Baroque Pianism: Perspectives on Playing Baroque Keyboard Music on the Piano, with Emphasis on Bach’s Fugues in the *Well-Tempered Clavier*

Chih-tung Cheng
*The Graduate Center, City University of New York*
Baroque Pianism: Perspectives on Playing Baroque Keyboard Music on the Piano, with Emphasis on Bach’s Fugues in the *Well-Tempered Clavier*

By

Chih-Tung Cheng

A dissertation submitted to the Graduate Faculty in Music in partial fulfillment of the requirements for the degree of Doctor of Musical Arts, The City University of New York

2019
Baroque Pianism: Perspectives on Playing Baroque Keyboard Music on the Piano, with Emphasis on Bach’s Fugues in the *Well-Tempered Clavier*

By

Chih-Tung Cheng

This manuscript has been read and accepted for the Graduate Faculty in Music in satisfaction of the dissertation requirement for the degree of Doctor of Musical Arts.

__________________________________________
Date

Thomas Sauer
Chair of Examining Committee

__________________________________________
Date

Norman Carey
Executive Officer

Supervisory Committee:

Janette Tilley
William Rothstein
Thomas Sauer
John Musto

THE CITY UNIVERSITY OF NEW YORK
Abstract

Baroque Pianism: Perspectives on Playing Baroque Keyboard Music on the Piano, with
Emphasis on Bach’s Fugues in the Well-Tempered Clavier

By

Chih-Tung Cheng

Advisor: Janette Tilley

In a famous quote, Schumann described the fugues in Bach's Well-tempered Clavier as pianists’ “daily bread.” This dissertation explains how these fugues can be pianists’ practical daily bread by encouraging them to explore a virtuosity of subtlety. I assert that the compositional complexity in these fugues increases pianistic challenges in both interpretive and technical aspects; these challenges can lead pianists to explore a multi-faced pianistic awareness in a way that they may not encounter when performing other styles of music.
Acknowledgement

I am very thankful that things I have experienced in my pianistic journey so far fell into place in this dissertation. The *Well-tempered Clavier* has been my beloved work always, and Prof. Lina Yeh was the one who encouraged me to initiate my Bach adventure when I was in college. The experience of learning the harpsichord with Prof. Arthur Haas expanded my imagination of pianistic expression. The injury I had many years ago taught me to explore pianistic awareness. Even my three failures of German exam, which made me study German grammar intensely, eventually powered my research on the topic of Bach’s works.

The fact of writing about how I have been practicing, however, did not make the writing process easier. I was surprised by the challenges of organizing and describing my ideas, and I would not be able to succeed without the generous and genuine support from my committee members. I want to express my deepest thanks to Prof. Janette Tilley and Prof. William Rothstein, the first two mentors of this dissertation, for not only helping me to see the clarity of my thoughts, but also making corrections on wordings that help me to improve my writing in English. In particular, Prof. Tilley, my advisor, helped me to develop a better understanding and awareness of the logic of explaining ideas in English; this awareness was of fundamental importance throughout the entire working process. Prof. Rothstein, my first reader, helped me to advance my thoughts especially from the theoretical aspect, not to mention that his seminars on musical theory had taught me the logic of musical reasoning. I am deeply grateful that my piano teacher, Prof. Thomas Sauer, was willing to be the second reader. His thoughtfulness about musical details helped me to further clarify my ideas and polish this dissertation. More importantly, he helped me to initiate my exploration of pianistic awareness, which made this
dissertation possible. I really appreciate that Prof. John Musto joined the committee as the third reader. His knowledge of piano mechanisms helped me to further observe the connection between the pianist and the piano.

I want to express my special thanks to Prof. Norman Carey for offering his insights about practicing and initially advising me to write a dissertation about playing Bach on the piano. I also want to express my sincere gratitude to Prof. Sylvia Kahan, Prof. Raymond Erickson, and Prof. Richard Kramer. Their seminars nourished my musicality; furthermore, they have been always willing to listen to my playing and offer insightful and genuine feedback. I am also very thankful for Jacqueline Martelle’s warm support throughout my years in the CUNY Graduate Center; she was like a guardian angel who made some tough moments somewhat easier.

It has been a long process until I presented this dissertation. I cannot thank my parents enough for being who they are and everything they have been doing for me.

Above all, Thanks be to God. *Soli Deo Gloria.*
## Contents

<table>
<thead>
<tr>
<th>Introduction</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Part I</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Chapter 1. The Issue of Instrumental Timbre and Touch</strong></td>
<td>6</td>
</tr>
<tr>
<td>1.1. Sonic Clarity and Pianistic Touch</td>
<td>6</td>
</tr>
<tr>
<td>1.2. Pianist’s Intuitive Touch</td>
<td>9</td>
</tr>
<tr>
<td>1.3. Circular Touch vs. Finger Touch: A Perspective from the Physics of Sound and Piano Mechanics</td>
<td>14</td>
</tr>
<tr>
<td><strong>Chapter 2: Weighted-Finger Touch</strong></td>
<td>18</td>
</tr>
<tr>
<td>2.1. Historical Perspective of Finger Touch</td>
<td>18</td>
</tr>
<tr>
<td>2.2. Weighted-Finger Touch in Relation to Finger Strength and Finger Awareness</td>
<td>23</td>
</tr>
<tr>
<td>2.3. Existing Approaches to Developing Finger Strength and Finger Awareness</td>
<td>26</td>
</tr>
<tr>
<td>2.4. Finger-Balance in Relation to Developing Finger Strength and Finger Awareness</td>
<td>33</td>
</tr>
<tr>
<td>2.4.1. Balanced Muscular Support</td>
<td>36</td>
</tr>
<tr>
<td>2.4.2. Natural Finger-Alignment</td>
<td>38</td>
</tr>
<tr>
<td>2.4.3. Balanced Finger-Key Contact</td>
<td>39</td>
</tr>
<tr>
<td>2.4.4. A Practice with the Awareness of Finger-Balance</td>
<td>40</td>
</tr>
<tr>
<td>2.5. Hand-Balance Based on Finger-Balance</td>
<td>43</td>
</tr>
<tr>
<td>2.6. Summary</td>
<td>47</td>
</tr>
<tr>
<td><strong>Part II</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Chapter 3: Critical Review of Existing Research</strong></td>
<td>49</td>
</tr>
<tr>
<td>3.1. Bringing out the Subject</td>
<td>50</td>
</tr>
<tr>
<td>3.2. Independence of Individual Voices</td>
<td>57</td>
</tr>
<tr>
<td>3.3. Graded Dynamics</td>
<td>64</td>
</tr>
<tr>
<td>3.4. Terraced Dynamics</td>
<td>70</td>
</tr>
<tr>
<td>3.5. Articulation, Agogics, and Rubato</td>
<td>74</td>
</tr>
</tbody>
</table>
Chapter 4. Complementary Relations between Notes 84
4.1. Note-Level Complementary Relations 86
4.2. The Four Perspectives of Note-Level Complementary Relations 89
4.3. Horizontally Complementary Relations between Notes 91
   4.3.1. Horizontally Complementary Intervals 92
   4.3.2. Horizontally Complementary Rhythms 94
4.4. Vertically Complementary Relations between Notes 99
   4.4.1. Vertically Complementary Intervals 101
   4.4.2. Vertically Complementary Rhythms 106

Chapter 5: Dynamic Shaping of Phrase Contour 116
5.1. Avoiding Romantic Influence on Dynamic Shaping of Phrase Contour 116
5.2. The Hierarchical Shaping of Terraced Dynamics and Graded Dynamics 123
   5.2.1. Five-Level Dynamic Shaping 125
      5.2.2. Variations in Five-Level Dynamic Shaping 131
         Dynamic Shaping at Levels 1 and 2 in relation to Rhythmic Counterpoint 131
         Adding a Sub-Level at Level 1 or Level 2 132
         Choosing Appropriate Size of Level-2 Terrace 133
         Lapses in Perception of Levels 3 and 4 135
   5.2.3. Large-Scale Dynamic Shaping at Level 5 142

Part III

Chapter 6. Synthesis of Interpretive Elements 145
6.1. Complementary Relation between Length and Dynamics of an Individual Tone 145
   6.1.1. Tone Cessation 149
   6.1.2. Tone Production 155
6.2. Musical Continuity and Finger Techniques Revisited 161
   6.2.1. The Subtleties of Articulation 162
   6.2.2. Finger Techniques Revisited 164
   6.2.3. Refinement of Weighted-Finger Touch 166
   6.2.4. Finger Legato 168
Chapter 7. Pianistic Choreography 172
  7.1. Existing Studies on Pianistic Choreography 172
  7.2. Topological Visualization of Weight Distribution 176
    7.2.1. Locations of Finger-Key Contacts and Balanced Condition of the Fingers and Hand 180
    7.2.2. Grouping Notes into Movements based on Interrelationships between Hand and Keyboard 185
  7.3. Weight Manipulations and Downward/Upward Movements 188
  7.4. A Synchronized Relation between Movement and Weight 193
  7.5. Coordination between the Hands 196

Conclusion 199

Bibliography 203
Examples and Figures

Chapter 1: The Issue of Instrumental Timbre and Touch

Figure 1.1. Illustration from Jean-Jacques Eigeldinger’s Chopin: Pianist and Teacher as Seen by His Pupils, 33. 10
Figure 1.2. Illustration from Tobias Matthay, The Act of Touch, 166. 12

Chapter 2: Weighted-Finger Touch

Figure 2.1. Illustrations from Sandor’s On Piano Playing: Motion, Sound and Expression, 23 36
Figure 2.2. Extensor digitorum communis (EDC) tendon 39
Figure 2.3. MCP joint and CMC joint of thumb, and MCP joint of finger 5 44

Chapter 3: Critical Review of Existing Research

Example 3.1. Fugue in C minor, WTC II, BWV 871, mm. 10–12, NBA edition (1980) 54
Example 3.2. Fugue in C minor, WTC I, BWV. 871. mm. 10–12, Czerny edition (1837) 55
Example 3.3. Fugue in C minor, WTC I, BWV. 871. mm. 10–12, Busoni edition (1894) 56
Example 3.4. Fugue in D minor, WTC II, BWV. 875, mm. 1–2, 3, 6 60
Example 3.5. Fugue in D minor, WTC II, BWV. 875, mm. 9–13 62
Example 3.6. St. Matthew Passion, final chorus, mm. 75–80 65
Example 3.7. Example from Kirkpatrick, 94 66
Example 3.8. Example from Troeger, Playing Bach on the Keyboard, 103 66
Example 3.9. Example from Keller, 67. Italian Concerto, 1st movement, mm. 75–78 76
Example 3.10. Example from Türk, 345 78
Example 3.11. Neumann quotes an example from Türk’s treatise, 95 81
Example 3.12. Example from Troeger, 163. Bach, Partita No. 6, BWV 830, mm. 1–2 82

Chapter 4: Complementary Relations between Notes

Example 4.1. Fugue in C minor, WTC II, BWV 871, m. 1 87
Example 4.2. Fugue in C minor, WTC II, BWV 871, m. 1 94
Figure 4.1. Illustration of metrical hierarchy, Lerdahl and Jackendoff, 16 96
Figure 4.2. Diagram of metrical pulses in relation to metrical positions and hierarchies of beat
Example 4.3. Fugue in C major, WTC II, BWV 870, mm. 7–8 and 53–55
Example 4.4. Fugue in C major, WTC II, BWV 870, mm. 33–36
Example 4.5. Fugue in G minor, WTC II, BWV 885, m.8
Example 4.6. Fugue in B-flat major, WTC II, BWV 890, mm. 7–9
Example 4.7. Fugue in D major, WTC II, BWV 874, m. 3 and m. 6
Example 4.8. Illustration from Badura-Skoda, 30.
Example 4.9. Fugue in B-flat major, WTC II, BWV 890, mm. 15–20
Example 4.10. Interaction between rhythmic configurations and harmonic nuance
Example 4.11. Fugue in C minor, WTC II, BWV 871, mm. 1–2 and m. 4
Example 4.12. Fugue in C minor, WTC II, BWV 871, m. 20
Example 4.13. Fugue in C minor, WTC II, BWV 871, m. 20.
Example 4.14. Fugue in C minor, WTC II, BWV 871, mm. 20–21
Example 4.15. Fugue in D minor, WTC II, BWV 875, mm. 26–27

Chapter 5: Dynamic Shaping of Phrase Contour
Example 5.1. Chopin, Ballade no.4, op. 52, mm.25–28
Example 5.2. Czerny’s edition of C-minor fugue, WTC I, BWV 847, mm.22–23
Example 5.3. Beethoven, 6 Bagatelles, op.126, no.1, mm.1–9
Example 5.4. Busoni’s edition of C-sharp-major fugue, WTC. I, BWV 848, mm.12–19
Example 5.5. Schumann, Davidsbündlertänze, op.6, mm. 1–8.
Example 5.6. Busoni’s edition of E-major fugue, WTC I, BWV 854, mm. 56–58
Example 5.7. Busoni’s edition of D-minor fugue, WTC I, BWV 851, mm.25–30
Example 5.8. Fugue in C-sharp major, WTC I, BWV 848, mm. 12–19.
Example 5.9. Fugue in C major, WTC II, BWV 870, mm. 1–7
Example 5.10. Fugue in C major, WTC II, BWV 870, m. 2 and m. 6
Example 5.11. Fugue in C-sharp major, WTC I, BWV 848, mm. 16–18
Example 5.12. Fugue in C major, WTC II, BWV 870, mm. 33–38
Example 5.13. Fugue in F minor, WTC II, BWV 881.
Figure 5.1. Large-scale dynamic shaping at level 5
Chapter 6: Synthesis of Interpretive Elements

Figure 6.1. Sol Babitz illustrates the two performances (versions B and C) of four equal eighth notes.
Example 6.1. Fugue in C major, WTC II, BWV 870, mm. 33–36
Figure 6.2. Three-stage manipulation of tone cessation
Figure 6.3. Different timings of initiating sound decay and silence
Example 6.2. Fugue in G minor, WTC II, BWV 885, mm. 1–2
Example 6.3. Fugue in C minor, WTC II, BWV 871, m.8.
Example 6.4. Fugue in C sharp minor, WTC II, BWV 873, mm. 1–2
Figure 6.4. Physical movement is synchronized with metrical perception
Figure 6.5. Physical movement at a faster speed is synchronized with metrical perception
Figure 6.6. Physical movement at a slower speed is in synchronized with metrical perception
Figure 6.7. Physical movement is desynchronized with metrical perception
Example 6.5. Fugue in C minor, WTC II, BWV. 871, m. 5
Example 6.6. Fugue in C minor, WTC II, BWV. 871, m. 5
Example 6.7. Fugue in G-sharp minor, WTC II, BWV 887, mm.140–143
Example 6.8. Fugue in G minor, WTC II, BWV 885, m.8
Example 6.9. Fugue in D minor, WTC II, BWV 875, final measure

Chapter 7: Pianistic Choreography

Figure 7.1. Example 58e from 20 Lessons in Keyboard Choreography, 90
Figure 7.2. Example 62a from 20 Lessons in Keyboard Choreography, 102
Figure 7.3. Chopin’s Fundamental Pattern
Figure 7.4. Example 5.2. from Natural Fingering, 82. Excerpt from Beethoven, Sonata, Op, 81a
Figure 7.5. Fugue in C minor, WTC II, BWV 871, m. 14.
A topological visualization of the successively depressed finger-key contacts
Figure 7.6. Fugue in C minor, WTC II, BWV 871, m. 14. A spatial network
Figure 7.7. Fugue in C minor, WTC II, BWV 871, m. 14
Figure 7.7A Choreography in favor of minimum in-and-out movement
Figure 7.7B Choreography in favor of finger-balance
Figure 7.8. Illustration from Fink’s study, P. 20
Figure 7.9. Fugue in C minor, WTC II, BWV 871, m. 21
Figure 7.9A Choreography that engages unnatural hand-wrist alignment
Figure 7.9B  Choreography that engages natural hand-wrist alignment 183
Figure 7.9C  Choreography of C-E♭-F-G-A♭ 184
Figure 7.9C  Shifting the finger-key contacts inward while sustaining the keys 184
Figure 7.10.  Fugue in C minor, *WTC* II, BWV 871, m. 14. Organizing notes into movements 185
Figure 7.11.  Choreography based on groupings of figures 186
Figure 7.12.  Fugue in A minor, *WTC* II, BWV 885, m. 4 187
Figure 7.13.  Fugue in D-sharp minor, *WTC* II, BWV 877, m. 1–3 189
Figure 7.14.  Fugue in C minor, *WTC* II, BWV 871, m. 14, soprano 189
Figure 7.15.  Vertical relations between the hand and the keys 191
Introduction

The performance practice of baroque keyboard music, and Bach’s keyboard music in particular, has been intensely studied in modern research.¹ In these studies, the authors commonly organize the discussion by categories of performing issues—such as choice of keyboard instruments, dynamics, tempo, rhythm, articulation, and ornamentation—and approach the issues through realizing the historical notation and performing style based on seventeenth- and eighteenth-century documents. This history-oriented focus has dominated the scholarly discussion of baroque keyboard performance practice since the beginning of the early-music revival in the late nineteenth century. It initiated a mania for historical authenticity in the first half of the twentieth century, which advocated playing the piano in the manner of a harpsichord that resulted in rigid and mechanical interpretation. This mania for historical authenticity subsided after the second half of the twentieth century; nevertheless, the history-oriented focus inevitably remains dominant in the scholarly studies of historical performance practice.

Many important contributions have been made in terms of realizing the historical notation and performing style of baroque music. Nevertheless, from the pianistic perspective, the history-oriented focus does not diminish the role of the piano in the studies of baroque music performance; for example, the issues of dynamic nuance and the use of pedal are frequently

¹ The substantial studies of Bach’s keyboard music include:
discussed with a piano in mind. Many writers draw a connection between the piano performance
of Bach’s music and historical accounts about style and techniques, in particular citing the
pedagogical editions of Bach’s keyboard music from the nineteenth century. A number of them
discuss the pianistic interpretation of selected pieces by Bach; for instance, Brian James Dykstra
(1969) discusses the pianistic interpretation—the tempo, articulation and phrasing, and
dynamics—of each of the preludes and fugues in the *Well-Tempered Clavier* (hereafter *WTC*)
Book I based on historical editions and modern scholars’ research.² Glen Blaine Carruthers
(1986) discusses the nineteenth-century perception of Bach’s music, instructive editions, and
piano arrangements and transcriptions of Bach’s works.³ Susan Elizabeth Grove (1992) writes
about the performance history of performing Bach’s music on the piano.⁴ Theodore Pierce
Dickens (2001) compares techniques on the piano, harpsichord, and organ.⁵ Chiara Bertoglio
(2012) discusses the instructive editions of the *WTC*, and explores the technical issue of piano
touch.⁶ Based on Mugellini’s edition of Bach’s *WTC*, she discusses the difference between the
old school (finger touch) and new school (rotary touch) in performing Bach’s music on the piano.

There are many studies discussing Bach’s keyboard music from the pianistic perspective.
However, all of these studies approach performing issues and interpretation in reference to
historical documents, and historical documents are not informative of how piano technique and
expression, which are profoundly rooted in the romantic tradition, ought to be adjusted to the
performance of baroque keyboard music. More specifically, the 48 preludes and fugues of

---
⁵ Theodore Pierce Dickens, *A Brief Overview of Keyboard Technique as Applied to Playing the Harpsichord, the Piano, and the Organ* (PhD diss., The University of Alabama, 2001).
Bach’s *WTC* are considered the crowning achievement of baroque keyboard music, and the fugues in particular were praised by Schumann as pianists’ “daily bread.” There is abundant research devoted to the contrapuntal method and historical style of these fugues, but there is no sufficient discussion of the pianistic issues of performing these fugues other than the generalized guidelines described in historical accounts, such as “bring out the subjects” and “illuminate the independence of individual voices.” When it comes to issues of performing Bach’s fugues on the piano, the history-oriented focus fails to address how the compositional complexity and subtlety of fugues demand subtle observation, interpretation, and execution in a way that pianists do not often otherwise encounter. In other words, there are many considerations with which the pianist ought to be concerned in addition to the issues addressed in existing studies. These considerations are of fundamental importance prior to any historical understanding coming into play, for they transform the complexity of fugue compositions and any understanding about historical style into musical beauty and expression.

Under the title of *Baroque Pianism*, this study will discuss the technical issues of performing baroque music on the piano, and the interpretive issues specifically related to performing Bach’s fugues from the *WTC*. The study consists of three parts. Part one is devoted to the issue of pianistic touch in playing baroque music, an issue that is considered in this study as the foundation of performing baroque music prior to any interpretive ideas coming into play. I propose the “weighted-finger touch” as a basic piano technique appropriate to playing baroque music. The discussion intends to complement modern research in terms of how piano technique ought to be adjusted to baroque keyboard music.

---

Part two is devoted to the interpretive issues specifically related to playing Bach’s fugues on the piano. Chapter 3 initially takes a critical look at modern research on the two dominant principles for fugue playing— bringing out the subject and independence of individual voices—as well as the interpretive elements that are commonly associated with baroque music: graded dynamics, terraced dynamics, articulation, agogic accent, and rubato. In order to address the complexity of fugal content, chapters 4 and 5 propose two ideas for playing fugues on the piano—complementary relations between notes, and the hierarchy of dynamic organization. The idea of note-level complementary relations focuses on the issues of creating relatively nuanced difference between notes and figures—horizontally and vertically, as well as harmonically and rhythmically—in order to create relations between them to reinforce the effect of counterpoint. This idea engages with a local-level observation of the complexity and subtlety of fugal content. Finally, through the hierarchical organization of dynamics, the performer manifests various hierarchies of compositional content—note, figure, group of figures, phrase, and group of phrases—by means of multiple levels of dynamic organizations that involve both graded dynamics and terraced dynamics.

Part three explores further technical issues in relation to the interpretive complexity in fugal performance. Chapter 6 discusses the synthesis of interpretive elements in relation to the finger techniques of finger awareness, finger strength, and finger legato. Instead of understanding the nuance of tones from the different perspectives of the interpretive elements—dynamics, articulation, agogics, and tempo rubato—the synthesis of interpretive elements points out that all these interpretive elements can be integrated through the finger techniques that manipulate the key-speed and timing of the tone production and tone cessation. This perspective complements the common approach that discusses each element in isolation and inevitably
neglects the nuance created by the interaction between different elements. Chapter 7 discusses the further technique of pianistic choreography. The contrapuntal texture in the fugues from the \textit{WTC} often results in rather awkward coordination of fingers and hands; the technique of pianistic choreography aims to develop efficiency and continuity of weight distribution in performance.

Many issues discussed in this study are relevant in performing piano music of any style. Nevertheless, the compositional complexity of the fugues in Bach’s \textit{WTC} provides a particular context that allows the complexity in interpretation and execution to stand out in a way that surpasses any other music. By exploring the issues of fugal complexity, the pianistic awareness of all aspects may be developed and will benefit the process of learning piano music of other styles. In this respect, the fugues of the \textit{WTC} are truly the “pianist’s daily bread.”
Chapter 1. The Issue of Instrumental Timbre and Touch

1.1. Sonic Clarity and Pianistic Touch

It seems that the old adage “play the piano as if it were a harpsichord” has receded into the background of early music discussions along with a slavish devotion to historical “authenticity”. Nevertheless, while it is inappropriate to force the piano to sound like a harpsichord, it is equally inappropriate to ignore totally how the sound quality of early keyboard instruments characterized baroque keyboard music.

From an informed perspective of performing baroque music on the piano, it is necessary to understand that, with the exception of organ music, most baroque keyboard music was originally played on the harpsichord or clavichord, instruments whose timbre is characterized by sonic clarity and directness. The sonic clarity of the harpsichord or clavichord is a necessary timbral correlation to compositional subtleties of baroque keyboard music, such as contrapuntal texture, melodic and rhythmic contour, and ornamentation. Therefore, although a strict imitation of the harpsichord sound on the piano results in an unmusical effect, an important pianistic issue remains in terms of how to produce harpsichord-inspired sonic clarity that conveys the intrinsic characteristics of baroque keyboard music. This understanding leads to the issue of pianistic touch in baroque music performance prior to considering any stylistic issues such as dynamics, articulation, or ornamentation.

---

8 Robert Greene, *Mastery* (London, Profile, 2012), 117–118. Greene wrote that Alberto Guerrero (1886–1959), Glenn Gould’s teacher, “revealed his idea that it was often best to imagine you were playing a piano piece by Bach as if it were on a harpsichord.” Greene also reports that Guerrero would “read reviews of Gould’s performances in which the critic would note how he seemed to play Bach as if it were on harpsichord.”
Unlike the stylistic issues that have received much scholarly attention, the issue of pianistic touch in relation to sonic clarity has not received much discussion. In modern research, the issue of touch is commonly discussed under categories of different keyboard instruments and in relation to the instrumental properties of timbre and mechanism. This approach inevitably neglects how to create harpsichord-inspired sonic clarity on the piano by means of touch. The overall neglect of touch is further reinforced by the fact that baroque keyboard compositions were often not intended for a specific keyboard instrument. Thus, modern studies that adopt the history-oriented focus tend to pay attention to the stylistic issues that can be applied to different keyboard instruments, instead of the technical issues keyboardists might encounter when playing the same pieces on different keyboard instruments.

There are a few studies concerning the character of pianistic sound in performing baroque music; however, none of them look into the issue of capturing sonic clarity by means of touch. Badura-Skoda’s 1990 book on Bach’s keyboard music includes a section entitled “Problems of Touch in Bach.” He first of all criticizes the idea of playing the piano like a harpsichord. He points out:

There is widespread misunderstanding about playing Bach on the modern piano, for many pianists attempt to “play the harpsichord”, or at least to imitate the sound of the latter. (This is understandable, for every musician is aware that the rounded romantic piano sound produced by a plentiful use of the pedal was unknown to Bach.) However, this often leads to musically unsatisfactory and indeed quite ugly results.9

He then discusses the pianistic approach appropriate to performing baroque music:

The rediscovery of authentic instruments and performance styles has taught us that eighteenth-century performances were brighter, more lively, and clearer than modern ones, and also a great deal quieter. If we are going to play instruments that are louder than authentic ones, then this is something we should not exaggerate. It is perfectly possible to play quietly and yet clearly and brightly on modern instruments. In so doing it is important that this softer tone should be full of character and energy. At any rate, an

---

“unstable” and blurred tone with an ill-defined beginning should be ruled out. Clarity is primarily achieved by finger-articulation and appropriate phrasing.\(^{10}\) Badura-Skoda’s account makes an important point that a clear and bright piano sound is more appropriate for performing baroque keyboard music than the “blurred tone with ill-defined beginning.” Nevertheless, he associates the issue of producing clear and bright piano sound with the interpretive issues of finger articulation and phrasing without considering the more fundamental issue of the manner of touch.

Richard Troeger (2000) also criticizes “the romantic, wet sound,” and “a deliberately machinelike evenness, shorn of inflections of time or small-scale dynamics” in performing baroque music on the piano.\(^{11}\) He further points out that “the clarity of the harpsichord’s sustained sound is more difficult to emulate on the piano than the bright attack.”\(^{12}\) Troeger’s point concisely describes a fundamental issue in performing baroque music on the piano. Nevertheless, he does not dig further into the pianistic issue of bright attack to illuminate the intention of emulating the clarity of harpsichord sound on the piano.

Both studies express disfavor with the mechanical, dry sound associated with pedantic imitation of the harpsichord, as well as the blurred, wet sound associated with romantic style. However, their criticism does not lead to a further exploration of the touch that would enable the pianist to produce an appropriately clear sound quality. In responding to the lack of discussion in this matter, this study suggests that it is, first of all, necessary to differentiate between the touch suitable for performing baroque music and that common to pianists trained in the romantic tradition.

---

\(^{10}\) Badura-Skoda, 184.  
\(^{12}\) Ibid., 41
Pianistic expression is deeply rooted in nineteenth-century tradition, and the “romantic and wet sound,” which is considered inappropriate for performing baroque keyboard music, is predominately the product of a romantic notion of *singing tone*. This notion of singing tone has been deeply integrated into pianistic intuition since the nineteenth century and has had great impact on the manner of touch. In a sense, the intention of achieving sonic clarity in performing baroque music is fundamentally against the pianist’s intuition of making a fundamentally percussive instrument sing. In order to differentiate between the touch suitable for performing baroque music and that of pianistic intuition, I will discuss how the notion of singing tone has profoundly influenced touch in general.

1.2. Pianist’s Intuitive Touch

The vision of making percussive keyboard instruments sing was expressed as early as Bach himself. In his introduction to the Inventions (1723) he urges keyboard players to develop a “singing style” in playing, a style that is commonly interpreted in modern research as legato playing. By the nineteenth century, the notion of *singing tone* emerges. Unlike the singing style that refers to legato playing, the romantic notion of singing tone is associated in particular with the manner of pianistic touch.

The touch inspired by the idea of a singing tone demands the movement of wrist and arm to produce a less direct key-depression than a touch that only involves finger movement without movement of wrist and arm. Accounts of singing tone may be found in numerous piano instructions since the nineteenth century. Jean-Jacques Eigeldinger, in his book *Chopin: Pianist*

---

13 J.S. Bach, Inventions and Sinfonias, BWV 772–801: title page (Band I, no. 153)  
“Upright Instruction wherein the lovers of the clavier, and especially those desirous of learning, are shown a clear way not alone (1) to learn to play clearly in two voices but also, after further progress, (2) to deal correctly and well with three obbligato parts; furthermore, at the same time not alone to have good inventiones [ideas] but to develop the same well and, above all, to arrive at a singing style in playing and at the same time to acquire a strong foretaste of composition.”
and Teacher as Seen by His Pupils (1986), quotes Chopin’s five-note exercise (shown in figure 1.1) from Kleczynski’s book The Interpretation of the Works of Frederic Chopin (1880).14 According to Kleczynski, Chopin advises pupils to play this exercise in the manner of “legato staccato” or “heavy staccato.”

Figure 1.1: Illustration from Jean-Jacques Eigeldinger’s Chopin: Pianist and Teacher as Seen by His Pupils, 33.

Neuhaus in his Art of Piano Playing (1973) makes a further annotation about Chopin’s five-note exercise:

Chopin (1810–49) made his pupil play these five notes in turn not legato (which could have caused a certain tenseness or stiffness with an inexperienced beginner) but as a light portamento, using the wrist, so as to feel in every point complete freedom and flexibility. Thanks to this simple exercise the beginner immediately makes friends with the instrument….15

Neuhaus’s annotation doesn’t mention “singing tone”; nevertheless the description of “light portamento” and “using the wrist” indicates this manner of touch in relation to producing a singing tone.

Adolf Kullak (1823–62), in his Aesthetics of Pianoforte Playing (1860), uses the term “singing touch” to describe the touch that produces a singing tone. He differentiates the “falling finger” and “pressing finger,” and explains that “pressure by a pressing finger” results in singing tone. “The falling finger has a dashing, striking effect; a pressing finger has, firstly, in its feeling a more intimate relation to the key, and secondly, the predominance of pressure takes something

of its hard, rough peculiarity from the stroke of the hammer.”\textsuperscript{16} He further points out that in order to execute singing touch by pressing fingers, “one should press the key as one grasps the hand of a friend, with warmth, with feeling.”\textsuperscript{17} Kullak’s account about pressing fingers again describes indirect movement as producing a singing tone.

Adolf Kullak’s idea of executing singing touch through “pressure by a pressing finger” was later incorporated in so-called weight-technique. Ludwig Deppe (1828–1890) is considered one of the pioneers of the weight-technique. Elisabeth Caland’s book, \textit{Artistic Piano Playing as taught by Ludwig Deppe} (1903), demonstrates Deppe’s teaching methods. According to Caland, the techniques of finger-fall, controlled free-fall of hand and arm, and the curvilinear movement are of fundamental importance in Deppe’s teaching. Finger-fall represents a preliminary exercise of lifting up a finger and letting it fall of its own weight.\textsuperscript{18} Controlled free-fall describes the direct and unwavering downward movement that allows hand and arm to fall of their own weight upon the keys.\textsuperscript{19} Curvilinear movement describes the movement that can be applied both in producing a single tone as well as uniting group of tones. Regarding the curvilinear movement, Caland makes the following explanation:

When Deppe uttered the axiom, “a flat pose of the hand \textit{sounds} flat”—i.e., lifeless or wooden—he meant thereby to emphasize the importance of making every movement a curved one, for it is only by an awkward and angular movement that one can lay the hand "flat" upon the keys, and the inevitable consequence thereof is a hard, unmusical tone. But the placing of the hand, with wrist well raised, upon the keys, is the beginning of a curvilinear movement; this is continued in the pliant, downward-and-outward motion with which the wrist returns the hand to the normal position; and it finds further expression as the wrist rises again, with an equally flexible, yet controlled, movement, and thus prepares the hand for a new descending curve.\textsuperscript{20}

\textsuperscript{17} Ibid., 150.
\textsuperscript{19} Ibid., 40.
\textsuperscript{20} Caland and Deppe, 41–42.
The first half of the account describes curvilinear movement as a fundamental technique for producing musical tone as well as musical line; the second half explains the manner of curvilinear movement. The manner of circular movement—raising the wrist to initiate the movement and applying a downward-and-outward motion to bring the wrist back to the normal position—is also described in Tobias Matthay’s *Act of Touch* (1903) under the term “clinging attitude.” He explains “the clinging attitude makes for beauty of the tone, the singing-quality, with its carrying character; because the whole limb is here in its most elastic condition.” He uses the illustration below to show the manner of “clinging attitude.” According to his explanation, the arrows $a$ and $b$ in the illustration indicate the raising wrist, and the arrows $c$ and $cc$ indicate the downward-and-outward motion of the wrist and arm.

![Illustration of grasping and releasing energy](image)

Arrows $a$ and $b$ denote the direction of the energy resulting from the finger and hand clinging to the key, and how it manifests itself as an upward and forward-drawing stress at the knuckle and wrist. Arrows $c$ and $cc$ indicate the direction in which the energy tends, that is set free in this case at the elbow and wrist, and derived from arm-weight through its release. And the arrows $c$ and $cc$ indicate the outward, or abduction, motion of arm away from the body that creates the circular movement of the wrist and arm.

Breithaupt, in his treatise *School of Weight Touch* (1907), also stresses the importance of circular movement in tone production. He writes that “it is important that every motion or action preceding, or producing, the touch should be prepared and resolved (after the attack).… Such preparation and resolution are best effected by a light (gentle) and soft undulating or tilting

---


22 Ibid.

23 Abduction and adduction refer to motions that move a structure away from or towards the centre of the body.
motion of the wrist, or the loosening action produced by rolling the fore-arm.”

He defines tilting motion as a circular motion. Moreover, in György Sandor’s treatise (1981), although he advises to “avoid large circular ‘relaxed’ motions of the whole arm on each note,” he values the cushioning movement of the wrist in producing a singing tone. He points out that “singing tone is produced when the cushioning activities of the joints slow down the descending arm speed, thus making it possible for only a portion of the speed and weight to be transferred to the keys.”

The cushioning movement indicates the “responsive springy action in the wrist and the other joints,” which includes “a slight rebound of the hand and fingers, and, notably, of the wrist.”

From Chopin’s advice on the five-note exercise, to Adolf Kullak’s singing touch, to the modern piano teachings of Deppe, Matthay, Breithaupt, and Sandor, the manner of touch is repeatedly described as consisting of preparatory and finishing movements from wrist and arm in order to produce a singing and ringing tone. Finger movement alone is generally considered insufficient to make the piano sing. This understanding not only dominates the approach to pianisic touch, but also the legato technique—a technique that also concerns the ability of the piano to sing—in treatises on piano playing. For example, Sandor asserts that “there is no way to play a real legato by fingers alone…. A real legato, a real grouping of notes, can be accomplished only by a unifying motion of the arm (that is, of the forearm and upper arm).”

Similarly, in his treatise Mastering Piano Technique (1992), Fink describes the circular movement of the wrist and arm from the anatomical perspective as “the lateral wrist and

---

25 Ibid., 41. 
27 Ibid., 179, 42. 
28 Sandor, 67.
shoulder circling” and discusses the movement in relation to legato playing.\textsuperscript{29} He explains that “the lateral wrist and shoulder circling allow for a greater subtlety of movement of the playing apparatus, which in turn frees movement of the arms along the keyboard, smooths connections, and eventually enables you to support various finger patterns that can be organized within the cycles.”\textsuperscript{30}

Seen in the context of the performance tradition rooted in romantic expression, the circular movement generates a singing character that is profoundly integrated into the pianistic mind and technique. As a consequence, treatises on piano playing emphasize the circular movement in touch, which hereafter will be termed \textit{circular touch}. The circular touch, however, represents a fundamental issue in performing baroque music, because it produces the ringing quality that does not convey the sonic clarity preferred for the performance of baroque music. Section 1.3. will compare the different timbres produced by circular touch and the touch that mainly involves finger movement without circular movement from the wrist and arm: so-called finger touch. The comparison, based on scientific evidence, will confirm that circular touch is indeed less preferable for playing baroque music than finger touch.

\textbf{1.3. Circular Touch vs. Finger Touch: A Perspective from the Physics of Sound and Piano Mechanics}

Based on evidence from studies on the physics of sound and piano mechanics, I will explain how a specific property of sound waves contributes to the perception of sonic clarity. Importantly, this specific property is produced by finger touch more than circular touch.

My explanation concerns the relationship between the manners of touch and the waveforms of their resulting sounds. However, studies of keyboard acoustics and waveforms

\textsuperscript{30} Ibid.
commonly focus on how the waveforms change according to difference of playing force or duration of the attack. The term *touch* in these studies is used only to indicate the dynamics or articulation, *i.e.* the hard/soft or legato/staccato touch; the concern about the manners of touch—finger touch or circular touch—in relation to waveform is absent in scientific studies. Nevertheless, by establishing the relationship between touch and force, experiments on force and waveform can be used to explain the relationship between touch and waveform. Since there are no scientific accounts of the relationship between manners of touch and force, I will first establish it by explaining the relationship between touch and key speed, and then between key speed and force.

The relationship between touch and key speed is explained in Matthay’s *The Act of Touch* (1903). He uses the term “muscular touch” to describe the finger touch that is initiated by the muscular exertion of finger and hand, and the term “weight-touch” to describe the circular touch that is initiated by arm weight. He explains that muscular touch produces more sudden key descent and more brilliant tone quality, while the weight-touch produces a gradual increase of speed during key descent, and therefore tends to make a more rounded and singing tone-quality. Matthay’s account suggests that given the same muscular exertion, the manner of finger touch (muscular touch) would produce faster key speed than circular touch.

The relationship between key speed and force is explained in Otto Ortmann’s *The Physical Basis of Piano Touch and Tone* (1925). He points out that “any difference in degree of force or its mode of application must show itself in the speed of key depression.” He then applies the equation $F = M \cdot A$ to show that since $M$ (mass of the key or the moving mechanism

---

involved in action) remains constant in key execution, F (force, or volume) is in direct proportion to A (acceleration, or key speed).

Based on Matthay and Ortmann’s studies, it can be concluded that given any amount of muscular exertion, the manner of finger touch results in faster speed of hammer and greater dynamic impact on the string in comparison to the manner of circular touch. Now that we have established the relationship between touch, key speed, and force, it is possible to correlate touch, hammer speed, and the property of a resultant sound wave.

With respect to the physics of sound, the perception of a bright sound stems from the relative dominance of higher-frequency partials. For example, R.-D. Weyer (1976) analyzes the waveform of the piano and harpsichord in his study “Time-Frequency-Structures in the Attack Transients of Piano and Harpsichord Sounds—I.” He compares the sound waves of selected tones produced by a grand piano and a Flemish harpsichord; the experiment shows that the greater sensation of brightness in the harpsichord sound in comparison to the grand piano sound is a result of the greater prevalence of higher frequencies of upper partials in the harpsichord sound.33

Askenfelt and Jansson’s study (1990) provides further understandings of the high-frequency partials in relation to the nonlinear-stiffness characteristic of the piano hammer.34 They make the following observation:

The hammer “feels” soft to the string when striking at a low velocity (piano), but “transforms” to a much stiffer piece of felt when striking at a high velocity (forte). This increase in effective stiffness sharpens the initial pulse created at hammer contact, and the high-frequency part of the spectrum is enhanced at loud dynamics.35

---

35 Ibid., 59.
They further point out that when a hammer becomes harder as a consequence of high velocity, the duration of hammer-string contact (the contact time between hammer and string) consequently becomes shorter, and “shorter contact duration increases the amount of high-frequency partials in the spectrum.”

The above studies point out that, firstly, high-frequency partials in the waveform result in a sensation of sonic clarity and brightness. Secondly, given the same muscular exertion, finger touch could generate more of these high-frequency partials than circular touch, because it creates greater hammer speed, which increases the stiffness of hammer as it contacts the string, and in turn shortens the duration of hammer-string contact. As a conclusion, finger touch is indeed more capable of producing sonic clarity than circular touch, and, as a result, is more appropriate for performing baroque music.

---

36 Askenfelt and Jansson, 46.
Chapter 2: Weighted-Finger Touch

Rooted in the dynamic expression of romantic music, piano treatises from the nineteenth century onward focus on the techniques that involve circular movement from the wrist and arm rather than the finger techniques such as finger touch and finger legato. The lack of focus on the technical issues of finger-touch represents a fundamental issue when speaking of the touch appropriate for performing baroque keyboard music. Chapter 2 thus focuses on the technical issues of finger touch under the criterion of capturing the desired sonic clarity in performing baroque music.

In order to explore the finger-touch appropriate for performing baroque music, chapter 2 first looks into the development of finger-touch technique in the course of history, and then proposes the appropriate technique—weighted-finger touch—that aims to capture the desired sonic clarity and engage the dynamic capability available on the piano.

2.1. Historical Perspective of Finger Touch

The technique of finger-touch can be traced back to the harpsichord. Historical treatises of harpsichord performance describe the technique of using only the strength of the fingers to attack the keys, keeping the hand and arm weightless. For example, Rameau, in his treatise *Code de musique pratique* (1760), described that finger touch as one that should be executed without actively moving the arm.

Imagine your fingers to be set into your hand like elastic metal springs fastened into a small iron bar…. the hand must remain, as it were lifeless, but the wrist must stay flexible, so that the fingers, acting solely from their own impulse, may develop strength, easiness, and regularity. With this supposition, place the five fingers on five subsequent keys, the top joint of the thumb very much bent in order to lie on and touch the key; the other fingers must fall down straight and only with their own weight… Whilst the hand
remains in its position…elbows must be completely relaxed…they follow the movements of the hands, which, in their turn, follow the movements of the fingers.37

Rameau also advises keyboardists to choose the proper keyboard instrument; the advice shows a focus on developing finger strength.

First you need a soft (or softly quilled) instrument, so that its resistance does not force the fingers (which are still weak in their movements) to derive their strength from the whole hand. As the freedom of movement increases, so does the acquired strength, and correspondingly one can increase the resistance of the keys by using harder quills to pluck the strings.38

In modern treatises on harpsichord performance, Eta Harich-Schneider (1973) points out “a pianist undergoes a special training of arm, shoulder and back, to supplement the fingers with the necessary weight. Nothing could be more fatal on the harpsichord… A harpsichordist is never supposed to use his whole muscular strength in playing.”39 Troeger, in his harpsichord treatise (1987), also points out that “the basic touch of the harpsichord consists in playing from the fingers alone, with relaxed wrists and the arms lightly supporting themselves…Weight is occasionally necessary but should be employed by choice; the basic touch should be free of weight.”40

The manner of harpsichord touch shows its influence on piano technique in early piano treatises. Hummel, in his treatise (1827), states: “in general, to attain the necessary facility, steadiness, and certainty in playing, we must avoid every violent movement of the elbows and hands; and the muscles must not be exerted, beyond what a free and quiet position of the hand

---

39 Eta Harich-Schneider, *The harpsichord, an introduction to technique style and the historical sources* (Kassel: Barenreiter-Verlag, 1973), 11.
requires.”41 This manner of touch characterizes Hummel’s performing style. As Czerny recorded (1824), “never before had I heard such novel and dazzling difficulties, such cleanliness and elegance in performance, nor such intimate and tender expression, nor even so much good taste in improvisation.”42 Czerny himself, in his treatise Letters to a Young Lady (1840), also advises that “the percussion on the keys is effected solely by the fingers, which, without any actual blow, must press each key firmly down; and in doing this, neither the hand nor the arm must be allowed to make any unnecessary movements.”43

Against the background of virtuosic techniques that require circular movements from the wrist and arm, modern piano treatises show diverse perspectives on the manner of finger touch. On the one hand, finger touch is sometimes considered an “old school” and insufficient technique in some treatises. As Sandor describes, “the old school of piano playing emphasized ‘finger’ strength. While this kind of technique sufficed for the harpsichord, clavichord, and organ, it became completely unsatisfactory for the modern concert grand piano.”44 On the other hand, the understanding and technique of finger-touch also evolved accordingly with the development of piano techniques. An important development was to engage the weight technique in finger-touch, which can be seen in Ludwig Deppe’s teaching (1903). Deppe advises, “do not strike; let the finger fall of its own weight.”45 Although this advice seems to resemble Rameau’s idea of letting fingers fall with their own weight, Deppe adds further description that explains the manner of finger touch in the context of weight technique:

43 Carl Czerny, Letters to a young lady, on the art of playing the pianoforte (New York: Pond & Co., 1851), 5.
44 Sandor, 6.
45 Caland and Deppe, 29.
The hand must be light as a feather…. But how shall it be rendered light? The hand will be light only when it is carried, instead of carrying itself, over the keyboard. The lightness and freedom thus imparted to the hand is effected through the agency of the shoulder and arm muscles, which support and carry the hand.46

Deppe explains the lightness of the hand in relation to the support from the shoulder, and within this larger musculoskeletal framework the finger is advised to fall of its own weight. While Rameau’s viewpoint confines finger touch to only finger movement and finger strength, Deppe’s viewpoint relates finger touch to a larger context of a weight-system, which provides an important foundation for further development and extension of the technique of finger touch.

The issue might arise here that Deppe’s idea of letting the shoulder carry the hand and fingers seems to contradict Rameau’s idea of letting the elbow follow the fingers. The conflict, however, is an illusion. Tobias Matthay’s treatise *Act of Touch* (1903) clarifies the seeming illusion and advances the understanding of finger touch. Matthay uses the analogy “act of leverage” to describe the act of touch.47 He points out that “touch, in a word, resolves itself ultimately into an act of levering more or less weight upon the key during descent.”48 He explains two different manifestations of force: “force derived from the activities that bear upwards by recoil against the wrist, and the arm-inactivities that produce a down-stress.”49 In other words, the act of touch is understood as a leverage between the upward force derived from the fingers against gravity and the downward force derived from the arm weight; different manners of touch are produced by manipulating the balance between the upward and downward force in the act of leverage. According to the two-direction force explained by Matthay, Rameau and Deppe’s viewpoints both describe the act of touch: the shoulder ought to carry the hand and

46 Caland and Deppe. 20.
48 Ibid., 103.
49 Ibid., 104.
fingers to balance the upward force; at the same time, the fingers ought to lead the arm to balance the downward force.

Based on this understanding of the act of leverage, Matthay explains three different forms of touch: “a movement of some portion of the super-imposed limb is however bound to ensue…. This movement may take the form either of finger-movement, hand-movement, or arm-movement; these we term respectively finger-touch, hand-touch (so-called ‘wrist-action’) and arm-touch.”50 Matthay writes that “finger-touch results, when it is the finger-activity that slightly outbalances the other two elements; i.e., when the finger-activity is slightly greater than the activity put forward by the hand, and is also in excess of any weight set free by lapse on the part of the arm-supporting muscles.”51

Matthay’s explanation extends the application of finger-touch. It defines finger touch as one in which the movement of the fingers predominates, rather than one in which finger weight is the exclusive means of key depression. In other words, finger touch can combine finger movement with finger-weight, arm-weight, or as much weight as the fingers can be trained to bear. The present study takes Matthay’s viewpoint as a starting point to propose the weighted-finger touch—a manner of touch that combines finger movement and weight technique. The form of finger-movement serves the purpose of producing sonic clarity that characterizes baroque keyboard music. The weighted technique aims to accommodate the range of piano expression that requires weight in addition to finger weight. The following sections will discuss the technical issues relating to weighted-finger touch.

51 Ibid.
2.2. Weighted-Finger Touch in Relation to Finger Strength and Finger Awareness

The first technique essential to the weighted-finger touch is finger strength. As noted earlier, Matthay (1903) compares the act of touch to the act of leverage, and explains “all good touch implies a levering of weight upon and against the key to induce the latter to move. This act of leverage must be almost entirely fulfilled by the finger and hand.” This understanding ultimately points to the technique of finger strength, by which the finger is capable of bearing and distributing into the keys as much weight as the sound requires.

In the context of piano techniques that greatly engage arm weight, the value of finger strength varies in different treatises. On the one hand, pedagogues such as Sandor (1981) associate the use of finger strength with “the old school of piano playing.” This viewpoint relates finger strength only to finger weight, without considering finger strength as an ability to bear and distribute weight in the act of touch. On the other hand, there are pedagogues who share Matthay’s viewpoint and view finger strength as an important medium in the act of touch. For example, Neuhaus (1981) states that “finger strength’ is in actual fact only the ability of the fingers and hand to support any kind of load.” William Newman, in his treatise Pianist’s Problems (1986), also points out the importance of finger strength by describing the problem of lacking finger strength:

The first problem in teaching the use of the fingers is to get them actually into use. Most students (as well as most pianists who are badly out of practice) do their playing by impulses from the arm, the fingers moving just enough so that the whole hand does not strike at once. In other words, these students fail to make that essential stationary base out of the hand, merely transferring the responsibility all the way back to the trunk. The result is a very common jogging or bouncing motion of the hand and arm, along with

---

52 Matthay, The Act of Touch in All Its Diversity, 158.
53 Sandor, 6.
54 Ibid.
55 Neuhaus, 93.
reduced speed and control. The speed, in fact, is limited to that of the arm jogging! The loss of control is most evident in a sacrifice of legato to detached playing.\textsuperscript{56}

Against the background of the common practice of using circular movement to engage arm weight, which can blur the focus on finger strength, one can observe finger strength in the execution of weighted-finger touch in a way that does not stand out in circular touch. It is because the execution of weighted-finger touch requires greater finger strength than circular touch. For example, in tone production—the moment when weight is loaded and sound is produced—circular touch allows the springy and cushioning movement from the wrist to add weight onto the finger gradually. Without the cushioning movement of the wrist, the weight from the hand and arm would be loaded onto the fingers more directly by weighted-finger touch; therefore greater finger strength is required to accommodate the stronger impact of weight distribution.

Right after a tone is produced, tone sustaining requires only that the key remain sufficiently depressed to maintain the elevation of the damper.\textsuperscript{57} Much of the weight required by tone production therefore ought to be released once the tone is initiated. Circular touch allows the cushioning and circular movement from wrist and arm to help take most of the weight away from the finger. Weighted-finger touch, however, requires the finger to be able to stabilize itself pliantly in the key while releasing most of the weight. If the finger strength is not sufficient to stabilize fingers during tone sustaining, a common sign is the “jogging or bouncing motion of the hand and arm”—as Newman (1986) describes. Such a bouncing motion might look similar to a cushioning movement, but it in fact represents insufficient support on the part of finger muscles.


\textsuperscript{57} Depending on the piano, the touchweight is around 50–52 grams and the upweight is around 28–30 grams.
On the piano, once a tone is produced, it starts to decay even the key is still depressed. One can produce tone cessation by releasing the key, which triggers the descent of the damper until it fully rests on to the string and silences the tone. When the key is released at different speed, the damper would descend and contact the vibrating string at a corresponding speed, which produces different shading of tone cessation.\footnote{From the perspective of piano mechanics, tone cessation simply means that the damper falls back onto the string, dampens the string vibration, and ends the sound. In actual practice, however, we can observe that the expression of tone cessation is far more colorful than merely a stop of the tone. There is a lack of scientific research on the issue of how the speed of key release affects sound decay. However, a related account can be seen in Matthay’s Relaxation Studies (1908). In his discussion on the speed of lifting the damper pedal, he concerned the manners of dampers descent and stated that “there is, in fact, a distinct difference between damping suddenly and damping gradually”(P. 128). Matthay’s account corresponds to the observation that different speed of key release or damper descent results in different shading of tone cessation.} In tone cessation, weighted-finger touch not only requires greater finger strength than circular touch, but also greater finger awareness—namely, one’s awareness of finger movements. The word “awareness” appears frequently in modern piano treatises to describe the conscious mind. This study takes one step further to explore what to be aware of when executing finger movements. For example, in tone cessation performed by circular touch, a tone ceases at the end of a circular motion. Without the circular movement from the arm, weighted-finger touch requires one to focus on what the finger ought to do when ending a tone, which ultimately leads to an awareness of the speed and timing of key release. A slower key release results in a more gradual and longer decay of tone than a faster key release. The speed of key release further determines the timing to initiate the key release. For example, compared to producing a tone with a more rapid decay, producing a tone with a more gradual decay requires a slower key release that takes more time; therefore, the movement of releasing the key ought to be initiated earlier.
The case of tone preparation—any setup prior to the moment of tone production—also requires much awareness of finger movement. Circular touch allows the finger to follow the circular motion of the hand and wrist. Weighted-finger touch, however, requires one to nuance a tone by manipulating the speed and timing of the lifting and falling finger movements. Slower speed of key-depression results in a rounder tone than faster speed. Depending on the speed of key depression and the weight to be distributed onto the keys, the timing of key depression varies accordingly. For example, producing a tone by a slower key depression would require earlier timing to initiate the falling movement than producing a tone by a faster key depression. Further technical issues about manipulating the speed and timing of finger movements will be discussed in chapter 6.

The techniques of finger strength and finger awareness are of great importance in performing piano music of any style. Nevertheless, in the context of performing baroque music on the piano, the particular concern about producing sonic clarity by means of the weighted-finger touch brings these two techniques to the spotlight. The following sections will further discuss the technical issues of developing finger strength and finger awareness in the context of weighted-finger touch.

2.3. Existing Approaches to Developing Finger Strength and Finger Awareness

There is no lack of pianistic attention to the importance of finger strength and finger awareness throughout the development of piano technique. Even though the understanding of finger awareness was not yet systematically discussed in the nineteenth century, its importance is implied in every account of sensitive performance and musical expression. For example, Czerny points out:

The most difficult part of the business is, always to observe the proper medium at each mark of expression; for you already know that there is great diversity in the shades and
degrees of forte, piano, legato, staccato, accelerando, and ritardando…. the most gentle pressure of the finger on a key produces a perceptible alteration and modification in the tone.\textsuperscript{59}

Czerny’s account ultimately points to the technique of finger awareness that subtly shades the tones.

The issue of finger strength has been clearly addressed in historical accounts. Along with the development of piano mechanics, pianists’ perspective on finger strength changed accordingly. Czerny, in his treatise Op. 500 (1839), advised that “we must take care to calculate our strength, so as not to injure the key, put the strings out of tune, or break them altogether.”\textsuperscript{60} A few decades after Czerny’s warning against damaging key or string, a major pianistic concern became how to obtain powerful finger strength. In the nineteenth century, the intention of developing virtuosic techniques once caused a mania about developing finger strength. Marienne Uszler and Stewart Gordon’s book \textit{The Well-tempered Keyboard Teacher} (2000) describes a scene in the mid-nineteenth century:

Fascination with developing the mechanical side of piano playing weighed heavily in the balance of many pedagogical works during the mid-nineteenth century. An entire literature was created that emphasized finger action and strength virtually to the exclusion of sensitivity to tone or musical thought. Leading the group was a method published in 1865 by Sigismund Lebert (1822–1884) and Ludwig Stark (1831–1884), founders of the Royal Conservatory at Stuttgart. The method emphasized practicing pieces loudly, without attention to dynamic detail in the early stages, and the authors went on to advocate that fingers be held firmly about an inch over the keys, strike rapidly, strongly, perpendicularly, and quickly return to position.\textsuperscript{61}

The importance of strengthening fingers is continuously emphasized in later treatises.

Carl Tausig, in his piano exercises (1873), advises strengthening fingers by practicing the

\begin{itemize}
  \item \textsuperscript{59} Carl Czerny, \textit{Letters to a Young Lady, On the Art of Playing the Pianoforte} (New York: Pond & Co., 1851), 30–31.
  \item \textsuperscript{61} Marienne Uszler, Stewart Gordon, and Elyse Mach, \textit{The well-tempered keyboard teacher} (Schirmer Books, 2000), 283.
\end{itemize}
exercises with a powerful stroke.\textsuperscript{62} Ernst von Dohnanyi (1929), in the preface to his \textit{Essential Finger Exercises}, describes a general guideline on strengthening fingers: “the exercises have to be played \textit{forte} with all possible strength, slowly and with well raised fingers, as well as \textit{piano} in more rapid tempo.”\textsuperscript{63} Arrau, in an interview (1967), expresses the same viewpoint:

To develop finger action, lift the fingers as high as you can, then strike immediately down on the key, taking the arm along and relaxing afterwards. I start students very slowly, of course.\textsuperscript{64}

The practice of developing finger strength by lifting the finger high and striking the key powerfully represents mainstream advice since the nineteenth century. This approach, however, does not provide further instructions for the pianist to engage an awareness of kinesthetic movements (hereafter “kinesthetic awareness”). George Kochevitsky, in his \textit{The Art of Piano Playing: A Scientific Approach} (1967), provides a historical review of the schools of piano technique, including what Kochevitsky describes as the “anatomic-physiological school” emerging in the second half of the nineteenth century, and the “psycho-technical school” emerging in the first half of the twentieth century.\textsuperscript{65} Kochevitsky points out that the anatomic-physiological school reflected the “faith in the absolute accuracy and objectivity of science” of the era, and approached the solution of piano technique through the anatomy and physiology of the musculoskeletal apparatus.\textsuperscript{66} He is critical of the anatomic-physiological school for its reliance on superficial information of anatomy and physiology, and belief that complicated technical problems could be solved instantly by understanding which limbs, which muscles are

\begin{itemize}
\item \textsuperscript{62} Carl Tausig, \textit{Daily Studies for the Piano-Forte} (New York: G. Schirmer, 1880), 39.
\item \textsuperscript{63} Ernst von Dohnanyi, \textit{Essential Finger Exercises for Obtaining a Sure Piano Technique}, trans. Norah Drewett (Budapest: Editio Musica Budapest, 1929).
\item \textsuperscript{64} Dean Elder, \textit{Pianists at Play: Interviews, Master Lessons, Technical Regimes} (Evanston, IL: Instrumentalist, 1982), 38. Interview of December 1967.
\item \textsuperscript{66} Kochevitsky, 9.
\end{itemize}
involved, and how they function in the movement of piano performance. Kochevitsky is right to criticize the anatomic-physiological school from a practical perspective, for it focused more on the scientific facts instead of how to engage anatomic knowledge in practice. Nevertheless, the emergence of this school marks an important shift of pianistic attention at the turn of the century from descriptions of movements and force—such as finger lifting and a powerful stoke—to understanding the reasons for movements and force.

The psycho-technical school emerged in the first half of the twentieth century. Unlike the anatomic-physiological school, it paid little attention to anatomic understanding of movement. Kochevitsky points out that the representatives of this school believed “what distinguishes pianistic movements from other human motor activity lies not in the periphery—in fingers, hands or arms—but in the central nervous system.” They claim that the brain intellectually understands the musical substance of the piece and decides what movement to execute accordingly; “the muscle sensation connected empirically with purposeful movement is much more important for technical development than the perception of movement form.”

Kochevitsky then takes the viewpoints of the psycho-technical school as a foundation to establish his approach. He discusses piano technique in the context of the process of see→ hear inwardly→move→hear actually →control, as well as in the context of the relationship between visual and auditory stimulus and proprioceptive sensation. Both the psycho-technical school and Kochevitsky’s research address the importance of one’s awareness of kinesthetic sensation, which was neglected by the anatomic-physiological school. Nevertheless, their research only concerns the factual perspective of the connection between perception and movement. They do not give practical insights about what kind of kinesthetic sensation the pianist ought to look for.

68 Ibid., 16.
69 Ibid., 28.
and work toward in order to improve the efficient connection between mind and movement, and to develop fine technique.

The perspectives of the anatomic-physiological and psycho-technical schools engage the physical and the psychological perspectives of piano technique. The two perspectives were later combined in approaches that engage the principle of mind-body interaction. The mind-body principle suggests that kinesthetic awareness could improve the quality of movements by inducing more conscious control over muscular movement. By developing an awareness of kinesthetic sensations in practice, the pianist would more likely notice the problem when an inefficient movement occurs, figure out the cause of the inefficiency, and make adjustments accordingly. One could therefore refine the quality of movements more efficiently than practicing the movements without engaging kinesthetic awareness. The mind-body principle is engaged in various techniques such as Alexander Technique, Feldenkrais Method, and Somatics, as well as in the studies by Barbara Conable (1998), Thomas Mark (2004), Mia Olson (2009), and Pedro de Alcantara (2013). Among these studies, Thomas Mark’s book *What Every Pianist Needs to Know about the Body* (2000) adapts the method of Body Mapping—a theory and practice developed by Alexander Technique teacher Barbara Conable—and provides great insights particularly for the pianist. Based on the belief that “in order to evaluate the quality of our movement we need to know what to look for,” he explains the idea of a “body map” that the pianist ought to learn to become aware of.

We have an internal representation of our body and its movements and we use this representation to coordinate our actions. This internal representation is our body map.

---


Our body map includes the structure, size, and function of our body and its parts. It is not something we are born with, nor does it remain fixed throughout our lives. It could not be fixed and still be useful…. We generate our body maps from our experience and revise them through the course of our lives.

Like other experiential knowledge, our body map may be vague or detailed, accurate or inaccurate.... This is an important issue because our body map is a representation that governs our movement….We can put the point this way: our body has a particular anatomical structure. In our brain is a representation of that structure. But the representation, not the structure, determines how we try to move.\(^72\)

The studies and techniques developed according to the mind-body principle have added many great insights about improving the efficiency of technique and the quality of practice. Nevertheless, the particular issues of developing finger strength and finger awareness still have not yet been sufficiently explored. The reason is that these two techniques ought to be discussed in the context of finger muscles; however, in modern treatises, there is simply no sufficient focus on finger muscles. For example, Mark’s book (2000) represents a comprehensive and insightful study from the pianistic viewpoint. Nevertheless, in the section on the fingers and hands, he only focuses on the joints of the hand and finger without looking into the issues relating to finger muscles. Consequently, there is no further discussion of developing the strength and awareness of finger muscles. Physicians Shmuel Tatz and Vladmir Mayoroff’s book *Hand on a Keyboard: A Guide for Musicians and Computer Users* (2010) includes a discussion of finger-muscles.\(^73\) However, their discussion focuses on the anatomic understanding of finger muscles; it does not examine the practical issues of engaging finger muscles in a piano performance.

A fundamental reason behind the lack of pianistic focus on finger muscles ultimately points to a common understanding that associates the quality of touch with the firmness of “fingertip” or “finger joint,” instead of the efficient support of finger muscles. Czerny, in his treatise Op. 500 (1839), frequently stresses the “firmness of touch,” or “the key must be firmly

\(^{72}\) Mark,10–11.

held down.”\textsuperscript{74} Czerny’s description of “firmness of touch,” however, was handed down over time with some different terminology. In modern treatises, it is common to see descriptions such as the “firmness or yielding of motion at joints,” “flexible joints,” and “firm finger joints.”\textsuperscript{75} What is the difference between “firmness of touch” and “firm finger joint,” and does the difference actually matter? The difference is that the latter, unlike the former, particularly focuses on the finger joint; however, it is really not the joint itself—the structure where two bones are fitted together—that produces the impression of flexible or firm joints. The bone structure of the finger joint itself cannot physically become firm; what can be trained and strengthened are the finger muscles surrounding the joint. In other words, the impression of the firm finger joint is the outcome when the strength of finger muscles can move the finger joints with sufficient stability and certainty.

It might be true that the conventional description of firm finger joint, although somewhat misleading, still describes the character of finger movement when it is well stabilized by sufficient finger strength. However, from the perspective of developing finger techniques, the description becomes problematic, for it ignores the fact that the impression of the firm finger joint has to be achieved through a rather complex and time-consuming process of developing the abilities of finger muscles. Without considering the role of finger muscles behind the impression of firm finger joint, an intention of developing firm finger joint simply by firming the joint will only inappropriately strain and stiffen the fingers and hand and result in technical inefficiency.


The misleading use of the word “joint” has resulted in a lack of discussion of finger muscles, and consequently the techniques of finger strength and finger awareness that have to be explored in relation to finger muscles. In the following sections, I adopt the existing studies of anatomy and kinesthetic awareness to propose a complementary practice. This practice focuses on two issues: the kinesthetic awareness of the balanced condition of the finger (hereafter finger-balance) and that of the hand (hereafter hand-balance). The practice of finger-balance will be explained in relation to fingers 2–5 because these four fingers share a similar anatomical structure of muscles in comparison to the thumb. Hand-balance will be explored in relation to the finger-balance of thumb and finger 5 due to the symmetry of their anatomic structure. Through paying attention and working on the finger-balance and hand-balance in practice, the techniques of finger strength and finger awareness can be mutually improved, which will not only directly benefit the execution of the weighted-finger touch in performing baroque music, but also every technique that involves finger strength and finger awareness.

2.4. Finger-Balance in Relation to Developing Finger Strength and Finger Awareness

Finger-balance describes a condition of the finger that performs efficient distribution of weight onto a key. In order to explain the idea of finger-balance, it is, first of all, important to understand that the finger does not move as a single unit, but as a group of muscles that are located both in the forearm (extrinsic finger muscles) and palm (intrinsic finger muscles). By analogy, a finger could be understood as a tube attached and supported by guy wires pulling in different directions. All the wires maintaining the tube in a well-balanced position may be seen as similar to when the finger muscles provide support sufficient to keep the finger in a balanced condition. In practice, it is by no means possible to observe and adjust the strength of different finger muscles in order to balance the finger. I suggest that, as an alternative, one could visualize
the balanced condition of the finger in relation to the shape of the finger. In practice, first, one can set the hand in a posture of piano playing with palm facing down and fingers curved, and choose one of fingers 2–5 on which to focus in the visualization. Then visualize that the finger is symmetrical in shape, which means that any two corresponding points on the two sides of the finger—left and right—are equidistant from an imaginary axis of the finger and the root of the finger from where the weight is distributed.

In the visualization of a symmetrical finger, any two corresponding points on a finger are not only equidistant from the source of weight to receive equal weight distribution, but also vertically equidistant from the key-surface to form a symmetrical relationship between the finger and the key-surface. When the finger maintains a symmetrical relationship with the key-surface by moving through a vertical axis, any interpretation of weight—how much and how fast the weight is intended to be distributed—can be transferred into the key motion and embodied in the sound with the most efficiency. This describes the finger-balance in relation to a balanced and efficient weight distribution, which is commonly understood as vertical weight distribution. Any unbalanced condition of muscular support would create unbalanced and inefficient distribution of weight, which would not only affect the sound quality, but also possibly produce unnecessary physical strain and result in technical inefficiency.

In reality, the finger is not a perfectly symmetrical structure. Nevertheless, by visualizing the symmetrical weight distribution, one can engage an intention of providing balanced support of finger muscles, which helps maintain the finger in a condition so as to improve its balance.

The understanding of finger-balance in relation to weight distribution helps clarify the different interpretations of vertical weight distribution that are seen in piano treatises. Some treatises associate vertical weight distribution with a vertical finger motion—an interpretation
that is adopted in this study—while some treatises associate it with vertical fingertip. For example, Czerny (1840) points out that pianists should “strike each key perpendicularly; that is, straight downward, and exactly on the middle, and therefore not sideways nor obliquely.”\textsuperscript{76} The description of striking the key “not sideways nor obliquely” suggests the vertical finger motion. Ortmann, in his book \textit{The Physiological Mechanics of Piano Technique} (1929), also views vertical weight distribution in relation to vertical finger motion against the sideways slanted finger. He points out “with the hand in a horizontal position, these joints are pre-eminently fitted for vertical movements of the fingers. As soon as the hand deviates from the horizontal, for example when it slants toward the fifth finger, the finger-stroke can no longer be vertical.”\textsuperscript{77}

Unlike Czerny and Ortmann, Sandor views vertical weight distribution in relation to vertical fingertip:

The piano key is set in motion by the finger. The piano key moves up and down in a straight vertical line, except for the negligible curve, which is caused by the fulcrum. Therefore the position of the last phalanx of the finger should be as close to vertical as possible at landing on the key so that energy can be transferred in the most direct manner. Any slanted approach to the keys results in a certain detraction of energy.\textsuperscript{78}

Sandor uses the illustrations below (see figure 2.1.) to show the correct and incorrect positions. The illustrations show that Sandor views a “slanted finger” as flattened or over-curved, instead of the obliquely and sideways slanted finger described in the Czerny and Ortmann accounts. It is appropriate to encourage the use of a vertical fingertip in piano playing. Nevertheless, Sandor’s viewpoint is somehow misleading, because vertical weight distribution is the result of vertical finger motion, but not necessarily the vertical fingertip. There are times when the finger needs to curve more or less to produce different sound characters; as long as the vertical finger motion is maintained, a non-vertical fingertip can still produce vertical weight distribution. On the contrary,\

\textsuperscript{76} Carl Czerny, \textit{Letters to a young lady, on the art of playing the pianoforte} (New York: Pond & Co., 1851), 16.
\textsuperscript{77} Ortmann, 24.
\textsuperscript{78} Sandor, 22.
if the vertical fingertip is presented, but the finger moves in an oblique and sideways direction, the vertical weight distribution cannot result.

Figure 2.1. Illustrations from Sandor’s *On Piano Playing: Motion, Sound and Expression*, 23

The tube-wire analogy and the visualization of the symmetrical shape of the finger provide basic understandings of finger-balance. Based on these understandings, the following sections will further explain that, in practice, finger-balance may be observed and improved from three perspectives—balanced muscular support, natural finger-alignment, and balanced finger-key contact. The three perspectives are in mutual relation and ought to be considered together in actual practice. All three perspectives engage the techniques of finger strength and finger awareness; the development of finger-balance therefore ultimately contributes to the development of finger techniques. The explanation does not focus on knowledge of finger anatomy, but some necessary information about anatomy will be included for clarity.

### 2.4.1. Balanced Muscular Support

Finger-balance describes a balanced condition of muscular support from the finger muscles. For the sake of practicality, the method proposed here focuses on only the intrinsic muscles, which are easy to locate and visualize in practice in comparison to the extrinsic finger muscles, which are located inside the arm. The intrinsic finger muscles consist of the lumbricals, palmar interossei, and dorsal interossei. The lumbricals are located on the palmar side of the
hand that flex (curve) and extend (stretch) fingers 2–5. The palmar interossei and dorsal interossei lie on each side of metacarpal bones that adduct (moving toward finger 3) fingers 2–5 and abduct (spreading away from finger 3) the middle three fingers, respectively. Finger 5 has its own abductor, abductor digiti minimi, which is located on the ulnar border of the palm of the hand and abducts the little finger away from finger 4. In practice, we can extend this understanding of anatomy and visualize that the locations of these intrinsic finger muscles approximately correspond to the palmar side and the two sides of each of fingers 2–5; the three sides of each of these fingers function as the three forces that together stabilize a finger, keep a finger in a balanced condition, and maintain the symmetrical relationship between the finger and the key-surface during a vertical finger motion.

The visualization of the three sides of a finger in relation to the three intrinsic muscles can not only affect the movement of the intrinsic muscles, but also the extrinsic muscles that are involved in the movement but cannot be conveniently observed. After all, finger movements are executed by a complex muscular system that engages both intrinsic and extrinsic muscles. Without realizing the complex muscular system during the movement, one could still make the muscular system work more appropriately by becoming more aware of the three sides of a finger in relation to its balanced condition. By analogy, kinesthetic awareness is like a light switch; one can turn the light on by flipping the switch without necessarily knowing how the power is connected.

---


80 Ibid., 170. “The palmar interossei are adductors of the fingers from the centeraxis passing through the middle finger.... The dorsal interossei are abductors of the middle three fingers.”

81 Ibid., 167.
Developing a kinesthetic awareness of each of the three sides of a finger is very helpful in developing finger-balance. Because of the imperfectly symmetrical structure of finger muscles and individual habits of playing, some muscles may be accustomed to working more and appear to be stronger, while others may tend to work less and appear to be weaker. The unbalanced muscular support then causes inefficient weight distribution and technical deficiency. With a kinesthetic awareness of the three sides of a finger, one could observe how the three sides of a finger counterbalance each other muscularily and locate the weakness of muscular support when one side appears to be weaker than the others. Once the weakness is observed and located, one could then make an adjustment by directing the kinesthetic awareness to the weak side of a finger. The concentration can get the weak muscles to work with increased consciousness, which in turns strengthens the weak muscles and improves the finger-balance. Section 2.4.4. will further discuss how an awareness of balanced muscular support can work in coordination with natural finger-alignment and balanced finger-key contact in order to strengthen the weak muscular support and advance the techniques of finger strength and finger awareness.

2.4.2. Natural Finger-Alignment

The idea of natural finger-alignment draws inspiration from a common understanding of finger-forearm alignment: fingers are the extension and continuation of forearm muscles and tendons; therefore a fairly straight, continuous line between finger and forearm will result in the least waste of energy. The idea of finger-forearm alignment focuses on the alignment between forearm and finger; natural finger-alignment specifically describes the alignment between the finger bones inside the palm (metacarpals) and the bones of finger digits (phalanges).

---

82 Sandor, 54–55.
Maintaining a relatively natural alignment between finger bones could help the finger achieve efficient weight distribution.

In practice, natural finger-alignment can be conveniently observed and adjusted by paying attention to the tendon of the extensor digitorum communis (EDC). The EDC tendon lies along the finger bones of each of the fingers 2–5 (see figure 2.2); the tendon pops out on the posterior side of hand especially when the corresponding finger lifts (extends) vertically. The natural straightness of the EDC tendon indicates natural finger-alignment, while a twist of the EDC tendon indicates twisted finger-alignment. By paying attention to the straight line of the EDC tendon in relation to natural finger-alignment, one could efficiently observe and adjust any unnecessary sideways stroke that disturbs natural finger-alignment and the vertical finger motion.

![Extensor Digitorum Communis](http://classes.kumc.edu/sah/resources/handkines/images/eeextdigcomm.gif)

**Figure 2.2.** Extensor digitorum communis (EDC) tendon [Online image]. Retrieved Nov. 5, 2017, from http://classes.kumc.edu/sah/resources/handkines/images/eeextdigcomm.gif

### 2.4.3. Balanced Finger-Key Contact

Similar to the understanding that a finger moves as a group of muscles instead of a single unit, the fingertip represents a surface where the finger contacts a key—that is, finger-key contact—instead of a “tip” that is conceptually understood as a dot. When the finger moves through vertical motion and maintains a symmetrical relationship with the key-surface, the weight delivered through the finger is distributed symmetrically and evenly to the entire surface of finger-key contact. This condition describes balanced finger-key contact. Balanced finger-key
contact results in a weight distribution that efficiently transfers any interpretation of weight—how much and how fast the weight is distributed—in to a key and into sound without much unnecessary manipulation. On the contrary, when any sideways finger motion disturbs the vertical finger motion, the finger-key contact would receive weight unevenly and consecutively from different points on the fingertip. The result is an inefficient weight distribution that would inappropriately affect the desired tonal result.

Developing a balanced finger-key contact can not only produce efficient weight distribution, but also create a more synchronized weight impact on the fingertip than a not-so-balanced finger-key contact; this will contribute to an increase of stability and firmness in touch. In other words, balanced finger-key contact describes the kinesthetic awareness behind the common understanding of the firm finger. As section 2.1. pointed out, Matthay makes an analogy between the act of touch and the act of leverage. A balanced finger-key contact can stabilize the fingertip, which represents one of the two ends of a lever in the act of leverage, and allows the act of touch to function with efficiency.

### 2.4.4. Practice with the Awareness of Finger-Balance

In this section, I demonstrate how, in practice, the pianist can efficiently observe and improve balanced muscular support, natural finger-alignment, and balanced finger-key contact finger-balance by engaging the visualization of the three sides of a finger and the symmetrical relationship between the finger and the key-surface. In order to observe the condition of balanced muscular support, let one of the fingers 2–5 execute the vertical motion at a very slow speed, aiming to maintain the smoothness and continuity of the movement at an even speed. Compared to moving quickly, moving in slow motion requires muscles to work harder, which could more likely reveal the weaknesses of the muscular support. The motion should be slow enough that the
finger almost starts to shake, and it feels difficult to maintain a smooth motion and even speed. Any wiggling motion or uneven speed of the movement indicates the unbalanced support from the finger muscles that fails to set a finger in a balanced condition and maintain the stability of finger motion. Instead of tightening the finger to suppress the wiggling motion, one can reinforce the balanced muscular support by visualizing the symmetrical support from the two sides of the finger, as well as the symmetrical relationship between the finger and the key-surface. Through practice with the visualization, the stability of the vertical movement will be developed, which indicates an improvement both in the strength of the weak muscles and the sharpness of finger awareness.

Observing natural finger-alignment will help restore balanced muscular support. Taking finger 4 as an example, the hand tends to tilt toward the finger-5 side due to the decreased finger length between fingers 3, 4, 5 and the weaker muscular support at the base of finger 5 in comparison to that at the base of the thumb. This tendency to tilt toward the fifth finger twists the natural finger-alignment of finger 4 and results in sideways finger motion of finger 4. In this case, one could try to adjust finger 4 slightly toward finger 3 to restore the natural straightness of the EDC tendon of finger 4. With this adjustment, the inner side of finger 4 would experience a pulling sensation during the lift-and-fall movement, and the finger might experience an unstable and wobbling motion. The pulling sensation of the inner side of finger 4 and the wobbling motion indicate that the muscles associated with finger-4 adduction (moving toward the midline of finger 3) are now trying to work harder, however, without full success. One could then direct kinesthetic awareness to the inner side of finger 4 to help the related muscles work more consciously. By paying attention to maintaining the natural alignment of finger 4, the weak
muscles associated with finger-4 adduction would be strengthened and the finger-balance of finger 4 would be improved.

After the natural finger-alignment is restored and the balanced muscular support is improved, a finger will contact the key with a sensation of increasing stability and firmness—as if the finger strength is suddenly improved. This firm sensation perceived at the moment of finger-key contact, however, only marks the beginning of developing balanced finger-key contact; it does not necessarily indicate that the finger obtains sufficient strength to maintain the balanced finger-key contact when it sustains a key. In practice, in order to take the idea of balanced finger-key contact further to develop finger strength, one could allow the finger to press down into a key with arm weight distributed. The finger ought to try to maintain finger-balance while obeying gravity, and bearing the arm’s weight on its own without being supported by the arm. In the beginning of practice, the finger might feel weak, wobbling, and unable to bear much arm weight on its own. This is because often the finger is accustomed to working in coordination with support from the arm, and arm weight is often added onto the finger gradually through circular movement. In addition, if the finger is not used to maintaining natural finger-alignment during the movement, restoring the finger’s natural alignment would also cause the sensation of a weak finger or insufficient muscular support.

The sensation of a weak and wobbling finger, however, is a good indication; it indicates that finger muscles—both extrinsic and intrinsic muscles associated with the adjustment—are trying to work on their own strength to bear the weight without getting help from, or being supported by, the hand or arm. When the finger experiences a sensation of weakness while sustaining the key, instead of tightening the finger to suppress the wobbling sensation, supporting the finger by hand or arm, or taking the weight away from the finger, one can try to
observe which part of the fingertip appears to be less stable and weaker than the other part, and
direct kinesthetic awareness to the weak spot of the fingertip to restore balanced finger-key
contact. Then allow the finger to stand on the key in this balanced condition for a while, so that
finger muscles—especially the weaker muscles—work for longer and get more training.

After all, the three perspectives—balanced muscular support, natural finger-alignment,
and balanced finger-key contact—are in mutual relation with the condition of finger-balance. By
being aware of these three perspectives, one can efficiently observe the weakness of the
muscular movements and improve finger-balance, through which the techniques of finger
awareness and finger strength will be simultaneously developed.

2.5. Hand-Balance Based on Finger-Balance

While finger-balance concerns the balanced condition of individual fingers 2–5, the
kinesthetic awareness of hand-balance concerns the balanced condition between fingers across
the hand, including the thumb. The purpose of developing this kinesthetic awareness is to set the
hand in a balanced condition and allow as much balance of individual fingers as possible in any
given circumstance of finger coordination.

From the anatomic perspective, hand-balance concerns the balanced relationship between
the thumb and finger 5. The thenar muscles are located at the base of the thumb and they operate
the movement of the thumb; the opposed muscles—hypothenar muscles—are located at the base
of finger 5 that operate the movement of finger 5. The thenar muscles and the hypothenar
muscles form the two principal groups of palm muscles located on the outer sides of the hand,
and consist of the muscles of similar organization with similar names.83 The midpalmar space is

---

83 Thenar muscles consist of the opponens pollicis, the abductor pollicis brevis, and the flexor pollicis brevis.
Hypothenar muscles consist of the opponens digiti minimi, the abductor digiti minimi, and the flexor digiti minimi
brevis.
the palm area in between these two major muscle groups and is less heavily muscled. Based on the anatomic structure of the palm, we can initially explore the idea of hand-balance from the perspectives of the finger-balance of the thumb and finger 5.

The finger-balance of the thumb and finger 5 can be observed and adjusted by the position of the metacarpophalangeal (MCP) joint of the thumb and finger 5, as well as the carpometacarpal (CMC) joint of the thumb. Figure 2.3 shows the MCP joint and CMC joints of the thumb and the MCP joint of finger 5.

![Figure 2.3: MCP joint and CMC joint of thumb, and MCP joint of finger 5.](image)

Finger-5 movement is mainly activated by hypothenar muscles from the MCP joint. The efficiency of finger-5 movement can be achieved when the MCP joint is well supported by the hypothenar muscles. Insufficient support of the hypothenar muscles would fail to support the MCP joint of finger 5 properly, which in turns causes the MCP joint of finger 5 to slightly sink in, twist the natural finger-alignment of finger 5, and make the hand tilt toward the finger-5 side. This condition disturbs the balanced condition of finger 5 and consequently the balance between the thumb and finger 5. In order to improve the finger-balance of finger 5, one could strengthen the hypothenar muscles by pulling up the MCP joint of finger 5 and making it more level with

---

84 Midpalmar space consists of the previously mentioned intrinsic finger muscles of interosseis and lumbricals.
the MCP joints of fingers 2, 3, and 4. During adjustment, a pulling sensation might be perceived at the base of finger 5 and under the MCP joint of finger 5, which indicates that the hypothenar muscles are working harder than usual. Through practice with an awareness of balanced finger-key contact in practice (see section 2.4.4.), the finger strength and finger awareness of the hypothenar muscles will be developed and the finger-balance of finger 5 will be improved.

Unlike finger-5 movement, which is mainly activated by the hypothenar muscles from the MCP joint, thumb movement is activated by the thenar muscles not only from the MCP joint but also from the CMC joint. Studies by Thomas Mark (2000) and others indicate that the CMC joint is capable of performing a larger range of motion than the MCP joint of the thumb. A thumb movement activated from the CMC joint can therefore perform with greater flexibility and less physical tension than the movement activated only from the MCP joint. When the CMC joint of the thumb is not well supported by the thenar muscles, the thumb will appear to squeeze toward the palm. This condition decreases the mobility and flexibility of the MCP joint and results in a stiff and straight thumb with less curve on the MCP joint. Yoshinori Hosaka’s study (2009) addresses the issue of insufficiently supported CMC joint of thumb. He points out that the thumb moving “inwards to the palm side of the hand” represents a common problem of thumb movement, and he suggests a solution by paying “careful attention to the root of the thumb (and) bring[ing] it out a little from the rest of the hand.” Bringing the base of the thumb away from the palm can make the CMC joints and MCP joints appear to be push outward instead of pulling inward. This posture indicates that the thenar muscles are working harder to provide better support for the CMC and MCP joints of the thumb. This adjustment will improve the balanced condition of the thumb and the efficiency of thumb movement. Like the hypothenar

86 Ibid., 88–89.
muscles of finger 5, the strength of thenar muscles could be also developed through practice with an awareness of balanced finger-key contact.

Based on an awareness of finger-balance of the thumb and finger 5 in relation to muscular support from the thenar and hypothenar muscles, and the positions of MCP and CMC joints, a kinesthetic sensation of hand-balance as a balanced relationship between the thumb and finger 5 will be gradually developed. In practice, I suggest that in order to perceive and improve hand-balance, one can let the fingers remain naturally curved and the thumb and finger 5 sustain an interval of a fifth—or a different interval depending on the size of the hand—with arm weight loaded. In this position, one will observe and adjust the positions of the CMC and MCP joints of the thumb, and the MCP joints and natural finger-alignment of finger 5, so that the hand is well supported by the thenar and hypothenar muscles and remains level without tilting toward either side. After the hand balance is restored, one can observe the balanced relationship between the finger-key contacts of the thumb and finger 5, as well as the balanced muscular support between the two outer sides of the hand. A balanced sensation of the hand would feel like as if the two finger-key contacts of the thumb and finger 5 counterbalance each other, as well as the two outer sides of the hand. This balanced condition allows the hand to perform movements with the most efficiency and flexibility.

The sensation of hand-balance developed between the thumb and finger 5 provides a large context for one to further observe and develop the balanced relationship between any combination of fingers. The sensation of a balanced relationship exists between the fingers that play simultaneously, as well as between the fingers that play successively. Piano playing may therefore be understood as a continuous balancing process between fingers, during which the kinesthetic awareness of hand-balance works mutually with that of finger-balance. With an
awareness of finger-balance and hand-balance, the pianist can explore the most efficient technical approach in any given condition of finger-coordination.

2.6. Summary

The desire to produce sonic clarity when performing baroque music requires the weighted-finger touch, which further leads to the technical issues of finger strength and finger awareness. The concern about developing finger strength and finger awareness then points to the focus on finger muscles. Based on the mind-body principle—kinesthetic awareness improving quality of movement—this study proposes a practicing method that engages with the kinesthetic awareness of finger-balance and hand-balance. Through awareness of finger-balance and hand-balance, the techniques of finger strength and finger awareness are consciously engaged and can be mutually developed. On the one hand, the development of finger strength can increase the freedom of finger-movement, which expands the variety of sensational feedback to sharpen finger awareness. On the other hand, the development of finger awareness could increase the efficiency in observing and adjusting muscular support, which allows one to develop finger strength efficiently.

Developing kinesthetic awareness of finger-balance and hand-balance can be very time-consuming. It is a continuous process of making good movements—finger-balance and hand-balance—a habit. The following account by Thomas Mark makes a good point for the pianist to keep in mind all the time when making good movements a habit. His account points out that executing good movements might not feel right initially if the muscles are not used to these movements; it is therefore very important to constantly observe the differences between habitual and naturally efficient movement.

Good movement is indeed “natural” in two senses. First, it is natural in the sense that it is in harmony with the structure of the body. It is what we are “designed” for. Second, good
movement is natural in the sense that it “comes naturally” when we are first learning to use our bodies. Most young children move efficiently and in balance. Alexander teachers often point to toddlers and preschool children as models of good use of the body. But although good use is “natural” in the senses just given, it is not “natural” in the sense of feeling “normal” to someone whose habits are poor. People may stand badly, sit badly, and move badly, yet the way they stand, sit, and move feels “natural” (i.e., normal) to them. To such a person, efficient movement will feel odd and unaccustomed (even if the person recognizes that it is better). Telling a student to do what feels right without demonstrating what actually is right usually amounts to reinforcing bad habits and is therefore poor teaching.  

Mark’s account appropriately describes the mindset when trying to habituate finger-balance and hand-balance in relation to the techniques of finger strength and finger awareness. Moreover, his account implies that making good movement a habit consists of repeated cycles of observation and adjustment—a process that is fundamentally driven by the kinesthetic awareness of finger-balance and hand-balance. The cycle repeats, given that the fingers and hand are imperfectly symmetrical, that everyone has personal habits that reinforce the unbalanced condition of muscular support, and above all, that no one can ever be perfectly aware of every movement at every second. As long as one can become more aware of the kinesthetic condition of movements, there is room for technical development for every level of pianist.

Practice with kinesthetic awareness is mentally demanding and time-consuming. However, incorporating it in a pianist’s practice can not only develop the techniques required by performing baroque music, but also fundamentally develop an efficient and sensitive connection between the pianist’s mind and fingers, resulting in a healthy technical development in the long term. Considering how our initial concern with producing sonic clarity by the weighted-finger touch has led to an exploration of the fundamental techniques of finger strength and finger awareness, we see that Bach’s fugues in the WTC are indeed a pianist’s daily bread.

---

87 Mark, 10.
Chapter 3: Critical Review of Existing Research

Chapter 3 examines existing studies on two established principles for performing fugues: bringing out the subject and illuminating the independence of individual voices. I explain that these principles oversimplify the complexity of performing the fugues in the *WTC*. This chapter also looks into the interpretive elements—graded dynamics, terraced dynamics, articulation, agogic accents, and rubato—that are commonly discussed in modern research on baroque performance practice. I make the point that the common practice of graded dynamics—a crescendo or decrescendo applied to a group of figures—cannot take into account dynamic gradations adjusted to individual notes, which is crucial for illuminating the compositional subtleties of fugues. The common association between terraced dynamics and contrasting dynamic levels also restricts the application of terraced dynamics. This study explains that terraced dynamics can be viewed as a means to unify dynamic nuance at various levels, which allows terraced dynamics to be applied in fugues with fewer compositional contrasts.

Articulation is often addressed by the categories of legato, non-legato, and staccato. It is, however, equally important to explore the relative lengths of notes beyond these categories. By viewing articulation in terms of note length, this study asserts that articulation can be synthesized with agogics and rubato, which also manipulate the relative length of notes. This understanding of synthesizing articulation, agogics, and rubato will be further discussed in chapter 6, which explores the synthesis of time elements—articulation, agogics, and rubato—and dynamic elements.
3.1. Bringing out the Subject

The question many musicians seem to be most concerned about in fugue playing is how much and how often to bring out the fugue subject. This question arises out of nineteenth-century thinking which is so preoccupied with the idea of more important-less important, as in melody-accompaniment.  

Rosalyn Tureck (1914–2003)

What are fugae? Fugae are nothing else but frequent, successive repetitions of the same theme in diverse voices.  

Johannes Nucius (1556–1620)

Tureck’s viewpoint is shared by many modern scholars, who consider the idea of “bringing out the subject” inappropriate in fugue performance because it reflects the romantic expression of melody-accompaniment hierarchy. However, Nucius’ account from the sixteenth century reveals that the awareness of frequent repetitions of the fugue subject is not merely a product of the nineteenth century. Whether the long history of the idea qualifies it as an appropriate instruction for fugue performance or not, it suggests that this idea deserves further investigation and should not be abandoned simply because of its connection with nineteenth-century expression.

As Alfred Mann (1987) points out, “from the earliest period of its use, the term fugue holds a curious double meaning of texture or form or genre that has bedeviled musical theory ever since.” Bartel in his Musical Poetica (1997) defines fuga—the Latin (and Italian) cognate to “fugue” in English—as (1) a compositional device in which a principal voice is imitated by subsequent voices; (2) a musical passage which employs fuga to vividly express chasing or

---

fleeing. According to the accounts of fugue by musical theorists from the sixteenth through the eighteenth centuries, the most characteristic feature in fugue—in both texture and form—is the repetition of the subject. In addition to the abovementioned account by Nucius (1556–1620), Joachim Thuringus from the late sixteenth century explains “what is a _fuga_? It is an artful _distributio_, a successive repetition of one and the same _clausula_ in various parts of the composition. Or, it is a delightful repetition of one and the same _melodia_ in other voices.

Whence comes the name? From _fugare_, because one voice appears to chase and follow the other voice due to the similarity of their notes.”

Johann Walther (1684–1748) also points out that “the _fuga_ ... is an artful composition in which one voice chases the other, as it were, using the same theme at different pitches.”

Early musical theorists focus on the fugue subject from compositional and rhetorical perspectives. This theoretical attention to the fugue subject later shows its influence on eighteenth-century treatises of performance. For example, Quantz points out that “a so-called _thema_ or principal subject of a fugue, and often-repeated ideas in a concerto, must be set off and stressed with emphasis and with conspicuous strength of tone.” C. P. E. Bach also advises:

> These octave doublings are very good for imitations which are to be loudly performed or for the entrance of fugal subjects. But when a subject or any passage of significance contains lively figuration which cannot be easily executed by one hand in octaves, at least the principal tones should be doubled and the others played simply.

Matthew Dirst, in his _Engaging Bach_ (2013), studies the perception of Bach’s music, especially that of the _WTC_, in the eighteenth and nineteenth centuries. He explains that the idea of bringing out the subject entries was preserved by the musical gatherings of Viennese connoisseurs and

---

91 Bartel, 277.
aristocrats in the late eighteenth century and the first half of the nineteenth century.\textsuperscript{96} Gottfried van Swieten’s Sunday salon, where Mozart encountered Bach’s music in 1782–83, was one of them. During this time, Mozart wrote K.404a and K. 405, a collection of transcriptions of Bach’s preludes and fugues for string quartet. In these transcriptions of fugues, the subject entries are highlighted, “including those Bach had cleverly concealed either by hiding an entering subject’s first note with the last note of the preceding phrase or by blurring the new entry in a thick contrapuntal texture.”\textsuperscript{97}

Aside from Mozart’s compositional treatment of the fugue subject, in a letter to his sister (1782), Mozart expresses “if a fugue is not played slowly, one cannot distinguish clearly the entries of the subject, and consequently it is of no effect.”\textsuperscript{98} Hummel, in his keyboard treatise (1828), expresses a similar viewpoint. He advises, “entrances of the [fugue] subjects must be somewhat forcibly marked, that they may not escape the observation of the ear.”\textsuperscript{99} Czerny (1839), who encountered Bach’s music through Viennese nobleman Franz Joseph Reichsritter von Hess (1739–1804), also pointed out “the characteristic feature of every fugue is the frequent repetition of the theme or subject in the various parts. It is necessary therefore that this subject should stand out in a marked and prominent manner, so as to be clearly distinguishable among other parts.”\textsuperscript{100} He also explains that the subject should be played with the same expression throughout the piece, and that the re-appearance of the subject, particularly when it occurs in the bass, should be played forte.

\textsuperscript{96} Matthew Dirst, \textit{Engaging Bach} (New York: Cambridge University Press, 2012).
\textsuperscript{97} Ibid., 145–150.
\textsuperscript{98} Letter of April 20, 1782, as cited in Warren Kirkendale, \textit{Fugue and Fugato in Rococo and Classical Chamber Music}, (Durham, NC: Duke University Press, 1979), 158.
Although Czerny advocates the idea of bringing out the subject entries in his treatise, it is interesting to notice that Czerny’s edition of the *WTC* (1837) does not rigorously show emphasis on entries of the fugue subject. In fact, Schumann praises Czerny’s edition of the *WTC* for the added expression-markings that create “shading of each piece,” because “nothing can be more tiresome….than to restrict one’s representation of his creations to a mere emphasis on the entrance of the principal themes.”\(^{101}\) Czerny’s advice on emphasizing the fugue subjects seems to contradict his editing of the *WTC* and Schumann’s perception of this edition. Nevertheless, the contradiction between these historical sources might be illusory. After all, many parameters can complicate the relation between writers’ intentions, their descriptions (which could vary in different contexts), and readers’ perceptions. For example, it is possible that Czerny describes his belief in bringing out the subject as a general rule when writing his treatise, but in the different context of editing music, his attention to other musical concerns makes this rule less normative. Also, along with the change in musical style, Schumann probably had perceived Czerny’s edition somewhat differently from what Czerny believes—not to mention the ever-present possibility of differences in the reception of historical documents and the initial intention behind these documents.

By being aware of the relation between intentions, descriptions, and perceptions, not only can we avoid making an illusory argument based on only the face value of historical sources and accounts, but also start to see the fundamental problem of “bringing out the subject.” Although the idea reflects an appropriate intention of realizing an important feature of fugal compositions, it engages a problematic description that can easily oversimplify one’s perception of fugues instead of encouraging one to explore their musical complexity.

---

Since Czerny’s 1837 edition of the *WTC*, numerous editions of this masterwork were published before the rise of historical authenticity toward the mid-twentieth century. Regarding the fugues, a few editors, such as Carl Reinecke (1892) and Gordon Saunders (1901), show their interpretation primarily by adding fingerings.\textsuperscript{102} Most of the editors added abundant dynamic markings in their editions.\textsuperscript{103} The dynamic emphasis on the subject is particularly evident in editions such as Klindworth’s *WTC* I (1894) and Busoni’s *WTC* I (1894). Examples 3.1, 3.2, and 3.3 compare three interpretations of a hidden subject entry in the C-minor fugue from the *WTC* II. Examples 3.1 and 3.2 are from the Neue Bach-Ausgabe (NBA edition) and Czerny’s edition, respectively; both editions show no emphasis on the hidden subject entry.\textsuperscript{104} Example 3.3 shows Busoni’s interpretation with a dynamic emphasis on the hidden subject entry.


In example 3.1, the subject is shown in the box. In measure 11 the chromatic motion B$\flat$–B$\natural$–C in the low voice emphasizes the B$\flat$ and de-emphasizes the C at the end of the chromatic motion, where the subject enters. Harmonically speaking, the 6–5 motion between the outer voices on


\textsuperscript{104} Alfred Dürr, *Neue Ausgabe sämtlicher Werke* (NBA) V/6/2 (Kassel: Bärenreiter, 1995).
beat 3 intensifies the interval of a sixth and weakens the entry of the subject. This subject entry in the second half of measure 11 is further de-emphasized by other musical events in this measure: the lowest note in this fugue, which is initially reached just before beat 2; the continuous ascent C-F-B♭-B♭-C in the bass; the ascending fourth C-F in the bass, which is coupled with the parallel motion E♭-A♭ in the top voice; and the rhythmic interaction between the top and middle voices, which is newly introduced at this moment of the fugue.

Examples 3.2 and 3.3 show Czerny’s and Busoni’s interpretations of this hidden subject entry. In example 3.2, Czerny applies a crescendo marking in measure 11 in favor of the overall ascending motion. This interpretation shows no emphasis on the subject entry in the bass. In fact, Czerny’s fingerings on beat 2 in the bass suggest a separation between the F and B♭, which emphasizes the beginning of the chromatic motion and de-emphasizes the subject entry on the C. Example 3.2. Fugue in C minor, WTC I, BWV. 871. mm. 10–12, Czerny edition (1837)

Compared to Czerny’s interpretation, Busoni’s shows a clear intention to bring out the subject entry by adding a slur over the hidden subject, a sostenuto marking, and the grouping of the eighth-note beams. The interpretation of bringing out this hidden subject entry is also seen in the editions by Klindworth (1894) and Mugellini (1908–09).
Example 3.3. Fugue in C minor, *WTC* I, BWV. 871. mm. 10–12, Busoni edition (1894)

Against the performing focus on the fugue subject that is evident in many nineteenth-century editions of the *WTC*, Schweitzer, at the turn of the twentieth century, criticized the interpretation of “sacrificing everything in a fugue to the working-out of the theme.” With the rise of historical authenticity, pedagogical editions were abandoned after the mid-twentieth century and replaced by Urtext editions. Nevertheless, the purity of Urtext editions does not necessarily free modern pianists from the influence of early pedagogical editions. As Dirst points out:

Czerny aimed to preserve a historical way of playing these pieces [Bach’s fugues], one whose roots can be seen in Mozart's arrangements of several *WTC* fugues (among other sources) and whose most essential aspects, I would argue, are still with us. Players of historical and modern keyboards alike still rigorously foreground each and every statement of the fugue subject.

The longevity and frequent criticism of the idea of bringing out the fugue subject testifies to its ambiguity. On the one hand, the compositional method of fugues inevitably results in an analytical focus on the subject entries. On the other hand, literally emphasizing every subject entry in a fugue performance could easily oversimplify the musical complexity in Bach’s fugues. William Rothstein (2005) describes the issue of bringing out subject entries as “the clearest

---


106 Dirst, 145.
conflict between ‘analysis’ and ‘synthesis’.” He explains that the excessive attention to the fugal subject is “the result of the way in which fugues are conventionally analyzed.” However, from the performing perspective, “analysis alone will not help, because in such a case analysis—which, by definition, involves the resolution of an object into its parts—is not the solution but the very source of the problem.” He advises “it is ‘the meaning of the voice-leading’ that Schenker takes to be the real meaning of the work, the meaning that the performer's hand must not violate.” Rothstein’s viewpoint corresponds to what Tureck believes: “it is not a question of how much, or how often, a fugue subject should be brought out, but rather one of relationship of parts within the whole form.” After all, even though the subject entries represent an important compositional feature of fugues, any performing instruction in favor of a particular compositional feature might potentially lead to an exaggeration of the feature and consequently oversimplify one’s perception and interpretation of the musical content.

In order to be able to observe subtle details in fugal content instead of simply focusing on the fugue subject, chapter 4 will discuss an alternative, which aims to encourage the development of an awareness of musical nuance at the note-level by observing the complementary relations between notes in both horizontal and vertical dimensions.

### 3.2. Independence of Individual Voices

Italian composer and theorist Niccolò Pasquali (1718–57) expressed his concern about differentiating voices on the harpsichord. He points out that the harpsichord is not suitable for fugue-playing because “it is impossible to hold every note its full length… also by the too great nearness of the parts, the ear will confound the passages of one part with those of another, and

---


108 Tureck, 20.
often reduce the effect of four parts to that of two.”\textsuperscript{109} Whether the harpsichord is indeed incapable of differentiating voices in a fugue performance or not, this historical account describes a concern about the independence of individual voices that still remains widely accepted in fugue performance on the piano.

Independence of individual voices is commonly understood as—in Charles Rosen’s words—“where each note comes from and where it is leading.”\textsuperscript{110} This understanding, however, is fundamentally problematic, because it only describes the horizontal relationship between the notes within one voice (hereafter horizontal independence) and neglects the vertical integration between voices that creates effective counterpoint. As Thomas Benjamin (1986) points out, in Bach’s keyboard fugues “the voices will usually exhibit some degree of independence of shape, as contours which are too consistently similar will not make for effective counterpoint.”\textsuperscript{111} This account describes the vertical independence or differentiation between voices, which results in complementary interrelation between voices and is of fundamental importance for creating effective counterpoint. A clear example is that, in species counterpoint, the species are categorized by five different rhythmic relationships between cantus firmus and counterpoint. The first, second, and third species are defined by the different number of notes—one, two, and four—against each note in the cantus firmus; the fourth species employs suspension, which rhythmically desynchronizes the motion of voices; the fifth species combines the note values of the preceding species with the newly added paired eighth-note.

The importance of complementary interrelations between voices is well addressed in theoretical and compositional studies of counterpoint and fugue. However, in studies of performance practice, its importance is overridden by an overwhelming focus on horizontal

\textsuperscript{109} Niccolò Pasquali, \textit{The Art of Fingering the Harpsichord} (Edinburgh: Bremner, 1758), 21.
independence of individual voices. In addition to the abovementioned account by Rosen, Donald Francis Tovey, in the preface to his edition of the \textit{WTC} (1924), makes an assertion that “the individuality of the parts is prior to all other questions of phrasing and grammar.”\footnote{Johann Sebastian Bach, \textit{Das Wohltemperierte Clavier I}, edited by Donald Francis Tovey (London: The Associated Board of the Royal Schools of Music, 1924), Preface by Tovey, 15.} Frederick Neumann also agrees: “in music with contrapuntal textures, each voice has to have its individual phrasing with the dynamic nuances that help to bring the independence of the parts into clear relief.”\footnote{Frederick Neumann, \textit{Performance Practices of the Seventeenth and Eighteenth Centuries} (New York, Schirmer Books, 1993), 289.} He further points out that “in the polyphonic music of the late baroque the role of dynamic gradation was small since each independent voice had its own internal dynamic leanings that would usually conflict with those of a simultaneous voice.”\footnote{Ibid., 158.}

It is in the context of harmonic nuance where studies on performance practice show concerns for the vertical relationship between voices in fugues. For example, Forkel, in his Bach biography, states that the “true harmony is the interweaving of several melodies...Bach's harmony consists in this melodic interweaving of independent melodies, so perfect in their union that each part seems to constitute the true melody.”\footnote{Johann Nikolaus Forkel, \textit{Johann Sebastian Bach; his life, art, and work}, trans. by Charles Sanford Terry (London: Constable, 1920), 73.} This viewpoint is later shared by Tovey and Rosen. Tovey states: “most of Bach’s counterpoint actually sounds best when the parts are evenly balanced. It is never a mere combination of melodies, but always a mass of harmony stated in terms of a combination of melodies.”\footnote{Tovey’s edition of \textit{WTC} I, preface, 14.} Rosen also holds the opinion that “a fugue of Bach can be fully understood only by the one who plays it, not only heard but felt through the muscles and nerves. Part of the essential conception of the fugue is the way in which voices that the fingers can feel to be individual and distinct are heard as part of an inseparable harmony.”\footnote{Rosen, introduction, 3.}
These accounts concern the vertical relationship between voices from the perspective of combining voices into harmony. This perspective is important, but it differs from the perspective of vertical independence between voices. The former perspective suggests that differences between voices are not in the foreground of a pianist’s perception, because they are perceived collectively in the same harmonic context. On the contrary, the latter perspective heightens differences between voices and encourages one to be aware of the ever-changing interrelations between them.

The problem of focusing on horizontal independence ultimately lies in the fact that horizontal independence of individual voices is less evident in Bach’s keyboard fugues, above all the fugues in the WTC, compared to his vocal fugues. Renwick, in his study on the Schenkerian approach to fugues, points out that “independence and equality of parts (in Bach’s vocal fugues) is more important than in keyboard fugues. The necessity of setting text naturally leads to the development of fugues with multiple countersubjects, since free counterpoint does not provide the same rigor of text-music association.” Example 3.4 shows three subject entries in the exposition from the D-minor fugue from WTC II. The subject enters in the middle, top, and bass voices in measures 1, 3, and 6, respectively.

Example 3.4. Fugue in D minor, WTC II, BWV. 875, mm. 1–2, 3, 6

---

In this fugue, beat 1 and beat 3 are metrically equivalent, and the final cadence falls on beat 3; these features suggest J.P. Kirnberger describes as compound 4/4 meter. In the exposition, all three subject entries enter on beat 1, establishing the metrical perception of the subject entry in this fugue: the entry of the subject would create a metrical perception of beat 1 even when the subject does not enter on beat 1.

Example 3.5 shows measures 9–13 in the same fugue. In measure 10, preceded by the triplet motive entering on beat 1 in the bass, the subject enters on beat 4 in the top voice. Due to the beat-1 perception established in the exposition, one may temporarily perceive beat 4 in measure 10 as a new beat 1. If one plays the top voice alone and gives priority to its independence, this metrical displacement would last until the end of the subject on beat 1 of measure 12, and then create problematic metrical perception in the following measures. The leap in the beginning of measure 12 might recall the original location of the strong beat in the exposition. However, without a differentiation of note value between measure 11 and measure 12, one might not hear the metrical structure being reset in measure 12. The lack of clear metrical structure therefore makes it impractical to appreciate the independence of the top voice.

---

Example 3.5. Fugue in D minor, \textit{WTC II}, BWV. 875, mm. 9–13

On the other hand, if one considers the vertical relation between the top voice and the other voices, even though the fourth beat of measure 10 may be still perceived as a new beat 1, the metrical displacement will be corrected on beat 3 of measure 11. On this beat, a new sequence is introduced in the lower voices, which reinterprets the weak beat 2 of the metricaly displaced subject back to a metrically correct strong beat 1.

The interaction between the metrically displaced subject and other voices also results in different nuances of metrical emphasis and note grouping, which might be ignored if one gives priority to the horizontal independence of each voice. For example, the subject entering on beat 4 of measure 10 is mostly identical to the initial subject entry in measures 1–2. Nevertheless, unlike the B on beat 1 of measure 2, which is metrically emphasized, the B on beat 4 of measure 11 no longer receives metrical emphasis. Instead, because of the new sequence entering in the lower voices on beat 3 of measure 11, it is the C-sharp in the subject that receives metrical emphasis. The different metrical emphasis shapes the same subject differently. In the initial
subject entry in measures 1–2, one would perceive A-D-C#-C in the second half of measure 1, and B-Bb-A-G in the first half of measure 2. However, in measures 10–11, due to the shift of metrical emphasis, the chromatic passing tone C# is emphasized, which creates a different expression of the subject by reinforcing the chromatic descent C#-C-B-Bb in the top voice, in coordination with the G-F#-F-E in the middle voice in measure 11.

Finally, example 3.5 shows that the horizontal independence of voices is weakened by the rhythmic syncopation in measure 9 and measures 11–12. The fugues in the *WTC* frequently adopt syncopated rhythms. In order to appreciate the rhythmic and harmonic nuances created by syncopation, the syncopated rhythm in the top voice in measure 9 ought to be perceived against the steady beats provided by the middle voice. Similarly, the syncopated rhythm in the middle voice in measures 11–12 would sound ineffective without being perceived along with the outer voices.

By understanding how the idea of independent voices neglects the vertical interrelation between voices, we can see that the two common practices—“bring out the subject” and “independence of individual voices”—fundamentally engage the same problem of isolating voices from each other. One could perhaps observe the commonality between the two strategies in Glenn Gould’s recordings of Bach’s *WTC*. Gould’s interpretation is often praised for the clarity of independent voices, which he frequently achieves by interpreting different voices by contrasting dynamics and articulation—for example, one voice is played legato and another is totally non-legato. His interpretation with a focus on horizontal lines, in a way, simultaneously demonstrates the practices of bringing out the subject and the horizontal independence of each voice; however, it also results in neglect of the interrelation between voices. Compared to Gould’s particular interpretation, a more balanced interpretation can be heard in the recordings
by Edwin Fischer (1933–36), Edward Aldwell (1989, 1992), and Peter Hill (2012). These pianists give careful consideration to the voice leading of individual voices in their recordings. However, it is not for creating an impression of independent voices as if each voice is indifferent to each other, but for creating expressive interaction between voices. By giving priority to the musical expression of individual fugues beyond any stereotype or strategy, their performances evoke simplicity and genuineness of musical beauty from within the complexity of compositional content in Bach’s fugues.

3.3. Graded dynamics

Graded dynamics, commonly understood as crescendo or decrescendo applied to a group of figures, are often viewed in contrast with terraced dynamics in research of baroque performance practice. Nowadays, modern research of baroque performance practice shares the viewpoint that although large-scale graded dynamics (i.e., exceeding the length of a phrase according to F. Neumann) are inappropriate to baroque music, “inner dynamics” corresponding to the harmonic tension are necessary.120 A different viewpoint, however, can be seen in the case of fugue performance. For example, Kirkpatrick (1984) points out “swell-box dynamics are relatively crude in their functioning. They affect everything at the same time, while leaving insufficient control over individual voices.”121 Neumann (1993) also notes that “contrapuntal music that provides enough musical interest with its complex interplay of voices, varied rhythms, and generally rich harmony has little or no need for the coloristic dimension that dynamics can provide.”122 Kirkpatrick and Neumann’s viewpoints show that compared to other kinds of music,

---

120 Neumann, Performance Practices of the Seventeenth and Eighteenth Centuries, 162. He suggests that “stylistic-structural factors disfavored dynamic gradations that exceeded the length of single phrases.”
122 Neumann, Performance Practices of the Seventeenth and Eighteenth Centuries, 159.
the complexity of fugues seems to prevent applications of graded dynamics. Seen in this context, this study will first look into different perspectives of graded dynamics, and then point out the one appropriate for fugue performance.

In modern research, the terms graded dynamics, dynamic gradation, graduated dynamics, and transitional dynamics are used interchangeably to describe continuous dynamic change applied over a group of figures. Robert Marshall (1989) points out that Bach marks a sequence of dynamic markings $p – piu p – pp$ in the final chorus of the St. Matthew Passion (1736), which represents “the earliest unambiguous indication of graduated dynamics.”\textsuperscript{123} Example 3.6 shows this passage.

Example 3.6. St. Matthew Passion, final chorus, mm. 75–80

Graded dynamics are also discussed in relation to harmonic intensities. Kirkpatrick (1984), in the chapter entitled “Harmonic Approach,” uses a harmonic reduction of the opening of the C-major prelude from \textit{WTC} I (shown as example 3.7) to explain “if one has any understanding of the harmonic functioning of this piece, there is no necessity for being told where to make a crescendo and where a diminuendo, where to play piano and where forte.”\textsuperscript{124}

\textsuperscript{124} Kirkpatrick, 97.
Example 3.7. Example from Kirkpatrick, 94.

Troeger (2003), in a section “Dynamics based on harmony,” quotes an account by C.P.E. Bach to explain the general principle of dynamic-harmonic relationship: “in general it can be said that dissonances are played loudly and consonances softly, since the former rouse our emotions and the latter quiet them (Essay, 163).” Troeger explains that this principle could be also applied on the large scale to indicate harmonically strong or weak measures. Example 3.8 shows a harmonic reduction of the beginning of the C-major prelude from *WTC* I, which he adopts to show the large-scale irregularity of measure grouping based on the dynamic indications of harmonies at the measure level.

Example 3.8. Example from Troeger, *Playing Bach on the Keyboard*, 103

The abovementioned perspectives represent the common understandings of graded dynamics in relation to musical contour at phrase-level and harmonic tension. However, they are

---

126 Ibid., 102.
127 Ibid., 103.
not sufficient for illuminating the complexity of a fugue. First, fugal texture complicates dynamic interpretation. By no means are large-scale dynamic gradations and long stretches of continuing figure contours absent in a fugue. Nevertheless, the method of counterpoint engages figures of small sizes and with frequent changes of direction, which require one to pay particular attention to small-scale dynamic shadings in addition to large-scale dynamic gradations over a phrase or several phrases. Second, the dynamic implications of harmonies as a collection of notes does not reflect the harmonic expression at the note level, which constantly varies along with the contours of individual voices and the counterpoint between them.

The foundation of illuminating the compositional complexity of a fugue consists of dynamic gradations adjusted to individual notes. The practices of note-level dynamic gradation are documented in historical accounts of rhetoric. Neumann (1993) discusses the relationship between dynamic nuance in music and the tone modulation—raised or lowered—in speech, a topic that was frequently discussed in historical documents such as Praetorius’ treatise *Syntagma musicum* (1614–1619). Neumann quotes Praetorius’ account of speech and music:

> Just as it is an orator's role not only to grace a speech with beautiful, graceful, and lively words, and with splendid figures of speech, but also to deliver it properly so as to arouse the emotions: by raising his voice here, lowering it there, speaking alternately with powerful, with gentle, with full and resonant voice; so it is the duty of the musician not simply to sing, but to sing with artistry and grace, so as to stir the heart of the listeners and move their emotions and thus allow the song to fulfill the purpose for which it was destined. \(^{129}\)

Praetorius also points out that tone adjustment ought to be made based on the meaning of each word in speech and singing:

\(^{128}\) For example, the exposition of a fugue could engage a gradual crescendo as each voice enters. Continuing figure contours stretching over several measures are also present in single voices, such as the C-sharp-major fugue from *WTC* II, measures 30-33, top voice.

How abominable it is when even a preacher makes no distinction appropriate to the sense of the words by the rise and fall of his voice, but sends out string after string of words on a monotone. If this is vile in speech, it is ten times viler in singing.130

Based on the understanding of adjusting speaking tone to the meanings of words, Praetorius further discusses the issues of performing keyboard instruments. He points out the deficiency on keyboard instruments that “they cannot be made to ‘modulate’—to have the level of sound raised or lowered... And the sound is not enduring; once the string is struck, and sounds, the note dies away.... This fading away is the complete opposite of modulation, which demands the rising from a low to a high volume.” Therefore, he suggests, “it becomes necessary to split up whole notes into smaller time-units, percussing several times to achieve sustenance.”131

Praetorius’ viewpoint provides an important perspective in understanding the relation between figure contour and dynamic nuance: the notes within a figure fundamentally function as diminutions that sustain the main note of this figure and simultaneously create the effect of modulating sound. This understanding immediately points to the use of graded dynamics adjusted to a figure’s contour at the note level.

In modern research, the perspective of graded dynamics at the note-level is implied by Tureck (1960), who points out that “the highest skill in varying dynamic levels requires completely independent fingers and the ability to change quantity of tone distinctly and unmistakably from one note to another.”132 Kirkpatrick (1984), in the chapter “Melodic Approach,” also points out that in singing, “it is the measurement of an interval that creates its significance, not its component notes”; “if the keyboard is not infused with some sort of vocal sense, it is scarcely more eloquent than a typewriter.” He makes a wonderful remark that “a

131 Praetorius, Syntagma musicum I and II, 70–71.
132 Tureck, 6.
change of melodic direction is an eventful occurrence for the voice whether or not it embodies a temporary diatonic decoration or makes a salient point in the melodic outline.” Kirkpatrick’s accounts describe the relation between figure contour and dynamic nuance at the note level. However, he doesn’t discuss the issue further; he merely asserts, “there are other factors, mainly harmonic, that affect dynamics far more than melodic contour.”

Badura-Skoda (1990) and Troeger (2003) discuss some common practices of note-level graded dynamics. Badura-Skoda points out that “high notes, on account of the greater tension of the vocal cords and so on, are louder and more intense than low ones.” Troeger provides more detailed instructions based on eighteenth-century treatises and common practices. For example, “appoggiaturas are played more loudly than their resolutions”; “the first note under a slur receives a slight accent, and the ensuing notes are successively softer”; “the principal notes are always played more strongly than passing tones (Quanz)”; “long notes (notes longer than others in the context) are stressed”; “syncopated notes are stressed”; and “a change of harmony, made on what is otherwise a weak beat, makes that beat strong”; etc. Regarding dynamics in relation to intervallic contour, he points out that “notes that stand out from the prevailing range (for instance, an isolated high note) are usually separated out from their context when slurring is marked….which suggests dynamic emphasis of such notes.”

The accounts by Tureck, Kirkpatrick, and Troeger provide useful insights for the pianist to explore dynamic gradation at the note level. However, considering the complicated content of fugues, the issue of note-level graded dynamics deserves further investigation. In addition to getting to know general principles and historical practices, it is important to go beyond rules and

---

133 Kirkpatrick, 52–62.
134 Badura-Skoda, 131.
136 Ibid.
develop an awareness of dynamic subtleties from within the compositional complexity of fugues. In particular, the subtle differences between notes frequently go beyond the impression of which ones are louder or softer; they are just different in expression. Chapter 4 will explore how one may develop an awareness of the relative nuances between notes—in both horizontal and vertical dimensions—through observing the complementary relations between them.

3.4. Terraced Dynamics

The notion of terraced dynamics, unlike that of note-level graded dynamics, which is documented in historical accounts of speech and singing, represents a modern understanding of baroque performance practice; there are no historical accounts of terraced dynamics. It arises at the end of nineteenth century with an increasing awareness of historical performance on the harpsichord, which is only capable of producing a few dynamic terraces by using different combinations of harpsichord manuals. The term “terraced dynamics” was probably first articulated by Schweitzer (1903) when he notes that “a certain strength of tone dominates a whole period, and is followed by another period of a contrasted intensity of tone.”

Tureck (1960) expresses a similar view that “dynamic changes must be made on the first note of the new color, for the pianist's habit of continual rise and fall does not suit Bach.” In the preface to her edition of a collection of Bach’s keyboard works, she also advises “each dynamic indication in this volume's pieces is to be maintained without change until the next one appears.”

The understanding of terraced dynamics as maintaining a certain dynamic level throughout a period of time, however, was met with arguments in the course of the twentieth century. On the one hand, both Schweitzer and Tureck acknowledge that the practice of terraced dynamics does not exclude subtle nuances of dynamic gradation. Schweitzer (1903) stresses:

---

138 Tureck, 6.
This view (terraced dynamics) can seem pedantic only to those who think that it elevates monotony to an artistic principle. The opposite is really the case. When the one quality of tone is distributed over a segment, large or small, it must be richly shaded in detail, but in such a way that these shadings do not overstep the limits of that particular degree of tone.\textsuperscript{139}

Tureck, after making the statement about maintaining dynamic terraces, further advises achieving finger independence in order to “change quantity of tone distinctly and unmistakably from one note to another.”\textsuperscript{140}

On the other hand, along the trend of historical authenticity in the first half of the twentieth century, there were scholars, such as Hans Hering (1949–50) and Arthur Mendel (1951), who understood terraced dynamics as flat dynamics based on the fact that historical keyboard instruments are incapable of producing dynamic gradation. Hering criticizes the romantic expression shown in nineteenth-century editions of Bach’s keyboard music and suggests that Bach’s music has its own structure that ought to be realized by flat dynamics.\textsuperscript{141}

Mendel, in the preface to his edition of the St. John Passion (1951), expresses a similar viewpoint that the dynamic nuance in Bach’s music is already built into its composition:

As for the effects of \textit{crescendo} and \textit{diminuendo}, much of Bach’s music was planned, and sounds best, without any such gradual changes. On the harpsichord and organ, Bach frequently provided for gradual increases and decreases of volume when he wanted them, by increasing and decreasing the number of tones to be played simultaneously.\textsuperscript{142}

Against the rigid perspective of terraced dynamics executed flatly, scholars such as Edwin Hughes (1925), Robert Donington (1965), Sol Babitz (1967), and Nikolas Harnoncourt

\textsuperscript{139} Schweitzer, vol. 1, 363.
\textsuperscript{140} Tureck, 6.
Donington maintains that “it is a complete misunderstanding to confine baroque music within a range of what has recently been called terraced dynamics: long stretches of loud or soft flatly sustained.” Harnoncourt agrees:

It was long believed that dynamics were always used “in terraced fashion”; in steps, abruptly and without gradual changes. Even though a very small part of this theory is true, nonetheless, consistently applied, it destroys musical continuity and makes it impossible to play music that “speaks.”

Dorottya Fabian, in her study *Bach Performance Practice, 1945–1975* (2003), provides a comprehensive review of the historical argument about terraced and graded dynamics—one of the heated topics of the historical authenticity movement that lasted for more than half of the twentieth century. However, what is missing in her study is a clarification that terraced dynamics were not meant to be understood in opposition to graded dynamics when initially advocated by Schweitzer. Whether the criticism of terraced dynamics misunderstood the original intention behind their use, or represented a reaction against a pedantic viewpoint of terraced dynamics at that time, the opposition and arguments between terraced and graded dynamics are intrinsically illusory.

By the late twentieth century, terraced dynamics were no longer misunderstood as flat dynamics. In the studies by Robert Marshall (1989), Badura-Skoda (1990), and Troeger (2003), terraced dynamics are commonly discussed in the context of Bach’s dynamic markings found in his *Italian Concerto* and *French Overture*. Based on the relationships between Bach’s

---


144 Donington, 416.

145 Harnoncourt, 45.

markings—*forte* and *piano*—and compositional content, terraced dynamics are understood as dynamic alternations of contrasting dynamic levels associating with large-scale compositional settings such as shifts in texture and register. For example, in the last movement of the *French Overture*, the markings of *forte* and *piano* are used alternately in relation to shifts of registration, which create an echo effect. In the *Italian Concerto*, the dynamic markings in the outer movements suggest the effect of tutti and soli in a baroque concerto grosso, and the dynamic markings in the second movement indicate the melody-accompaniment relationship. Terraced dynamics are also discussed frequently in the context of the *Goldberg Variations*. Here, the general dynamic scheme of each variation is suggested by Bach’s indications of different uses of harpsichord manuals—lower manual indicates ordinary volume, upper manual indicates a softer volume, and the combination of the two indicates a louder volume. Above all, modern scholars endorse Schweitzer’s viewpoint that the practice of terraced dynamics engages subtle dynamic gradations. As Troeger points out, “in common with much of the dynamic notation of the later eighteenth century, Bach’s *f* and *p* markings are generic rather than literal. A complete scheme of relative dynamics must be realized within each level, both *forte* and *piano*.”

Modern scholars focus on the relationship between dynamic terraces and large-scale compositional contrasts. In the context of performing the fugues in *WTC*, a common practice to engage terraced dynamics is to associate them with the increasing or decreasing number of voices. Robert Marshall explains, “Bach could, and frequently did, of course, augment the volume level of a passage or a composition by adding more and louder instruments, or perhaps simply by increasing the number of polyphonic parts.” Nevertheless, textural changes in fugues often do not happen frequently enough to form a substantial dynamic plan. Concerning an

---

147 Troeger, *Playing Bach on the Keyboard*, 100.
overall lack of compositional contrasts in fugues, Schweitzer states that “with many preludes and fugues….we can discover in them no dynamic plan…. In the fugues we shall still more frequently have the conviction that they are not planned for dynamic variety.”

Whether or not the fugues were planned for dynamic variety, Schweitzer is correct to point out that the common practice of associating terraced dynamics with compositional contrast finds few outlets in fugue performance. In chapter 5, I will explain how terraced dynamics could be used to unify dynamic nuances of low-level compositional content such as figures or a small group of figures in addition to higher-level compositional contrasts between phrases or groups of phrases. In this way, dynamic gradations adjusted to individual notes can be further unified within a figure or a small group of figures by a dynamic terrace, which also creates dynamic differentiation between the terraces at the figure level. In other words, terraced dynamics could be a means of unifying the musical nuance within a group and creating differentiation between groups at various hierarchical levels of compositional content. The correspondence between terraced dynamic unifications and hierarchies of compositional content will then effectively illuminate the subtly differentiated phrasing in Bach’s fugues.

3.5. Articulation, Agogics, and Rubato

Articulation, agogics, and rubato represent three interpretive elements that deal with time—that is, the manipulations of the length of sound or silence. Articulation is commonly associated with three kinds of relationships between notes—legato, staccato, and non-legato—as well as note groupings defined by connections or disconnections between notes. Agogics and rubato are commonly associated with fluctuations of time spans created by lengthening or

---

149 Schweitzer, vol. 1, 361.
shortening notes. Agogic accent is defined in Troeger’s study as “the emphasis made through duration rather than dynamics.” Rubato concerns rhythmic flexibility against consistent beats.

Among these three interpretive elements, issues of articulation have received the most detailed discussion in modern studies. Many include a chapter on articulation issues in Bach’s keyboard music and draw analogies between the abundant articulation markings in Bach’s instrumental works and his keyboard works, which contain few articulation markings. Bodky’s study, although based on the inauthentic articulation markings of questionable editions, provides an insightful discussion on the relationship between Affect and articulation. In a section entitled “Links between Affect and Articulation”, he quotes an account by Quantz:

The degree of passion of a piece can be recognized with the help of the occurring intervals, according to whether they are close or remote ones, and whether the notes are to be slurred or played staccato. Slurred and close intervals express the caressing, the sorrowful and the tender; staccato notes and distant jumping intervals, also figures where a dot is given to the second note express the gay and the bold.

After Quantz’s account, Bodky concludes “the connection between articulation and affect is at least as great as that between affect and tempo.”

Hermann Keller, in his book Phrasing and Articulation (1973), interprets Bach’s separation of beams within beats—in the outer movements of the Italian Concerto—as indicative

---

150 Troeger, Playing Bach on the Keyboard, 137.
152 Quantz, 125–126, quoted in Bodky, 208. The italics are by Bodky.
153 Bodky, 209.
of articulation. Examples are shown below in measures 76 and 78.\footnote{Keller, 67. One might argue that, in this particular example, the separations of beams can indicate changes of manual on the harpsichord instead of articulation. However, Keller wrote this book from the perspective of piano performance; it is thus clear that he used this example to show articulation.}

Example 3.9. Example from Keller, 67. \textit{Italian Concerto}, 1\textsuperscript{st} movement, mm. 75–78

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{example39.png}
\caption{Example from Keller, 67. \textit{Italian Concerto}, 1\textsuperscript{st} movement, mm. 75–78}
\end{figure}

He also explains that “in older music it is normal for the upbeat to be separated from the note to which it leads, so that the accented part of the measure may thereby indirectly be given more weight.”\footnote{Ibid., 39.} Kirkpatrick (1984) describes the dual functions of articulation. On the one hand, when articulation functions as “the subsidiary of phrasing,” “articulation is the mere detaching or connecting of notes.” On the other hand, “[I might add the concept of melodic inflection, which is the placing of various degrees of intensity and accentuation.”\footnote{Kirkpatrick. 62.} He refers back to the preface to his edition of Scarlatti’s keyboard sonatas to explain how he categorizes the nuances of articulation: breaks, indivisible connections, partially connected divisions, small division embraced by a large division, detachment, emphasis, and slur.\footnote{Ibid., 63.} Badura-Skoda (1990) points out some common associations between articulation and the musical content of intervals, harmony, and rhythm. For example, legato playing is suitable for singing style and movements reminiscent of chorales.\footnote{Badura-Skoda, 118.} Toccata-like virtuoso pieces and the figures of walking bass call for staccato or non-legato.\footnote{Ibid., 96.} In addition, “stepwise passages should on the whole be played legato, whereas
larger intervals and leaps should be detached”; dissonances should be linked to resolutions; octave or broken triads (especially in fast tempo) should usually be played non-legato or staccato; etc.\textsuperscript{160} Like Keller, Badura-Skoda suggests an avoidance of slurring into the downbeat. Butt (1990) adopts a historical approach to analyze Bach’s articulation markings in his instrumental and vocal music. Regarding keyboard music, he applies historical examples to show how slurs were used to indicate note-grouping and rhythmic inequality. He also points out that “a further function of slurs, relevant only to keyboard music, is the sustaining of slurred notes until the end of the slur. This seems to have originated in France.”\textsuperscript{161} Neumann and Cry discuss articulation in the context of fingerings indicated in Bach’s keyboard music and historical treatises.

Each study approaches the issues of articulation from different perspective. Nevertheless, one common focus is the three types of articulation—legato, non-legato, and staccato—which are grammatically categorized to define the relationship between notes. Among the three types of articulations, non-legato, or “ordinary movement,” is considered to be particularly appropriate for baroque keyboard performance practice. As Troeger explains, “for notes that are neither slurred nor detached, the baroque and classical treatises specify ‘ordinary movement’—that is, a simple, clear connection or near-connection of tones, neither detached nor running together.”\textsuperscript{162} Historical accounts by writers such as Friedrich Wilhelm Marpurg (1755) point out that “because this ordinary movement [\emph{ordentliche Fortgehen}] is always assumed, it is never indicated.”\textsuperscript{163} Daniel Gottlob Türk (1789) also advises that “for tones that should be played in the usual way (that is, neither detached nor slurred), one lifts the finger a little earlier from the key than is required by the duration of the notes.” He uses the example below to illustrate the manners of

\textsuperscript{160} Badura-Skoda.
\textsuperscript{161} Butt, 52–54.
\textsuperscript{163} Friedrich Wilhelm Marpurg, \textit{Anleitung zum Clavierspiel} (Berlin: Haude and Spener, 1755), 29. “Dieses ordentliche Fortgehen wird, weil es allezeit voraus gesetzt wird, niemals angezeigt.”
non-legato/ordinary movement; “the notes in (a) are played approximately as in (b) or (c),
depending on the circumstances. If some notes are intermingled that should be held out for their
full value, then ‘ten.’ or ‘tenuto’ is written over them (d).”\textsuperscript{164}

Example 3.10. Example from Türk, 345

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>(b)</td>
<td>(c)</td>
</tr>
<tr>
<td>(\underbrace{\text{\textsuperscript{164} Daniel Gottlob Türk, School of Clavier Playing. Trans. by Raymond H. Haggh (Lincoln: University of Nebraska Press, 1982). 345.}})</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Kochevitsky (1973) also points out that in performing baroque keyboard music, “this piano
legato should, however, be a rather ‘thin’ one and should never sound like the lush, ‘fat,’ almost
overlapping legato or romantic-style playing.”\textsuperscript{165} He quotes an account by Isai A. Braudo (1896-1970) regarding Busoni’s viewpoint about performing Bach:

Busoni was the first (at the end of the 19th century) to raise an objection against the ideal
of the smooth and supple romantic legato and proclaimed, as the basic mode, the distinct
and masculine pronunciation, the non-legato touch, which, he believed, suited Bach's
style best. After Busoni, all great Bach performers bring the art of touch to a high
level.\textsuperscript{166}

It is interesting to notice that an overlap between articulation and touch can be observed
in the abovementioned accounts. Türk discussed the ordinary movement in the context of
articulation, while Marpurg discussed it from the perspective of touch. Marpurg’s account of the
ordinary-movement touch, however, is quoted by Troeger and Kochevitsky in their discussion of
articulation.\textsuperscript{167} Kochevitsky also quotes Braudo’s account of Busoni’s non-legato touch in the
section of articulation. The interchangeable context between articulation and touch suggests that
the nuances of articulation are rooted in the manners of touch. From this perspective, we start to

\textsuperscript{164} Daniel Gottlob Türk, School of Clavier Playing. Trans. by Raymond H. Haggh (Lincoln: University of Nebraska Press, 1982). 345.
\textsuperscript{166} Isai A. Braudo "Articulation" section in The Questions of the Art of Musical Performance (Moscow: Muzyka, 1969). Quoted in Kochevitsky, 38.
\textsuperscript{167} Troeger, Technique and interpretation on Harpsichord and Clavichord, 70; George A. Kochevitsky, Performing Bach's Keyboard Music, 39.
see the issue of categorizing articulation. For the sake of convenience in description, length of touch is categorized into legato, non-legato, and staccato under the topic of articulation. Nevertheless, like the relativities in nuances of touch, shadings of articulation are also relative and beyond categories. For example, it is important to know the historical connection between non-legato articulation and baroque style. However, practically speaking, knowing this piece of historical fact only makes a limited contribution to an actual performance—after all, not all the notes should be played equally non legato.

While the majority of studies discuss articulation by categories, the studies by Fuchs (1985) and Troeger (2003) further discuss relative nuances of articulation. Fuchs makes a distinction between the notated articulation and the articulation that emerges from within the composition based on compositional factors. He views the latter aspect of articulation as the relative length of a note rather than the grammatically organized terms of legato or staccato.168 Troeger also points out that “many subtle gradings are possible along the continuum of connected, barely connected, and detached notes.”169 By understanding articulation as relative length of note, Fuchs and Troegers’ viewpoint potentially suggests a synthesis of articulation, agogics, and rubato—namely, since articulation represents the relative length of a note, it means that articulation could be combined with agogics and rubato, which also deal with the relative length of notes. Considering that the three time elements are conventionally discussed separately, in chapter 6, I will discuss the synthesis of the three time-elements as part of the synthesis of interpretive elements.

Agogics and rubato are commonly discussed separately from articulation. Agogics, as defined by Troeger, is “musical emphasis made through duration rather than dynamics or other

Both Neumann and Troeger focus on the use of agogics in harpsichord performance. Troeger explains that “agogics are essential to expressive harpsichord playing and must work in conjunction with other stresses and accents such as those produced by harmonies, texture, and range.” Neumann (1993) also expresses the viewpoint that “agogic accents are of particular importance for the harpsichord and the organ, which, owing to their lack of dynamic potential, depend on such slight lengthening as their only means of emphasis and often as the best means of clarifying the meter.” Neumann further points out that “for media capable of dynamic nuances, an agogic accent will frequently be combined with a subtle dynamic emphasis.” He gives a survey of the historical accounts of agogic accent by Quantz, Türk, Leopold Mozart, and C.P.E. Bach. One of the important pieces of advice given in these historical accounts is to perform the note at the beginning of a slur a little longer and louder than the rest of the notes.

As Neumann defines it, “the term rubato means robbed: the idea then is to rob some notes of part of their value and give it to others for the sake of enhanced expression.” He quotes C.P.E. Bach’s account of rubato: “one hand seems to play against the beat while the other sounds the beat with greatest precision.” According to the historical accounts by Sylvestro Ganassi (1535) and Christoph Bernhard (ca. 1660), Neumann points out that rubato was “unquestionably practiced by soloists in all media from at least the 16th century to the present, and it is an important means of enhancing expression in slow movements and is nearly indispensable for the dynamically inflexible organ and harpsichord.” He quotes an example from Türk’s treatise (see example 3.11) to show that a rubato effect can be created by “shifting

---

170 Troeger. Playing Bach on the Keyboard, 137.
171 Ibid.
172 Neumann, Performance Practices of the Seventeenth and Eighteenth Centuries, 91.
173 Ibid., 91.
174 Ibid., 92–95.
175 Ibid., 92
176 Ibid.
of the note values in either direction.”¹⁷⁷ In the example, the notation shown in part A can be performed either by shifting the upper voice forward (shown as part B) or backward (shown as part C), depending on musical context and individual interpretation.

Example 3.11. Neumann quotes an example from Türk’s treatise, 95

Example 9.4. Türk (1789)

Troeger discusses rubato in conjunction with the rhythmic fluctuation created by means of agogic accent. In fact, he considers agogics as the simplest form of rubato, and when an agogic accent involves “stretching the overall time slightly by pushing and pulling the metric beats,” it produces a rubato effect.¹⁷⁸ He points out that “within an overall strict time frame, the accent is made by elongating the accented note and subtracting time from the next. This approach is a major component of the classic definition of rubato as a rhythmically flexing line rendered against a steady accompaniment.”¹⁷⁹ He applies the early and final versions of Bach’s Partita No. 6 to explain that the latter engages agogic accent on the downbeat of each measure to create a rubato effect.

¹⁷⁹ Ibid.
Example 3.12. Example from Troeger, 163. Bach, Partita No. 6, BWV 830, mm. 1–2:

(A) Early version

(B) Final version

While rubato and agogic accent are often integrated to create rhythmic fluctuation, there has been no sufficient discussion of rhythmic fluctuation in conjunction with articulation. Troeger’s account represents one of the few that points out the relation between articulation and agogics in the context of harpsichord playing. He explains:

Silence before a note will give it emphasis; covering it by varying degrees of overlapping legato will deemphasize it. Such articulations and a varied scheme of agogic accents, working in conjunction with the dynamics of texture and relative harmonic and linear stresses, form the harpsichordist’s primary expressive means.  

In this account, articulation and agogics are viewed as the time-elements in relation to the volume-element of dynamics. However, there is no further discussion to explore how articulation can integrate and interact with agogics from the pianistic perspective.

The separate focus on articulation on the one hand, and agogics and rubato on the other hand, potentially limits one to explore rhythmic nuance in an interpretation, which represents an issue particularly for the modern pianist. The practice of inserting articulation and creating subtle rhythmic fluctuation in relation to figure contour, metrical structure, and harmonic content is

---

180 Troeger, Playing Bach on the Keyboard, 41.
essential for performing on the harpsichord. However, such practices are generally less familiar to the majority of modern pianists, who receive no training on the harpsichord. The separate focus on articulation, agogics, and rubato inevitably prevents the pianist from further exploring subtle manipulations of relative length of notes and nuances of rhythmic fluctuation. Chapter 6 will be devoted to the technical issues of integrating the time elements, as well as that of synthesizing the time elements with the dynamic element.
Chapter 4. Complementary Relations between Notes

The meaning of fugue changed between the sixteenth and eighteenth centuries.\(^{181}\) In addition to Alfred Mann’s account (1987), which is previously quoted in section 3.1, Paul Mark Walker (2000) also explains that fugue was understood as imitative texture in the sixteenth century rather than a type of composition.\(^{182}\) Whether the term fugue describes imitative texture or a form, it has been considered as a “highly learned element of composition” since the sixteenth century.\(^{183}\) From a performance perspective, the highly learned element of composition increases the interpretive challenge of fugues. This study suggests that interpreters draw inspiration fundamentally from rhetoric instead of merely adopting the clichés “bringing out the subject” and “independence of individual voices.”

Both Butler and Bartel quote the sixteenth-century composer and theorist Johannes Stomius, who remarked that “mimeses or fugae are ingenious constructions, in which one and the same voice is successively sung by other voices which are delayed by a specified interval of time (1536).”\(^{184}\) Regarding Stomius’ reference to fugue as “Mimeses”—a rhetorical device of repetition—Bartel explains, “mimesis in this context refers to imitation.”\(^{185}\) Butler discusses the manners of imitation/ repetition. He quotes a sixteenth-century account by Anonymous of Besançon:

---

\(^{181}\) See the quote by Alfred Mann on page 51.

\(^{182}\) According to Paul Mark Walker, in the sixteenth century “a piece constructed in the sixteenth-century motet style proceeds as series of imitative sections—called points of imitation today but fugues by many musicians of the period—which overlap to form a seamless composition.” Paul Mark Walker, *Theories of Fugue from the Age of Josquin to the Age of Bach* (Rochester, University of Rochester Press, 2000), introduction.


\(^{185}\) As Bartel explains, in the Middle Ages, the meaning of mimesis accords with “imitation,” which is fundamentally distinct from the earlier concept of mimesis, namely, music’s capacity to affect ethos, not the mere imitation of sounds (*Plato: Laws*, ii, 669e–670a; cf the Aristotelian Problems, xix.15).” 277.
The first figure is called *plókè* in Greek, *copulatio* in Latin. But among singers, it is now commonly referred to as *fuga*. It is however *ploce*, a parallel repetition of similar tones in a certain way, that is, a uniform or like comparison [collatione] of parts corresponding to one another.\(^{186}\)

Butler explains that *ploce*, *copulation*, and *collatio* all refer to different manners of repetition. He then discusses the logical procedure of fugue by specifically focusing on the word *collatio* (collatione).\(^{187}\) The word *collatio* implies “comparison” in Medieval Latin.\(^{188}\) Butler takes this definition and makes a further statement:

Comparison (*collatio*), the process by which similarity or dissimilarity is established, is of course one of the most basic procedures in logical reasoning…. *Collatio* is itself a rhetorical device, a procedure involving a comparison made between two analogous elements, as the result of a logical sequence in which a similitude is developed to a full comparison.\(^{189}\)

Butler’s account suggests that the rhetorical device of *collatio* represents a logic of establishing relations between analogous elements. In the context of musical composition, we can observe the embodiment of this logic in the rules of species counterpoint, which systematize intervallic and rhythmic relations between notes in both horizontal and vertical dimensions. By profoundly engaging these rules, studies of species counterpoint and fugal compositions, in a way, represent practical realizations of this rhetorical device in theoretical and compositional contexts, respectively. On the other hand, however, this rhetorical device is very much neglected from a performance perspective. Existing approaches of performing fugues mainly focus on the surface features of subject entries and independent voices in fugues, instead of looking into the compositional logic that fundamentally characterizes fugues. By contrast, this study draws

---

\(^{186}\) Butler, 51. The term *figure* and *device* are used interchangeably in a rhetorical context. Roman rhetorician Quintilian (c. 35 – c. 100 CE) defines rhetorical *figure* as "a conformation of our speech altered from the common and obvious usage .... A figure is therefore a new and artful manner of speech." This definition is different from the other meaning of *figure* in the musical context as a set of notes. For the sake of clarity, the present study uses *device* to indicate the application of rhetoric in composition; the term *figure* is used to indicate a small group of notes.

\(^{187}\) In Latin, *collatione* is the ablative singular of *collatio*.

\(^{188}\) *Dictionary of Medieval Latin from British Sources*, s.v. “collatio.”

\(^{189}\) Butler, 52
interpretive insights from the rhetorical device of *collatio* and proposes an idea of *note-level complementary relations* as a means to interpret compositional details at the note level in a fugue.

4.1. Note-Level Complementary Relations

The idea of note-level complementary relations aims to create musical relationships between notes by differentiating their nuances in a way that complements each other. By analogy, the idea of differentiating notes to create musical relationships can be understood as differentiating the elevation between two points on a water channel. When one point is higher than the other, the water flows to the lower point, which creates a directional relation between the two points. With no difference in elevation between the two points, water will remain still and no directional relation between the two points would be created. Similarly, when two notes are interpreted differently, a perception of musical relationship will be created between the notes. On the contrary, with no differentiation between notes, the musical relationship between notes will not be present. In a fugue performance, this is how one could create relations between notes, both horizontally and vertically, in order to illuminate the counterpoint. Without sufficiently differentiating the nuances between notes, the relations between notes—therefore the affect of counterpoint—would be weakened.

The compositional complexity of fugues calls for subtle musical nuances in interpretation. Sometimes the difference between two notes can be so subtle that one could only tell that they are interpreted differently, but it may be difficult to determine which one is louder, softer, longer, or shorter than the other. In fact, it is possible that one note could simultaneously convey seemingly contradictory expressions. This is because a note often exists in multiple compositional contexts, and each context could suggest different nuances that might contradict each other. For example, a note could be emphasized by metrical structure, but de-emphasized
by intervallic contour. Logically speaking, every note in any piece could be observed in multiple contexts and might convey multiple expressions. However, a texture characterized by a clear melody-accompaniment hierarchy will likely reinforce stereotypical compositional treatments, such as the flow of a melody, and reduce the perception of multiple contexts. Fugues, on the other hand, do not feature melody-accompaniment texture. When a note in a fugue is observed in multiple contexts, it could be an oversimplification to choose one way or the other in interpretation—after all, the multiple contexts could create sophisticated relationships between notes and reinforce the counterpoint. One ought to carefully consider and integrate the different nuances suggested by different compositional contexts.

Example 4.1 compares the initial G and E♭ in the opening subject of the C-minor fugue from *WTC* II. The example demonstrates that a note could simultaneously convey several expressions that seem to contradict each other.

Example 4.1. Fugue in C minor, *WTC* II, BWV 871, m. 1

Compared to the initial G on the afterbeat, the metrical structure emphasizes the E♭ that falls on the stronger beat 2. In terms of the voice leading, the G is emphasized because it initiates the subject and the third-progression G-F-E♭ (♯5-4-3). And yet, the E♭ on beat 2 generates a sense of harmonic stability by anticipating the E♭ on the downbeat of measure 2, the local destination of the third-progression. Considering the intervallic contour, the descent G-E♭ adds tension to the higher pitch G. The change of direction on beat 2 adds tension to the E♭; and yet the ascending
motion after the E♭ turns it into a low point with less tension. All these different compositional contexts suggest nuances that contradict each other, and they are all equally important. One ought to carefully integrate the different expressions suggested in various contexts and create a sophisticated differentiation between the G and E♭. While no description can actually convey the subtle difference between these two notes, it might be relevant to describe that, compared to the offbeat G, which initiates the subject and the third progression, the E♭ on beat 2 is lower in tension but not softer; it carries more harmonic stability but is not louder. One could create this impression by increasing the rounded quality in the tone of the E♭ without increasing its volume. Chapter 6 will further discuss the technical issues of producing roundness of tone by manipulating the speed and timing of finger movement.

In practice, in order to observe the subtle differentiation between notes, it could be very helpful to visualize the musical tension along the voice contours in a fugue, so that one could closely observe the differentiations in musical tension that constantly vary at the note level. In the visualization, one could perceive sound—the physical sound or the sound in one’s inner hearing—in the form of energy, which travels through notes of a voice. As the energy travels through each note, one perceives musical tension that increases or decreases depending on one’s interpretation of the rise or fall of each voice’s contour. Although one voice contour is basically visualized as a single flow of energy, sometimes the energy passed through a note could last even after the note is completed and the energy flows onto the following note: it is as if one energy flow temporarily splits into two. This visualization is created when one voice is split into two parts. Taking the abovementioned third-progression G-F-E♭ in the C-minor fugue as an example, the musical tension of the G, F, and E♭ lasts beyond their written values and creates a perception of a third-progression in addition to the literal voice contour. In the context of a fugue,
one would visualize multiple voices as multiple flows of energy, which vertically interplay with each other and create all sorts of nuances of harmonic and rhythmic tension between voices.

### 4.2. The Four Perspectives of Note-Level Complementary Relations

Complementary relations between notes can be systematically explored by observing intervallic and rhythmic contours in horizontal and vertical dimensions. This results in four types of complementary relations: horizontally complementary intervals, horizontally complementary rhythms, vertically complementary intervals, and vertically complementary rhythms. It is helpful to discuss each type in reference to species-counterpoint rules. Firstly, these rules systemize the rhetorical device of *collatio*, and hence provide an efficient context to discuss complementary relations between notes in relation to this device. Secondly, these rules heighten a focus on musical nuance at the note level. In the simple context of species-counterpoint exercises, the counterpoint demonstrates an economical use of notes that do not necessarily create a perception of musical figures. Such focus on musical nuances at the note level does not commonly stand out in one’s experience of listening to actual musical compositions, which is dominated by the perception of musical figures and phrases. However, an awareness of musical nuance at the note level is essential, for it allows one to explore differences between notes to create a perception of figures. Based on this, one can further explore musical relations between figures to create a perception of groups, and the relations between groups to create a perception of phrases.

Derived from the rhetorical device of *collatio*, which, by extension, addresses musical differentiation at the note level, an awareness of complementary relations between notes thus could provide a solid foundation for the pianist to explore and illuminate the full spectrum of a fugue. Through practicing with this awareness, one would be able to illuminate not only the subject without ignoring other voices and each voice’s musical continuity without sacrificing the
interaction between them, but also the musical complexity of displaced metrical emphases and irregular phrasing that often occur in fugues. As examples 3.4 and 3.5 in chapter 3 demonstrate, one’s metrical perception of the subject entry is established when the subject in each voice enters on the same metrical position in an exposition. Thus, when the subject later enters on a different metrical position, the established metrical perception of the subject entry would lead one to reinterpret the notated metrical position of the subject, resulting in shifts of metrical emphasis and irregular phrasing. As the subject can enter on different beats in different voices, such conflict between notated and perceived metrical structures and irregular phrasing occurs frequently in fugues, and will be solved by an eventful musical figure that reinterprets a metrically displaced beat back to a metrically correct beat. The issue of irregular phrasing resulting from a metrically displaced subject is a huge topic and can be discussed with reference to Lerdahl and Jackendoff’s *A Generative Theory of Tonal Music* (1983). Without theoretically analyzing the issues in depth, the pianist could pay close attention to the complementary relations between the subject entries and other voices, which will enable one to appropriately observe and nuance the musical emphases in response to the complexity of phrasing in a fugue performance.

The following sections will organize the four types of note-level complementary relations into two large sections—horizontally complementary relations and vertically complementary relations—and discuss each type in reference to corresponding species-counterpoint rules. The four types are discussed separately for the sake of clarity. In practice, all four types are inseparable and ought to be considered together to make interpretive decisions.

---

190 See section 3.2., examples 3.4 and 3.5, in chapter 3.
4.3. Horizontally Complementary Relations between Notes

Horizontally complementary relations describe intervallic and rhythmic relations between notes in a single voice. The idea could be initially understood in relation to Salzer and Schachter’s idea of *horizontalization* (1969), which describes a process of horizontalizing a chord into linear intervals to spell out the components of vertical harmony:

The basic idea of chord prolongation is the elaboration in time of a governing vertical sonority—a chord or an interval. Chord prolongation can be achieved by means of several techniques. The most significant of these techniques is the *horizontalization* of intervals belonging to the prolonged chord. When an interval is horizontalized, its tones unfold against a background determined in the vertical dimension by the governing sonority of which it is a part. Horizontalization, therefore, draws into close interrelation the two dimensions of music, the vertical and the horizontal.¹⁹²

The idea of horizontalization focuses on horizontal intervals in relation to harmony. This idea raises one’s awareness of illuminating the intervallic relations between notes in a voice. Looking beyond the harmonic nature, the concept of horizontalization can broadly describe the horizontal relations between musical events other than harmonies. Like a vertical sonority such as a chord or interval, which can be horizontally unfolded, a chosen time-span or a beat can be hierarchically subdivided into horizontally unfolded rhythms, as will be explained in section 4.3.2 (see figure 4.2). In other words, the idea of horizontalization can also point to complementary relations between different lengths of tones in a voice. From a performing perspective, the idea of horizontalization thus can raise a performer’s awareness of both intervallic and rhythmic relations between notes in a voice. The following sections will discuss the intervallic and rhythmic perspectives separately.

4.3.1. Horizontally Complementary Intervals

The idea of horizontally complementary intervals is compositionally demonstrated by the species-counterpoint rules about creating a natural and singing line through manipulating the sizes and directions of intervallic motions. In general, “in the horizontal dimension the stability of an interval depends upon size as well as upon consonance or dissonance; a melodic tenth has much more tension than a melodic third.”\textsuperscript{193} The cantus firmus is advised to contain predominantly stepwise motion for the sake of continuity; disjunct motion is added sparingly, only to add variety. Paired eighths in the fifth species are also required to move by step for the sake of continuity. Changing melodic directions “helps to create variety.”\textsuperscript{194} It is advised that “skips of a third can be continued in the same direction” and “leaps larger than a third should be followed by a change of direction, preferably in stepwise motion.”\textsuperscript{195}

In reference to the species-counterpoint rules that concern intervallic nuances at the note level, the idea of horizontally complementary intervals raises the pianist’s awareness of nuancing horizontal intervals in relation to their constantly changed sizes and direction. As the species-counterpoint rules suggest, small intervallic moves and continuous motion generate musical stability, while larger intervals or changing direction could increase musical tension, which calls for detached articulation or an increase of dynamic tension in interpretation. On top of this general understanding, it is important to further consider voice leading in order to appropriately interpret the complexity of intervallic contours in Bach’s fugues. Unlike classical and romantic music, which often features large musical gestures, the figure contours in Bach’s music are rather irregular and complicated. As Kirkpatrick writes (1984):

\textsuperscript{193} Salzer and Schachter, 4.
\textsuperscript{194} Ibid., 7.
\textsuperscript{195} Ibid., 6.
The difference is quite striking between a Bach melody and a melody of the nineteenth century, or even an Italianate cantilena of one of Bach's contemporaries such as Handel. Probably the reason for this difference is to be found in the essentially crystalline structure of the Bach melody. The elements that compose it, as well as the details that elaborate it, retain their identity. They do not flow imperceptibly into one another like certain forms of liquids and semi-liquids. The Bach melody is composed of large crystals with accretions of smaller crystals, which remain distinguishable, even when overlapping or interfused.\footnote{Kirkpatrick, 61.}

While Bach's preludes sometimes involve regular musical gestures throughout a piece—such as the preludes in C major and C-sharp major from \textit{WTC} I and the prelude in G major from \textit{WTC} II—Kirkpatrick's concern about complicated melodic contour is particularly evident in the fugues from \textit{WTC}. The voice contours in these fugues feature figures that are short in length and frequently change melodic direction. Illuminating the irregular and complex melodic contour thus requires one to carefully consider voice leading.

By considering voice leading, the conventional understanding of increasing musical tension in relation to larger intervals and changing direction is shown to be too simple. On the one hand, the conventional understanding is appropriate when a larger interval or changing direction marks an important musical event such as shifting register, variation in texture, or significant change of harmonic expression. In such cases, creating a noticeable difference of musical expression—by means of manipulating dynamic nuance and/or rhythmic fluctuation—could sufficiently raise musical tension.

On the other hand, there are times when larger intervals do not call for greater musical tension. This may happen when a larger interval or change of direction serves the purpose of splitting a voice into two parts to enrich the voice leading. Taking the abovementioned opening of the C-minor fugue as an example, the fugue subject spells out a C-minor chord in part through a third-progression G-F-E♭ (\hat{5}–\hat{4}–\hat{3}).
Example 4.2. Fugue in C minor, *WTC* II, BWV 871, m. 1

The C on beat 3 completes the C-minor triad. Nevertheless, in relation to the third-progression, this C is perceived as an inner voice or even as the bass voice. Therefore, even though the descent G-C represents the largest intervallic motion in measure 1 on a strong beat, it ought to be interpreted with less tension in order not to disturb the dynamic continuity between the main notes G-F-E♭. In fact, considering that larger intervals could easily generate more tension than smaller intervals, this fifth on a strong beat would require greater de-emphasis than the stepwise motion on beat 4 in order not to disturb the continuity of the voice leading.

In example 4.2, further nuance can be realized by observing the interaction between the third-progression and the metrical structure. Taking the comparison between the initial G and the G on beat 3 as an example, even though the initial G harmonically marks the beginning of the third-progression, in practice it is more appropriate to give more emphasis to the second G on the stronger metrical position. The emphasis on the second G not only reinforces the metrical structure, but also the perception of the third-progression at a steady quarter-note pace.

4.3.2. Horizontally Complementary Rhythms

The idea of horizontally complementary rhythms is demonstrated by the rules of fifth-species counterpoint. Fifth-species counterpoint combines half notes, quarter notes, paired eighth notes, and tied (syncopated) notes. By expanding rhythmic diversity, the teachings of the fifth species concern well-balanced rhythmic variety and unbroken rhythmic continuity by avoiding
excessive use of the same rhythmic pattern. The rules also focus on the interaction between rhythmic figures and metrical structure, which suggests avoiding a contradiction between rhythmic emphasis and metrical emphasis. As Salzer and Schachter explain, “the long values most naturally coincide with the strong pulses, the short values with the weak pulses”; “pair of eighths may appear only on the second or fourth quarter.”

The rules of the fifth species represent a compositional focus on the complementary interrelations between rhythmic stability associated with long notes on strong beats, and rhythmic mobility associated with short notes on weak beats. By drawing inspiration from the teachings of the fifth-species counterpoint, the idea of horizontally complementary rhythms raises the performer’s awareness of musical nuances in relation to note value and metrical structure in order to illuminate the complementary interrelations between rhythmic stability and mobility. Kirkpatrick (1984) provides useful insights regarding illuminating rhythmic nuance in relation to note values. He points out that it is important for performers to pay attention to the moments when the note value changes, because “a regular series of even notes, except as qualified by melody and harmony, is unlikely to be particularly eventful.” He then discusses the difference between moving from fast (notes of short value) to slow (notes of long value) and from slow to fast. He explains that the progression from fast to slow marks a diminution of momentum while progression from slow to fast creates momentum.

Lerdahl and Jackendoff’s study (1983) provides insights regarding rhythmic nuance in relation to metrical structure. They use the illustration below to explain the idea of metrical

---

197 Salzer and Schachter, 103.
198 Kirkpatrick, 70.
199 Ibid., 70–72. Kirkpatrick explains that when moving from fast to slow, it is with the second of the slower notes that one becomes aware of the change of the rhythmic speed, “because with the first of them it has not yet become apparent that one is going to slow down.” And when moving from slow to fast, the preparation takes place before the first note of faster speed.
hierarchy: “at the smallest level of dot the first, second, third, and fourth beats are all beats; at the intermediate level there are beats under number 1 and 3; and at the largest level there are beats only under number 1.”

They further point out:

The principle of recursion says that the elements of metrical structure are essentially the same whether at the level of the smallest note value or at a hypermeasure level (a level larger than the notated measure). Thus the pattern in 2.7a (as shown above) not only expresses 4/4 meter, but could apply equally to a sequence of 16th notes or a sequence of downbeats of successive measures.

Based on this understanding, figure 4.2 shows metrical pulses in relation to hierarchies of beats in the case of 4/4 meter; the figure represents the modern conception of 4/4 meter, which begins with Kirnberger as far as theory is concerned.

---

200 Lerdahl and Jackendoff, 19.
201 Ibid., 20.
Figure 4.2. Diagram of metrical pulses in relation to metrical positions and hierarchies of beat

In the diagram, the quarter-note level represents the beat-level that defines the four metrical pulses—strong, weak, secondarily strong, and weak. Within each quarter-note beat, the eighth-note level involves further subdivision of a strong–weak metrical pulse. Similarly, the levels of triplet and sixteenth note involve further subdivision of the metrical pulse. The diagram shows that the rhythmic nuance of a note is determined by its position at the beat-level, which defines the meter, as well as its position at the subdivision-level equivalent to its own value. For example, at the eighth-note level, the second eighth note within beat 2 would generate a different nuance from the second eighth note on beat 3. The two eighth notes locally involve the common metrical position—the second eighth note within a quarter-note beat—at the eighth-note level, but different metrical positions—beat 2 and beat 3—at the quarter-note level. The diagram also shows that compared to a rhythmic figure that consists of notes of the same value—engaging the metrical hierarchy at a single level—a rhythmic figure with notes of different values engages multiple levels of the hierarchies, which complicates one’s rhythmic perception. This explains
why rhythmic figures with changes of note value generate greater rhythmic tension than those with the same note value.

The above discussion of figure 4.2 shows that one could explore rhythmic nuances from two perspectives: the metrical positions that horizontally define beats, and the vertical hierarchies of metrical subdivision in relation to different note values in rhythmic figures. This understanding could encourage one to nuance rhythmic figures in great detail. On the one hand, according to fifth-species rules, combinations of a longer note on the strong beat and a shorter note on weaker beat, such as \( \text{and } \), represent the norm. From this perspective, the rhythmic figures \( \text{and } \), by engaging equal note value between stronger and weaker beats, differ from the norm and could generate additional musical tension. On the other hand, changes of note values engage multiple levels of metrical hierarchy, which also generate musical tension. From this perspective, the rhythmic figures \( \text{and } \) would generate additional musical tension compared to the figures \( \text{and } \).

The two perspectives seem to contradict each other. Nevertheless, it would be more appropriate to understand that the two seemingly contradictory perspectives complement each other and can be integrated in practice. Taking the subject of the C-minor fugue from \( WTC \) II as an example (see example 4.2), the subject consists of the rhythmic pattern \( \text{. The paired sixteenth notes on beat 4, on the one hand, present a standard rhythmic treatment of placing short notes on a weaker beat, which implies no additional musical tension. On the other hand, the sixteenth-note figure marks a change of note value in this context, which suggests an increase of musical tension. In practice, by considering these two perspectives, one would appreciate the musical interest of shifting from steady eighth-note rhythm to sixteenth-note} \)
rhythm; simultaneously, the attention to the sixteenth-note figure will not cause unnecessary tension on the weak beat toward the end of the subject.

4.4. Vertically Complementary Relations between Notes

In order to explore this idea, it is necessary to explain the vertical interrelation between voices, for its importance does not sufficiently stand out in the conventional teachings of fugue performance. Examples 4.3A and 4.3B show two passages from the C-major fugue in *WTC II*. The top voices in these two passages are identical. However, the bass in example 4.3B results in different vertical interrelations between voices and therefore different interpretations of the top voices between the two passages.

Example 4.3. Fugue in C major, *WTC II*, BWV 870, mm. 7–8 and 53–55

4.3A                                                                      4.3B

The passage in example 4.3A, without bass, presents a lighter texture and character than the passage in example 4.3B. In this case, the ascending figure in the middle voice can reinforce the elegance of a light texture by adopting an articulation shifting from legato in the first half of measure 7 to staccato in the second half of the measure. This interpretation is complemented by a legato articulation in the top voice and a subtle decrescendo along the ascending figure in the middle voice. Unlike passage A, passage B contains a bass that establishes a cadence in measures 54–55. In order to increase musical tension toward the cadence, the ascending figure in the middle voice now engages legato articulation with a crescendo. The legato middle voice is
then complemented by two-note slurred figures in the top voice, which help to increase rhythmic activity and musical tension.

By paying attention to the vertical interrelation between voices, it becomes clear that the differences between voices are designed to complement each other. For example, the moving directions of different voices are often non-parallel; larger intervallic motions often counterbalance smaller intervallic motions; notes with longer value tend to counterbalance notes with shorter value. These differences between voices all call for interpretation of complementary relations. Moreover, with an awareness of vertically complementary relations, one could create complementary interrelations between voices even when notational differences are not obvious. Example 4.4 shows a passage from the same fugue in which the two voices engage parallel contour in the second half of each measure. Nevertheless, the parallel figure contour can be differentiated by means of interpretation.

Example 4.4. Fugue in C major, WTC II, BWV 870, mm. 33–36

One can apply measure-long slurs with continuing dynamics to interpret the voice with continuous sixteenth-note figures (the middle voice in measures 33 and 35, the top voice in measures 34 and 36), and two-note slurs with more frequent dynamic inflections in the other voice.

When one pays attention to the vertical differentiations between voices, notes and figures can be better perceived because they are enhanced and supported by their simultaneous counterparts that are carefully nuanced. Consequently, the effect of counterpoint will be better
illuminated. The idea of vertical complementary relations thus can complement the common practice of illuminating the independence of individual voices by encouraging one to pay attention to the interrelations between voices. It also complements the practice of bringing out the subject by encouraging the performer to explore the balancing relation between voices and avoid focusing only on the subjects. The following sections will discuss the intervallic and rhythmic perspectives of vertical complementary relations separately.

4.4.1. Vertically Complementary Intervals

The idea of vertically complementary intervals concerns the musical expression created by intervallic relationships between voices. The idea is demonstrated by the species-counterpoint rules about the relative motion and intervallic distance between voices. As Salzer and Schachter point out, “the different consonant intervals (between the parts) possess varying degrees of stability, and the dissonances possess varying degrees of tension.”202 Based on the mutual relation between intervals and musical tension, they suggest that, for the sake of variety, “the student of counterpoint should try to make use of all the available types of relative motion between two voices: similar, parallel, contrary, and oblique…. Contrary motion should predominate slightly because of its ability to promote independence.”203 In addition, in order to make sure each voice can interact effectively, the distance between voices is advised not to exceed a tenth; “only for the sake of an important melodic event should wider spacing occur—and then, only temporarily.”204

In addition to the teachings of species counterpoint, the focus on vertical intervals and their harmonic nuance at the note-level can be also seen in Salzer and Schachter’s

---

202 Salzer and Schachter, 13.
203 Ibid., 17.
204 Ibid., 19.
The abovementioned account of “horizontalization.” They explain: “the process of horizontalization is by no means confined to a single melodic line. In textures of two, three, or more parts, horizontalized intervals can unfold simultaneously in several voices.”205 The focus on vertical unfolding of horizontalized intervals between voices describes an awareness of the note-level harmonic nuances of vertical intervals within a larger harmonic context—namely, the harmonic expression of a chord as a collection of notes. For example, in the excerpt in example 4.4, each measure can be summarized by one harmony: $I_6$, $V_4^6$, $I_e$, $IV_4^6$. Within each harmony, the harmonic nuance of vertical intervals, however, changes every sixteenth-note beat.

The focus on note-level harmonic nuance is well explored in theoretical and compositional contexts; however, it does not receive much discussion in modern studies on baroque performance practice. These studies commonly discuss harmonic nuance from the perspective of Roman-numeral analysis, an analytical method that collectively identifies the harmonic function of a group of notes rather than momentary changes of harmonic nuance at the note level. Kirkpatrick (1984) describes an issue of applying Roman-numeral analysis to analyze Bach’s harmony:

In analyzing Bach’s harmony, it is preferable to label chords in terms of eighteenth-century figured bass, without adding the Roman numerals that are customary to nineteenth- and twentieth-century harmony treatises. These are better reserved for indicating areas of tonality in terms of the piece as a whole.

The levels of harmonic intensity are affected by many influences. Harmony has a way of spilling over into its surroundings. Even when every chord has been identified, as well as every component note and every decoration, the total effect of the harmony in the context of a piece is still far from having been explained. But, as with melody, there is one sure method, and that is the vocal approach, either real or imaginary. It will usually indicate a great deal more than any amount of theorizing.206

205 Salzer and Schachter, 144.
206 Kirkpatrick, 93.
By criticizing Roman-numeral analysis for its inability to explain the expression of harmonies, Kirkpatrick suggests applying figured-bass analysis and a vocal approach. Both approaches are more capable of expressing harmonic nuance at the note-level than Roman-numeral analysis; however, Kirkpatrick does not further focus on note-level harmonic nuance. As section 3.3 explains, he discusses the expression of harmonies in the context of a harmonic reduction of the C-major prelude from *WTC* I, and suggests that “a very simple way of examining one's feeling for the harmony of a given passage is to take pairs of successive chords and determine which within the context is more and which less intense.”

A harmonic reduction may summarize harmonic nuance and reinforce one’s perception of harmonic progression and musical direction in a performance. Nevertheless, in the context of fugues, one of the fascinating beauties is the subtlety and complexity of intervallic interrelations between voices that are constantly manipulated by means of counterpoint. In a performance of fugues, it is therefore crucial to pay attention to the momentary harmonic nuances as much as the large-scale nuance of harmonic progression. Example 4.5 shows a simple example of interpreting harmonic nuance based on the intervallic interrelation between voices. In this example, each repeated G in the top voice calls for a different nuance in response to an increasing musical tension resulting from the increasing size of the vertical distance between the two voices, as well as the dissonant horizontal interval between beat 1 (B♭) and beat 3 (E) in the bass.

Example 4.5. Fugue in G minor, *WTC* II, BWV 885, m.8

---

207 Kirkpatrick, 94.
Besides applying a crescendo, articulating the repeated Gs differently could efficiently illuminate the increase of musical tension and add musical interest. One could lengthen the first two or three Gs to enhance the connection between them; the smooth effect in soft dynamics could reinforce the closeness between voices. One then gradually shortens each successive G; the increasingly detached articulation could effectively activate the rhythmic pulse and increase the musical tension. It is worth pointing out that the Gs on beat 2 in the top voice are doubled by the Gs in the bass; the doublings between voices increase harmonic stability and decrease contrapuntal tension. Seen in the context of an overall increase of musical tension, this brief moment of harmonic stability adds further musical interest—it could represent an increase or decrease of musical tension, depending on individual interpretation—to the treble G on beat 2.

Example 4.6 shows another case of manipulating interpretation in relation to the vertical intervallic interrelation between voices. Example 4.6B shows the original content from the B-flat-major fugue in WTC II; example 4.6A shows only the top voice in the original content.

Example 4.6. Fugue in B-flat major, WTC II, BWV 890, mm. 7–9

Example 4.6A shows that without considering the lower voice, the top voice presents parallel figures in measure 7 and measure 8, suggesting a parallel interpretation between the two measures: a measure-long slur shows the parallel grouping; the two-note slurs illuminate the figures of paired eighths; and a decrescendo expresses the descending gesture. Example 4.6B
shows that by considering the intervallic interrelationship between the two voices, the interpretation of the top voice can be quite different from that shown in example 4.6A. In example 4.6B, the contrary motion between the two voices and a dissonant second on beat 3 created by the tied F both increase the harmonic tension. The tension is gradually released in m. 8 through a series of harmonic treatments—the dissonant second on beat 1; the parallel sixths on beat 2, which resolve much of the tension generated on beat 1; and the diminished fifth on beat 3 resolving through the perfect fourth at the end of measure 8 to the major third on the downbeat of measure 9. Based on these intervallic nuances between voices, a crescendo and decrescendo are applied in measures 7–8. A two-measure-long slur above the two-note slurs is added to reinforce the two-measure dynamic plan.

In light of an awareness of intervallic relations between voices, the convention of interpreting the subjects in the same manner throughout a fugue seems questionable. Considering how important the vertical interrelation between voices is to fugal composition, it seems inappropriate for the pianist to interpret the fugue subject in the same way throughout a fugue, disregarding the fact that each subject entry engages different intervallic relations with other voices. After all, a large distance between voices makes it relatively easy to distinguish important musical events, while a narrow distance increases difficulty in differentiating voices aurally and calls for more a careful consideration of voicing in performance.

Example 4.7 compares two subject entries in the D-minor fugue from *WTC II*. The comparison shows that the interpretation of the notes in the circles can vary depending on the distance between the ascending fourth in the subject and the ascending stepwise figures in the countersubject.
Example 4.7. Fugue in D major, WTC II, BWV 874, m. 3 and m. 6

In measure 3, because of the large distance (larger than a tenth) between the subject in the top voice and countersubject in the middle voice, the high A in the subject can be perceived easily. This allows one more freedom to interpret this high A. For example, one could interpret the A softly to create a sense of transparency in the high register without worrying that the soft tone would be overridden by the entry of the countersubject. In measure 6, the D in the circle is musically parallel with the circled A in measure 3. However, the interpretation of the circled D has to compromise with the narrow distance and overlap between voices. Unlike the high A in measure 3, the D in measure 6 has to be played with sufficient volume to distinguish the intervallic leap in the subject from the stepwise motion in the other voices.

4.4.2. Vertically Complementary Rhythms

The idea of vertically complementary rhythms is demonstrated by the classification of the five species of counterpoint, which is based on different rhythmic relationships between the contrapuntal voices and the cantus firmus. The first species represents the rhythmic relationship of the simplest form—note against note. The second and third species represent the rhythmic ratio of two to one and four to one, respectively. The fourth species employs suspension, which desynchronizes motions between voices. The fifth species combines the note values of the preceding species with newly added, paired eighth notes. From the perspective of performing fugues, one could be inspired by the classification of the five species and become aware of
illuminating, and even creating, musical nuance in relation to vertical rhythmic relationships between voices.

Existing studies discuss vertical rhythmic relationships between voices from different perspectives. Neumann’s study (1993) includes a section entitled “Rhythmic Counterpoint,” in which he focuses on the rhythmic counterpoint in a specific context of binary-ternary rhythmic conflicts. He suggests that “as long as the rhythms of the various voices are in the same meter, with the same subdivisions on all levels, they pose no specific performance problems.”208 Kirkpatrick (1984) and Badura-Skoda (1990) both suggest desynchronizing rhythmic emphasis between voices in order to illuminate vertically complementary rhythms. Kirkpatrick, in his discussion of “Rhythmic Polyphony,” points out that “in all good ensemble playing, rhythmic polyphony is derived from different rates of speed in different voices, and from non-simultaneous occurrence of accents and impulses. Nothing will more effectively kill rhythmic polyphony in performance than simultaneous accents in all parts.”209 Badura-Skoda shares Kirkpatrick’s viewpoint and uses the term “complementary rhythm” to describe the non-simultaneous occurrence of rhythmic impulses between voices.210 He applies the following example to show that “while the tension increases in one voice, it decreases in another.”211

208 Neumann, Performance Practices of the Seventeenth and Eighteenth Centuries, 135.
209 Kirkpatrick, 86
210 Badura-Skoda, 29. “Here one of the most important principles (which few performers understand) is that of 'complementary rhythm'. Good polyphonic pieces have always been composed in such a way that as a rule accents and 'non-accents' in the various voices do not coincide. Rather, with the exception of final cadences, they are staggered. This means that while the tension increases in one voice, it decreases in another.”
211 Ibid., 29–30.
Kirkpatrick and Badura-Skoda’s advice of desynchronized rhythmic interpretations provides an important insight for the pianist to illuminate complementary rhythms between voices. The advice is particularly helpful when one interprets figures that are not rhythmically differentiated between voices. As example 4.3 above shows, when voices possess the same rhythmic contour, articulating each voice differently can create different lengths between notes of the same value, which results in rhythmic differentiations between voices despite their identical rhythms.

Example 4.9 shows another case of differentiating rhythmic nuance between two voices by means of articulation. Although Bach does not write any articulation marking in this passage, the paired eighth-note figures suggest two-note slurs in interpretation as shown in the example.

However, when two voices both engage the paired eighth-note figures, executing the two-note slur in the same manner between the two voices can significantly reduce the effect of rhythmic
counterpoint. By adding two-note slur to certain figures, this study suggests to shorten and soften the second note of each slurred figures more than its counterpart without slur. In this way, one could create rhythmic differentiation between the rhythmically identical voices and different expressions of the same rhythmic figures: the slurred figures reinforce the detachments between them to produce a more lively expression; the unslurred figures reinforce the connection between them to produce a smoother expression.

Depending on individual interpretation, one can add the two-note slurs differently from what is shown in example 4.9. This study suggests adding slurs in the top voice in measures 15–16 to enhance the brightness in the high register. In measures 17–18, there are two perspectives one could consider in interpretation. On the one hand, applying the slurs in the middle voice in measure 17 reinforces the correspondence between the local voice leading E♭-D-C in measure 16 and measures 17–18; the notes are shown with extended beams. On the other hand, applying the slurs in the bass in measure 17 could favor the cadential pattern in measures 17–19 and the syncopated B♭ in measure 19, reached by an octave leap. The cadence, octave leap, and syncopation in measures 17–19 increase the musical tension, which is continuously carried on in measure 20 by the double thirds in the upper voices and the contrary motion. Applying the two-note slurs in the bass in measure 17 therefore could favor an overall increase of musical tension and reinforce the musical direction in this passage. In practice, the two perspectives do not actually contradict each other and can be integrated. In fact, by being aware of the two perspectives, one would hear the details related to both perspectives. It would be rather difficult to only illuminate one perspective but not the other.

The idea of vertically complementary rhythms encourages one to explore not only rhythmic differentiations between voices, but also the harmonic nuance as manipulated by
rhythmic counterpoint. Example 4.10 shows how a rhythmic configuration can affect harmonic nuance in a simple context. In this passage, every G has the same harmonic function: the fifth of a C chord. However, one could imagine that the musical tension gradually increases toward the quarter-note G, as if the expression of G and the sonority of the C chord grow more intense. Since the Gs and the C chord are harmonic events, we can say that their harmonic nuances change in this passage, even though the source of the nuance is rhythmic.

Example 4.10. Interaction between rhythmic configurations and harmonic nuance

This simplified example demonstrates that a longer-value tone can generate more musical tension than a shorter-value tone; hence the harmonic event coinciding with a longer-value tone will create more harmonic tension than that with a shorter-value tone. Similar is the interaction between metrical position and harmonic nuance. The harmonic event on a stronger beat can often create a stronger harmonic impact than that on a weaker beat, but the harmonic event on a weaker beat can be also emphasized by its syncopated rhythm. Based on this understanding, an attention to rhythmic counterpoint can make one explore not only vertical differentiations of note-values, but also harmonic nuances affected by rhythmic counterpoint. Example 4.11 demonstrates how rhythmic counterpoint can affect the tension of a harmonic event. The excerpts show the first three subject entries in the exposition of the C-minor fugue. In measure 1, the two Gs are equivalent in harmonic function; both represent the fifth of the tonic chord. However, the G on beat 3 falls on a stronger beat than the initial G, which creates a harmonic tension increasing toward beat 3. In measure 2, the harmonic tension also leads to the D on beat 3. It is not only because beat 3 presents the highest note in this subject entry, but also the
rhythmic shift in the middle voice from eighth notes on beat 2 to quarter note on beat 3.

Compared to the eighth-note figure on beat 2, the longer note value on beat 3 in the middle voice adds musical tension to the harmonic event D in the top voice.

Example 4.11. Fugue in C minor, WTC II, BWV 871, mm. 1–2 and m. 4

Unlike the subject entries in measures 1 and 2, when the subject enters in the bass in measure 4, the harmonic tension is shifted to the E♭ on beat 2. It is due to the syncopated C in the middle voice, which raises the musical tension on beat 2 and increases the tension of the harmonic event E♭ in the bass. By comparison, if the half-note C in the middle voice were replaced by two quarter-note Cs, one would interpret the bass differently by leading the musical tension to the G on beat 3 (a stronger beat) instead of the E♭ on beat 2. One might argue that the beat 3 in the soprano, a quarter note following a series of sixteenths and eighth notes, raises the musical tension and might give a reason of favoring beat 3 in the bass. Nevertheless, compared to the syncopated half note in the middle voice, the quarter note in the soprano on beat 3 comes afterward and is shorter in length, which represents a weaker rhythmic event and does not significantly affect the harmonic event in the bass.212 Here, by observing how the rhythmic configurations in the upper voices can (or cannot) affect the harmonic tension in the bass, we can

---

212 Harmonically speaking, another reason of favoring beat 3 in the bass is the 6/4 chord on beat 3, where the perfect fourth between the lower voices adds harmonic tension. However, neither is this interval of a fourth strong enough to take the harmonic tension away from beat 2. Seen in the context of an overall descent at the end of the exposition, this fourth, like the tritone on beat 4, enriches harmonic nuance without particularly increasing musical tension.
say that the out-of-phase harmonic tension between the soprano on the one hand and the middle voice and bass on the other hand is caused by vertically complementary rhythms.

While any rhythmic treatment can impact the expression of a harmonic event, syncopation and suspension deserve further discussion. The Oxford Grove Music Online Dictionary defines syncopation as “the regular shifting of each beat in a measured pattern by the same amount ahead of or behind its normal position in that pattern.”

Resulting from a shift in the metrical position of a rhythmic figure, a syncopation can complicate the intervallic relations between voices, creating a different harmonic nuance. Examples 4.12A and 4.12B show how the syncopated C in the tenor voice could affect the harmonic tension in this measure.

Example 4.12. Fugue in C minor, WTC II, BWV 871, m. 20

4.12A. With a tie between beats 2–3

```
20
```

4.12B. Without a tie between beats 2–3

```
20
```

Example 4.12A shows the original content with a tie between beats 2 and 3; this tie turns the C in the tenor voice into a syncopation. Example 4.12B shows an altered version without the tie. By comparison, the syncopated C in example 4.12A adds musical tension on the tonic harmony on beat 2; without the syncopation, the subdominant harmony on beat 3 will receive emphasis due to its metrical placement on a stronger beat. This case is similar to the syncopated C in example 4.11, measure 4.

---

In practice, illuminating the expression of syncopation engages the following points. First, the tone that initiates the syncopation requires sufficient volume to sustain its sound. Second, a syncopated note is supposed to reinforce musical tension; however, a longer syncopation—for example, the syncopated C in measure 4 of example 4.11 and that in example 4.12A—will inevitably decay during its time-span. It is thus important to nuance the active voices in a way that could help to sustain musical tension. For example, in order to sustain the musical tension generated by the syncopated C in example 4.12A, one ought to sufficiently illuminate the rising fourth between beats 2 and 3 in the bass, the chromatic ascent E♭-E♯-F in the alto, and the syncopations in the soprano. The syncopations in the soprano and alto illustrate a complementary rhythm of unbroken sixteenth notes throughout measure 20; nevertheless, one must carefully avoid making the notes that belong to different voices sound as one voice, as shown as example 4.13. Third, the musical tension raised by a syncopation requires a resolution on the succeeding note. One must carefully figure out the tone of the succeeding note in order to create musical continuity between the end of the syncopation and the following note. A succeeding note with any inappropriate accent, which can be produced by means of excess volume or directness in touch, would fail to complete the expression of a syncopation.214


Suspension is defined as “a dissonance configuration in which the dissonant or non-harmonic note is tied over from the previous beat (where it is consonant) and resolved by step,

---

214 Chapter 6 will discuss details about the technical issues of producing rounded sound quality.
usually downwards.”

This definition points to the interaction between rhythm and harmony. In example 4.14, in the lower voices of measure 20, the parallel sixths (E♭-C and D-B♭) on beat 4 are rhythmically manipulated to form a 7–6 suspension. The dissonant seventh, combined with the dissonant second in the upper voices in the second half of beat 4, creates an impressive harmonic clash (D, C, F, G).

Example 4.14. Fugue in C minor, *WTC* II, BWV 871, mm. 20–21

At the beginning of measure 21, the three tied notes from the previous measure provide another example of the interaction between rhythm and harmony. Imagine if there were no ties and these three notes were played on the downbeat of measure 21: the striking sonority of the dissonant second in the upper voices and the augmented fifth in the lower voices will inappropriately weight the end of the descent in the top voice in measures 20–21. By understanding what an absence of ties would cause, the musical expression created by the ties becomes clear. The tied G contributes to the continuous descent between the top voice E♭-D-C-B♭-A♭-G and the alto voice F-E♭. The tied F prolongs the dissonant second and smoothens the harmonic dissonance toward the resolution. The tied B♭ results in the harmonic motion from the interval of minor sixth at the end of measure 20 to the interval of augmented fifth on the downbeat of measure 21; this shift from a consonance to a dissonance complicates the decreasing tension in the upper voices.

---

ties, which extend the lengths of these three notes, thus create smoothness and yet complexity in the harmonic resolution in the second half of beat 1 in measure 21.

In practice, the interpretation of tied notes and suspensions engages the same technical concerns that were discussed above in reference to example 4.12. One ought to sufficiently sustain the musical tension through the tied or suspended note, and carefully resolve its tension into the following tone.

Finally, the harmonic nuance of anticipation is also created rhythmically. Nevertheless, as Salzer and Schachter point out, “often the melodic tonic is anticipated at the cadential points,” it plays a less important role than syncopation and suspension. Example 4.15 shows a case of anticipation indicated by the arrow.

Example 4.15. Fugue in D minor, WTC II, BWV 875, mm. 26–27

An anticipated note intends to raise harmonic tension prior to its arrival. The separation between two repeated notes must not cause an interruption of musical flow and decrease the musical tension between notes. The concern about maintaining musical tension over a separation points to the technical issues of the timing and speed to release the first note, and that to depress the succeeding note. The techniques of manipulating the speed and timing of finger movements are crucial for putting the idea of note-level complementary relations into practice, which will be explored in chapter 6.

---

216 Salzer and Schachter, 250.
Chapter 5: Dynamic Shaping of Phrase Contour

In a fugal performance, contrapuntal texture, small musical figures, and a relatively narrow dynamic range call for subtle differentiations of melodic contours and increase the challenge of creating clear musical direction throughout a phrase. Chapter 5 will explore the issues of illuminating phrase contour by means of dynamic shaping. This issue will be examined from two perspectives: recognizing the influence of nineteenth-century approaches to dynamic shaping that ought to be avoided in a performance of Bach’s fugues, and understanding a hierarchical dynamic shaping in relation to different levels of compositional contents in order to illuminate phrase contour from the inside out.

5.1. Avoiding Romantic Influence on Dynamic Shaping of Phrase Contour

Since pianistic expression is profoundly rooted in romantic tradition, it is important to differentiate between baroque and romantic tendencies in shaping phrase contour in order to avoid intuitively adopting an anachronistic style. At the beginning of the twentieth century, when historical performance practice emerged, Albert Schweitzer made the point that “it is a false modernization to let a cadence that ends a forte section die away in a diminuendo, so as to lead over into the following piano; or to make a crescendo at the end of a piano section in order to glide imperceptibly into the forte.”217 Against the background of applying terraced dynamics in baroque music performance, Schweitzer’s criticism points out a general difference between dynamic shaping in baroque and romantic styles. The difference, however, is not further explored and clarified in later research. For example, Badura-Skoda points out that “it would of course be wrong to suppose that within a ‘terrace’ one should be inflexible in the use of forte or piano, though it would be equally wrong to introduce crescendos or decrescendos designed to

turn the terraces into slopes.” This account points out the issue of dynamically shaping a phrase contour in performing baroque keyboard music, but the passage does not clearly explain where, and in what contexts, dynamic manipulation could turn terraces into slopes and should therefore be avoided.

In order to point out the kinds of dynamic shaping to be avoided in performing baroque music, it is necessary to observe the romantic influence on pianists’ intuitive perception of dynamic shaping. An efficient approach is to look into early pedagogical editions of Bach’s keyboard music, recognize the romantic-influenced dynamic markings in these editions, and avoid these mannerisms. Busoni praised the romantic arrangements of Bach’s works, claiming they modernized the music and brought “it to full perfection.” Pedagogical editions from the mid-nineteenth century to the mid-twentieth century, such as Tausig (1869), Busoni (book I, 1894), Mugellini (1908), and Casella (1940s-50s), in a way, also reflected the nineteenth-century vision of modernization. These editions are characterized by abundant markings of the style considered modern at that time, which were later criticized by twentieth-century musicians for contradicting historical authenticity. As Badura-Skoda writes, “it hardly needs to be said that the numerous dynamic marks in nineteenth-century editions of Bach were mostly added by ignorant and sentimental ‘romantics’ acting in a wholly arbitrary manner; they should simply be ignored.”

It is, however, rather unfortunate that modern scholars and pianists abandon early pedagogical editions without learning from these editions about what mannerisms actually need

---

218 Badura-Skoda, 133.
219 Feruccio Busoni, Das wohltemperirte Clavier, Band I (Leipzig: Hoffmeister, 1894), introduction. Busoni expressed: “Outsoaring his (i.e., Bach) time by generations, his thoughts and feelings reached proportions for whose expression the means then at command were inadequate. This alone can explain the fact, that the broader arrangement, the ‘modernizing,’ of certain of his works (by Liszt, Tausig, and others) does not violate the ‘Bach style’—indeed, rather seems to bring it to full perfection.”
220 Badura-Skoda, 140
to be avoided. After all, substituting pedagogical editions with Urtext editions does not change the fact that piano performance is profoundly rooted in romantic tradition, and the purity of Urtext editions does not necessarily erase the romantic influence on a modern performance of baroque music. As a consequence, certain manners of dynamic shaping typical of romantic expression are still evident in modern performances of baroque music. From this perspective, we can understand that the markings in early pedagogical editions, though inappropriate in style, provide valuable information regarding how a romantic style of dynamic shaping has been transferred to baroque music, and therefore what modern pianists ought to avoid when performing baroque music. The following paragraphs will juxtapose passages from romantic repertoire with passages from pedagogical editions of *WTC*. The juxtapositions will show that some manners of dynamic shaping typically employed in baroque music performance are the products of romantic expression and should be avoided.

A dynamic shaping characteristic of romantic expression is the crescendo over a lead-in: the connecting passage between discrete melodic units. In the excerpt below, the crescendo across measures 26–27 shows an example. The lead-in appears between the cadential arrival on the fourth eighth of measure 26 and the entry of the following phrase in the second half of measure 27.

---

221 William N. Rothstein, *Phrase Rhythm in Tonal Music* (New York: Schirmer Books, 1989). 32, 52. Rothstein explains lead-in as connecting passage between melodic units, which represents a different method from overlap. “By its nature, the lead-in entails an overlap—specifically, an overlap between the added segment (the lead-in) and the beginning of the following phrase….it is not part of any complete phrase but merely a link between two phrases.”
Example 5.1. Chopin, Ballade no. 4, op. 52, mm. 25–28

If we disregard the crescendo, this lead-in can be heard as added material that extends the decaying effect after the end of the previous phrase. The crescendo turns this material in decay into an anticipation of the following phrase and results in an elongated arch over the two phrases instead of creating a clear separation between them.

Example 5.2 shows an excerpt from Czerny’s 1837 edition. In measure 22, the sixteenth-note figure on beats 3–4 (from the B♭ to the bass C) represents a lead-in between the two sequential statements in measure 22 and measure 23 in the upper voices.

Example 5.2. Czerny’s edition of C-minor fugue, WTC 1, BWV 847, mm. 22–23

Czerny marks a crescendo over this lead-in figure; this treatment corresponds to that which Schweitzer criticized as “making a crescendo at the end of a piano section in order to glide imperceptibly into the forte.” This crescendo marking and the slur starting with the beginning of the crescendo show an intention of gliding imperceptibly into the next sequential statement and

---

222 Carl Czerny, The Well-tempered Clavichord: Forty-Eight Preludes and Fugues (Schirmer’s 1898 republication of the 1837 edition with the original preface by Czerny).
creating a large-scale musical continuation. However, a counterpoint of small figures tightens relations between figures and metrical structure. Seen in this context, this dynamic shaping goes against the compositional setting of closing a sequential statement in the weak half of measure 22 and consequently disturbs the clarity of the phrase structure.

Another common dynamic expression in romantic music is to make a cadence fade away even though its compositional density increases. Example 5.3 shows an excerpt from Beethoven’s op. 126, in which Beethoven marked a decrescendo in measures 7–8.

Example 5.3. Beethoven, 6 Bagatelles, op.126, no.1, mm.1–9

Although this decrescendo does not sound unusual in this context of romantic expression, the marking might seem unusual when considering the range and texture: the cadence with contrary motion between outer voices in measures 7–8 and the added alto voice at the end of measure 7 that thickens the texture. Both could suggest sustaining the musical tension until the end of the cadence; however, Beethoven marks the decrescendo, which creates a sense of distance and longing. This is a frequent gesture in romantic music.

Approaching a cadence via diminuendo despite its compositional density can be seen frequently in pedagogical editions of Bach’s works, which corresponds to what Schweitzer critiqued as “letting a cadence that ends a forte section die away in a diminuendo, so as to lead
over into the following piano.” In the excerpt below, the decrescendo Busoni marks in measure 13 represents an example.  

Example 5.4. Busoni’s edition of C-sharp-major fugue, *WTC*. I, BWV 848, mm.12–19

![Music example](image)

Compared to the first half of measure 13, this cadence engages a steady eighth-note rhythm, double notes in the lower voices, and a less smooth contour in the soprano; these musical events suggest an increase of musical tension. Against these compositional designs, this decrescendo weakens the effect of the cadence, blurs the difference between the three-voice texture in measures 12–13 and the two-voice texture in measures 14–15, and hence reduces the clarity of phrase structure. In order to illuminate the differentiation between phrases, it might be more appropriate to maintain the musical tension at least up to beat 1 of measure 14.

A swelling effect applied to small figures also represents a common romantic expression. Example 5.5 shows the opening of Schumann’s *Davidsbündlertänze*, in which small crescendos create a wave-like dynamic expression and increase musical excitement.

Example 5.5. Schumann, *Davidsbündlertänze*, op.6, mm. 1–8.

![Music example](image)

---

Examples 5.6 and 5.7 are from Busoni’s edition of the *WTC* I. In the sequential passage, measures 57–58, in example 5.6, Busoni marked a crescendo into *mf* in each measure. In the context of a descending sequence, these dynamic markings equalize the dynamic expression between the two measures and disturb the large-scale continuity over the sequential passage.


Example 5.7 shows another case of wavy dynamic shaping in Busoni’s edition of the D-minor fugue. Here, a two-measure crescendo in measures 25–26 is followed immediately by a decrescendo in measure 27, which results in a wavy fluctuation of dynamic expression.


Moreover, the decrescendo does not correspond to the context: the subject entry in a high register in measures 27–28, an expanded distance between the outer voices in measure 27–28, a subject entry in the middle voice in measure 28, and a stretto in measure 27–30. All these musical events suggest sustaining the musical tension throughout the stretto passage. Against this context, the
decrescendo in measure 27 creates a small-scale dynamic inflection that disturbs the large-scale continuity of musical tension and weakens the directional perception of the phrase.

As the above comparisons show, in a performance of romantic music, it might be common to apply dynamic gradation between phrases to smooth the transition between phrases and elongate musical tension. However, such dynamic shaping could weaken the subtle differentiations between phrases in a performance of fugues. Applying wavy dynamic expression in a performance of romantic music might effectively dramatize musical tension. However, fugues feature small figures with frequent changes of melodic direction; small-scale dynamic inflections could inappropriately reinforce the contour of figures at a local level and disturb a large-scale direction of musical continuity. By being aware of the romantic-influenced dynamic expressions that are natural to modern pianists but can be inappropriate for baroque music, one can more consciously observe dynamic nuances generated from within the compositional content in a performance of the fugues in *WTC*.

5.2. The Hierarchical Shaping of Terraced Dynamics and Graded Dynamics

In order to produce a dynamic shaping in response to phrase contours in a fugue, this section proposes a hierarchical shaping of dynamics that engages both terraced and graded dynamics.

As mentioned in chapter 3, terraced dynamics are commonly understood as alternations of contrasting dynamics in relation to larger-scale compositional variations in numbers of voice, pitch level, and register. In correlation with this common understanding, one could further explore relativities of terraced dynamics. As Robert Marshall (1989) points out, “by and large, however, it is clear that Bach considered the prescription of dynamics to be necessary only in ensemble compositions.” He observes that Bach marked *forte* for tutti ensembles during the
ritornello, and piano when the solo sections enter. Therefore, he concludes that “it is important to recognize that the dynamic markings here are obviously fulfilling a formal rather than an expressive function.” This formal function of piano and forte markings is demonstrated in Bach’s solo keyboard work, the Italian Concerto, in which, as Marshall explains, the simultaneous employment of piano and forte markings indicates the differentiation between leading and accompanimental parts. Badura-Skoda also points out that in the second movement of the Italian Concerto, “the forte in the solo part was probably not intended to be as loud as the ‘orchestral’ tutti in the first and last movements.”

Based on Robert Marshall’s accounts of the formal function of Bach’s dynamic markings and Badura-Skoda’s observation about relativities of forte markings, we can understand that the piano and forte markings in Bach’s music do not necessarily suggest soft and loud dynamics, but relativities of compositional content. By extension, relativities of compositional content can be understood at different hierarchical levels. In other words, terraced dynamics can be applied to illuminate larger-scale changes in texture or register between phrases or groups of phrases, as well as smaller-scale differences in metrical positions and harmonies between figures or small groups of figures. Simultaneously, terraced dynamics can unify dynamic differences relatively within a terrace of chosen size, which can avoid exaggerated fluctuations of smaller-scale dynamic shaping and benefit an overall musical continuity.

Like terraced dynamics, graded dynamics could be applied at various levels. For example, graded dynamics could be used to differentiate dynamics at the note level to illuminate the contour of a figure, as well as cause a series of dynamic terraces to coalesce into a larger-scale dynamic gradation. By understanding terraced and graded dynamics as means of creating relative

---

225 Badura-Skoda, 137.
unifications and differentiations of dynamics, one can hierarchically combine the two in interpretation. The following sections will introduce a five-level dynamic shaping as a model of hierarchical shaping of terraced and graded dynamics.

5.2.1. Five-Level Dynamic Shaping

This section explains five-level dynamic shaping in reference to example 5.8.

Example 5.8. Fugue in C-sharp major, WTC I, BWV 848, mm. 12–19.
As this example demonstrates, graded dynamics are presented by crescendo and diminuendo markings; terraced dynamics are presented by brackets with given dynamic levels. The sizes of crescendos, decrescendos, and brackets at each level correspond exactly with the note groupings at different levels. Different interpretations will result in different analyses of dynamic markings at each level; the markings shown in examples 5.9 and the later examples only reflect my personal hearing.

The five levels shown in the example engage the following relationships between notes, figures, phrases, and the phrase group or section. Although it might be possible to pursue dynamic planning to levels larger than the phrase group, the nature of Bach’s keyboard fugues (unlike, say, that of classical and romantic sonata forms) does not seem to encourage it. Therefore, the phrase group is the largest level for which dynamic organizations are discussed in this dissertation.

Level 1: Graded dynamics organize individual notes into motivic figures.
Level 2: Terraced dynamics reinforce a figure or organize several figures into a group of figures.
Level 3: Graded dynamics organize groups of figures into a phrase or a large segment.
Level 4: Terraced dynamics reinforce a phrase or a larger segment
Level 5: Graded dynamics organize phrases into a group of phrases or a section

The five-level dynamic shaping represents a systematic approach for interpreting phrase contours in a fugal performance. However, this systematic approach is not meant to provide a formula for interpretation; rather, it aims to raise one’s awareness of the correspondences between multiple levels of dynamic shaping and hierarchies of compositional content. One important goal of this

226 The idea of hierarchical grouping of figures, phrases, and groups of phrases is influenced by the grouping study in Lerdahl and Jackendoff’s *A Generative Theory of Tonal Music* (Cambridge, Mass.: MIT Press, 1983).
approach is to allow the performer to observe and illuminate phrase contours from inside out instead of intuitively applying romantic expressions of dynamic shaping.

At level 1, the most local level, the graded dynamics are adjusted to individual notes to illuminate motivic figures. This is the level at which the previously discussed complementary relations between notes are illuminated based on the intervallic and rhythmic relationships between notes—in both horizontal and vertical dimensions—against the background metrical structure. For clarity of demonstration, the level-1 markings in example 5.8 only show a simplified interpretation. The small-scale crescendos and decrescendos show a general dynamic perception of small groups of notes, despite the relative differentiations between voices. The dashes and two-note slurs show dynamic accents and dynamic groupings. In practice, one would illuminate more detailed nuances at level 1 by considering complementary relations between notes.

At level 2, one or more level-1 dynamic gradations are organized into a dynamic terrace. Level-2 terraces illuminate the perceptible terraced groupings at the smallest level, reinforcing the perception of a figure or a group of figures by relatively unifying dynamic differences within each terraced group and simultaneously differentiating between terraced groups. The size and dynamic marking of each terrace are determined by the complex of harmonic content, figure contour, and metrical structure. In terms of the size of a terraced group, for example, a level-1 figure that is harmonically self-sufficient can receive one dynamic terrace by itself at level 2, as shown in measure 12, beats 3 and 4. Several level-1 figures spelling out one harmony (as shown in measure 12, beats 1–2), or a harmonic progression such as a cadence (as shown in measures 13/3–14/2), can be grouped into one terraced group. Figure contour also determines how dynamic gradations at level 1 are grouped into dynamic terraces at level 2. For example, in

---

227 See chapter 4.
measures 14/3–16/1, where the subject enters in the bass, the figures in measures 14/3–15/2 are perceived as one terraced group at level 2. The reason is that the figures in measures 14/3–15/2 are not sequential, which would be perceived collectively in comparison to the sequential figures in the second half of measure 15. Also, harmonically speaking, the structural note D# in the subject is prolonged throughout measures 14/3–15/2 before descending stepwise to the A# on the downbeat of measure 16. As a result, one may perceive the figures in measures 14/3–15/2 as a group in relation to the first half of the subject, in which the dynamic at level 2 is maintained according to the interpretation in this study. The two beat-level figures in the second half of measure 15 would be perceived in relation to the second half of the subject; they receive separate terraces in response to the sequential statements and the descent of structural notes at the beat level in the bass.

In terms of the dynamic marking given to a terraced group, since each dynamic marking of $p$, $mp$, $mf$, and $f$ represents a range of relative dynamic nuance, this example uses three sub-levels of each dynamic marking to indicate relativities of terraced dynamics from softer to louder: $p^-$, $p$, $p^+$, $mp^-$, $mp$, $mp^+$, $mf^-$, $mf$, $mf^+$, $f^-$, $f$, and $f^+$. The dynamic marking given to each terrace is determined not only by strong-weak metrical positions, but also by harmonic content and melodic contour. For example, by convention beat 4 is metrically weaker than beat 3; nevertheless, the figure on beat 4 in measure 12 receives a louder dynamic terrace than that on beat 3 because of the higher register and the increasing distance between the outer voices. In the sequential passage in measures 16–18, each measure is organized into three terraced groups in response to the harmonic content and figure contour. The three dynamic markings in each measure illuminate the metrical relation between figures. According to the interpretation in this study, even though the sequential statement in measure 17 engages lower pitches than that in
measure 16, both measures adopt the same dynamic markings. The reason is that the G-sharp-
major harmony in the first half of measure 17 brightens the expression of this sequential
statement. Measure 18 applies softer dynamic terraces than measure 17 because of the minor
harmonies as well as its position at the end of the descending sequence.

Level 3 illuminates a phrase or a larger segment by forming a larger-scale dynamic
gradation over several level-2 terraces. There is an expansion in size of the unit from a figure or
group of figures at level 2 to a phrase or larger segment at level 3. At level 2, one focuses on the
dynamic unification within each figure-level terrace and the differentiations between successive
terraces. At level 3, one will organize a general direction over several level-2 terraces and
perceive the dynamic shaping of a phrase. Thus, even though a series of lower-level dynamic
terraces seems capable of suggesting a dynamic gradation, the difference lies in that the higher
level engages a larger-scale organization beyond a series of dynamic differentiations between
smaller-scale terraces.

Many early pedagogical editions of *WTC* added dynamic markings that represent the
dynamic gradations at level 3, such as the crescendo and decrescendo shown in example 5.4.
Without concerning the lower levels of dynamic shaping, however, a level-3 dynamic gradation
could turn a phrase into an over-smooth slope because it does not focus on nuances at the note
and figure levels. On the other hand, a performance could show a lack of musical direction if the
dynamic shaping at levels 1 and 2 is not made coherent by level-3 gradations. In example 5.8, the
dynamic terraces at level 2 are grouped into three larger dynamic gradations at level 3: a hairpin
from measure 12 to the cadence ending on beat 2 of measure 14; a decrescendo from beat 3 of
measure 14 to the downbeat of measure 16; and a decrescendo in measures 16–19. The dynamic
markings at different levels can appear to contradict each other sometimes, but these conflicts do
not present practical conflicts. For example, even though measures 16 and 17 adopt the same terraced nuances at level 2 because of the harmonic content, the large-scale descent in measures 16–19 results in an overall impression of decrescendo at level 3 throughout this sequential passage. Neither are the discrepancies between graded dynamics at levels 1 and 3 in genuine conflict; the small-scale gradations at level 1 illuminate detailed dynamic fluctuations within an overall increase or decrease of dynamics at level 3.

At level 4, one or more level-3 gradations at the phrase level are organized into a dynamic terrace to reinforce the perception of a phrase and simultaneously create larger-scale differences between successive terraced groups. There is no expansion in the size of the unit between level 3 and level 4. The terraced dynamics at level 4 represent the common understanding of terraced dynamics that illuminate compositional variations at the phrase level, such as changes in musical texture/number of voices, register, or tonal modulation. Nevertheless, level-4 terraced dynamics differ from the common understanding of terraced dynamics by engaging a hierarchical process of organizing lower levels of dynamic shaping into a higher-level dynamic terrace. In example 5.8, the three level-4 terraces correspond to the phrases organized by level-3 gradations and further show the dynamic relations between them. The dynamic markings of level-4 terraces are based not only on the corresponding dynamic markings at level 2, but also on the relative relationship between successive terraces at level 4. For example, measures 12–14/2 in example 5.8 consist of several small terraces at level 2 ranging from \textit{mf-} to \textit{f-}; these level-2 terraces form an overall dynamic perception of \textit{mf+} at level 4 in relation to the \textit{mf-} in the following terraced group.

At level 5, dynamic terraces of the prior level are organized into a large-scale dynamic gradation to illuminate the dynamic shaping over a group of phrases. Given the relatively short
phrase lengths in the fugues in *WTC*, a group of phrases is often perceived as a section. In this regard, level 5 could engage an expansion in size of the unit by integrating several phrases into a section. In example 5.8, a large-scale decrescendo is perceived throughout the entire excerpt to show a decrease of musical tension through the three-voice texture in measures 12–14/2, the two-voice texture in measures 14/2–15, and the descending sequence in measures 16–19.

### 5.2.2. Variations in Five-Level Dynamic Shaping

By no means does one literally need to analyze the five-level dynamic shaping of each fugue in practice. Nevertheless, it is helpful to look into some issues one might often encounter when applying hierarchical dynamic interpretation in a fugue performance.

**Dynamic Shaping at Levels 1 and 2 in relation to Rhythmic Counterpoint**

Different rhythmic counterpoint can affect one’s perception of figures, and consequently the dynamic shaping at levels 1 and 2. Measures 2 and 6 in example 5.9 illustrate this idea. The soprano in measures 2 and 6 are thematically parallel. However, the two quarter notes in measure 2 are perceived as one motivic figure and organized by one dynamic gradation at level 1. On the other hand, the two quarter notes in measure 6 receive separate dynamic gradations at level 1 because of the sixteenth-note figures at the beat level in the lower of the two voices. The differences at level 1 affect the terraced grouping at level 2. In measure 2, since the level-1 gradation illuminates the strong-weak metrical structure within a measure, the level-2 terrace could further illuminate the group of figures in measures 1–2. In measure 6, each level-1 gradation expresses the dynamic shaping of the sixteenth-note figure within a beat, which calls for two level-2 terraces to further show the strong-weak metrical relationship between the beats.
Example 5.9 demonstrates that the dynamic shaping at levels 1 and 2 permits flexibilities in illuminating grouping units of different hierarchical levels, because different rhythmic counterpoints can make one perceive figures at either the measure level or the beat level. Levels 3 and higher concern the dynamic shaping beyond the figure level, which would not be affected by different rhythmic counterpoints.

**Adding a Sub-Level at Level 1 or Level 2**

Based on the previous discussion of small-scale dynamic shaping in relation to rhythmic counterpoint, we understand that a dynamic shaping at a single level—either level 1 or 2—can illuminate grouping units of different hierarchical levels. This understanding further suggests a possibility of adding an additional dynamic level at levels 1 or 2 to expand the size of a group and equalize one’s perception of hierarchical level at level 2. I will refer to such an added level as a sub-level.

Examples 5.10A, 5.10B, 5.10C, and 5.10D demonstrate applications of adding a sub-level.
Example 5.10. Fugue in C major, *WTC II*, BWV 870, m. 2 and m. 6

Examples 5.10A and 5.10B show the original interpretation represented in example 5.9, in which level 2 illuminates the dynamic terrace at the measure level in measure 2, and that at the beat level in measure 6. Examples 5.10C and 5.10D show that by adding a sub-level at level 1 or 2 in measure 6, one could perceive the dynamic terrace at the measure level at level 2. This practice favors the larger-scale terrace at the measure level, emphasizes the parallel setting between measure 2 and measure 6, and may reinforce one’s perception of musical continuity. It might be more musical to adopt the interpretation shown in 5.10C than in 5.10D, because the sub-level 1 in 5.10C reinforces the fact that the two quarter notes belong to one figure and corresponds to the interpretation in measure 2.

**Choosing Appropriate Size of Level-2 Terrace**

Adding a sub-level at level 1 or 2 could equalize one’s hierarchical perception at level 2. However, sometimes adding a sub-level at a lower level might not be appropriate, for it would additionally restrict dynamic expression. It is particularly true when adding a sub-level 2, which can further reduce the dynamic differentiations between figures. After all, the fugues in *WTC* already feature a narrower dynamic range compared to classical and romantic music; sometimes
it may be more practical to illuminate musical content by figuring out an appropriate size of level-2 dynamic terraces instead of adding a sub-level.

Example 5.11 shows a sequential passage from the C-sharp-major fugue from *WTC* I. The parallel structure of sequential statements seems to suggest a sub-level 2 at the one-measure level. Nevertheless, since this sequential passage features the figure pattern of 2 beats + 1 beat + 1 beat in each measure, the small-scale dynamic terraces at the beat level would sufficiently illuminate the parallel statement at the measure level. Thus, adding sub-level 2 at the measure level would be unnecessary. In fact, adding a sub-level 2 would be inappropriate in this context, for it would further reduce the differentiations at the beat level. It would also be inappropriate to replace the dynamic terrace at the beat level with that at the measure level, which can only illuminate an empty structure of this sequential passage without expressing the content within each sequential statement.

Example 5.11. Fugue in C-sharp major, *WTC* I, BWV 848, mm. 16–18

Unlike example 5.11, which favors smaller-scale dynamic terraces, example 5.12 favors larger-scale dynamic terraces. In this sequential passage, the figure pattern in each measure is not
characteristic enough to generate dynamic terraces at the beat level. It is therefore appropriate to apply larger-scale terraces to illuminate each sequential statement at the two-measure level.

Example 5.12. Fugue in C major, *WTC* II, BWV 870, mm. 33–38

![Example 5.12. Fugue in C major, WTC II, BWV 870, mm. 33–38](image)

**Lapses in Perception of Levels 3 and 4**

In the five-level model of dynamic shaping, not every level is important in a thoroughgoing way. Of the five, level-1 gradations nuance individual notes to show the contour of motivic figures; level-2 terraces illuminate small-scale differences between figures or groups of figures. Both levels deal with dynamic perception at fundamental levels and remain present in all kinds of compositional content. Graded dynamics at level 5 embrace all the previous levels and present the largest-scale musical direction, which also finds itself relevant in all kinds of musical content. Unlike levels 1, 2, and 5, however, level-3 gradations and level-4 terraces can temporarily drop out of one’s perception depending on the individual interpretation of a passage.

Example 5.13 represents a dynamic analysis of the F-minor fugue in *WTC* II. Schweitzer considered this fugue to be one of the examples in which “we can discover in them no dynamic plan that could not equally well be replaced by another, and our only recourse is to bring out the theme and avoid marked contrasts.” Schweitzer, vol. 1, 361. This study uses this fugue as an example to show how one could create dynamic plan by means of five-level dynamic model.

---

228 Schweitzer considered this fugue to be one of the examples in which “we can discover in them no dynamic plan that could not equally well be replaced by another, and our only recourse is to bring out the theme and avoid marked contrasts.” Schweitzer, vol. 1, 361. This study uses this fugue as an example to show how one could create dynamic plan by means of five-level dynamic model.
point of this analysis is to show an example of hierarchical hearing with the focus on how levels 3 and 4 may periodically drop out of perception. One could apply the concept of five-level dynamic shaping to create a different analysis based on individual interpretation.

When the musical content features an overall dynamic unification, the level-2 terraces will become foregrounded in one’s perception and make level-3 gradations unnecessary and temporarily drop out of perception. In example 5.13, level-3 gradation initially drops out in measures 14–16, where the dominant prolongation and the similar figure contour reinforce the dynamic unification at level 2, making level 3 irrelevant. Level-3 gradation then returns in measure 17, where the changes of figure contours increase musical tension and create the perception of a crescendo at level 3. According to the interpretation in this study, dynamic unifications also cause level-3 gradations to drop out in measures 25–29, 33–46, 56–58, 66–69, and 79–85. Regarding the last eighth-note beat in measure 40 to measure 46, the interpretation in this study shows that even though the level-2 terraces represent decreasing tension, the mild differences between successive terraces do not necessarily create an obvious perception of dynamic gradation, which causes the level-3 gradation to drop out.

An interpretation of dynamic unification illuminated at level 2 may cause not only level-3 gradation to drop out temporarily, but also a further dropping-out of level-4 terraces. In the cases

229 Regarding the lapse of level-3 gradation in measures 33–46, one might observe a seeming conflict in this analysis: the material in measures 17–24 and 33–40 is similar; however, only the former receives level-3 gradations. According to my hearing, measure 17 is grouped with measures 14–16, because it reinforces the key of F minor and closes the neighboring motion between the F-minor harmony in measure 15 and its subtonic harmony in measures 14 and 16. Preceded by the group of measures 14–17, the sequence in measures 18–21 is heard as one group. On the other hand, due to the subject entry in measures 29–32, the sequence in measures 33–36 is heard as one group. Based on this hearing of grouping, the motivic figures in measures 18–21 and 33–36 appear in reverse order, which results in a different dynamic interpretation. In measures 18–21, the bass contour features the rhythmic pattern of four eighth notes followed by sixteenth-note figures, which makes me hear a two-measure crescendo at level 3. In addition, the major mode and delightful expression in measures 17–24 also encourages me to hear a more lively dynamic fluctuation at the measure level. In measures 33–36, the bass contour features the rhythmic pattern of sixteenth-note figures followed by four eighth notes. This combination sounds more dynamically stable to me. Also, the minor mode creates a bold expression in measures 33–46. These two reasons cause the lapse of level-3 gradations in my hearing.
of measures 14–16 and 56–58, the dynamic unification can be sufficiently illuminated by level-2 terraces, making a further unification at level 4 unnecessary. In the cases of measures 25–29, 33–46, 66–69, and 79–85, although the dynamic unification causes a dropping-out at level 3, the compositional content requires level-4 terraces to illuminate a larger-scale dynamic unification.

Another case in which a level-4 terrace can temporarily drop out of one’s dynamic perception is when the dynamic perception is when level 3 dominates. In example 5.13, such cases are seen in measures 17, 47–50, and 62–65. These passages feature a dramatic increase of musical tension, which makes a further a dynamic unification at level 4 unnecessary.

Example 5.13. Fugue in F minor, WTC II, BWV 881.
No level 3 in mm. 14-16

No level 4 in mm. 14-17

Tension maintains at $mp^+$ in mm. 14-16

Tension increases from $mp^+$ to $mf$ in m. 17

Tension decreases from $mf$ to $mf^-$ in mm. 18-24

Tension decreases from $mf$ to $mf^-$ in mm. 18-24, arriving cadence in mm. 22-24

No level 3 in mm. 25-29

Tension increases from $mp^-$ to $mf$ in mm. 25-40
L. 1
L. 2
L. 3
L. 4
L. 5

Tension increases from \( mp^- \) to \( mf \) in mm. 25-40.

Tension decreases from \( mp^- \) to \( p \)
arriving a cadence on the downbeat of m. 40.

Tension decreases from \( mp^- \) to \( p \) in mm. 41-46

No level 4 in mm. 47-50

Tension increases from \( p \) to \( f^- \)
in mm. 47-55
Tension increase from $p$ to $f^-$ in mm. 47-55

Tension drops in m. 59, and then increases from $mp$ to $f$ in mm. 59-65

Tension maintains at $f$ in mm. 56-58
L. 5  Tension maintains at f in mm. 66-69
Tension increases from mp⁺ to f⁺ in mm. 70-79

L. 5  Tension increases from mp⁺ to f⁺ in mm. 70-79

L. 3  No level 3 in mm. 79-85

L. 5  Tension maintains at f⁺ in mm. 79-85
5.2.3. Large-Scale Dynamic Shaping at Level 5

In my five-level model, level 5 embraces the dynamic shaping of the lower levels and represents the dynamic shaping of the largest scale throughout a section or an entire fugue. Figure 5.1 shows a large-scale dynamic plan based on the level-5 gradations shown in example 5.13; the numbers marked on the diagram indicate measure numbers. As was the case with the five-level dynamic shaping model, the purpose of this diagram is not to propose an analytical approach to dynamic interpretation, but to heighten one’s awareness of an overall musical direction in a performance. Several passages will be discussed below in reference to example 5.15 and figure 5.1.

![Figure 5.1. Large-scale dynamic shaping at level 5](image)

In example 5.13, measures 1–13 are grouped by five level-4 terraces: mp+ (measures 1–4), mf- (measures 5–6), mp+ (measures 7–8), mp (measures 9–11), and mf (measures 12–13). Although these five dynamic terraces do not represent a continuous increase of dynamic level, they create an impression of increasing tension along with the three subject entries in measures 1, 5, and 12, shown in figure 5.1 by a crescendo from mp+ to mf. This crescendo shows that several
smaller-scale dynamics of discontinuous expression can be made to cohere by a larger-scale
dynamic shaping of an overall direction.

The level-5 crescendo in measures 1–13 is followed by a sharp decrescendo from \( mf \) to
\( mp^+ \) between measures 13 and 14. The decrescendo results from a decrease in tension at the
figure level beginning in the second half of measure 13; the level-4 terrace, which responds to
the subject entrances at the measure level in measures 1–13, recedes in importance here. This
sharp dynamic gradation shows that lower-level dynamic shaping can coexist with a larger-scale
expression even when they seem to conflict each other on the surface. Similar instances are
observed in measures 24–25, 40–41, 58–59, and 69–70. The sharp decrescendo also
demonstrates that level-5 gradations can reflect not only level-4 terraces but also lower levels of
dynamic shaping.

One can also observe how level-5 gradations can embrace lower-level shaping in the
passages that engage an absence of level 3 and/or 4. In measures 14–16, as mentioned, the
dominance of a level-2 terrace causes a dropping-out of levels 3 and 4; thus, the level-2 \( mp^+ \) is
also perceived at level 5. Maintained for three measures, this dynamic level is increased from
\( mp^+ \) to \( mf \) in measure 17, which is illuminated by a level-3 crescendo with no further need of a
level-4 terrace. The level-3 gradation is thus perceived at the final level.

Along with an awareness of complementary relations at the note level, the practice of
hierarchical dynamic shaping ultimately aims to develop a thorough awareness and appreciation
of the beauty of a fugue, from local contours of figures to an overall musical direction. Through
a process of differentiating and unifying dynamic contours at various levels, this practice, in a
way, also represents a realization of the rhetorical device of \textit{collatio} in the performing context.
How beautiful it is that now we see a deep correspondence between the compositional logic of
fugues on the one hand and performer’s awareness of complementary and hierarchical dynamic shaping on the other.
Part III

Chapter 6. Synthesis of Interpretive Elements

After exploring the fundamental issues of finger strength and finger awareness in relation to weighted-finger touch in part one, and the interpretive issues of performing Bach’s fugues in part two, part three will discuss further technical issues that are crucial for illuminating interpretive ideas in a performance of Bach’s fugues in the WTC. To complement the existing studies that discuss interpretive elements separately, chapter 6 discusses the technique of synthesizing interpretive elements—in particular, manipulating the length of a tone in relation to its dynamic decay. The technique, which is of particular importance in illustrating the previously discussed idea of complementary relations between notes, ultimately aims to shade musical relations and continuity between tones.²³⁰ Through training the fingers to perform subtle movements and shade individual tones, the strength and awareness of the fingers will be developed.

6.1. Complementary Relation between Length and Dynamics of an Individual Tone

In execution, the dynamics and length of a tone interact with each other. A change of length can affect the perception of dynamics. For example, given the same dynamic level, a longer tone can accentuate the sound and create a perception of louder dynamics than a shorter tone. Similarly, a change of dynamics can affect the perception of tone length. For example, given the same length, a louder tone can reinforce the sound and create a perception of longer length than a softer tone.

²³⁰ See chapter 4.
In modern research, there are few accounts of how the complementary relations between dynamics and length could enrich musical nuances. Sol Babitz’s 1967 article “Concerning How Long a Note Should Be Held” contains the illustration below, which juxtaposes a written version (A) with two interpretations (B and C).231

Babitz explains, “among four equal 8th notes the first is to be played at 2/3 of its written value, the third at 1/3 and the second and fourth at 1/4…. The relative lengths of the notes in B are similar to what happens when one follows Türk's accent instructions (C), since the relative dynamics when played with articulation silences influence the length of the note in performance.”232

Example 6.1. Fugue in C major, WTC II, BWV 870, mm. 33–36

Example 6.1 demonstrates Babitz’s viewpoint in an excerpt from the C-major fugue from WTC II. This passage is discussed in chapter 4 to demonstrate vertically complementary rhythms.233

---

231 Sol Babitz, “Concerning the Length of Time that Every Note Must Be Held,” The Music Review vol. 28 (1967), 22.
232 Ibid., 22.
233 See example 4.4 in chapter 4.
As chapter 4 suggests, the sixteenth-note figures in each voice can be articulated differently to complement each other. Here we will further explore different shadings of the two-note-slurred figures. It is a common practice to shorten the second note in a two-note-slurred figure. This study suggests that one can shorten the second note more or less depending on the complementary relations between dynamics and length. If the dynamic difference between two notes is greater, the difference in length could be less; namely, the second note of the slur can be shortened less. Conversely, if the dynamic difference between two notes is less, the difference between two notes’ lengths will need to be increased by shortening the second note more. Depending on individual interpretations of tempo and character, the pianist will figure out appropriate complementary relations between dynamics and length. This study suggests applying the former combination (greater dynamic difference with less difference in length) in the top voice to reinforce lightness in the higher register, and the latter combination (less dynamic difference with more difference in length) in the middle voice to increase rhythmic pulse in the lower register.

While the illustration in Babitz’s study demonstrates the interactions between dynamics and articulation without engaging tempo rubato and agogics, the following account by Richard Troeger (2000) suggests a synthesis of all the interpretative elements: dynamics, articulation, agogics, and tempo rubato:

The harpsichordist uses these shadings (articulatory palette) partly for color, but mainly to create effects of dynamic variety. Silence before a note will give it emphasis; covering it by varying degrees of overlapping legato will deemphasize it. Such articulations and a varied scheme of agogic accents, working in conjunction with the dynamics of texture and relative harmonic and linear stresses, form the harpsichordist's primary expressive means. Experience of these techniques can subtly color the pianist's response to eighteenth century music on the piano. They teach the pianist to cultivate a light and highly differentiated sound, based on the harpsichordist's reliance on what can be found in textural contrasts.234

234 Troeger, Playing Bach on the Keyboard, 41.
Troeger concludes, “even on the dynamically flexible piano, it is necessary to use refinements of
timing as well as dynamics and articulation to convey the nuances of a line.”

In reference to Babitz and Troeger’s accounts, this study proposes the idea of
synthesizing interpretive elements of dynamics, articulation, agogics, and rubato. The idea raises
one’s awareness of exploring interactions between these four elements and producing subtle tone
colors within a relatively narrow dynamic range. This awareness and technique play a
particularly important role in a performance of the fugues in *WTC*, considering that these fugues
feature a narrower range of dynamics compared to classical and romantic music. Synthesis of
interpretive elements engages the previously discussed idea of synthesizing time elements—
ariculation, agogics, and rubato. As section 3.5. explains in reference to Fuchs’s account,
ariculation can be viewed as the relative length of a tone rather than the grammatically
organized manners of legato, non-legato, and staccato. This viewpoint suggests that the three
time elements can be synthesized since they all deal with relative lengths of tones. And because
the dynamics and length of a tone can interact with each other, the synthesis of time elements can
be further synthesized with dynamics. Rooted in the nature of sound decay on the piano and the
piano mechanics, which enable one to exert subtle control over key speed, synthesis of
interpretive elements can be first observed and explored in the context of tone cessation
produced by key release, during which the dynamic expression of a tone’s decay is in direct
relation with the time span of the decaying tone. The expression of tone cessation, of course, is
inseparable from that of tone production. The idea of synthesizing interpretive elements thus can
raise one’s awareness of both tone cessation and tone production. For the sake of clarity, the
following section will discuss these two perspectives separately.

---

236 J.R. Fuchs, 17. Fuchs makes a distinction between the notated articulation and the articulation that emerges from
within the composition based on compositional factors.
6.1.1. Tone Cessation

A piano performance fundamentally deals with the manner of tone production and that of tone cessation. However, pianists tend to pay much more attention to production than the sound’s end—just think about how important the issues of pianistic touch are to the pianist and in piano treatises. For example, Otto Ortmann (1925) claims that in the case of ceasing a tone, the different speeds of key release are so slight as to have no practical effect.\textsuperscript{237} He emphasizes, “the important fact is that, no matter how we release the key, we cannot increase the speed of its ascent.”\textsuperscript{238} The focus on tone production has resulted in a lack of systematic discussion of tone cessation; this section will thus provide a complementary discussion of the issue of nuancing tone cessation.

In the context of two successive tones, the first tone can decay into a silence to produce a disconnection between the decaying tone and the subsequent tone. With an awareness of tone cessation, one can nuance the disconnections between tones with variety and subtlety. In order to systematically explore the different shadings as a tone ends in relation to one’s control over key release, I suggest that, in execution, one can consider the time span of a tone in three stages—solid sound, sound decay, and silence—and manipulate each stage mutually. In the stage of solid sound, the key is fully depressed and the damper raised. (During this stage, there is of course some decay in sound, an amount variable through the range of the instrument.) In the stage of sound decay, the finger starts to release a key and the damper begins to descend and contact the vibrating string at the speed correspondent to that of the key release. As mentioned in section 2.2., different speed of key release and damper descent will result in different qualities of tone cessation. Finally, silence happens when the finger completely releases a key and the damper

\textsuperscript{237} Ortmann, 32.
\textsuperscript{238} Ibid.
fully rests on the strings. Based on individual interpretation and musical material, one can manipulate the length of each stage to nuance the dynamic expression of tone cessation. In figure 6.2, part A and part B show two manners of tone cessation.

![Figure 6.2. Three-stage manipulation of tone cessation](image)

In each part, the two circles represent the attacks of two tones; the distance in between represents the time span of the first tone. The three types of line illustrate the three stages—solid sound, sound decay, and silence—of the first tone. In the manner marked A, a longer solid sound is combined with a rapid sound decay produced by a quick key release, and a longer silence before the entry of the second tone. This combination produces a clean cessation of the first tone and hence a clear-cut articulation between the two tones. In the manner marked B, a shorter solid sound is combined with a longer sound decay produced by a more gradual key release, and a shorter silence that is just enough for reproducing the next tone. Compared to manner A, this combination produces a smoother decay of the first tone and a subtler articulation between the two. Depending on musical content and individual interpretation, one can lengthen or shorten each stage to manipulate the entire time-span of the first tone and create rhythmic fluctuation against metrical beats.

In execution, the three-stage manipulation of tone cessation requires the performer to figure out appropriate timings to initiate sound decay and silence. By intuition, one’s metrical perception of equally subdivided beats naturally governs the timing or pace of pianistic
movements. In other words, one would tend to initiate sound decay and silence at times that coincide with one’s perception of beats or subdivisions of beats. In the same context of performing two repeated tones, figure 6.3 shows different manners of tone cessation in relation to perception of subdivided beats.

Figure 6.3. Different timings of initiating sound decay and silence

It is intuitive to perform equally proportional depressing and lifting motions, as shown in manners A and B. The difference between them is that manner A shows a precise ending of the solid sound, which requires one to release the key as fast as possible in order to produce minimum decaying effect. Compared to manner A, manner B represents the most common way to release a key. It shows a very short sound decay after the solid sound, resulting from a more natural and slightly slower key release compared to manner A. This manner produces a clear ending but with less precision than manner A. Manner C engages a consideration of producing a smoother cessation with a rounder decay compared to manners A and B. Nevertheless, the proportional relations between the three stages show that the motions are still governed by metrical perception. Manner D shows the least influence of metrical perception compared to the other three; the timings to initiate sound decay and silence are desynchronized with the proportional perception of beats. Among the four manners, the first one can produce the tone with the most precise cessation; the fourth one can produce a tone with the most gradual sound decay. Each of the four manners finds its place in different musical contexts. With an awareness
of the interaction between physical motions and metrical perception, one will be able to explore subtlety and variety of tone cessation without being wholly confined by intuition.

Example 6.2 demonstrates different manners of tone cessation in musical context. According to the interpretation in this study, the D in measure 1 and the E♭ in measure 2 both require a substantial length of solid sound to produce a bold expression, but the syncopated D creates higher tension (at least rhythmically) than the E♭. A precise tone cessation (like manner A in figure 6.3) can be applied to the D to reinforce its bold characteristic. A tone cessation with slightly more gradual sound decay (as shown in manner B in figure 6.3) would be appropriate for the E♭. If one prefers to increase the difference between the D and E♭, slightly lengthening the decay (as in manner C in figure 6.3) can produce a rounder ending of the E♭.

Example 6.2. Fugue in G minor, *WTC II*, BWV 885, mm. 1–2

This study also suggests that the B♭ in measure 1 and the E♭ in measure 2 can be separated to accentuate rhythmic tension. Here the disconnection addresses an important issue of nuancing tone cessation in order to create musical continuity over a disconnection. Although the B♭ is an eighth note, one ought to shade its decay carefully in order to sustain the musical tension over the silence between B♭ and E♭. Tone cessation with a gradual sound decay and a relatively short silence (as in manner D in figure 6.3) can appropriately sustain musical tension to create musical continuity between B♭ and E♭.

Similarly, the disconnections forcefully produced by large intervals or awkward finger coordination require one to carefully nuance tone cessation in order to create an illusion of
musical continuity. Using pedal to connect forcefully disconnected tones is less preferable in the context of fugue performance due to a concern about maintaining sonic clarity. Example 6.3 shows that the two notes in the circle belong to one figure, but are forcefully separated by a large interval.

Example 6.3. Fugue in C minor, WTC II, BWV 871, m.8.

In order to sustain the musical tension over the disconnection between the E♭ and A♭, the performer must first figure out an appropriate timing and speed to release E♭ in order to produce a gradual sound decay. Then one would figure out the right timing to initiate the silence; the silence should not only allow the hand to move from the E♭ to A♭, but also create a sense of anticipation to reinforce musical tension between the notes. Releasing the E♭ at an inappropriately early time and via a fast speed would result in an abrupt end to the tone, which fails to carry on the musical continuity. If one elects to use pedal to connect the two notes, one might consider adding it at a later than usual time to gently prolong the decay of E♭. A conventional pedaling—namely, pressing the pedal down right after the E♭ is depressed—will amplify the resonance of the tone and disturb the overall clarity of sound.

Attention to tone cessation in relation to its three-stage manipulation not only benefits subtleties of disconnection between tones, but also plays an important role in nuancing the connection or overlapping of tones. In the context of two successive tones, the common practice of releasing the first tone at the time of producing the second tone will produce the fullest
connection between tones, because this manner only engages the solid sound of the first tone with no decaying effect produced by a gradual key release. One could make the connection between the two tones sound thinner by initiating the decay of the first tone before the entrance of the second tone. The decay of the first tone can also overlap with the second tone to produce various shading of ultra-connection or an effect of finger pedaling. By nuancing tone cessation, a great variety of tone connection thus can be explored, even in a fast tempo. Example 6.4 is from the C-sharp-minor fugue from \textit{WTC} II; the entire fugue is characterized by running-triplet figures with a fast tempo and a fiery character.

Example 6.4. Fugue in C sharp minor, \textit{WTC} II, BWV 873, mm. 1–2

In order to articulate the high musical tension, disconnecting the sixteenth notes seems to be appropriate. However, this interpretation would very likely produce a mechanical and choppy effect due to the fast tempo and the angular contour. A better solution is to produce the kind of connection that combines solid sound with a slightly decaying effect at the end of each sixteenth note. A brief decay can be produced by releasing each key slightly, but not entirely, right before the entry of following tone. If the key is not released slightly before the entry of the following tone, the solid sound will result in a full connection between tones, which reduces the fiery characteristic. If the key is released entirely before the entry of the following tone, a disconnection between tones will result. Such a complex connection, produced by combining solid and decaying sound, could simultaneously benefit musical continuity and articulate individual notes. Depending on different expressions of individual tones and the connections
between tones, one could create different combinations of solid and decaying sound. For example, a note on a stronger beat could engage a fuller connection, produced by longer solid sound with shorter decaying sound; a note on a weak beat could engage a thinner connection, produced by slightly shortening the solid sound and lengthening the decaying sound.

6.1.2. Tone Production

An awareness of manipulating length in relation to dynamics plays an equally important role in the context of producing tones with different expressions. Beyond producing individual tones, the manner of tone production is of fundamental importance in nuancing the connection between tones, because the perception of connection is typically associated with tones produced successively, without separation. Abundant discussions of tone production can be found in existing treatises on piano playing. Research by piano pedagogues, such as Otto Ortmann and Heinrich Neuhaus, provides a comprehensive discussion of the parameters involved in tone production. Ortmann addresses the issue of touch from the perspective of piano mechanics. He points out that “any differences of effect of touch upon key-movement must be differences in speed.” Neuhaus provides further insights from the perspective of pianistic execution; he points out that “the speed of the hand at the moment when it strikes the key varies depending on the value of force and height.”

Since the early twentieth century, the speed of key depression has remained an important focus in discussions of touch or tone production. However, there is another aspect crucial to tone production that has not received much attention in modern studies: the timing to initiate a preparatory movement before a key is physically depressed. Depending on the tone color to be produced, different preparatory movements need to be engaged to cause different falling speeds.

---

239 Ortmann, 15.
240 Neuhaus, 86.
In the case of fugue performance, an overall application of weighted-finger touch requires one to engage finger movement in particular to execute preparation, which can be a falling movement from the key or a lift-and-fall movement from above the key. The hand and/or arm can be coordinated to assist finger movements when needed—as long as they follow the relatively vertical motion of finger movement and do not create unnecessary circular movement to disturb sonic clarity. Performing different preparatory movements with different falling speeds requires different amounts of time, which in turn call for different timings to initiate the movements. For example, at a given time to produce a tone, a preparatory movement involving a slower key depression will take more time; one must initiate the movement at an earlier time to avoid a delay in sound. On the other hand, a preparatory movement involving faster key depression will take less time in execution and can be initiated later.

Like the execution of tone cessation, the execution of preparatory movement also involves an interaction between physical movement and metrical perception. As section 6.1.1. explains, one’s metrical perception of equally subdivided beats naturally governs physical movements. Figures 6.4, 6.5, 6.6, and 6.7 demonstrate interrelations between lift-and-fall finger movements and metrical perception in simplified contexts. In actual practice, one would engage movement of the hand or arm to assist finger movements according to the tone color to be produced.

Figure 6.4 shows that by intuition, the physical movement is synchronized with the metrical perception of equal subdivisions. In this simplified context, without engaging any concern about musical expression, the two notes are played by the thumb and finger 3 with no separation in between; each note requires a lift-and-fall finger movement for preparation.
Figure 6.4. Physical movement is synchronized with metrical perception.

In order to produce the E on beat 1 of measure 2, one’s intuition is to lift the thumb on beat 3 of measure 1, maintain it in a lifting position, and make it fall on beat 1 of measure 2. Then finger 3 performs the same procedure to produce the G in measure 3. In this case, the physical movements are governed by the metrical perception of half-note beats. The metrical perception of equal subdivisions also governs the speed of movements; the fingers would intuitively execute the lifting and falling movement at the same speed.

There are times that a tone requires a faster or slower key depression. Figure 6.5 shows a case of speeding up key depression, which, by intuition, lifting and falling movements are equally accelerated and governed by the metrical perception of quarter-note beats. One will lift the thumb on beat 4 of measure 1, maintain it in a lifting position, and make it fall on beat 1 of measure 2 to produce the E. Once the E is produced, the fingers remain still until finger 3 lifts on beat 4 of measure 2.

Figure 6.5. Physical movement at a faster speed is synchronized with metrical perception.
Figure 6.6 shows a case of slowing down key depression. By intuition, the lifting and falling movements are equally slowed down.

Figure 6.6. Physical movement at a slower speed is in synchronized with metrical perception

In order to produce the E in measure 2, one will gradually lift the thumb between beat 1 and beat 3 in measure 1, and continuously let the thumb fall between beat 3 of measure 1 and beat 1 of measure 2. The same procedure is repeated by finger 3 to produce G. The execution in figure 6.6 is also governed by the metrical perception of half-note beats. However, unlike figure 6.4, which also involves half-note-beat perception, it engages continuous movements throughout the time span of a half-note beat.

In addition to the movements governed intuitively by metrical perception, it is important to be able to perform movements asynchronously with metrical perception. This technique is of particular importance when a tone requires a slow key depression, because, in practice, musical material does not often allow one to equally reduce the speed of lifting and falling movements, as shown in figure 6.6. Within any given amount of time available for a preparation, it is therefore very important to be able to execute a lifting movement quickly and save the time for the falling movement, which has a direct impact on key depression.

Figure 6.7 shows a case of performing two whole-note Es with a rounded quality. This simplified passage simultaneously addresses the issue of tone production and how to create musical continuity over a disconnection.
Figure 6.7. Physical movement is desynchronized with metrical perception

Under the criterion that each E is given one beat of preparation, one might intuitively apply the manner shown in figure 6.5—lifting the thumb on beat 4 and letting it fall on the following beat 1—in order to shorten the disconnection between the repeated tones. This manner, however, will result in a fast key depression and fail to produce a rounded sound. Figure 6.7 shows that one can lift the thumb quickly on beat 4, and then immediately initiate the falling movement. Compared to figure 6.5, this manner allows one to have more time to perform the falling movement at a reduced speed and produce a rounder sound. The execution engages the lifting and falling movements at unequal speeds; the timings of initiating lifting and falling movements are desynchronized with metrical perception of equally subdivided beats.

The desynchronized relation between physical movements and metrical perception is less natural to pianistic intuition and requires thoughtful planning and practicing. Nevertheless, practicing with an awareness of various interrelations between physical movement and metrical perception could help the pianist to expand musical expression without being limited by intuition.

Example 6.5 shows an excerpt from the C-minor fugue in WTC II. According to the interpretation in this study, the three notes in the soprano are played by fingers 1, 3, and 5; the treble C calls for a rounded quality and can be gently emphasized when it is slightly disconnected from the previous G. The four manners 6.5A, 6.5B, 6.5C, and 6.5D demonstrate the four tone productions demonstrated in figures 6.4, 6.5, 6.6, 6.7.
Example 6.5. Fugue in C minor, *WTC* II, BWV. 871, m. 5

In example 6.5A, the movements of finger 5 are conducted by the perception of eighth-note beats suggested by the rhythmic figures in the top voice. In this case, finger 5 would lift at the time when finger 3 plays the G, wait in the air, and fall right before producing the C. In example 6.5B, the movements of finger 5 follow the perception of sixteenth-note beats reinforced by the bass; finger 5 would lift and fall right before producing the C. Examples 6.5A and 6.5B correspond to the abovementioned figure 6.4 and figure 6.5; both manners produce a fast key depression that do not produce a rounded tone required by the interpretation. Example 6.5C corresponds to figure 6.6. The execution shows an intention to slow down the falling movement in order to produce a rounded sound, and by intuition the lifting and falling movements are equally slowed down. However, the time-span between the G and the circled C is relatively short. Even though this manner could slow down the key depression and produce a slightly rounder sound compared to manners 6.5A and 6.5B, the resulting tone color will not be as rounded as the interpretation requires.

Unlike previous examples, the finger movement in example 6.5D is not synchronized with metrical perception, which corresponds to the manner shown in figure 6.7. Here, finger 5 begins to fall at an earlier time than the others, right after it is lifted. By lifting finger 5 quickly
and slowing down the speed at which it falls, this manner is more capable of producing a round tone compared to those shown in other examples.

6.2. Musical Continuity and Finger Techniques Revisited

A concern for musical continuity is universally important for playing piano music; however, it is of particular importance in fugue performance. Much piano music engages continuous melody, which helps enhance listeners’ perception of musical continuity and, to some degree, reduces the pianistic challenge to create it in a performance. This is, however, not the case for performing the fugues in *WTC*. The contrapuntal texture in these fugues complicates one’s perception of musical continuity not only by dividing one’s attention between multiple voices, but also by engaging musical figures that are short in length and frequently change melodic direction. In many respects, the contrapuntal textures and angular figure contours present in Bach’s fugues—features that call for highly articulated approaches to the interpretation of line—might seem to go against one’s desire to create musical continuity. Hence, compared to a performance of other genres, creating musical continuity represents a greater challenge in a fugue performance and warrants further investigation. With a heightened awareness of tone cessation and tone production, the performer can explore subtleties of musical continuity. For example, if the musical content requires a bold expression, producing excess decay in tone cessation and insufficient directness in tone production would inappropriately decrease the distinction between tones. Tones that end or are produced with insufficient decay or roundness, respectively, are incapable of smooth musical continuity. Through observing and adjusting finger movements in tone cessation and tone production, the following perspectives explain how the pianist can nuance musical continuity and simultaneously develop finger techniques.
6.2.1. The Subtleties of Articulation

A subtle articulation is defined here as a gentle disconnection with a seeming connection, or an illusion of connection, between tones. Compared to a clear disconnection or connection, a subtle articulation can produce more complex nuance that allows the pianist to simultaneously illuminate note groupings and reinforce musical continuity between tones. Because the angular figure contour in the fugues in the *WTC* calls for frequent articulation, subtleties of articulation are of great importance for musical continuity over small and frequent note-groupings.

A subtle articulation between two tones is produced when the first tone decays enough to create an impression of disconnection, and the second tone enters before the decay completely ceases in order to create an impression of connection. In this regard, producing a subtle articulation engages the above-discussed idea of how tone cessation could nuance connection between tones.241 The execution of a subtle articulation first engages a relatively gradual key release in order to be able to manipulate the expression at the end of the decay. Second, it engages a gradual key depression in the following tone production in order to produce a rounded tone that smoothly carries the musical continuity. It is essential to let the second tone enter before the silence at the end of the first tone’s decay is clearly perceived.

Example 6.6 shows that by inserting a subtle articulation between the treble G and treble C, one can reinforce the musical tension between the two notes and enhance the expression of the treble C. The execution engages a gradual release of G with a brief silence at the end of its decay (as shown in the manner C in figure 6.3), and a gradual depression of the treble C to produce a rounded sound (as shown in figure 6.7 and example 6.5D). The preparation for the treble C is desynchronized with metrical perception and has to be initiated during the release of G; this requires careful coordination between the two fingers.

---

241 See section 6.1.1. in chapter 6.
Example 6.6. Fugue in C minor, *WTC* II, BWV. 871, m. 5

The technique of producing subtle articulation can be very useful for creating complementary rhythms between voices. In example 6.7, one ought to avoid connecting or disconnecting all three voices between the end of measure 142 and the final G#s. On the one hand, connecting all three voices will fail to accentuate the expression of the final tone. On the other hand, disconnecting all three voices will fail to sustain the musical continuity and harmonic support.

Example 6.7. Fugue in G-sharp minor, *WTC* II, BWV 887, mm.140–143

Depending on individual interpretation, voices can be articulated differently to create different expression. This study suggests inserting a subtle articulation with slightly more disconnection in the top voice to enhance the final G# after a smooth descent, inserting a subtle articulation with slightly more connection in the bass to express the intervallic leap without sacrificing harmonic support, and connecting the middle voice to complement the articulation in the top voice and bass.

The technique of producing subtle articulation also allows one to produce maximal connection between the tones that are inevitably separated. Example 6.8 was discussed in chapter
4 to explain the idea of vertically complementary intervals; one can gradually shorten the eighth-note Gs in the top voice to increase rhythmic tension.

Example 6.8. Fugue in G minor, *WTC* II, BWV 885, m.8

![Example 6.8](image)

In order to produce maximal connection between the first few repeated Gs, the technique of subtle articulation is required to reproduce a tone on the same key before the key is fully released.

A similar case is shown in example 6.9, where the final D in the top voice is preceded by an anticipation. With the technique of subtle articulation, one can produce maximal connection between the last two Ds in the top voice to reinforce the musical continuity in between.

Example 6.9. Fugue in D minor, *WTC* II, BWV 875, final measure

![Example 6.9](image)

### 6.2.2. Finger Techniques Revisited

Chapter 2 discussed the basic understandings of finger awareness and finger strength for sonic clarity. In chapter 6, the focus on creating musical continuity by nuancing tone cessation and tone production encourages the pianist to further explore finger techniques in relation to manipulating the timing and speed of finger movements.

It is initially through one’s intention to manipulate finger movements in practice that the techniques of finger awareness and finger strength will be developed. By training the fingers to
obey one’s intention and embody interpretations—for example, depressing or lifting the finger faster or slower than one’s intuition, executing the movements at an appropriate time and speed, or making the fingers move against one’s metrical perception—one will obtain more sophisticated control over finger movements and the technique of finger awareness would be improved. An improved control over finger movement indicates that the finger muscles are capable of distributing weight with increasing efficiency, which plays an important role in developing finger strength when practicing with an awareness of balanced finger-key contact. This finger strength then allows one to explore a greater variety of movements and musical expression, which in turn leads to further development of finger awareness.

Through practicing with an awareness of nuancing tone cessation and tone production, one will also explore and develop subtle kinesthetic sensations of releasing weight when creating different expressions of sound decay, as well as adding weight when producing different tone colors. The kinesthetic sensation of distributing weight away from or into the keys can be observed in the fingertips. Seen in the context of applying weighted finger-touch, where the fingers would lead the movements of hand and arm, one’s awareness of such kinesthetic sensation plays an important role in choreographing appropriate hand movements in order to manage challenging finger coordination and create musical continuity in a performance of fugues. The sensation of weight distribution in the fingertips, together with the efficient choreography of hand movements, will further develop the technique of efficient weight distribution. In a larger context of engaging hand movements in addition to finger movements, chapter 7 will further discuss efficient weight distribution under the title of pianistic choreography.

242 See sections 2.4.4. in chapter 2. “In practice, in order to take the idea of balanced finger-key contact further to develop finger strength, one could allow the finger to press down into a key with arm weight distributed. The finger ought to try to maintain finger-balance while obeying gravity, and bearing the arm’s weight on its own without being supported by the arm.”
6.2.3. Refinement of Weighted-Finger Touch

Chapter 2 proposes the weighted-finger touch for producing sonic clarity. With the understanding of nuancing tone production, this section discusses a further issue of weighted finger-touch: avoiding unwanted directness in sound quality when trying to create sonic clarity by weighted-finger touch. Any unwanted directness in sound will be perceived as an unnecessary accent that can interrupt musical continuity. It is extremely important to avoid producing unnecessary sonic directness or emphasis in a fugue performance. Because the fugues in WTC employ a relatively narrow range of dynamics and the differentiations between tones are often subtle, the musical continuity in these fugues is more sensitive to interpretation than other kinds of music and can be easily disturbed by any unnecessary emphasis.

Deppe’s teaching about “controlled free fall” provides useful insights about avoiding unnecessary directness in tone production. He suggests that “the descending movement should be so direct and unwavering, so devoid of all hesitancy or incoherence.”243 An important point revealed from this account is that a direct touch is not produced by accelerating falling movement, but by maintaining finger-balance to avoid wavering movement—as chapter 2 explains—and keeping an even speed of falling movement to avoid any hesitancy or incoherence. In other words, although weighted finger-touch is characterized by a faster key depression compared to circular touch (see section 1.3.), the relatively fast key depression is the result of a carefully adjusted manner of touch rather than simply speeding up a falling movement. At any speed of falling movement, one can perform a weighted finger-touch by maintaining an even and continuous speed of a finger-fall movement.

Despite a very slight acceleration of finger-fall movement due to gravity, which is too small to be considered from a pianistic perspective, performing an even and continuous speed of

---

243 Caland and Deppe. 40.
finger-fall movement might not be one’s intuition in execution. During a finger-fall movement, an intuitive hesitation might be observed when the finger senses the key resistance. After the tiny hesitation, the finger then tends to increase the speed of falling movement in order to break through the key resistance and depress the key. The tendency of accelerating falling movement after a hesitation interrupts the continuity of movement, which not only ruins any planned preparatory movement, but also results in unnecessary directness in sound. The intuition of performing uneven speed of falling movement might relate to one’s subconscious insecurity about the key resistance. In the context of fugue performance, the contrapuntal texture often complicates finger coordination, which can psychologically increase the challenge of performing smooth and even speed of falling movements. Since an uneven falling movement might relate to a subconscious hesitation, in the first place, one might find it helpful to mentally encourage the fingers to break through the key surface without hesitating.

In addition to a mental reinforcement, executing an evenly paced falling movement often requires one to carefully adjust the speed and initiation time of a movement depending on its size and time-span. Taking the production of a loud tone as an example, a convenient manner is to speed up the falling movement in tone production in order to increase volume. This conventional manner, which simultaneously increases the volume and directness of sound quality, however, would be inappropriate if one needs to produce a loud tone with a rounded quality. How to create a loud tone without primarily speeding up the key depression? One will need to increase the size of a falling movement. Compared to a smaller falling movement, a larger falling movement engages a higher degree of muscular strength and results in a greater impact of weight in a key depression. It also increases the time-span of the movement, which allows the finger to fall at a

---

244 It is worth clarifying that a preparatory movement can engage lifting and falling movements of different speeds, as section 6.1.2, figure 6.7, demonstrates. The falling movement in a preparatory movement, however, has direct impact on key motion and ought to be performed with an even and continuous speed.
reduced speed and produce a rounder sound. By increasing the size and time-span of falling movement and reducing the speed of key depression, one would need to initiate the preparatory movement at an earlier time and figure out the desynchronized relation between the movement and metrical perception.

Since the musical continuity in fugues is extremely sensitive to interpretation and can easily be disturbed by unnecessary emphases, it is particularly important to find a balance between producing dynamic emphasis and creating musical continuity when playing loud tones. Many fugues in *WTC*, such as the C-sharp-minor fugues from Book I and the D-sharp-minor and G-minor fugue from Book II, include an extensive ending section with continuous high intensity. One ought to carefully consider the manner of tone production in such passages in order to avoid producing a noisy and choppy effect ruinous to the musical continuity.

6.2.4. Finger Legato

In reality, an increasing attention to all the abovementioned manipulations of finger movements in relation to expressions of individual tones and between tones can increase unnecessary physical tension and reduce technical efficiency in execution. The technique of finger legato provides a solution to efficiently transfer physical tension between the fingers in order to produce musical continuity beyond physical connections or disconnections between tones. The technique is rooted in finger awareness and finger strength; the hand and arm can be incorporated to assist the finger movements when extra weight is needed.

Due to concerns over the ability to produce adequate sonic clarity through weighted-finger touch, the technique of finger legato plays a crucial role in performing Bach’s fugues. Nevertheless, owing to performance traditions rooted in romantic expression, treatises on piano performance emphasize the legato technique that engages circular movements from the wrist and
arm and overlook the importance of finger legato. As Sandor asserts, “a real legato, a real grouping of notes, can be accomplished only by a unifying motion of the arm (that is, of the forearm and upper arm).” The technique of finger legato is not emphasized in studies of baroque performance practice, in which the issue of legato is commonly discussed from the interpretive perspective of articulation but not the technical perspective of pianistic approach.

Unlike Sandor’s account, which clearly deemphasizes finger legato, Deppe’s approach, though rooted in romantic tradition, describes the fundamental importance of finger legato under the name of “pure legato style.”

The finger has simply been allowed to fall of its own weight upon the key. Deppe always said, “Do not strike; let the fingers fall.” … Each separate finger, quite unaffected by the task which its neighbor has to perform, must carry out with perfect independence the commands transmitted to it from the brain. In this manner one may, by watchful observation, obtain an exact idea of the extent to which his fingers actually work under the conscious direction of the will….

At this point one is ready to proceed to the binding together of two consecutive tones, … listening with keen attention to make sure that each tone, as it dies away, is really carried over to the next one, in pure legato style….

A tone produced according to these rules will, of necessity, be weak in the beginning… But, after the precise position of the hand has been acquired, and the working of the muscular mechanism has been mastered both physically and mentally, then the tone will ever grow in beauty and in sonority.

Deppe’s teaching describes the technique of finger legato from three technical perspectives, which are all rooted in the techniques of finger awareness and finger strength. First, “do not strike; let the fingers fall” describes the technique of controlled free fall. As the previous section explains, the technique of controlled free fall points to even and continuous speed of finger-fall movement, by which one can enhance roundness and avoid unnecessary directness or emphasis in tone production. This perspective concerns the sound quality required for producing musical continuity, which represents the foundation of the technique of finger legato.

---

245 Sandor, 67.
246 Caland and Deppe, 29–31.
Second, Deppe instructs us that “each separate finger, quite unaffected by the task which its neighbor has to perform, must carry out with perfect independence the commands transmitted to it from the brain.” This passage points to an efficient weight distribution between the fingers. As chapter 2 explains, the technique of efficient weight distribution is in mutual relation with the techniques of finger strength and awareness. The better finger strength and awareness of individual fingers is developed, the more efficiently each finger can execute the required movements—including receiving weight from and transferring weight to other fingers—on its own. When the weight can be efficiently distributed between the active fingers without unnecessarily affecting the inactive fingers, the fingers would appear independent.

Third, Deppe’s reference to “the binding together of two consecutive tones” points to the previous discussion of nuancing tone cessation and tone production. As mentioned, the angular figure contours and narrow dynamic range in the fugues in the WTC can increase the challenge of producing musical continuity between tones. Newman describes this difficulty in his 1950 treatise: “the plodding or choppy effect seems to come in certain passages in spite of the most careful finger legato. It shows up particularly in the even 8th- and 16th-note passages that are so common in music of moderate tempo by Bach.”\textsuperscript{247} Nevertheless, as Troeger (1987) suggests, “on keyboard instruments, the impression of legato often requires that the volume of each note match that at the end of the preceding note.”\textsuperscript{248} By paying close attention to the sound at the end of tone cessation and that of the following tone production, one can subtly shade the musical continuity and create continuous nuance between tones even in a performance of fugues.

Based on Deppe’s teaching, we observe the three perspectives of executing finger legato: appropriate sound quality with roundness and clarity, efficient weight distribution, and skills of

\textsuperscript{247} Newman, 50.
\textsuperscript{248} Troeger, \textit{Technique and Interpretation on Harpsichord and Clavichord}, 66.
nuancing tone production and tone cessation according to one’s interpretation of musical continuity. All three aspects are rooted in finger awareness and strength. Nevertheless, in a fugue performance, it is by no means true that the execution only involves finger movements. In order to complement the discussions of finger techniques, chapter 7 will discuss the technique of pianistic choreography, which concerns hand movements in relation to weight distribution.
Chapter 7. Pianistic Choreography

Pianistic choreography describes the technique of producing efficient weight distribution by choreographing appropriate movements according to the fingers to be used and the keys to be played. The technique is important for performing music of every style. However, the fugues in WTC provide a particular context to explore the technique, because the angular contours of figures and their contrapuntal texture complicate physical movements and increase the challenge for the pianist to perform efficient weight distribution.

This chapter will first look into existing studies on pianistic choreography. Then, in relation to the previously discussed finger techniques, chapter 7 will explore how to design hand movements to perform efficient weight distribution. Well-designed hand movements and the previously discussed finger legato ultimately serve the purpose of creating musical continuity beyond connections or disconnections between tones. By no means does the focus on hand movements suggest preventing the wrist, forearm, and upper arm from moving. Considering the application of weighted finger-touch in a performance of fugues, the wrist and arm will follow and assist an appropriate hand movement and will not be discussed separately in this study.

7.1. Existing Studies on Pianistic Choreography

Seymour Bernstein, in his 20 Lessons in Keyboard Choreography (1991), explores the idea of choreography from a pianistic perspective. He points out that “choreography means the same thing to pianists as it does to dancers: It is a means of making a physical connection to musical feeling.” He explains:

The word choreography has always been associated with the dance…. The fact is, tracing your hands in various gestures across the keyboard creates a choreography all of its own. In other words, interpreting slurs, staccatos and rests, to mention only three notational signs, requires various combinations of vertical, horizontal and rotational movements—
movements which connect you to your instrument and to the music as well. The accumulation of all of these movements during the performance of a single composition results in a veritable ballet of fingers, wrists, arms and torso—a keyboard dance if you will.249

Unlike the majority of treatises that categorize piano techniques and discuss each separately—such as free fall, rotation, circular movement, lateral movement, staccato, octave, and thrust, just to name a few—Bernstein’s idea of “keyboard dance” integrates pianistic movements beyond categories. He uses series of symbols to describe pianistic choreography. For example, up-and-down arrows indicate lifting and falling movement, as shown in figure 7.1.

![Figure 7.1. Example 58e from 20 Lessons in Keyboard Choreography, 90](image)

Figure 7.1. Example 58e from 20 Lessons in Keyboard Choreography, 90

Figure 7.2 is from example 62a in Bernstein’s study. He uses this example to show “double rotation”; he explains that “in order to rotate onto your thumbs and 5th fingers, you were instructed first to make a preparatory swing in the opposite direction. In other words, in Ex. 62a, before you played your thumb by rotating towards your body, you swung away from your body to create momentum.”250

250 Ibid., 105.
Using symbols can be helpful for the pianist to systematically clarify appropriate movements and improve efficiency in practice. However, the symbols shown in Bernstein’s study are deficient in illustrating essential details. Even though he makes the point that the arms would “move away from you and rising slightly higher for the black keys, and return towards you at a slightly lower position for the white keys,” the symbols in his illustrations do not reflect the interplay between hand structure and the topological scheme of a keyboard. In actual practice, the keys to be played (shorter/higher black and longer/lower white keys), the fingers to be used (longer and shorter fingers), and the tone colors to be produced all play a role in one’s choreography. For example, in figure 7.1, in addition to the up-and-down movement applied to each chord, the shifts between G and F# in the inner voice of measures 2–4, marked by the added brackets, suggest the hand moving left from the higher G to the lower F#, inwards from the longer white key to the shorter black key, and upward from the lower surface of the white key to the higher surface of the black key. The choreography is far more complex than the up-and-down arrows can describe.

Jon Verbalis’s book, *Natural Fingering* (2012), focuses on the interplay between the topological scheme of the keyboard and the structure of the hand from the perspective of

---

251 Bernstein, 72.
fingering. He explains that Chopin’s “Fundamental Pattern” (shown as figure 7.3) reveals an understanding about uneven key surface, unequal lengths between black and white keys, and different lengths of the fingers.252 Based on this understanding, he points out three principles for figuring out efficient fingerings: 1) long fingers on short keys, short fingers on long keys; 2) fourth finger on black key, thumb on white key; and 3) no unnecessary stretches or adjustments.253

Figure 7.3. Chopin’s Fundamental Pattern

Verbalis further emphasizes the importance of achieving consistency and symmetry of fingerings in the context of scales, arpeggios, chords, and double notes. For example, he uses figure 7.4 to show that the fingering pattern 1-3-2-4 can be applied to the right hand from the offbeat of beat 3 in measure 9 to the downbeat of beat 5 in measure 10. In the left hand, the fingering pattern 4-2-1 is applied from beat 3 in measure 9 to beat 2 in measure 10.

Figure 7.4. Example 5.2. from *Natural Fingering*, 82. Excerpt from Beethoven, *Sonata, Op. 81a*

---

253 Ibid., 23–24.
He emphasizes, “keyboard topography and symmetry are at the core. And only a unifying, integrated response to them—one that engages the hand’s own structural symmetry—can result in consistency of approach and maximum effectiveness.”

Verbalis’s study provides useful insights for performing virtuosic passages with large musical gestures, but not the fugues in *WTC*, which feature small figures with frequently changing direction. Regarding a performance of fugues, he only provides a little general advice: the double-sixth exercise could enhance the player’s ability to bring out outer voices, and the technique of redistribution could help in dividing middle voices between two hands.

Against the background of these approaches, this study provides a complementary practice of pianistic choreography from the perspective of fugal performance. Unlike Bernstein and Verbalis’ studies, this study does not intend to propose any symbolic system or fingering analysis, because the designs of fingerings and movements would vary from pianist to pianist depending on individual interpretation and technical ability. It is particularly true in the cases of performing the fugues in *WTC*, because a lack of articulation markings suggests diverse interpretations of articulation, which can result in different designs of fingerings and physical movements. Instead, this study will focus on how one could develop a mutual awareness between pianistic choreography and the efficiency of weight distribution.

7.2. Topological Visualization of Weight Distribution

In practice, the technique of pianistic choreography can be efficiently developed in relation to one’s visualization of weight distribution between finger-key contacts in the context of the topological scheme of a keyboard. A topological visualization of weight distribution relates to the previously discussed visualization of musical tension along a figure contour. As I

---

254 Verbalis, 125.
255 Ibid., 125, 143.
suggest in chapter 4, the pianist could perceive sound—the physical sound or the sound in one’s inner hearing—in the form of energy that travels through notes in each voice.\textsuperscript{256} As the energy travels through each note, one perceives an increase or decrease of musical tension depending on one’s interpretation of the rise or fall of a particular voice’s contour. This visualization aims to encourage one to closely observe musical tension at the note level, which constantly varies along with the intervallic and rhythmic contours of figures.

Instead of visualizing musical tension traveling along a figure contour, in a topological visualization, one would visualize musical tension as physical weight distributed between successively or simultaneously depressed finger-key contacts. Figure 7.5 shows a topological visualization of the contour $E_b$-F-G in the soprano. The circles indicate the locations of the three finger-key contacts, and the straight lines between the circles show the more efficient path to distribute weight between the finger-key contacts compared to curved lines. The weight distributed from the black key to white keys engages an altitude-difference between higher and lower surfaces, which cannot be sufficiently shown by a two-dimensional illustration but can be easily visualized in one’s mind.

\textbf{Figure 7.5.} Fugue in C minor, \textit{WTC} II, BWV 871, m. 14.

A topological visualization of the successively depressed finger-key contacts

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure7.5.png}
\caption{Fugue in C minor, \textit{WTC} II, BWV 871, m. 14.}
\end{figure}

\textsuperscript{256} See section 4.1. in chapter 4.
In the context of fugues, a topological visualization of contrapuntal texture does not require individual visualization of each voice. Instead, one would visualize a spatial network between the finger-key contacts that are depressed successively and simultaneously, as in performance of any other piece of music. Figure 7.6 shows an example. For the sake of clarity in demonstration, this topological visualization is generated only from the notes within the box.

Figure 7.6. Fugue in C minor, *WTC* II, BWV 871, m. 14. A spatial network

The circles indicate the locations of finger-key contact; the numbers inside indicate the fingerings. The two groups of thick lines, one on the left and one on the right, indicate the spatial relationships between the successively depressed finger-key contacts in the inner voice and the soprano, respectively. The thin lines indicate the spatial relation between the simultaneously depressed finger-key contacts. Let me explain the spatial network by focusing on the fingers that switch on the A in the inner voice. The two circles on the A key indicate that the fingers swap from longer finger 2 to shorter finger 1; the short, thick line between these two circles represents the weight distributed from finger 2 to finger 1. There are two thick lines between the A and the following B♭, because the fingers swapping on A results in a weight distribution when finger 2 moves from the A to B♭, as well as between finger 1 on the A and finger 2 on the B♭. In terms of the spatial relationships between the simultaneously depressed finger-key contacts, the switching
of fingers on the A results in the spatial relationships first between finger 2 on A and finger 4 on
D (line a), and then between finger 1 on A and finger 4 on D (line b).

As the above figures demonstrate, the function of a topological visualization is to clarify the motion of weight distribution and increase efficiency of distributing weight in execution. Any weight distribution between finger-key contacts must involve muscular activities in the hand to distribute weight between the fingers; compared to a fixed and stiff hand, weight can be distributed more efficiently when engaging appropriate hand movements in response to the motion of weight distribution. An appropriate hand movement can be as obvious as a sideways shift between different registers or as subtle as an intentional motion of the hand when the musical content seems to require no obvious hand movement. A topological visualization thus can function like a map of hand movements, which makes one become more aware of the directions and sizes of hand movements than merely moving intuitively between keys. A topological visualization also helps one to pay closer attention to a counterbalanced sensation of distributing weight between the simultaneously depressed fingers, so that one could adjust the balanced condition of the fingers and hand to improve efficiency of weight distribution.

A topological visualization can raise one’s awareness of hand movements, and yet different locations of finger-key contacts will result in different topological visualizations. The following sections will explore the aspects one ought to consider when locating finger-key contacts and choreographing movements. Through figuring out appropriate locations of finger-key contact and creating a well-organized choreography to distribute weight, one’s topological visualization will be in turn refined. Engaging a refined visualization in practice, like using a map with higher accuracy and precision when traveling, will then further increase efficiency in execution.
7.2.1. Locations of Finger-Key Contacts and Balanced Condition of the Fingers and Hand

As explained in chapter 2, the technical foundation of creating efficient weight distribution is to set the fingers and hand in a balanced condition. In practice, one can improve finger-balance and hand-balance by adjusting the locations of finger-key contact in relation to a balanced muscular support, natural finger-alignment, balanced finger-key contact, positions of the MCP joints of finger 5 and the thumb, and position of the CMC joint of the thumb.\textsuperscript{257} Figure 7.7 represents a comparison between the previously mentioned figure 7.5 (here shown as figure 7.7B) and a different visualization shown as figure 7.7A. The comparison shows how the locations of finger-key contact could affect efficiency of weight distribution.

![Figure 7.7. Fugue in C minor, WTC II, BWV 871, m. 14.](image)

![Figure 7.7A. Choreography in favor of minimum in-and-out movement](image)

![Figure 7.7B. Choreography in favor of finger-balance](image)

Figure 7.7. Fugue in C minor, WTC II, BWV 871, m. 14.

The three circles in each figure, with fingerings marked inside, indicate the three finger-key contacts on the keys E♭, F, and G. Figure 7.7A shows locations of the three finger-key contacts

\textsuperscript{257} See sections 2.4. and 2.5. in chapter 2.
that require no hand movement shifting from the black key to the white keys. This execution demonstrates a common teaching of achieving technical efficiency by minimizing in-and-out movement between black and white keys. Fink (1992) uses the illustration (shown in figure 7.8) to explain the idea of “three depth-zones areas of the keyboard—black zone, white zone, and the gray zone that overlaps the common border of the other two zones.” He advises to “play in the gray area to minimize the in-and-out adjustments of the upper arms when moving single fingers laterally on note patterns involving both black and white keys.”

Figure 7.8. Illustration from Fink’s study, P. 20

Compared to figure 7.7A, the three finger-key contacts in figure 7.7B require a hand movement shifting slightly downward and outward from the black key to white keys. It is worth noting that the hand does not need to move sideways in this case even though the weight distribution engages a sideways motion between different fingers. The manner shown in figure 7.7B engages a bigger movement and seems to be less efficient than figure 7.7A. Nevertheless, figure 7.7B can produce weight distribution more efficiently than figure 7.7A for the following reasons. First, as mentioned, one could produce efficient weight distribution by engaging an appropriate motion of the hand. Second, the choreography shown in figure 7.7A might require the long fingers 3 and 4 to curve more than their natural curvature in order to bring them closer

---

258 Fink, 20.
to the shorter finger 5 and minimize the in-and-out movement. By comparison, the choreography shown in figure 7.7B can avoid different physical strain between the more curved fingers and the less curved finger; thus, the three fingers can approach the keys in a more equally balanced condition and result in a more continuous weight distribution than figure 7.7A. After all, although avoiding unnecessary in-and-out movement between black and white keys is important, it is equally important to consider the balanced condition of the fingers and hand in execution.

The difference between figures 7.7A and 7.7B may seem minute on the surface. Nevertheless, the comparison highlights one’s awareness of the interrelationships between locations of finger-key contacts, a balanced condition of the fingers and hand, and motions of the hand. This awareness plays an important role for one to perform efficient weight distribution in the fugues in *WTC*, where the compositional complexity frequently requires one to perform awkward coordination of the fingers and hand. For example, the fingers and hand often need to execute an extended stretch with unnatural finger-hand-wrist alignment in order to perform sustaining and moving voices at the same time. Because unnatural coordination inevitably requires one to engage extra strain and experience some degree of physical awkwardness, it becomes easy to engage excess strain without realizing it and even be blind to a less-awkward solution. With an awareness of balanced muscular sensation in relation to locations of finger-key contact, one could not only observe unnecessary strain more efficiently, but also avoid or reduce unnecessary strain by adjusting finger-key contacts and improving balance. Figures 7.9A and 7.9B show an example.
In the excerpt shown in figure 7.9, the three notes indicated by the arrows are simultaneously depressed by right-hand fingers when finger 1 depresses the E♭ at the end of beat 3. Figures 7.9A and 7.9B show two choreographies of these three finger-key contacts when they are simultaneously depressed. Figure 7.9A shows that, because of the notes on beat 1, one’s finger 5 would intuitively depress the half-note C on the spot indicated by the arrow. Sustaining the C on this spot while playing the notes on beats 2–3 then results in the choreography shown in figure 7.9A, which requires the wrist to twist left and causes an awkward alignment between the fingers, hand, and wrist during the end of beat 3 and the beginning of beat 4. With an awareness of finger-balance and hand-balance, one could adjust the locations of

---

259 The E♭ on beat 1 is played by finger 1 on the edge of the black key. Considering the similar length between fingers 1 and 5, one’s finger 5 would depress the half-note C on the spot that is approximately level to the finger-key contact of the E♭.
finger-key contact and discover the more efficient choreography shown in figure 7.9B, which does not engage unnatural alignment on beats 3–4.\textsuperscript{260}

After figuring out the efficient choreography shown as figure 7.9B, the next step is to clarify the way to shift the hand and perform this choreography—after all, due to the notes on beat 1, the half-note C would be depressed by finger 5 on its initial spot shown in figure 7.9A.

Figure 7.9C. Choreography of C-E\textsuperscript{\#}-F-G-A\textsubscript{b}  
Figure 7.9D. Shifting the finger-key contacts inward while sustaining the keys

Figure 7.9C shows that finger 5 sustains the half-note C on its initial spot when the other fingers play E\textsuperscript{\#}-F-G-A\textsubscript{b} in the alto. Figure 7.9D shows that once finger 3 depresses the A\textsubscript{b} on the edge of the black key, the hand starts to continuously shift inward while finger 5 sustains the C and fingers 3, 1, and 2 play the A\textsubscript{b}, G, and F, respectively. The squares with fingering inside show the initial finger-key contacts of these four notes, and the dotted arrows indicate the inward shifting movements. This adjustment makes finger 3 on the quarter-note A\textsubscript{b} arrive at the spot of circled 3 at the end of the shifting movement, which allows finger 1 to play the E\textsubscript{b} on beat 3 on the spot of circled 1. One is thus able to perform the three simultaneously depressed finger-key contacts in the manner shown in figure 7.9B.

\textsuperscript{260} In practice, one might find it helpful to adjust the locations of finger-key contacts while holding the three keys down simultaneously, for it could reinforce one's perception of finger-balance and hand-balance and help one to observe and adjust the balanced condition efficiently.
Figures 7.9A, 7.9B, 7.9C and 7.9D show that adjusting hand positions while holding the keys down represents an efficient means to achieve a balanced condition of the hand and fingers, continuity of hand movements, and efficiency of weight distribution. Depending on the musical content, the hand can shift in-and-out, swing sideways, or any combination of the two. This practice, like the common practice of switching fingers on the same key to reposition the hand, can help one to greatly improve technical efficiency when performing contrapuntal textures.

7.2.2. Grouping Notes into Movements based on Interrelationships between Hand and Keyboard

Recent studies by Bernstein and Verbalis have addressed the point that an efficient interrelationship between keyboard topology and hand structure plays an important role in achieving technical efficiency. This section discusses some further issues in this regard, because the contrapuntal texture and angular figure contours in fugues often increase the challenge of producing continuous weight distribution over small movements with frequently changing directions.

Figure 7.10 shows that the nine notes in the C-minor fugue subject can be organized into three movements shown by the thin line, thick line, and dotted line. It is easier for one to create continuous motion between the three movements than between the nine notes.

Figure 7.10. Fugue in C minor, WTC II, BWV 871, m. 14. Organizing notes into movements
The thin line indicates the movement between G and Eb, which moves upward from the white key to the black key and from the shorter finger 5 to the longer finger 3. The thick line indicates that the notes Eb, F, G, and C are organized into one downward movement moving from the black key to the white keys and from longer fingers to shorter fingers. The dotted line indicates that the notes C, F, Eb, D, and Eb are organized into one upward movement. This movement consists of several small hand movements in slightly different directions; however, an overall shift from white keys to a black key and from a shorter finger to long fingers allows one to organize several smaller movements in different directions into a larger movement with an overall direction.

The three movements in figure 7.10 further show that groupings of notes based on the interrelationships between the hand and keyboard can differ from groupings of figures based on figure contours and metrical structure. Figure 7.11 shows one of the ways to divide the subject in the C-minor fugue; the three figures—G-Eb-F, G-C, and F-Eb-D-Eb—are indicated by the slurs.

![Figure 7.11. Choreography based on groupings of figures](image)

If one literally transfers the three figures into three movements, one would intuitively apply the downward and upward movements in the manner shown by the arrows. This choreography would be inappropriate, for it neglects the interrelationships between hand structure and the topological scheme of the keyboard. Second, an exact correspondence between down-up movements and figure groupings can reinforce individual figures. An appropriate emphasis on individual figures can be suitable when performing small figures, such as two-note figures, in a
faster and lively fugue. However, in a slower and lyrical fugue, such as this C-minor fugue, overly segmenting individual figures could produce a rigid expression and interrupt musical continuity.

Another important concern is to differentiate the direction of a hand movement from the notational profile of figure contour; otherwise, one might intuitively make hand movements mirror the profile of figure contour and result in inefficient choreography. Figure 7.12 shows an example that the same profile of figure contour can engage movements in different directions.

![Figure 7.12. Fugue in A minor, WTC II, BWV 885, m. 4](image)

In figure 7.12, the two ascending figures in the boxes share the same ascending profile, which might encourage one to apply similar movements to perform each figure. However, considering the interrelationship between the fingers and the keyboard, the first ascending figure requires a downward/outward movement from a black key to white keys; the fingering 3–2–1 would work nicely in this case. The second figure, however, engages an upward/inward movement from the E to F#. Compared to the fingering 3–2–1, the fingering 3–1–2 would work better by allowing the shorter finger 1 to play the E on the white key and longer fingers to play the D# and F# on black keys.

At this point, it becomes clear that although fingerings provided by editors might be helpful as a reference, any design of fingerings is essentially personal. Differences in hand structure and interpretation of articulation will result in a different design of fingerings. One
ought to carefully figure out appropriate fingerings based on individual interpretation of articulation, balanced condition of the fingers and hand, and interrelationships between hand and keyboard. Considering the complexity in the fugues in *WTC*, figuring out appropriate fingerings can greatly benefit efficient work on a fugue. On the other hand, even a careful design of fingerings does not remain fixed; it can be refined as one’s technique improves, allowing greater flexibility and possibility in execution.

7.3. Weight Manipulations and Downward/ Upward Movements

As mentioned, without intentionally adding or releasing weight along a movement, one can reinforce continuous weight distribution by engaging a downward/outward or an upward/inward movement to accommodate the topological difference between black and white keys, as well as different lengths of finger. This practice, along with the finger techniques discussed in chapters 2 and 6, can produce continuous shading between tones without obvious dynamic differences in between, which represents a foundation of creating musical continuity despite connections or disconnections between tones. On this foundation, one will further manipulate weight by adjusting the vertical size of a movement in order to nuance dynamics.

Compared to a circular movement that is initiated from the wrist and engages sideways movement, a downward or an upward movement is produced by lowering or lifting the hand, which results in a vertical weight impact on the keys. This makes downward and upward movements particularly appropriate for performing fugues, for they can be efficiently coordinated not only with weighted-finger touch, which features vertical finger movements, but also with one’s choreography, without engaging unnecessary sideways movement to deviate the hand from an appropriate motion between finger-key contacts. A downward or an upward movement is conventionally associated with adding or releasing weight, but this association is
not fixed. One can add or release weight by either a downward or an upward movement. Figure 7.13 shows that the notes G#, F#, E# in measure 2 are coordinated by a downward movement from black keys to a white key. The rhythmic and melodic contour suggests that one can engage a gentle decrescendo and gradually distribute less weight along this downward movement. The following interval, E#-A#, is coordinated by an upward movement from the white key to the black key. In this context, the eighth-note A# on beat 4 would be slightly louder than the sixteenth-note E# on the preceding offbeat. One will thus distribute slightly more weight along this upward movement.

Figure 7.13. Fugue in D-sharp minor, WTC II, BWV 877, m. 1–3

The three movements in figure 7.14 were discussed earlier to explain interrelationships between fingers and keys. Here, we can add further insights about manipulating weight along the movements.

Figure 7.14. Fugue in C minor, WTC II, BWV 871, m. 14, soprano

The upward movement between G and E♭ is for accommodating the move from a white key to a black key. According to the interpretation in this study, there is no need to add or release weight

---

261 See figure 7.10 in this chapter.
along this movement; the upward movement simply produces continuous shading between the
two notes with no obvious dynamic difference. This choreography corresponds to an earlier
discussion of these two notes: the expressions of G and E♭ are simply different; it’s hard to tell
which is louder or softer.262

The contour E♭-F-G-C is performed by a downward movement. By moving the hand
downward, this movement can naturally add weight on the G on beat 3 to emphasize the first
important strong beat and reinforce the metrical structure. After gradually adding weight through
E♭-F-G to emphasize the G, this study suggests continuing the downward movement when
releasing weight between the G and the following C. This choreography seems to go against the
intuitive execution of ending the downward movement on the dynamically emphasized G and
applying an upward movement to release weight toward the following C. Nevertheless, in this
context, adding and releasing weight in one movement can produce smoother continuity than
engaging movements in different directions. Moreover, this elongated downward movement is
favorable for accommodating the movement between two shorter fingers, 5 and 1, on the G and
C, as well as the following upward movement between the shorter finger 1 on the C and the
longer finger 4 on the F. If one intuitively applies an upward movement between the G and C to
release weight, it will be troublesome to perform another upward movement between the C and F.

We can make a further observation about manipulating weight along this downward
movement. For example, if one wants to increase dynamic emphasis on the G on beat 3, it would
be inappropriate to speed up the key depression of the G and produce a tone that can be too harsh
in this context. Similar to the previously discussed issue of producing a loud tone with a rounded
quality, one would set the hand in a higher position prior to the G in order to perform a larger

262 See section 4.2.1. in chapter 4.
downward movement and engage more weight when producing the G.\textsuperscript{263} Figure 7.15 represents four curved lines; none literally resembles the profile of the movements between G, E♭, F, G, and C, but each gives an idea of how one could manipulate the vertical size of the movement and dynamically nuance the G. The thin line represents the upward movement through G-E♭; the thick line represents the downward through E♭-F-G-C.

![Diagram](image)

Figure 7.15. Vertical relations between the hand and the keys

Manner A engages no intention to enlarge the vertical size of the downward movement; this manner produces the gentlest emphasis on G among the four manners. Manner B shows that one could set the hand in a higher position at the end of the upward movement in order to initiate a larger downward movement and engage more weight when producing the G. Manners C and D show that, although the contour E♭-F-G-C engages an overall downward movement from a black key to white keys, it is possible to manipulate the vertical distance between the hand and the keyboard along the downward movement. Manner C show that right after one depresses fingers 3 and 4, one could make fingers 3 and 4 actively depress into the keys when sustaining the keys in order to send the hand away from the keyboard and increase the vertical distance between the hand and the keyboard. One could understand that the action of adding weight upon a key during key sustaining produces an opposite force—that is, reaction force—acting upon the hand and

\textsuperscript{263} See section 6.2.3. in chapter 6.
making the hand move in the opposite direction. Using reaction force to lift the hand can save energy compared to simply lifting the hand; it can also reinforce the continuity between the end of the previous movement and the beginning of the next movement. To use an analogy with dance, it is like pushing off the floor with the feet to make a jump easier. The movement also creates a smoother continuity between a standing position and a jump; otherwise, a jump will be stiff. By taking advantage of reaction force, manner C, compared to manner B, allows one to set the hand in a higher position on the F, enlarge the vertical size of the downward movement between the F and G, and produce a louder G. Manner D represents a midway solution between manners B and C. Although fingers 3 and 4 actively maintain the hand in a relatively high position, this manner shows more gradual downward movement between the F and G.

The practice of using a reaction force to enlarge the vertical size of a movement can also be applied to manipulate the vertical size of an upward movement to create dynamic emphasis. For example, in figure 7.14, if one prefers to add more emphasis on the F on beat 4, one could make finger 1 actively depress the C key during its key sustaining and create a reaction force to lift the hand higher before producing the F.

One can produce a reaction force not only to enlarge the vertical size of a movement and increase volume, but also to send the hand toward its following finger-key contacts and to reinforce continuous movements and musical continuity. This practice is particularly helpful when redirecting hand movements. As mentioned, the fugues in WTC engage small-size movements with frequent changes of direction. When performing a series of movements with different directions, any unprepared and sharp redirection of hand movement can inappropriately disturb the continuity of weight distribution and musical expression. One ought to consciously redirect the hand toward the direction of the following movement. Taking the three movements
in figure 7.14 as examples, the hand is redirected first on the E♭ on beat 2. After finger 3 producing the E♭ and sustaining the key, the finger would gently send the hand slightly outwards toward the direction of the F in order to initiate the following downward movement. The hand is then again redirected on the C on beat 3. Similarly, finger 1 on C would send the hand slightly inwards and upward toward the F on beat 4 to initiate the following upward movement. By means of creating reaction force during key sustaining, one can combine a redirecting movement with any adjustment of the vertical size of a downward or upward movement to enhance continuous movement and manipulate weight simultaneously.

7.4. A Synchronized Relation between Movement and Weight

Attention to a balanced condition of the fingers and hand is of fundamental importance for designing appropriate movements and performing efficient weight distribution. Nevertheless, with a heightened awareness of spatial relations between finger-key contacts and vertical sizes of hand movements, one may observe a further issue: creating a synchronized relation between hand movements and weight distribution in a performance of a fugue. By analogy, we can understand a movement as a blood vessel and the weight distributed through the movement as blood flowing through a vessel. Just as a healthy blood flow is maintained when there is no inappropriate increase or decrease in blood pressure, a synchronized relation between hand movement and weight results when there is no excess or insufficient weight distributed through a movement, or when weight is accommodated by a movement that is neither bigger nor smaller than necessary. Such a synchronized relation between movement and weight, like a healthy blood flow maintaining an efficient and effective blood supply, can avoid producing unnecessary or insufficient physical strain and play an important role in an efficient choreography.
Creating synchronization between weight and movement, however, can represent a greater challenge in the fugues of the *WTC* than in other styles of music. Compared to romantic and classical music that engages technically pianistic movements—such as scales, arpeggios, and chords, to name a few—the complex content and intense expression in these fugues are embodied by concise movements that are not obviously pianistic. Driven by an intense perception of the musical complexity of a fugue, one could easily engage more weight or physical tension than a concise movement could efficiently accommodate. In other words, weight and movement can be easily desynchronized in a fugal performance. Excess weight will disturb the fluency in a movement and increase unnecessary physical strain. It can also be trapped particularly at the end of a movement, which may make one produce an unwanted accent, work overly hard when redirecting movements, or even exaggerate a movement to accommodate excess weight.

While distributing more weight than necessary can cause excess weight to get stuck at the end of a movement, insufficient weight will not be able to supply the required musical tension throughout a movement. In this case, even though the fingers can produce every tone within a movement, one would feel as if weight moves behind a movement and there is not enough physical tension to carry the musical momentum to the end of the movement.

In practice, matching the size of a movement and the weight to be distributed represents the first concern for producing a synchronized relation between weight and movement. Depending on individual interpretation, one could make a movement accommodate weight by adjusting the distance between finger-key contacts as well as the vertical distance between the fingertip and the key. One could also accommodate weight to a movement by adding or reducing weight. Second, it is important to produce an even pace in relation to the size of a movement.
This viewpoint corresponds to what section 6.2.3. explains regarding maintaining an even and continuous speed of finger movement. Taking the first upward movement between the G and Eb in figure 7.14 as an example, if the hand moves faster than is appropriate, it will bring finger 3 to the finger-key contact of Eb before the time when the tone needs to sound. In this case, the upward motion will pause before the finger depresses the Eb, which interrupts the continuous weight distribution and therefore the musical continuity. On the other hand, if the hand moves at a pace slower than necessary, at the time when finger 3 needs to produce the Eb, the hand will be behind and fail to set finger 3 in a balanced condition. One will intuitively stretch finger 3 to play the Eb in this case. Nevertheless, an unnecessary stretch and a less appropriately balanced condition of the finger could generate additional strain, which can reduce efficiency in execution and possibly create an unnecessary emphasis on the Eb.

Last, as mentioned in section 6.2.3., one ought to pay attention to timing when initiating a falling movement; this movement can engage the finger only, or the finger with the hand and arm. The time to initiate a movement ought to be adjusted according to its size and speed, so that a manipulation of the movement would not cause any rush or delay in tone production. As mentioned in chapter 6, initiating a movement at an earlier time would engender an out-of-phase relation between metrical perception and physical movement, which represents an opportunity to improve technical efficiency through thoughtful practice with determination.

Along with the finger techniques explained in chapter 6 and the previously discussed concerns about choreographing hand movements, maintaining synchronization between movement and weight is ultimately crucial for creating musical continuity. It is because each production and cession of tone is coordinated within a larger flow of movement and weight distribution; thus, any excess or insufficient weight distribution or any inappropriate
choreography can disturb a subtle execution. Through practice, one will explore varieties of tone cessation and tone production in relation to different motions of the hand and the subtleties of releasing and adding weight through movements. In this regard, the sophistication and beauty of pianistic choreography truly emerges out of the complexity and subtlety of the fugues in *WTC*.

7.5. Coordination Between the Hands

Based on an appropriate choreography of individual hands, one should clarify how the hands move in relation to each other, so that each hand could perform different movements without being interrupted or unduly influenced by the other. In this regard, although practicing hands separately can be helpful for one to figure out appropriate movements of individual hands, being able to perform each hand efficiently is by no means equivalent to being capable of performing efficient coordination between the hands.

By intuition, the two hands tend to move in a symmetrical manner. For example, when one hand produces a loud tone, it would be more natural for the other hand to simultaneously produce a loud tone than a softer one. Or, when one lifts both hands, it would be more natural to lift both hands at the same time than at different times. However, musical compositions, especially complicated ones like the fugues in *WTC*, frequently require the pianist’s hands to move asymmetrically, such as in different directions, through different sizes or distance, in different speeds, or at different times. In order to develop an efficient coordination that allows the hands to perform asymmetrical movements efficiently, it is first helpful to become aware of how easily one’s intuitive tendency to perform symmetrical movements can dominate hand movements and inappropriately affect an intended choreography. Here are a few common examples one might observe in practice. When one hand performs a lift-and-fall movement while the other hand stays still to sustain a key, the inactive hand might intuitively share the tension of
the active hand. This shared tension could result in excess strain on the inactive hand, or even make it show a tendency to move the wrist up and down while the finger depresses the key. When two hands perform movements of different sizes, the hand that performs a larger movement may affect the hand that performs a smaller movement, which makes the latter execute the smaller movement with excess strain or exaggerate the size of the movement. Or, when the hands move obliquely—directions that are neither contrary nor parallel with each other—or at different speeds, they might be reflexively affected by each other. Such distraction can make each hand execute its movement with excess strain and even perform unnecessary movement. Considering that the contrapuntal texture in fugues frequently requires the pianist to perform asymmetrical movements between the fingers and hands, it is particularly important to observe inefficient interactions in order to achieve efficient choreography and coordination.

A lack of efficient hand coordination may not cause obvious mistakes or immediate technical issues in the first place, but it will certainly affect the quality of musical continuity and create long-term issues by constantly engaging unnecessary physical strain in execution. In practice, a fundamental way to develop efficient coordination between the hands is to visualize how two hands should move in relation to each other on the topological scheme of a keyboard, and then make the hands mirror the movements in one’s topological visualization. The sensation of two hands moving smoothly in relation to each other indicates an efficient coordination between the hands. If any awkwardness and technical deficiency becomes noticeable, it may indicate inefficient movements and unbalanced muscular conditions caused by inappropriate coordination between the hands.

As the musical beauty of fugal performance lies in complementary relations between voices, the pianistic beauty in a fugal performance lies in an efficient choreography of
interrelationships between the hands, fingers, and keys. Through careful observation and adjustments, the technique of pianistic choreography ultimately enables one to create a dance of finger and hand that translates a musical vision into sound.
Conclusion

Many kinds of knowledge can nourish a pianist and benefit a piano performance: historical styles, schools of piano technique, music theory, piano mechanisms, acoustics, literature, art appreciation, and so on. No matter what kinds of knowledge pianists embrace, what one ultimately has to deal with at the piano is the connection between a composition, and the performer’s mind, soul, and techniques. This connection, at the deepest level, points to the pianistic awareness of subtlety and efficiency, which represents the common foundation of piano performance and underlines the continuity throughout different styles beyond the diverse means of expression such as instruments, touch, dynamic shapings, ornaments, and pedaling. In the recordings by Liszt’s student Bernhard Stavenhagen (1862–1914), Claude Debussy (1862–1918), Maurice Ravel (1875–1937), and Béla Bartók (1881–1945), we can hear echoes of characteristics of Baroque music, such as musical clarity and subtlety of timing and articulation. Compared to many later pianists, they captured musical continuity less by means of long pedaling and more by rhythmic fluctuations at the local level, which create a more detailed and interesting interpretation with a more intense personal taste.

In light of contemporary music, which often values precision of complicated rhythms and equalization of harmonic dissonances and consonances, it is perhaps understandable that recent generations have become more distant from the organic subtlety of Baroque music than musicians in the late nineteenth and early twentieth centuries. Nevertheless, for those who value the continuity of musical styles and try to avoid performing on the piano as if no keyboard instruments existed before its invention, the baroque pianism hidden in the fugues in Bach’s WTC can be an effective tutor. These fugues were not composed for the piano. However, their compositional complexity heightens the pianistic awareness of subtlety and efficiency more
intensely than many other musical compositions, which qualifies them as a touchstone for the pianist. That being said, however, the dazzling virtuosity or overt expression of recital repertoires often overshadows the pianistic value of these fugues. We must not forget that these fugues embody the virtuosity of subtlety and represent excellent tools for the pianist to explore the pianistic awareness of musical delicacy in relation to technical efficiency.

By no means does this study intend to fully address this pianistic awareness. Against the background of existing studies of baroque performance practice and the common focus on the fugal subject and individual voices as far as fugal performance is concerned, this study represents a few basic aspects of pianistic awareness. Based on these aspects, pianists can further explore their own approaches to the fugues in WTC and Baroque music in general, refine overall awareness in interpretation and execution, and see issues of some common teachings that have been taken for granted.

Part I of this dissertation focused on a fundamental issue in performing baroque music on the piano: touch and tone color. Driven by the initial concern about sonic clarity in baroque keyboard music (chapter 1), this study proposed the weighted-finger touch, which leads to a technical focus on finger strength and finger awareness in relation to the kinesthetic sensation of finger-balance and hand-balance (chapter 2). Through observing balanced conditions of finger muscles, we understand that an efficient performance is not only about making hand postures look right, but also about, at deeper levels, looking for appropriate kinesthetic sensations in order to keenly notice technical issues and make adjustments. Through practicing with kinesthetic awareness, one can deepen the understandings of some common teachings. For example, although the descriptions “firm finger touch” and “firm finger joint” are often interchangeable in
piano treatises, we now understand that they can result in a very different focus in practice from the perspective of training finger muscles.

Part II was devoted to interpretive issues of performing fugues. An observation shows that although the two common principles—bringing out the subjects and illuminating independence of voices—are discussed separately in modern research, they are fundamentally the same regarding their focus on individual voices and neglect of vertical relations between voices (chapter 3). By drawing inspiration from the rhetorical device of *collatio*, this study proposed note-level complementary relations for illuminating local interrelationships between notes (chapter 4). Similarly, graded dynamics and terraced dynamics are commonly discussed separately in modern studies (chapter 3). Considering that both are capable of differentiating and organizing dynamic expressions, this study proposed a five-level dynamic model that engages both graded and terraced dynamics. Multiple levels of dynamic shaping correspond to different hierarchies of compositional content and aim to illuminate phrase contours from inside out (chapter 5).

Part III revisited technical issues relating to the interpretive concerns discussed in part II. In order to illuminate note-level shadings, this study proposed the idea of synthesizing interpretive elements of dynamics, articulation, agogics, and tempo rubato. Through exploring subtle interactions between the length and dynamics of a tone, one will refine control over the timing and speed of finger movements in tone cessation and tone production, which further improve finger techniques (chapter 6). In relation to finger techniques, this study discussed pianistic choreography: a dance of the hands that embodies musical expression as a dance of sound. By carefully considering interrelations between the topological scheme of the keyboard and the structure of fingers and hand, one aims to produce efficient weight distribution between
finger-key contacts and give the fingers freedom to connect one’s musical mind to the microcosm of Bach’s fugues (chapter 7).

These fugues heighten the pianistic awareness of exploring musical subtlety through observing complementary relations between notes, and improving finger techniques through paying attention to kinesthetic sensations. Beyond fugal performance, this pianistic awareness can improve one’s personal approach to piano performance in general; an attention to musical subtlety and an improvement of finger techniques can benefit performances of all musical styles. The latter can even contribute to an overall technical development, because the more individual fingers can execute required movements on their own, the less the hands, arms, and other body parts will share the tension of finger movements and the easier one can achieve technical efficiency.

Through a deep appreciation of genuine expression as it arises from compositional complexity, one can learn much from these fugues. One might not practice these fugues all the time, but their incomparable depth and richness can encourage many rediscoveries of life expressions and musical insights as one grows. Through continuously seeking a deeper awareness of subtlety and efficiency, these fugues can indeed be, in Schumann’s words, the pianist’s daily bread.
Bibliography


Ehrlich, Heinrich. *How to Practise the Piano Reflection and Suggestions; with Precise Directions for the Proper Use of the Tausig-Ehrlich "Daily Studies"*. New York: Schirmer, 1901.


**Selected Music Scores:**


