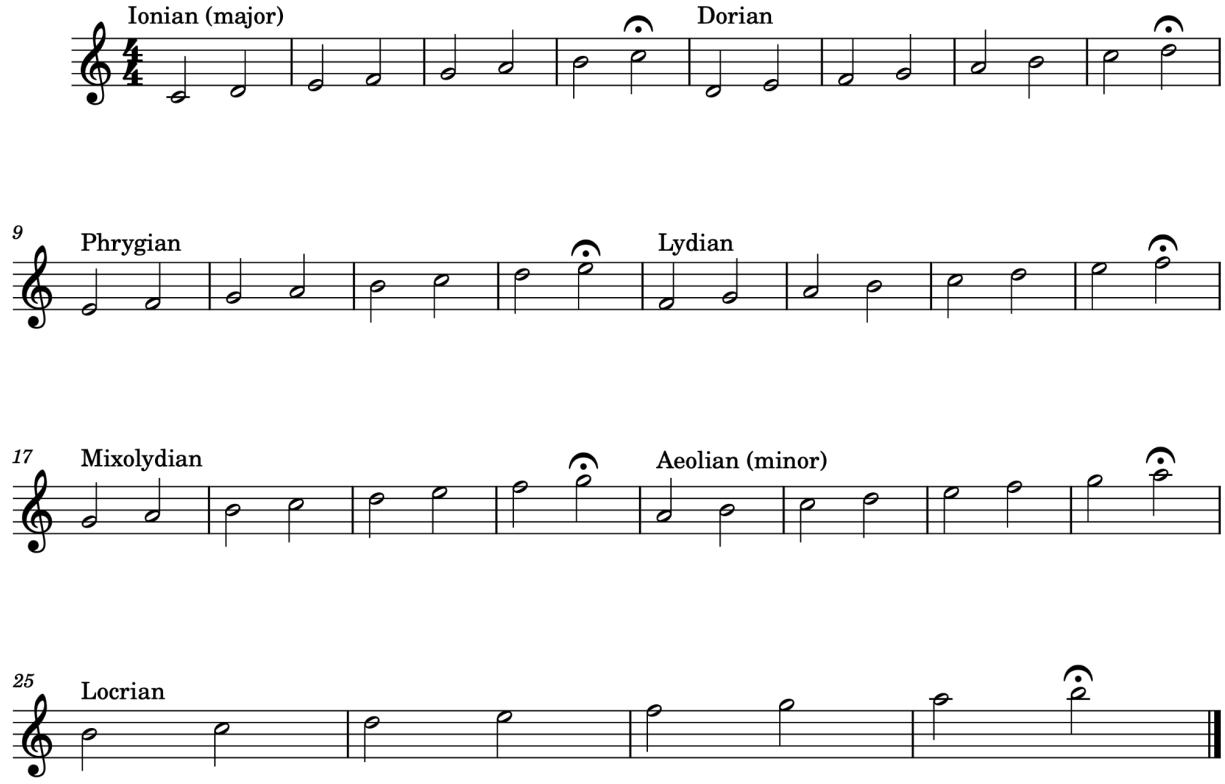
Instructions for Basic Modes:

1. Choose one less familiar mode at a time.
2. Begin by playing through the pattern on the flute and making note of the interval pattern.
3. Use a drone or reference pitch for motor imagery practice.
4. Repeat the scale using motor imagery.
5. Transpose the pattern up or down a step using motor imagery.

Goals for Basic Modes:

1. Build motor-imagery skills using mode patterns.
2. Become more confident in the modal patterns through mental transposition.
3. Build audiation skills by keeping track of the intervallic relationships.

Exercise 1: Basic Modes



Questions for Basic Modes:

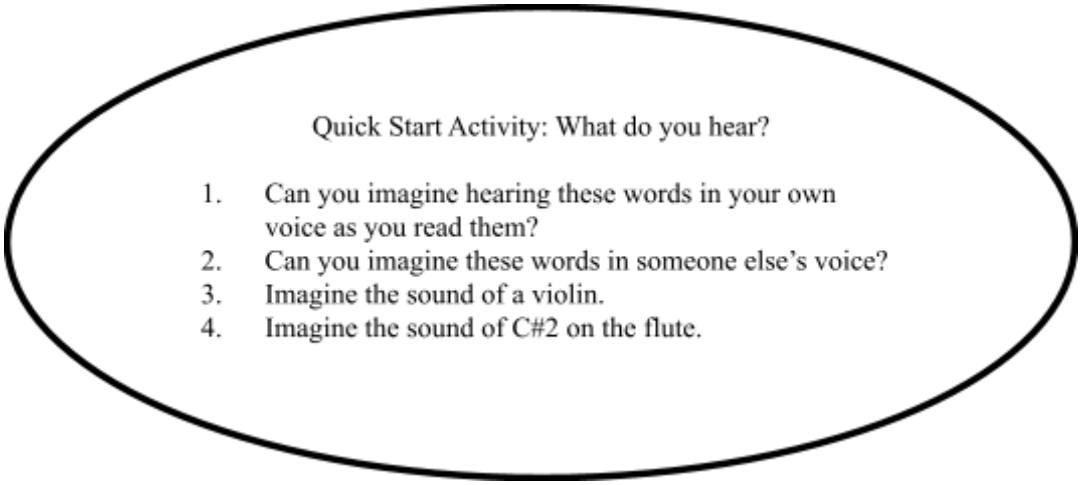
1. Which modes are less familiar?
2. How are these modes similar to or different from the major and minor modes?
3. How clear or unclear is the audiation aspect?

Tips for Basic Modes

1. Listen for a distinguishing factor or unique sound in each mode.
2. If transposition is difficult, practice it with the flute (or piano) first and alternate with motor imagery and audiation.
3. Try using solfege or scale-degree numbers to keep track of the patterns.

Audiation and Mental Transposition:

Practicing the skill of playing by ear or transposing using only audiation and motor imagery builds on the internalization of technique, specifically, the mastery of interval and key relationships. Mental transposition and audiation go hand-in-hand as they involve imagining music from nothing without an external source, recreating and manipulating intervals and patterns. This calls for focus, sensitivity, and stable relative pitch. Working on this technique internally will yield higher levels of confidence when playing by ear, transposing, or transcribing music. A heightened awareness of the subtle differences between timbres can lead to spontaneous pitch recognition. The idea of perfect pitch might sound like a mysterious gift for a privileged few. The sensitivity to distinguish differences among frequencies and immediately recognize pitch is normally present at birth or developed at a very young age. Is it possible to develop perfect pitch? Some are certain that the ear can be trained and claim an acquired accuracy of pitch. Others hold the opinion that if acquired, this perception is vastly different. The question is difficult to answer with certainty. In any case, it is definitely possible to improve and develop pitch awareness with time, creativity, and being open to the possibility. The focus is progress, not perfection. Being able to identify or audiate pitches with relative accuracy makes mental practice easier, but it is not necessary.



Goals for Exercise 1: Timbral Training

1. Build confidence with audiation, the mental creation of sound without an external source.
2. Explore audiation with specific pitch timbres on the flute.
3. Recognize and recreate differences in imagined flute sounds.

Exercise 1 - Timbral Training

1. Timbral training involves memorizing pitches by learning to distinguish between timbres/colors.
2. Choose a pitch with a distinct timbre/quality on the flute such as C#2 or Eb2.
3. Imagine the timbre and guess the pitch using audiation.
4. Check your guess with a tuner or reference pitch.

Questions for Exercise 1: Timbral Training

1. How close was your imagined pitch to the actual pitch?
2. How would you describe the distinct timbre of your pitch choice?
3. What are some differences between this pitch and the pitch a half-step lower?

Goals for Exercise 2: Record a Sample

1. Take time to notice the physical sensation of different pitches.
2. Listen for subtle timbral and color differences between pitches.
3. Strengthen recognition of heard or imagined pitches.

Exercise 2 - Record a Sample

1. Make a short audio recording of several different long tones, incorporating 2 or 3 easily recognizable pitches.
2. Notice how each pitch resonates in your body.
3. Listen back with eyes closed.
4. Notice how each pitch feels and sounds.

Questions for Exercise 2: Record a Sample

1. How many pitches can you recognize immediately from the recording?
2. Do you tend to feel or hear pitch differences more clearly?
3. Does the sound of each pitch connect easily with the feeling of each fingering?

Tips for Exercise 2: Record a Sample

1. Try waiting a day or two before listening back to the recording for an added challenge.
2. Match the pitches with your voice for additional internal reinforcement.

Goals for Exercise 3: Guess the Pitch.

1. Keep pitch memory stable while searching for a second pitch.
2. Refine the inner ear while solving an interval.
3. Connect audiated sound with flute fingerings.

Exercise 3 - Guess the Pitch.

1. Name a pitch and reinforce it with a reference (drone or tuner).
2. Quickly name another pitch and use audiation to create an interval in your mind.
3. Check the interval with a reference pitch or with the flute.

Questions for Exercise 3: Guess the Pitch.

1. How accurate was your imagined guess of the second pitch?
2. Was the imagined pitch slightly sharp or flat?
3. What interval is created by the two pitches?

Tips for Exercise 3: Guess the Pitch.

1. If it is difficult to maintain focus while audiating, try externalizing the process with your voice.
2. Experiment with this exercise as a group or partnered activity. The individual(s) guessing the second pitch will first imagine it, then sing or play it aloud.
3. Try reversing the exercise. The leader will name and play the first pitch followed by a second mystery pitch. The individual(s) will guess the name of the second pitch or play it on the flute to find a match.

Goals for Exercise 4: Mental Transposition

1. Build audiation and motor-imagery skills by mentally transposing simple tunes.
2. Refine the inner ear while moving through different keys.
3. Connect audiated sound with flute fingerings.

Exercise 4: Mental Transposition

1. Pick a simple song (see suggestion list in Tips for Exercise 4: #2).
2. Choose a starting key and reinforce it with a reference pitch.
3. Carefully play through the song using audiation and motor imagery.
4. Continue mentally transposing through all major or minor keys.
5. Check your final key with a reference pitch.

Questions for Exercise 4: Mental Transposition

1. How accurate is the imagined pitch in your final key?
2. Did the pitch become lower or higher?
3. Were you able to maintain mental awareness of the fingerings and/or letter names?

Tips for Exercise 4: Mental Transposition

1. Work though all major or minor keys chromatically or using the circle of fifths.
2. Some simple songs to try are Hot Cross Buns, Merrily We Roll Along, London Bridge, Happy Birthday, The Snake Charmer, The Lion Sleeps Tonight, Do-Re-Mi, etc.
3. If the pitch strays significantly, check with a reference pitch every two or three keys to stay on track.
4. If transposition is not part of your normal routine, consider incorporating a few minutes into your physical practice time before trying it without an instrument.

Goals for Exercise 5: Intervals

1. Build audiation and motor-imagery skills by mentally working through key areas using challenging intervals.
2. Gain confidence with recognizing and creating intervals internally.
3. Improve internal pitch accuracy.

Exercise 5: Intervals

1. Choose a challenging interval - augmented 4ths, minor/major 6ths, minor/major 7ths, etc.
2. Choose a starting key and reinforce it with a reference pitch.
3. Carefully play the interval using audiation and motor imagery.
4. Continue mentally transposing the internal through all key areas.
5. Check your final key with a reference pitch.

Questions for Exercise 5: Intervals

1. Which intervals are most challenging for you to recognize?
2. Which intervals are most challenging to audiate?
3. Does the imagined sound or fingering tend to come first?

Tips for Exercise 6: Patterns

1. If it is difficult to maintain focus, feel free to alternate between audiation and singing.
2. If the pitch strays significantly, check with a reference pitch every two or three keys to stay on track.

Goals for Exercise 6: Patterns

1. Build audiation and motor-imagery skills by mentally working through key areas using different patterns.
2. Gain confidence with recognizing and creating patterns internally.
3. Improve internal pitch accuracy.

Exercise 6: Patterns

1. Choose a pattern - major thirds, minor arpeggios, dominant 7th chords, whole-tone scales, etc.
2. Choose a starting key and reinforce it with a reference pitch.
3. Carefully play through the pattern using audiation and motor imagery.
4. Continue mentally transposing the pattern through all major or minor keys.
5. Check your final key with a reference pitch.

Questions for Exercise 6: Patterns

1. How accurate is the pitch of your final key?
2. Does the imagined sound or fingering tend to come first?
3. Were you able to maintain mental awareness of the fingerings and/or letter names?

Tips for Exercise 6: Patterns

1. Use letter names or solfege to tie the imagined sound to the imagined fingering.
2. If the pitch strays significantly, check with a reference pitch every two or three keys to stay on track.
3. If transposition/playing by ear is not part of your normal routine, consider incorporating a few minutes into your physical practice time before trying it without an instrument.

Additional Audiation and Mental Transposition Challenges:

Listen and Transpose:

1. Choose a familiar pop song.
2. Listen through once in the original key.
3. Identify the key.
4. Using the key a half step above the original, play through as much of the song as possible with motor imagery and audiation.

Compose and Transpose:

1. Establish a starting pitch.
2. Create a short, simple tune using audiation.
3. Play through the tune using motor imagery.
4. Transpose the tune through several additional keys.

Listen and Dictate:

1. Find a pop song you have never heard before.
2. Listen through the song a few times.
3. Identify the key.
4. Notate as much of the song as you can remember using letter names, staff paper, or a notation program.

Study and Dictate:

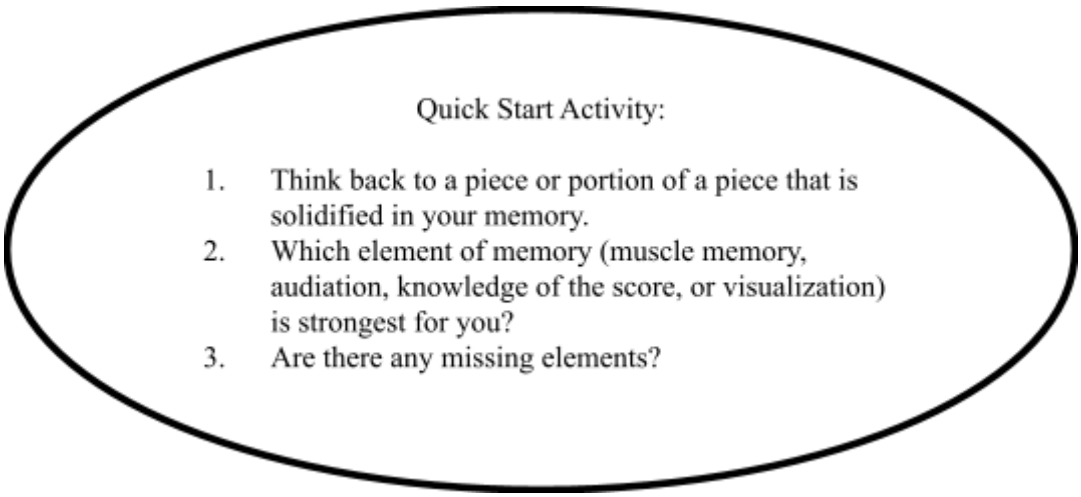
1. Choose a piece or excerpt you have performed.
2. Study the first ten measures of the score for a few minutes.
3. Pick an alternate key.
4. Notate the first ten measures in the alternate key.

Reinforcing Memorization with Mental Practice

What does it mean to memorize music? In its most simple form, the ability to play from memory suggests that the music is internalized to a point where the notation is no longer needed. Memory is a complex phenomenon and it is difficult to pinpoint how retention occurs and is maintained. The process of memorization is rather ambiguous. How can we build confidence in performance? Repetition combined with muscle memory, audiation, knowledge of the score, and visualization are all valuable steps in gaining comfort and competence. Since memory is strengthened by repetition and connections, combining as many of these steps as possible leads to a more developed neural network involved in the memory map.[28] Although it may not be possible to completely protect ourselves from memory slips, deliberate practice strategies can decrease the likelihood of derailment and foster the ability to move past minor lapses with assurance. This is key in moving beyond the initial intimidation of memorization to the excitement and freedom that comes from stepping away from the printed score. It's important to note that the unique combination of muscle memory, audiation, knowledge of the score, and visualization will vary greatly in practice and application among individuals. It is expected that the balance between these four elements might be slightly or significantly skewed based on the individual. For example, the strategy used by someone with a photographic memory will look very different from the strategy used by someone with aphantasia, the inability to visualize

[28] Roger Chaffin, Topher Logan, and Kristen T. Begosh, "Performing from Memory," *The Oxford Handbook of Music Psychology* (Oxford Library of Psychology. New York: Oxford University Press, 2009) 352-63.

mental images. The challenge here is to discover and combine two or more of these elements in the way that works best for you.



It can be helpful to imagine how an ideal performance from memory would look and feel in order to reveal some of the most important signs of solid memorization. The following list may be helpful as a starting point for compiling your personal non-negotiables.

Specific signs of solid memory work:

1. Lapses are rare, brief, and temporary.
2. When starting at any point in the piece, there is clear knowledge of what follows.
3. The first note of each section is identifiable while thinking through the piece.
4. You are able to sing/vocalize the piece in its entirety or pick it out on a piano.
5. Distractions while playing are not a major hindrance
6. A basic diagram of the score can be sketched from memory.
7. The most important elements of the piece can be notated from memory.
8. You are able to audiate what is happening in the piano, ensemble, or orchestra score.
9. There have been multiple, successful run-throughs alone and with others present.

Reinforcing Mental Practice with Memorization

It is important to address the “why” behind memorization. Performing from memory has no inherent or universal value on its own and is not usually necessary beyond traditional or practical reasons. While some might enjoy the challenge or find freedom of expression, this is not the case for everyone. The purpose of these exercises is to support the process of mental practice rather than to uphold memorization as superior to reading from a score. Practicing the skill of memorization is elective. Memory has been compared to a muscle that can be trained through regular exercise. Stimulating the brain in this way has value on its own, with or without a memorized performance attached. Even without the interest or need to perform from memory,

we can readily acknowledge the clear benefits of committing scale patterns, technique exercises, etudes, and standard excerpts to memory. If performing from memory is a desirable outcome, there is a double-reinforcement phenomenon at play, as memorization techniques enhance motor imagery practice and motor imagery practice supports memorization.

Goals for Exercise 1: Finger and Name

1. Practice deliberate awareness of the notation.
2. Enhance retention.
3. Challenge recall.

Exercise 1: Finger and Name

1. Select a short exercise or an excerpt of an exercise.
2. While looking at the notation, play through the exercise at least three times using residual tone.
3. Lightly finger through the patterns while speaking/singing the note names aloud at least three times.
4. Without the notation, lightly finger through as much of the excerpt as possible while speaking/singing the note names and/or solfege aloud.
5. Repeat steps 1-4 until you can recall the excerpt without the notation.

Questions for Exercise 1: Finger and Name

1. What is the pattern or form of the exercise?
2. How does the verbalization of the notation impact the memorization process?
3. Can you recall the exercise using audiation and motor imagery?

Tips for Exercise 1: Finger and Name

1. Try speaking/singing through the notation using solfege.
2. Use audiation to identify the notation rather than trying to recall the order of notes.
3. Make sure you are not relying solely on muscle memory during recall.

Goals for Exercise 2: Record

1. Build confidence in repetition without unnecessary physical strain.
2. Incorporate motor imagery within the memorization process.
3. Give attention to articulation and dynamics while memorizing.

Exercise 2: Record

1. Choose an excerpt of an etude or piece to memorize.
2. Record the excerpt at a slow tempo.
3. Listen back several times while following the score and imagining the motions of the fingers, tongue, and air.
4. Listen back without the score, imagining the motions of the fingers, tongue, and air.

Questions for Exercise 2: Record

1. What is the form or identifying pattern?
2. How does removing the flute impact the memorization process?
3. After successful audiation and motor imagery recall, are you able to transfer the memorized segment to the flute?

Tips for Exercise 2: Record

1. Practice engaging/directing the air and articulating through the segment (away from the flute) at least three times.
2. If it is difficult to keep track of notation, articulation, and dynamics simultaneously, repeat each element separately until they are comfortable.
3. In some ways, the brain cannot tell the difference between imaginary movement and reality.

Goals for Exercise 3: Flute Substitutes

1. Expand knowledge of the score beyond muscle memory.
2. Challenge recall by transferring knowledge to different contexts.
3. Avoid zoning out during repetitions.

Exercise 3: Flute Substitutes

1. Choose an excerpt of an etude or piece to memorize.
2. Play through the excerpt on the flute at least three times.
3. Sing or speak the articulations, dynamics, and expressions while fingering through the patterns at least three times using an object as a substitute for the flute (a pencil, cleaning rod, cooking utensils - anything remotely flute-shaped).
4. Repeat the steps until each can be accomplished without the score.

Questions for Exercise 3: Flute Substitutes

1. How does testing the excerpt on a flute substitute challenge your understanding of the patterns?
2. How does the absence of external sound shape your internal understanding of the intervals?
3. Are you able to recall the sound of the excerpt even when the finger patterns are unclear?

Tips for Exercise 3: Flute Substitutes

1. There is no need to have flawless repetitions on the flute-shaped objects.
2. The first attempts will likely include note mistakes, hesitation, and feel very clumsy.
3. Focus on maintaining awareness of the patterns through singing or audiation.

Goals for Exercise 4: Piano Test

1. Expand knowledge of the score beyond muscle memory.
2. Challenge recall by transferring knowledge to different contexts.
3. Avoid zoning out during repetitions.

Exercise 4: Piano Test

1. Choose an excerpt of an etude or piece to memorize.
2. Play through the excerpt on the flute at least three times.
3. Play the excerpt on a piano (or another instrument) at least three times, matching articulations, dynamics, and expressions as much as possible.
4. Repeat the steps until each can be accomplished without the score.

Questions for Exercise 4: Piano Test

1. How does testing the excerpt on the piano challenge your understanding of the patterns?
2. How does the visualization of intervals on a piano reinforce your knowledge of the feel and sound of the intervals?
3. Are you able to recall the sound of the excerpt even when the intervals are difficult to find?

Tips for Exercise 4: Piano Test

1. There is no need to have flawless repetitions on the piano.
2. The first attempts will likely include note mistakes, hesitation, and feel very clumsy.
3. Focus on keeping the sound of the excerpt clear in your mind while piecing it together on the piano.

Goals for Exercise 5: Dictation Test

1. Take time to internalize basic information and visual details of the score.
2. Use visualization and/or knowledge of the score to test recall.
3. Use audiation to fill in details.

Exercise 5: Dictation Test

1. Choose an excerpt from an etude or piece to memorize.
2. Play through the excerpt on the flute at least three times.
3. Study the score, noticing rhythm, note range, articulations, and dynamics.
4. Without referencing the score, notate as much of the excerpt as possible using staff paper, notation software, or writing out the letter names/solfege.

Questions for Exercise 5: Dictation Test

1. How does your dictation of the excerpt compare with the original?
2. Which elements of the score stand out the most?
3. Which elements of the score are more difficult to replicate?
4. How does your recall of the notation in the score compare with your memory of the sound?

Tips for Exercise 5: Dictation Test

1. Use a drone or reference pitch for reinforcement if needed.
2. For a longer excerpt, repeat the steps, filling in one element of the score each time.
3. Try transposing the excerpt to a different key for an additional challenge.

Goals for Exercise 6: Memory Ritual

1. Test and strengthen a memorized excerpt before reinforcing it with sleep.
2. Question and prove audiation and muscle memory.
3. Mentally zoom in on the details of the excerpt.

Exercise 6: Memory Ritual

1. Right before going to sleep, pick a memorized excerpt to test with motor imagery.
2. Slowly play through the excerpt in your mind while imagining the sound, finger movements, articulations, and dynamics.
3. It is not necessary to maintain steady tempos/rhythms while working through the excerpt.

Questions for Exercise 6: Memory Ritual

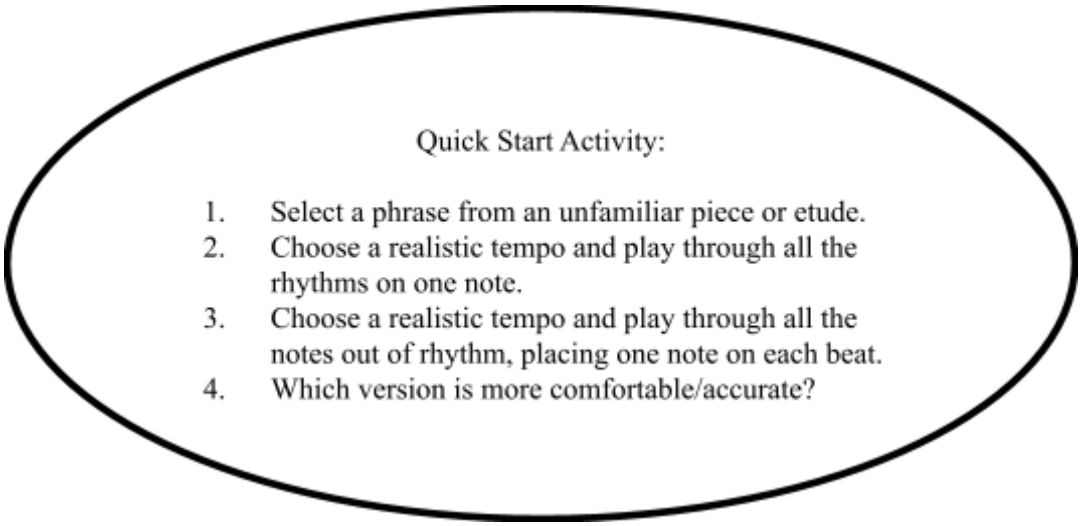
1. Is the audiated sound linked with the finger patterns?
2. Can you identify note names or solfege while slowly progressing through the section?
3. Which spots or elements are unclear/fuzzy?

Tips for Exercise 6: Memory Ritual

1. Use a reference pitch to begin if needed.
2. If a section is unclear, use audiation to identify the intervals.
3. If you tend to fall asleep before finishing the excerpt, practice starting at different sections.
4. In some cases, this practice may lead to very clear experiences of playing while dreaming.

Mental Sight-Reading Techniques

Sight reading while playing an instrument is a valuable practice, as even a small improvement in this skill can lead to increased comfort with unfamiliar music and efficiency in practice. Alternating between physical and mental practice can shed light on the process of reading music and helps to make the shift from microfocus to macro-focus. Much of our practice involves methodical attention to the smallest details of the score, breaking down complex notation, and taking a microscope to every element of technique. In contrast, reading music at sight involves taking in the larger context, prioritizing the overall sense of a work above accuracy, and interpreting gestures and shapes rather than individual notes. Often, an emphasis on playing correct pitches gets in the way of interpreting the pulse, rhythm, flow, and direction of a phrase, leading to frustration and anxiety while sight reading. Internalizing the process through mental practice takes off some of the pressure and allows for a resetting of priorities, maximizing awareness for the structural elements.



Goals for Exercise 1: Meter

1. Focus on the most basic elements of notation.
2. Notice how the meter intersects with the phrases and gestures.
3. Improve visual interpretation during the internal process of reading music.

Exercise 1: Meter

1. Select an unfamiliar piece or etude.
2. Notice the meter as well as any meter changes.
3. Choose a realistic tempo and set a metronome.
4. Move your eyes through the music with the metronome, making a mental note of where each beat is placed.

Questions for Exercise 1: Meter

1. How did the emphasis on meter feel in comparison with a typical sight reading experience?
2. Did you find yourself wanting to interpret other aspects of the score?
3. Did you discover anything surprising?

Tips for Exercise 1: Meter

1. If it is difficult to track the meter, use a finger or pencil to mark each beat on the score.
2. If there are any unclear moments, keep counting and continue to the next clear beat.
3. If the chosen tempo is too fast, reset the metronome and begin again.

Goals for Exercise 2: Rhythm

1. Focus on the most basic elements of notation.
2. Notice how the rhythms intersect with the meter.
3. Add a second layer to the internal process of reading music.

Exercise 2: Rhythm

1. Select an unfamiliar piece or etude (or use the selection from Exercise 1).
2. Notice the meter, meter changes, and any potentially tricky rhythms.
3. Choose a realistic tempo and set a metronome.
4. Move your eyes through the music with the metronome, speaking/hearing the rhythms internally within the structure of the beat pattern.

Questions for Exercise 2: Rhythm

1. How does the emphasis on rhythm feel in comparison with a typical sight reading experience?
1. Did you find yourself wanting to interpret other aspects of the score?
2. Did you discover anything surprising?

Tips for Exercise 2: Rhythm

1. Only move to this step once Exercise 1 is comfortable.
2. Use any syllable while audiating the rhythm (ta, da, 1-e-&-a, etc.)
3. If the rhythms are unclear at any point, shift the focus back to the meter alone and keep moving through the score until a clear rhythm appears.
4. Try this exercise externally as well, tapping the rhythms or playing them on one note with the flute.

Goals for Exercise 3: Rhythm

1. Reinforce the rhythmic patterns with articulation.
2. Begin to feel the shapes of the gestures.
3. Add a third layer to the internal process of reading music.

Exercise 3: Articulations

1. Select an unfamiliar piece or etude (or use the selection from Exercise 1).
2. Scan the music for the meter, complex rhythms, and articulation patterns.
3. Choose a realistic tempo and set a metronome.
. Move your eyes through the music with the metronome, speaking/hearing the rhythms and articulations internally within the structure of the beat pattern.

Questions for Exercise 3: Articulations

1. How does the addition of articulations add to your understanding of the rhythmic gestures?
2. Does the omission of notes up to this point feel freeing or disorienting?
3. Did you find yourself wanting to interpret other aspects of the score?
4. Did you discover anything surprising?

Tips for Exercise 3: Articulations

1. Only move to this step once Exercise 2 is comfortable.
2. Use articulation syllables while audiating (Tu, Ta, Du, Da, Ku, etc.)
3. If the articulations become overwhelming, fall back on rhythms only and keep moving through the score until the articulations are manageable.
4. Try this exercise externally as well, speaking the articulations aloud or playing them on one note with the flute.

Goals for Exercise 4: Articulations

1. Invigorate the gestures with dynamics.
2. Imagine the dynamic inflections without the challenges of specific notes on the flute.
3. Add a fourth layer to the internal process of reading music.

Exercise 4: Dynamics

1. Select an unfamiliar piece or etude (or use the selection from Exercise 1).
2. Scan the music for the meter, complex rhythms, articulation patterns, and dynamics.
3. Choose a realistic tempo and set a metronome.
4. Move your eyes through the music with the metronome, speaking/hearing the rhythms, articulations, and dynamics internally within the structure of the beat pattern.

Questions for Exercise 4: Articulations

1. How does the addition of dynamics add to your understanding of the rhythmic gestures?
2. Are all four layers manageable at the chosen tempo?
3. Does the omission of notes up to this point feel freeing or disorienting?
4. Did you discover anything surprising?

Tips for Exercise 4: Articulations

1. Only move to this step once Exercise 3 is comfortable.
2. If the reading becomes overwhelming, fall back on more foundational elements and keep moving through the score until the dynamics are manageable.
3. Try this exercise externally as well, vocalizing the articulations and dynamics aloud or playing them on one note with the flute.

Goals for Exercise 5: Articulations

1. Read approximations of notes as shapes and gestures.
2. Keep the focus on the first four elements.
3. Add the final layer of notes and note shapes to the process of reading internally.

Exercise 5: Note Shapes

1. Select an unfamiliar piece or etude (or use the selection from Exercise 1).
2. Scan the music for the meter, rhythms, articulations, dynamics, and note contours.
3. Choose a realistic tempo and set a metronome.
4. Use a drone to establish the key center.
5. Move your eyes through the music with the metronome, speaking/hearing the rhythms, articulations, dynamics and note gestures internally within the structure of the beat pattern.

Questions for Exercise 5: Note Shapes

1. How does the addition of notes/note shapes feel after all other elements are secure?
2. Are all five layers manageable at the chosen tempo?
3. How does this reading process feel in comparison with a typical sight reading experience?
4. What does a successful sight reading experience look and feel like for you?

Tips for Exercise 5: Note Shapes

1. Only move to this step once Exercise 4 is comfortable.
2. Playing some wrong notes or approximations of gestures is a sign that your focus has shifted in a useful direction.
3. It is not necessary or realistic for the audiation to be completely accurate.
4. As an added challenge, use motor imagery to feel some of the finger patterns.
5. Try this exercise externally as well, vocalizing the articulations, dynamics, and note shapes aloud or playing them on the flute.

CHAPTER FIVE
CREATIVE MENTAL PRACTICE

Any practice of enhancing musical exploration away from the comfort of a familiar instrument has the power to unlock new levels of confidence, freedom, and technique. How can mental practice techniques be used to harness deeper levels of creativity? In this chapter, the exercises are designed to build upon and add value to the every-day encounters we have with music.

Involuntary Musical Imagery

Scenario:

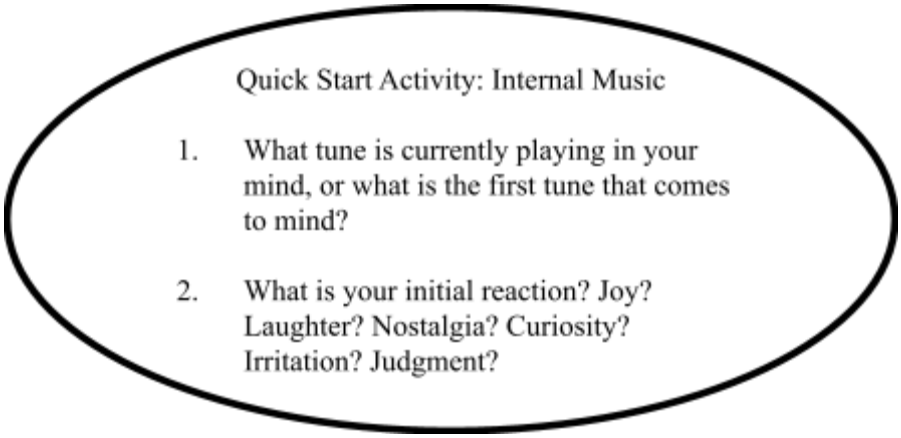
When was the last time you had a tune stuck in your head? What is playing in your mind right now? Many of us regularly experience this very basic form of audiation through popular, memorable, or favorite tunes that continue playing on repeat in our imagination long after being exposed to the external stimuli. This phenomenon is commonly referred to as an earworm, and can cause feelings of nostalgia when attached to pleasant memories, pain when attached to difficult memories, and aggravation when a random tune doesn't hold any meaning for us or when we actively dislike a song. Efforts to redirect our attention can range from listening to a full recording of the tune or singing it to someone else, to deliberately trying to distract our mind from the never-ending cycle by thinking about something else or attempting to replace the tune with another.

Challenge:

Instead of letting your earworm drive you to the point of desperation, embrace it! Our brains and memories are fascinating. The way we retrieve and connect information in any given moment is far beyond our full comprehension. It is so easy to dismiss random thoughts and memories as inconsequential. Instead, why not approach them with curiosity and playfulness?

Application:

The following goals, example exercises, and questions provide a basic strategy for practicing awareness and creativity with tunes that pass through your mind and are difficult to shake. Keep in mind that the exercises do not necessarily reflect or correlate with your experience as a musician. They are simply a guide showing which basic steps are necessary to begin with before continuing to the next exercise. Some steps are very basic and possibly automatic. Identify your comfort level with the suggested steps and choose a starting point that makes sense to you.



Goals for Exercise 1:

1. Habitually acknowledge and engage with music passing through the brain.
2. Improve confidence and speed with basic music analysis.
3. Gain accuracy and awareness with audiation.

Exercise 1 - Take Inventory

1. Notice the tune/song/excerpt/piece repeating in your mind.
2. Identify the mode - major/minor/etc.
3. Identify the meter and rhythmic patterns.
4. What is the basic structure of the tune/song/excerpt?

Questions for Exercise 1:

1. Is there a stand-out feature of the tune?
2. What do you like or dislike about it?
3. What memories or connections are triggered?

Goals for Exercise 2:

1. Build flexibility within audiation.
2. Begin to shape and alter your concept of a tune.
3. Open your mind to new possibilities.

Exercise 2 - Engage and Alter

1. Notice the music repeating in your mind.
2. As you continue to hear the music internally, experiment with the mode. If it is in a minor key, can you imagine it in a major key? If it is in a major key, can you imagine a minor-key version?
3. Try shifting the meter from duple to triple or vice versa.
4. Imagine the tune in an opposite or extreme tempo.

Questions for Exercise 2:

1. Do you prefer the tune in its original or altered mode?
2. How does the shifted meter and/or tempo alter the mood or meaning for you?
3. What are some additional ways to alter the tune in your mind?

Goals for Exercise 3:

1. Practice and refine pitch recognition.
2. Practice working out intervals and patterns by ear.
3. Open your mind to creative interpretations.

Exercise 3 - “Play” by Ear

1. Focus your attention on the music repeating in your mind.
2. What is the starting pitch/key? Make your best guess and test it against a reference pitch. How close is your guess?
3. Use motor imagery and the starting pitch/key to slowly work out how to play the song/excerpt on the flute.
4. Once you have successfully “played” the tune on the flute in your imagination, alter it slightly by adding passing tones, ornaments, etc.

Questions for Exercise 3:

1. Were you able to match or guess the tonal center using the timbral training technique? (See “Audiation and Mental Transposition” in Chapter Four.)
2. Can you work out the solfege for the tune?
3. What are your go-to ornaments/embellishments?

Goals for Exercise 4:

1. Sense and match intervals clearly through audiation and motor imagery.
2. Expand your imagination with improvisation.
3. Build confidence with playing and improvising by ear.

Exercise 4 - Improvise

1. Focus your attention on the music repeating in your mind.

2. After identifying the starting pitch/key, play the tune by ear on your imaginary flute.

3. Think of the tune as a starting point for improvisation. Explore and imagine different variations and make it your own.

4. Test your ability in your next physical practice session. Can you confidently play the tune/excerpt by ear without faltering?

Questions for Exercise 4:

1. Would a listener be able to identify the tune from your improvisation?
2. Can you alter the melody and rhythm/pacing beyond recognition?
3. How confident are you that you could notate the tune from memory?

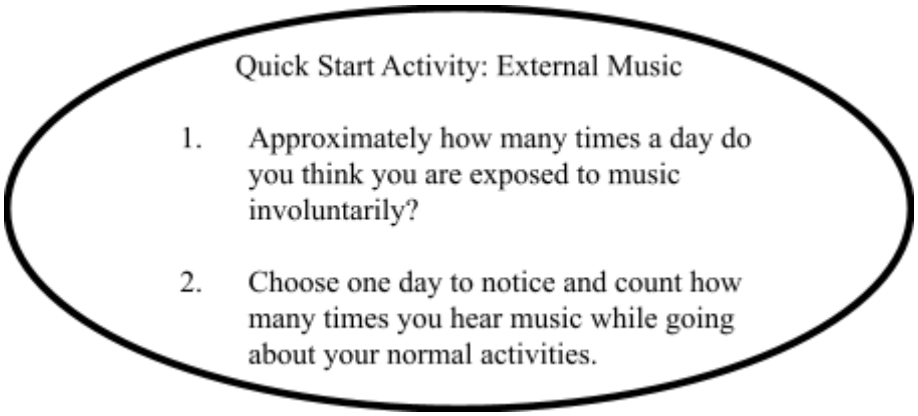
Involuntary Musical Exposure

Scenario:
We are constantly encountering music we have not consciously chosen. Examples include hold music, elevator music, and ambiance music in a restaurant, doctor’s office, grocery store, etc. If

we don't particularly appreciate these musical choices, it is easy to block them out or become mildly annoyed.

Challenge:
Again, embrace these moments! What better way to pass time while waiting on the phone, in line, or for an appointment than to explore creativity. The advantage of these encounters is that in contrast to the earworm phenomenon where our stimulus is internal, we are now playing off of an external stimulus. The challenge is in the fact that we have less control and must engage with the music in real time.

Application:
The following examples provide a basic strategy for practicing awareness and creativity with tunes that you notice in public spaces. Many of the steps are identical or similar to those included for involuntary musical imagery. Again, identify your comfort level with the suggested steps and choose a starting point that makes sense to you.



Goals for Exercise 1:

1. Habitually acknowledge and engage with music occurring in real time.
2. Improve confidence and speed with basic music analysis.
3. Gain accuracy and awareness with listening.

Exercise 1 - Take Inventory

1. Notice the tune/song/excerpt/piece that is playing in real time.
2. Identify the mode - major/minor/etc.
3. Identify the meter.
4. What is the basic structure of the tune/song/piece?

Questions for Exercise 1:

1. Is there a stand-out feature of the tune?
2. What do you like or dislike about it?
3. What memories or connections are triggered?

Goals for Exercise 2:

1. Practice noticing individual elements of the music.
2. Open your mind to new possibilities.
3. Practice adding a layer of sound via audiation to music heard externally.

Exercise 2 - Engage and Alter

1. Notice the music you are hearing.
2. Shift your focus from the melody through each layer of harmony and rhythm.
3. Imagine an extra layer of rhythm.
4. Imagine an additional harmony.

Questions for Exercise 2:

1. Can you shift easily between hearing individual layers and hearing the music as a whole?
2. Is it more natural for you to imagine adding rhythm or harmony?
3. What are some additional ways to alter the mix in your mind?

Goals for Exercise 3:

1. Practice and refine pitch recognition.
2. Practice working out intervals and patterns by ear.
3. Open your mind to creative interpretations.

Exercise 3 - “Play” by Ear

1. Focus your attention on the music.
2. What is the tonal center/key? Make your best guess and test it against a reference pitch. How close is your guess?
3. Use motor imagery and the tonal center/key to work out how to play the song/excerpt on the flute. If it is too complex to work out in real time, focus on the outline of the melody or the bassline.
4. If you are able to easily “play” the tune on the flute in your imagination, try altering it slightly by adding passing tones, ornaments, etc.

Questions for Exercise 3:

1. Were you able to match or guess the tonal center using the flute pitch audiation technique?
2. Can you work out some solfege for the tune in real time?
3. What are your go-to ornaments/embellishments?

Goals for Exercise 4:

1. Sense and match intervals clearly through audiation and motor imagery
2. Expand your imagination with improvisation.
3. Build confidence with playing and improvising by ear.

Exercise 4 - Improvise

1. Focus your attention on the music
2. After identifying the starting pitch/key, begin to play the tune by ear on your imaginary flute.
3. Think of the tune as a starting point for improvisation. Using motor imagery, explore and imagine different ways to interact with the music you are hearing in real time.
4. Test your ability in your next physical practice session. Can you confidently play the tune/excerpt by ear without faltering?

Questions for Exercise 4:

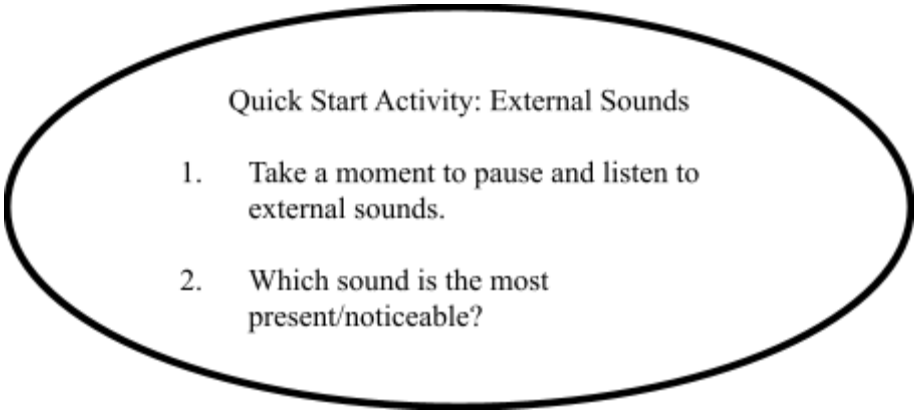
1. Would a listener be able to identify the tune from your improvisation?
2. How confident would you be to play the tune by memory?
3. How confident would you be to notate the tune from memory?

General Sound Exposure

Scenario:
The overwhelming exposure to different sounds in any setting provides additional creative material beyond purely musical sounds. Noticing and appreciating contextual and coincidental sensory stimuli is the first step in hearing general sound as music. This “musical hearing” creates new associations, inspiration, and possibility.

Challenge:
We already associate many sounds with musical ideas, including birdsong, running water, wind, and other nature-based sounds. What about the sounds of traffic, construction, footsteps, conversation, machinery, electronics, and typing?

Application:
These activities are designed to sharpen awareness of everyday sounds, support the habit of noticing, and elevate “musical hearing.”



Goals for Exercise 1:

1. Practice being present in a space.
2. Notice any external sounds.
3. Notice your basic reactions to sound.

Exercise 1 - Sound Inventory

1. Take a moment to pause and listen to your surroundings.
2. Which three sounds are the most noticeable?
3. Which sound is the most interesting to you?
4. Which sound is the most annoying?

Questions for Exercise 1:

1. Do you notice any additional sounds?
2. Are you able to identify the source for each sound?
3. What elements make a sound more or less interesting to you?

Goals for Exercise 2:

1. Practice being present in a space.
2. Accentuate your awareness by initially dampening your sense of sound.
3. Challenge yourself to notice sounds you usually ignore or block out.

Exercise 2 - Mindfulness and Sound

1. Take a moment to pause and close your eyes if you are comfortable.
2. Cover your ears with your hands or use earplugs for about 30 seconds.
3. Uncover your ears and listen.
4. How many different sounds do you notice?

Questions for Exercise 2:

1. As you cover your ears briefly, are any sounds breaking through?
2. What is the loudest sound you can perceive?
3. What is the softest sound you can perceive?

Goals for Exercise 3:

1. Remember sounds in relation to an environment.
2. Recreate sound in your imagination.
3. Isolate and combine specific sounds.

Exercise 3 - Memory and Audiation

1. Take a moment to visualize a favorite place (ex. favorite city, beach, park, coffee shop, etc.).
2. Begin to move through the space in your memory.
3. What types of sounds might be present in this space?
4. Can you partially recreate the soundscape in your imagination?

Questions for Exercise 3:

1. Are certain sounds easier to audiate than others?
2. Do you typically prefer spaces with more or fewer external sounds?
3. Does your imagined soundscape trigger feelings of excitement, peace, etc.?

Goals for Exercise 4:

1. Experiment with external sounds as possible inspiration for creativity.
2. Notice which elements of sound you are drawn to naturally.
3. Create mental connections between unrelated sounds.

Exercise 4 - Musical Listening

1. Take a moment to pause and listen to your surroundings.
2. Do certain sounds strike you as more musical than others?
3. Can you distinguish melodic or rhythmic elements?
4. If the external sounds were combined in a backing track, what would you add?

Questions for Exercise 4:

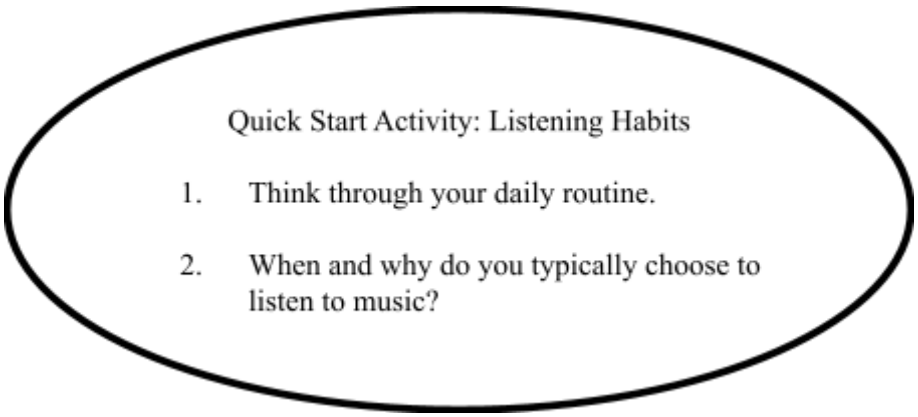
1. What elements of sound do you experience as more or less musical?
2. Can you link two or more unrelated sounds to create a rhythmic groove?
3. Can you imagine interacting musically with some of these sounds?

Voluntary Musical Exposure

Scenario:
Most of us incorporate listening to music in our daily routine as a way to elevate our experience. It is common to listen while working, driving, running errands, exercising, dancing, for recreation, and for pure enjoyment. What is on your playlist? Who are your favorite artists when you want to focus, relax, be energized, or be inspired?

Challenge:
In some contexts, we use music to create ambiance while the mind is otherwise occupied with work, study, etc., while in others the mind is free to wander or focus on the listening experience. Think about when and how you listen to music. Choose one or two contexts to begin a habitual practice of engaging with the music in new, intentional ways.

Application:
The following exercises focus on exploring your current listening habits and engaging with more intention. There are no right or wrong ways to interact with music. Embrace your experience and consider the questions with curiosity.



Goals for Exercise 1:

1. Understand how your attention flows with music you enjoy.
2. Notice how the music influences your thoughts.
3. Identify your typical habits of engagement.

Exercise 1 - Listening for Enjoyment

1. While listening for enjoyment, allow your attention to flow naturally for a few minutes.
2. Pause for a moment, and reflect on your experience.
3. Notice what drew your attention or what thoughts came up.
4. Notice the ways you interacted with the music, either internally or externally

Questions for Exercise 1:

1. Do you typically choose music to reflect your mood or to redirect your mindset?
2. Do you tend to interact with the music internally, externally, or both?
3. What is your favorite way to interact with music?

Goals for Exercise 2:

1. Explore different ways to engage with music.
2. Focus on external interaction.
3. Combine movement and vocalization.

Exercise 2 - Experience and Externalize

1. While listening for enjoyment, remain as still and quiet as possible for about 30 seconds.
2. Begin to move in time with the music in some way (tapping your foot/hand, clapping, dancing, etc.).
3. Pick some element of the music to vocalize with (rhythm, melody, harmony, lyrics, etc.).
4. Continue to move while vocalizing with the music.

Questions for Exercise 2:

1. Are you more likely to relax while listening to music or to interact with it in some way?
2. Is it more natural for you to add motion or vocal reinforcement?
3. Is it natural or challenging to combine both elements?

Goals for Exercise 3:

1. Explore different ways to engage with music.
2. Focus on internal interaction.
3. Add a layer of imagined interaction with the flute.

Exercise 3 - Experience and Internalize

1. While listening for enjoyment, remain as still and quiet as possible for about 30 seconds.
2. What is the tonal center/key? Make your best guess and test it against a reference pitch. How close is your guess?
3. Begin to “play” simple scale or rhythm patterns along with the music using motor imagery.
4. Try reinforcing the rhythm, melody, or harmony with your imaginary flute.

Questions for Exercise 3:

1. Is it easier to find the tonal center when you are familiar with or interested in the music?
2. Are you able to connect the tonal center to its counterpart on the flute?
3. Can you keep your anchor note in mind while exploring simple patterns and elements within the music?

Goals for Exercise 4:

1. Explore different ways to engage with music.
2. Begin to create and improvise in real time.
3. Practice motor imagery skills with your favorite music.

Exercise 4 - Internalize and Improvise

1. While listening for enjoyment, remain as still and quiet as possible for about 30 seconds.
2. What is the tonal center/key? Make your best guess and test it against a reference pitch if needed.
3. Begin to “play” simple scale or rhythm patterns along with the music using motor imagery.
4. Begin to imagine and play new material using motor imagery.

Questions for Exercise 4:

1. Does it feel natural or scary to stray “outside the lines” of the music you’re experiencing?
2. If you had the opportunity to join a jam session with the artists involved in the recording, what would you add to the mix?
3. Are you comfortable to mentally improvise using simple material, or do you try to add complex material too soon?

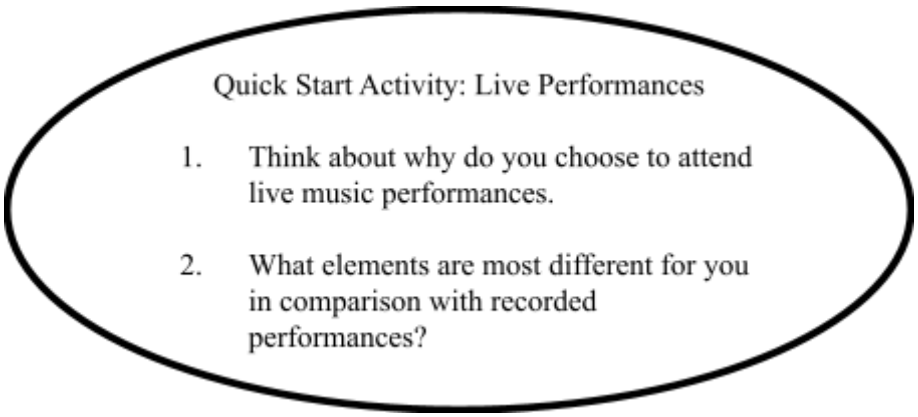
Listening to Music as an Experience

Scenario:
As musicians, we have sharpened our listening skills over time to quickly identify what is admirable or lacking in a performance. Impressions of a performer’s sound, style, stage presence, etc. are constructed almost as instantly as objective assessments of qualities including intonation and rhythm. The ability to form intelligent opinions about our own performance and that of others is essential to our development and autonomy as artists.

Challenge:
An equally important type of listening occurs when we choose to temporarily suspend the intellect and experience music from a purely physical/emotional perspective. This practice requires a conscious shift from a mindset of evaluating, judging, and assigning meaning to what we hear or see to a mindset of curiosity and allowing ourselves to feel or imagine the sensations created by another player's sound and/or movement. At its core, this is the definition of empathy: Choosing to temporarily suspend our personal experience, perspectives, beliefs, and feelings to fully immerse ourselves in someone else’s experience.

Application:
Many of us have experienced dreams where we are simultaneously experiencing the action and watching it from a distance. Certain movies and video games can have such a compelling effect that we leave our own reality in a sense to become immersed in another world. With practice, it is possible to replicate this experience while watching and listening to live music performances, video performances, and even audio recordings. While listening in this way, the secrets of our favorite artist become more clear. We can start to perceive and internalize physical cues for how they shape a phrase, produce a tone color, support articulation, control a release, and play difficult passages with ease and freedom. On the flip side, we will also perceive sensations of tension, struggle, inefficient movement, and imbalance. Many of these cues are obvious when watching and hearing a performance, however, it is not as simple to pinpoint the root cause of these issues. Through this shift in perspective, it becomes easier to accurately diagnose and

address issues in other musicians as well as in our own playing. Experiential listening is not necessarily the end goal. There are no right or wrong ways of listening to music. The purpose of these exercises is to enhance mental practice and awareness, to become more conscious of listening habits, and to unlock new levels of freedom and enjoyment in listening.



Goals for Exercise 1: Full Body Listening (Familiar)

1. Suspend and let go of prior knowledge of music.
2. Experience familiar music as a blank slate.
3. Focus on your physiological/sensory experience.

Exercise 1 - Full Body Listening (Familiar)

1. Listen to a recording of a familiar piece.
2. Imagine that this is your first experience of the piece.
3. Instead of anticipating what is coming next, let the music happen as you focus on the moment.
4. Notice how your body experiences sound.

Questions for Exercise 1: Full Body Listening (Familiar)

1. Did you notice or hear anything new while suspending prior knowledge?
2. Can you separate from your expectation of how the music will unfold?
3. How does the sound affect your body?

Goals for Exercise 2: Full Body Listening (Unfamiliar)

1. Suspend and let go of prior knowledge of music.
2. Experience unfamiliar music as a blank slate.
3. Focus on your physiological/sensory experience.

Exercise 2 - Full Body Listening (Unfamiliar)

1. Listen to a recording of an unfamiliar piece.

2. Instead of using logic and knowledge of musical phrasing and structure to guess how the music will unfold, allow yourself to enjoy the ride of complete surprise.

3. Feel the music as it happens.

4. Notice how your body experiences sound.

Questions for Exercise 2: Full Body Listening (Unfamiliar)

1. How does the experience with unfamiliar music compare with the previous exercise?
2. Can you separate from your expectation of how the music will unfold?
3. How does the sound affect your body?

Goals for Exercise 3: Full Body Listening (Personal)

1. Suspend and let go of typical reactions to your own playing.
2. Experience personal recordings as a blank slate.
3. Focus on your physiological/sensory experience.

Exercise 3 - Full Body Listening (Personal)

1. Listen to a recording of your own playing.
2. Imagine that you are listening to a complete stranger.
3. Feel the music as it happens.
4. Notice how your body experiences sound.

Questions for Exercise 3: Full Body Listening (Personal)

1. How does the experience with personal music compare with the previous exercises?
2. Can you separate from your expectation of how the music will unfold?
3. How does the sound affect your body?

Additional Questions for Exercises 1-3:

1. Where do you feel the sound resonating/vibrating?
2. How do you experience musical tension and release?
3. How does your body react to sudden changes in the music?
4. Does your body distinguish between pleasant and unpleasant sounds?
5. How does your body experience pleasant sounds vs. unpleasant sounds?
6. How is your heart rate affected?
7. How is your breathing affected?
8. Do you experience chills or goose bumps?
9. How does your body experience silence/space?
10. What emotions do you experience?
11. How long can you stay in this mode of listening without making a value judgment?
12. Is your attention drifting, or are you starting to fall asleep?

Additional Tips for Exercises 1-3:

1. Try the exercise with your eyes open and again with your eyes closed.
2. Try the exercise while sitting, standing, and lying down.
3. Try the exercise with and without headphones/earphones.
4. If you unintentionally make a value judgment, gently notice it, then move back toward full-body listening.

Goals for Exercise 4: Visual Listening

1. Notice external movements separately from the accompanying sounds.
2. Practice internalizing the movements of other performers.
3. Determine how the visible movement affects you.

Exercise 4 - Visual Listening

1. Choose a high quality video recording of a performance.
2. Watch the performance with the audio muted.
3. Follow the movements using motor imagery.
4. Notice how your body experiences the visible movement.

Questions For Exercise 4: Visual Listening

1. How does your body experience movement, gesture, and shape?
2. Can you hear imaginary music and feel moments of tension and release based on visual cues?
3. Can you immerse yourself in the visual experience until you feel that you are moving along with the performer?
4. Which movements seem to add to or detract from the overall experience?

Additional Tips for Exercise 4: Visual Listening

1. Try this exercise with familiar, unfamiliar, and self recordings.
2. Try this exercise with videos of flutists as well as other instrumentalists/vocalists.
3. Try this exercise with YouTube videos and change the settings for a slower playback speed to notice more detail.

Goals for Exercise 5: Experiential Listening (Live Performances)

1. Enhance your ability to experience live performance.
2. Exercise flexibility in how you choose to listen to and experience music.
3. Discover and question any habitual patterns.

Exercise 5 - Experiential Listening (Live Performances)

1. While attending a live performance, practice the mindful art of listening as an experience.

2. Practice consciously shifting between an experiential mindset and an intellectual, evaluative mindset.

3. Notice any thoughts, feelings, or physiological reactions.

4. Which mindset is more natural for you?

Questions for Exercise 5: Experiential Listening (Live Performances)

1. Do you have strong ideas about “correct” or “incorrect” ways to experience music?
2. How long can you stay in a purely experiential mode without making a value judgment?
3. Can you immerse yourself in the aural/visual experience until you feel that you are playing along with the performer?
4. Can you immerse yourself in the aural/visual experience until you feel that you are the performer?

Goals for Exercise 6: Experiential Listening (Live Performances)

1. Enhance your ability to experience recorded performances.
2. Exercise flexibility in how you choose to listen to and experience music.
3. Discover and question any habitual patterns.

Exercise 6 - Experiential Listening (Recordings)

1. While watching/listening to a video performance, practice the mindful art of listening as an experience.

2. Practice consciously shifting between an experiential mindset and an intellectual, evaluative mindset.

3. Notice any thoughts, feelings, or physiological reactions.

4. Which mindset is more natural for you?

Questions For Exercise 6: Experiential Listening (Recordings)

1. How long can you stay in a purely experiential mode without making a value judgment?
2. Can you immerse yourself in the aural/visual experience until you feel that you are playing along with the performer?
3. Can you immerse yourself in the aural/visual experience until you feel that you are the performer?

Goals for Exercise 7: Experiential Listening (Personal)

1. Enhance your ability to experience your own recorded performances.
2. Exercise flexibility in how you choose to listen to and experience music.
3. Discover and question any habitual patterns.

Exercise 7 - Experiential Listening (Personal)

1. While watching/listening to your own video performance or practice recordings, practice the mindful art of listening as an experience.

2. Practice consciously shifting between an experiential mindset and an intellectual, evaluative mindset

3. Notice any thoughts, feelings, or physiological reactions.

4. Which mindset is more natural for you?

Questions for Exercise 7: Experiential Listening (Personal)

1. How long can you stay in a purely experiential mode without making a value judgment?
2. Can you immerse yourself in the aural/visual experience until you feel that you are playing along with yourself?
3. Can you immerse yourself in the aural/visual experience until you feel that you are performing in the moment?

Additional Questions for Exercises 5-7

1. How does the sound affect your body?
2. Where do you feel the sound resonating/vibrating?
3. How do you experience musical tension and release?
4. How does your body react to sudden changes in the music?
5. Does your body distinguish between pleasant and unpleasant sounds?
6. How does your body experience pleasant sounds vs. unpleasant sounds?
7. How is your breathing and heart rate affected?
8. Do you experience chills or goose bumps?
9. How does your body experience silence/space?
10. What emotions do you experience?
11. How does your body experience movement, gesture, and shape?
12. Which movements seem to add to or detract from the overall experience?
13. Can you sense when the performer is experiencing freedom, joy, and connection?
14. Can you sense when the performer is experiencing physical or emotional discomfort?
15. How long can you stay in this mode of experiencing without making a value judgment?
16. Is your attention drifting, or are you starting to fall asleep?

Additional Tips for Exercises 5-7:

1. Try the exercise with your eyes open and again with your eyes closed.
2. If you unintentionally make a value judgment, gently notice it, then move back toward experiential listening.
3. If you unintentionally experience thoughts about comparison to others, preferences, or expectations, gently notice them, then move back toward experiential listening.
4. Try this exercise with flutists as well as other instrumentalists/vocalists.

Goals For Exercise 8: Full Body Listening with Movement

1. Reconnect with your inner child.
2. Trust your instinctive responses to music.
3. Make creative connections between sound and gesture.

Exercise 8 - Full Body Listening with Movement

1. While listening to music, allow your body to move instinctively.
2. Embrace the curious and playful attitude of a child.
3. Use a variety of movements as you are able and comfortable.
4. The movement could be as simple as clapping/marching in place or as complex as interpretive dance.

Questions for Exercise 8: Full Body Listening with Movement

1. How does your body experience the music?
2. How does your perception of the music shift during this exercise?
3. Can you immerse yourself in the experience until you lose your sense of self and "become" the music?

Additional Tips for Exercise 8: Full Body Listening with Movement

1. Try this exercise with a variety of musical genres.
2. Try this exercise with familiar and unfamiliar music.
3. Try this exercise using actual movement and again with pure motor and/or visual imagery.
4. Use this exercise with repertoire you view as serious or intimidating.
5. If you start to feel silly or foolish, notice and accept the feeling and try leaning into the movement causing the discomfort. (Note to teachers: In lessons or group class settings, be sensitive to the student's preference. It is often more effective to give a student the option to explore movement in their own privacy or explore movements together than to force unnecessary discomfort in order to make a point or create entertainment for an audience.)

FINAL CHALLENGE

The exploration of mental practice is an extremely personal journey. Compared with physical practice, there is far more ambiguity involved. Each individual imagines, visualizes, audiates, and senses differently. No one can affirm or critique your mental techniques. Personal experimentation is necessary in order to fine-tune the experience and discover the most efficient balance between physical and mental practice.

Álvaro Pascual Leone, a neurologist and researcher in brain mapping, designed an experiment to measure the effectiveness of mental practice in comparison with physical practice. Two groups of people with no prior experience in piano playing were asked to practice a five-finger sequence of notes. The first group listened to a recording of the sequence while looking at the piano keys and used motor imagery to become familiar with the pattern. The second group physically practiced the pattern on the piano. At the end of the study, the accuracy of both groups was tested and their brains were mapped to show any changes in comparison with the initial mapping. Both groups showed significant change in the part of the brain controlling motor function. While the physical practice group demonstrated better accuracy, the mental practice group was able to reach the same level of accuracy after only one physical practice session.[29]

What does this mean for us? Most of us do not have access to brain mapping, but there are simple, creative ways to imitate Pasqual Leone's experiment. These strategies can be adapted for individual use or to challenge students.

Chromatic Scale Test:

1. Select two chromatic scales, set a limit on repetitions (ex. 12), and set a target tempo. Physically play through the first scale 12 times, progressing from a slower tempo as needed. Record the first scale with a metronome.

2. Practice the second scale using motor imagery. Imagine playing through the scale 10 times, then physically play through it on the final 2 repetitions. Record the second scale with a metronome.

3. Listen to both recordings for any noticeable differences. Repeat the experiment using different proportions and notice any changes in confidence or quality.

---

[29] Álvaro Pascual-Leone, "The Brain That Plays Music and Is Changed by It," *Annals of the New York Academy of Sciences* 930 (June 2001): 315–29.

Etude Test:

1. Select (or assign) two different etudes of a similar difficulty level, one for mental practice and one for physical practice.

2. Practice both etudes for 3-7 days, recording the length of time spent with each.

3. At the end of the practice period, record or perform both etudes. Notice any differences in the experience or quality of the performances.

Sight-reading Test:

1. Choose two etudes (or pieces) to sight-read. Set a time limit for each etude (ex. 5 minutes).

2. Look through the first etude for 5 minutes, making a note of any potential challenges. At the end of the set time, play though or record the etude.

3. Look through the second etude for 5 minutes, using motor imagery to work through any potential challenges. At the end of the set time, play through or record the etude.

Rehearsal Test:

1. If you are rehearsing new repertoire with an ensemble, select a small section of one piece to practice using motor imagery, score study, and listening only.

2. While rehearsing with the ensemble, notice if the section feels more, less, or as familiar as the rest of the piece.

Performance Test:

1. In preparation for a performance or recital, choose one section or piece to practice using motor imagery.

2. Map out the weeks you will have to prepare. For example, if you have eight weeks to prepare for the performance, use motor imagery, score study, and listen to the section for seven weeks, then add physical practice during the final week.

3. Compare your experience between the different preparation strategies as well as the experience in the performance.

Bibliography

Agrell, Jeffrey. *Improvisation Games for Classical Musicians.* Chicago: GIA Publications, 2008.

Aleman A, Nieuwenstein MR, Böcker KB, and de Haan EH. Music Training and Mental Imagery Ability. Neuropsychologia 38 no. 12 (2000):1664-8.

Allen, D.R. "Mental representations in clarinet performance: Connections between auditory imagery and motor behaviours." Unpublished doctoral diss., University of North Carolina at Greensboro, 2007.

Altenmüller, Eckart, and Shinichi Furuya. "Brain Plasticity and the Concept of Metaplasticity in Skilled Musicians." *Advances in Experimental Medicine and Biology 957* (2016): 197-208.

Altenmüller, Eckart, Mario Wiesendanger, and Jürg Kesselring, eds. *Music, Motor Control and the Brain.* Oxford, New York: Oxford University Press, 2006.

Altenmüller, Eckart. "Neurology of Musical Performance. *Clinical Medicine* (London) 8 no. 4 (August 2008): 410-3.

Azzara, Christopher D. "Audiation-Based Improvisation Techniques and Elementary Instrumental Students' Music Achievement." *Journal of Research in Music Education* 41, no. 4 (1993): 328–42.

Bernardi, Nicolò Francesco, Alexander Schories, Hans-Christian Jabusch, Barbara Colombo, and Eckart Altenmüller. "Mental Practice in Music Memorization: An Ecological-Empirical Study." *Music Perception: An Interdisciplinary Journal* 30, no. 3 (2013): 275–90.

Boysen, Erika and David Brown. "Mapping Anatomical Locators for Musicians: Laryngeal Vibrato Production in Flutists: A frank question from a curious student launched a study in search of better understanding how the pharynx and larynx physically create vibrato. Boysen and Brown's study produced data relevant to performers, educators, and students." *Flutist Quarterly*, Spring 2021.

Brodsky, W., A. Henik, B. Rubinstein, and M. Zorman. "Auditory imagery from musical notation in expert musicians." *Perception and Psychophysics* 65, no. 4 (2003) 602-612.

Brooks, Ricky W. 1995. "Mental Practice and the Musician: A Practical Approach to Practice." *Update: Applications of Research in Music Education* 13, no. 2 (spring-summer 1995): 4–8.

Brown, Brené. *Atlas of the Heart: Mapping Meaningful Connection and the Language of Human Experience*. New York: Random House, 2021.

_____.*Daring Greatly: How the Courage to Be Vulnerable Transforms the Way We Live, Love, Parent, and Lead.* New York, NY: Gotham Books, 2012.

Carpenter, William Benjamin. *Principles of Mental Physiology, with Their Applications to the Training and Discipline of the Mind, and the Study of its Morbid Conditions.* New York: D. Appleton and Company, 1874.

Chaffin, Roger, Topher Logan, and Kristen T. Begosh. "Performing from Memory." In *The Oxford Handbook of Music Psychology*, 352–63. Oxford Library of Psychology. New York: Oxford University Press. 2009.

Clark, T., Williamon, A. and A. Aksentijevic. Musical imagery and imagination: The function, measurement, and application of imagery skills for performance. In *Musical imaginations. Multidisciplinary Perspectives on Creativity, Performance, and Perception*, edited by D. Hargreaves, D. Miell and R. Macdonald. New York: Oxford University Press, 2012.

Critchley, Macdonald and R.A. Henson, eds. *Music and the Brain: Studies in the Neurology of Music.* Springfield, IL: Charles C. Thomas Pub Ltd, 1977.

Csikszentmihalyi, Mihaly. *Flow: the Psychology of Optimal Experience.* New York: Harper Perennial, 2008.

Cockey, Linda. "Body, Mind and Spirit: Being at One with Your Instrument." *American Music Teacher* 57, no. 6 (2008): 42–44.

Coffman, Don D. "Effects of Mental Practice, Physical Practice, and Knowledge of Results on Piano Performance." *Journal of Research in Music Education* 38, no. 3 (1990): 187–96.

Davidson, Richard J and Sharon Begley. *The Emotional Life of Your Brain: How Its Unique Patterns Affect the Way You Think, Feel, and Live--and How You Can Change Them.* New York: Avery, an imprint of Penguin Random House, 2012.

Debost, Michel. *The Simple Flute: From A to Z.* New York: Oxford University Press, 2002.

Doidge, Norman. *The Brain That Changes Itself: Stories of Personal Triumph from the Frontiers of Brain Science.* Carlton North, Vic: Scribe Publications, 2010.

_____.*The Brain's Way of Healing: Remarkable Discoveries and Recoveries from the Frontiers of Neuroplasticity.* New York, NY: Viking, 2015.

Driskell, J.E., Copper, C. & Moran, A. “Does Mental Practice Enhance Music Performance?” *Journal of Applied Psychology* 79 no. 4 (1994):481-492.

Dweck, Carol S. Mindset: The New Psychology of Success. New York: Ballantine Books, 2016.

Feldenkrais, Moshe. *Awareness through Movement: Health Exercises for Personal Growth.* New York: Harper & Row, 1977.

_____.*The Elusive Obvious: or, Basic Feldenkrais.* Cupertino, CA: Meta Publications, 1981.

_____.*The Master Moves.* Cupertino, CA: Meta, 1984.

_____.*The Potent Self: a Guide to Spontaneity.* San Francisco, CA: Harper & Row, 1992.

Feltz, Deborah L., and Daniel M. Landers. " The Effects of Mental Practice on Motor Skill Learning and Performance: A Meta-analysis", *Journal of Sport Psychology* 5, no. 1 (1983): 25-57, Accessed Oct 31, 2021, https://doi.org/10.1123/jsp.5.1.25.

Fernandez, Cristina A., Karmel W. Choi, Brandon D. L. Marshall, Benjamin Vicente, Sandra Saldivia, Robert Kohn, Karestan C. Koenen, Kristopher L. Arheart, and Stephen L. Buka. “Assessing the Relationship between Psychosocial Stressors and Psychiatric Resilience among Chilean Disaster Survivors.” *The British Journal of Psychiatry* 217, no. 5 (2020): 630–37.

Freymuth, M. *Mental Practice and Imagery for Musicians.* Boulder: Integrated Musician’s Press, 1999.

Garfield, Charles A. *Peak Performance: Mental Training Techniques of the World's Greatest Athletes.* Los Angeles: J.P. Tarcher, 1984.

Goleman, Daniel and Richard Davidson. *Altered Traits: Science Reveals How Meditation Changes Your Mind, Brain, and Body.* New York: Avery, an imprint of Penguin Random House, 2017.

_____.*The Science of Meditation: How to Change Your Brain, Mind, and Body.* New York: Avery, an imprint of Penguin Random House, 2017.

Gordon, Edwin. “Research studies in audiation: I,” *Bulletin of the Council for Research in Music Education* 84, (1985): 34–50.

Gottschalk, Arthur. & Philip Kloeckner. *Functional Hearing: A Contextual Method for Ear Training.* New York: Ardsley House, 2007.

Gould, Daniel, Dana K. Voelker, Nicole Damarjian, and Christy Greenleaf. "Imagery Training for Peak Performance." In *Exploring Sport and Exercise Psychology*, edited by Judy L. Van Raalte and Britton W. Brewer, 3rd ed., 55–82. American Psychological Association, 2014.

Green, Barry. *The Inner Game of Music.* New York: Doubleday, 1986.

Harvard Business Review. "Mindfulness In the Age of Complexity: an interview with Ellen Langer by Alison Beard." In *Mindfulness* 1-25. Boston, Massachusetts: Harvard Business Review Press, 2017.

Highben, Zebulon, 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 (2004): 58–65.

Karpinski, G. S. *Aural Skills Acquisition: The Development of Listening, Reading, and Performing Skills in College-Level Musicians*. New York: Oxford University Press, 2000.

Klickstein, Gerald. *The Musician's Way: A Guide to Practice, Performance, and Wellness. Oxford; New York: Oxford University Press, 2009.*

Louke, Phyllis A., and Patricia D. George. *Flute 101: Mastering the Basics: A Method for the Beginning Flutist with Teaching and Phrasing Guides*. N.p.: Theodore Presser, 2010.

McHugh-Grifa, Abigail. "A Comparative Investigation of Mental Practice Strategies Used by Collegiate-Level Cello Students." *Contributions to Music Education* 38, no. 1 (2011): 65–79. Accessed October 30, 2021. http://www.jstor.org/stable/24127177.

McPherson, Gary E. "Cognitive Strategies and Skill Acquisition in Musical Performance." *Bulletin of the Council for Research in Music Education*, no. 133 (1997): 64–71.

Mielke, Susan, and Gilles Comeau. "Developing a Literature-Based Glossary and Taxonomy for the Study of Mental Practice in Music Performance." *Musicæ Scientiæ: The Journal of the European Society for the Cognitive Sciences of Music* 23, no. 2 (2019): 196–211.

Mikumo, Mariko. "Motor Encoding Strategy for Pitches of Melodies." *Music Perception: An Interdisciplinary Journal* 12, no. 2 (1994): 175–97.

Mulder, Th. "Motor imagery and action observation: cognitive tools for rehabilitation." *Journal of Neural Transmission* 114, no. 10 (2007): 1265-78.

Nelson, Samuel H., and Elizabeth L. Blades. *Singing with Your Whole Self: A Singer's Guide to Feldenkrais Awareness through Movement.* Lanham, Maryland: Rowman & Littlefield, 2018.

Nyfenger, Thomas. *Music and the Flute*. Guilford Ct: T. Nyfenger, 1986.

Palmer, Caroline. “The nature of memory for music performance skills.” In *Music, Motor Control and the Brain.* Edited by Eckart Altenmüller, Mario Wiesendanger, and Jurg Kesselring, 39-53. Oxford, New York: Oxford University Press, 2006.

Palmer, Caroline, and Rosalee K. Meyer. “Conceptual and Motor Learning in Music Performance.” *Psychological Science* 11, no. 1 (2000): 63–68.

Pascual-Leone, Álvaro. “The Brain That Plays Music and Is Changed by It.” *Annals of the New York Academy of Sciences* 930 (June 2001): 315–29.

Payzant, G. *Glenn Gould; Music and Mind*. Toronto, Ontario: Key Porter Books, 1997.

Postle, Bradley R. *Essentials of Cognitive Neuroscience.* Chichester, West Sussex, UK; Malden, MA : Wiley Blackwell, 2015.

Rideout, R. R. "The role of mental presets in skill acquisition" In *Handbook of Research on Music Teaching and Learning* edited by R. Colwell, 472-479. New York: Schirmer Books, 1992.

Ristad, Eloise. *A Soprano on Her Head: Right-Side-up Reflections on Life and Other Performances.* Moab, Utah: Real People Press, 1982.

Rywerant, Yochanan. *The Feldenkrais Method: Teaching by Handling: a Technique for Individuals.* San Francisco: Harper & Row, 1983.

Shurtleff, Michael. *Audition: Everything an Actor Needs to Know to Get the Part.* New York: Bantam Books, 1980.

Walker, Matthew P. *Why We Sleep: Unlocking the Power of Sleep and Dreams.* New York, NY: Scribner, an imprint of Simon & Schuster, Inc., 2017.

Westney, William. *The Perfect Wrong Note: Learning to Trust Your Musical Self.* Pompton Plains, N.J.: Amadeus Press, 2003.

Tang, Yi-Yuan. *The Neuroscience of Mindfulness Meditation: How the Body and Mind Work Together to Change Our Behaviour.* Cham: Springer International Publishing, Imprint, Palgrave Macmillan, 2017.