FORMAL FUNCTIONS OF METRICAL DISSONANCE
IN THE MUSIC OF PAUL HINDEMITH

by

YUNG CHEUNG MAK

B.A., The Chinese University of Hong Kong, 1985
Dip.Ed., The Chinese University of Hong Kong, 1991

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARTS

in
THE FACULTY OF GRADUATE STUDIES
(School of Music)

We accept this thesis as conforming

to the required standard

THE UNIVERSITY OF BRITISH COLUMBIA

November 1999

© Yung Cheung Mak, 1999
In presenting this thesis in partial fulfilment of the requirements for an advanced degree at the University of British Columbia, I agree that the Library shall make it freely available for reference and study. I further agree that permission for extensive copying of this thesis for scholarly purposes may be granted by the head of my department or by his or her representatives. It is understood that copying or publication of this thesis for financial gain shall not be allowed without my written permission.

Department of **Music**

The University of British Columbia  
Vancouver, Canada

Date **15 Oct. 1999**
Abstract

A close examination of Paul Hindemith’s compositions shows that metrical conflict is his favorite means to create rhythmic interest. The methodology in this study includes Harald Krebs’s layers of motion, John Roeder’s concept of pulse-streams, and Fred Lerdahl and Ray Jackendoff’s theory of grouping.

In an attempt to relate metrical dissonance in his compositions to other aspects of musical organization, my research reveals that Hindemith consciously manipulates metrical conflict in certain passages for particular musical purposes, for instance, to prepare for a change of tonality or the entry of a subject, to create points of tension, to intensify the build-up of a climax, and to provide a link between sections. As a compositional resource, metrical conflict is used to increase sectional contrast and so to articulate the form. It is a means of variation in the restatements of a theme, and can be a textural characteristic of an entire movement. Metrical dissonance is even exploited in the context of sonata form so that the conflict becomes the reference, while metrical consonance provides variety.

The compositional use of metrical conflict was not a sudden development but involved a gradual process of experimentation in Hindemith’s music. Some of his compositions use metrical conflict sparingly and experimentally while others exploit it in large-scale process. Hence, he does not use it excessively. Indeed, some of his compositions entirely lack this rhythmic quality, but his interest in metrical dissonance persisted throughout his whole life.
# TABLE OF CONTENTS

Abstract ii  
Table of Contents iii  
List of Musical Examples v  
Acknowledgement viii  

## INTRODUCTION 1

### Chapter One  
Methodology:  
- Harald Krebs's Layer of Motion 5  
- John Roeder's Pulse-stream Analysis 12  
- Lerdahl and Jackendoff's Grouping Techniques 12  

### Chapter Two  
Layers of Motion in Hindemith's Music:  
- How Hindemith Create Layers 14  
  - Within One Single Voice 24  
  - Between Voices 28  
- Changes Within Layers  
  - Shifting from One Layer-cardinality to Another 28  
  - Changing Group Lengths Shorter or Longer 30  
- Types of Metrical Conflict Hindemith Uses, and How They are Created  
  - Out-of-phase Group Boundaries in Different Voices 31  
  - Same-length Groups Out of Phase 35  
  - Krebs's Types of Dissonances 35  

### Chapter Three  
How Metrical Conflict Creates Musical Form and Process:  
- On a Small Scale 47  
  - Intensification 47  
  - Preparation for Entry of Subject 47  
  - Change of Tonality 48  
  - Use of Krebs's Types of Dissonances and Out-of-Phase Groups 50  
  - Pulse Transfer from One Voice to Another 50  
  - Simultaneous *Acceleration* and *Rallentando* between Voices 54  
  - Weakening an Established Layer 55  
- Summary Example 58  
- On a Large Scale 63  
  - Conflict as a Textural Characteristic of an Entire Movement 63
Contrasting Types of Layer Combinations Create Sense of Variation 70
Sectional Contrast and Reprise as Surprise 73
Link between Large Sections 76
Overriding the Formal Effects of Sonata Form 76

Chapter Four Conclusion 81

Bibliography 84
<table>
<thead>
<tr>
<th>Example</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sonata for Clarinet and Piano (1939), second movement, mm.12-21</td>
<td>3</td>
</tr>
<tr>
<td>2. String Quartet No.3, op.22 (1921), third movement, mm.73-77</td>
<td>6</td>
</tr>
<tr>
<td>3.1. Sonata for Horn and Piano (1939), first movement, mm.152-153</td>
<td>7</td>
</tr>
<tr>
<td>3.2. String Quartet No.1, op.10 (1919), finale, mm.51-54</td>
<td>8</td>
</tr>
<tr>
<td>4.1a. <em>Kammermusik</em> No.3 (1925), second movement, mm.23-25</td>
<td>10</td>
</tr>
<tr>
<td>4.1b. Grouping dissonance G4/3</td>
<td>10</td>
</tr>
<tr>
<td>4.2a. <em>Kleine Kammermusik</em>, Quintet for Wind Instruments, op.24, no.2 (1922), fifth movement, mm.14-16</td>
<td>11</td>
</tr>
<tr>
<td>4.2b. Displacement dissonance D3+1</td>
<td>11</td>
</tr>
<tr>
<td>5.1. Sonata for English Horn and Piano (1941), sixth movement, mm.1-8</td>
<td>15</td>
</tr>
<tr>
<td>5.2. Sonata for English Horn and Piano (1941), second movement, mm.41-44</td>
<td>15</td>
</tr>
<tr>
<td>5.3a. Sonata for Oboe and Piano (1938), first movement, mm.1-5</td>
<td>16</td>
</tr>
<tr>
<td>5.3b. Sonata for English Horn and Piano (1941), fourth movement, mm.9-14</td>
<td>16</td>
</tr>
<tr>
<td>5.3c. Sonata for Oboe and Piano (1938), first movement, mm.162-166</td>
<td>16</td>
</tr>
<tr>
<td>6.1. Sonata for English Horn and Piano (1941), second movement, mm.1-6</td>
<td>16</td>
</tr>
<tr>
<td>6.2. <em>Kleine Kammermusik</em>, Quintet for Wind Instruments, op.24, no.2 (1922), fifth movement, mm.84-89</td>
<td>17</td>
</tr>
<tr>
<td>6.3. Septet for Wind Instruments (1948), first movement, mm.54-57</td>
<td>17</td>
</tr>
<tr>
<td>7.1. <em>Kleine Kammermusik</em>, Quintet for Wind Instruments, op.24, no.2 (1922), first movement, mm.39-41</td>
<td>18</td>
</tr>
<tr>
<td>7.2. Clarinet Quintet, op.30 (1923), third movement, mm.59-62</td>
<td>18</td>
</tr>
<tr>
<td>7.3. Octet (1957/58), first movement, mm.75-84</td>
<td>18</td>
</tr>
<tr>
<td>8.1. Sonata for Horn in E\textsuperscript{b} (or Alto Saxophone) and Piano (1943), second movement, mm.170-173</td>
<td>20</td>
</tr>
<tr>
<td>8.2. Sonata for Violoncello and Piano, op.11, no.3 (1919), first movement, mm.189-193</td>
<td>20</td>
</tr>
<tr>
<td>8.3. Sonata for Violoncello and Piano (1948), first movement, mm.143-146</td>
<td>20</td>
</tr>
<tr>
<td>8.4. Octet (1957/58), third movement, mm.79-82</td>
<td>21</td>
</tr>
<tr>
<td>9. Theme and Four Variations: “The Four Temperaments” (1940), third variation, mm.63-68</td>
<td>22</td>
</tr>
<tr>
<td>10. Sonata for Viola and Piano (1939), second movement, mm.177-181</td>
<td>23</td>
</tr>
<tr>
<td>11.1. Sonata for English Horn and Piano (1941), fourth movement, mm.19-24</td>
<td>23</td>
</tr>
<tr>
<td>11.2. Sonata for Violin and Piano (1939), third movement, mm.32-36</td>
<td>24</td>
</tr>
<tr>
<td>12. <em>Ludus Tonalis</em> (1942): Interludium No.8, mm.1-7</td>
<td>25</td>
</tr>
<tr>
<td>13.2. <em>Ludus Tonalis</em> (1942): Interludium No.8, mm.45-47</td>
<td>25</td>
</tr>
<tr>
<td>14.1. Sonata for Violin and Piano (1939), third movement, mm.94-103</td>
<td>26</td>
</tr>
<tr>
<td>14.2. Octet (1957/58), first movement, mm.135-138</td>
<td>27</td>
</tr>
<tr>
<td>15.1. Sonata for Violoncello and Piano, op.11, no.3 (1919), first movement, mm.163-170</td>
<td>28</td>
</tr>
<tr>
<td>15.2. Octet (1957/58), first movement, mm.135-142</td>
<td>29</td>
</tr>
<tr>
<td>16.1. <em>Kleine Kammermusik</em>, Quintet for Wind Instruments, op.24, no.2 (1922), fifth movement, mm.39-50</td>
<td>30</td>
</tr>
</tbody>
</table>
16.2. Sonata for Piano No.2 (1936), first movement, mm.63-89 ........................................ 32
17.1. *Kleine Kammermusik*, Quintet for Wind Instruments, op.24, no.2 (1922),
fifth movement, mm.89-96 .................................................. 33
17.2. Sonata for Piano No.2 (1936), first movement, mm.63-89 ........................................ 33
18.1. Sonata for Oboe and Piano (1938), second movement, mm.106-112 ................................ 36
18.2. Sonata for Oboe and Piano (1938), second movement, mm.58-73 ................................ 36
19.1. Sonata for Oboe and Piano (1938), second movement, mm.220-226 ............................ 37
19.2. Sonata for English Horn and Piano (1941), fourth movement, mm.40-44 .................... 37
20.1. Sonata for Oboe and Piano (1938), second movement, mm.181-186 ............................ 38
20.2. Sonata for Clarinet and Piano (1939), second movement, mm.59-62 ........................... 38
21.1. Sonata for Clarinet and Piano (1939), second movement, mm.92-97 ............................ 39
21.2. *Kleine Kammermusik*, Quintet for Wind Instruments, op.24, no.2 (1922),
fifth movement, mm.30-54 .................................................. 40
22.1. Sonata for Violin and Piano (1939), third movement, mm.45-48 ................................ 43
22.2. Sonata for Violin and Piano (1939), third movement, mm.64-76 ................................ 43
23.1. Octet (1957/58), first movement, mm.265-268 .......................................................... 44
23.2. Sonata for Piano No.2 (1936), first movement, mm.95-100 ....................................... 44
24. Sonata for Oboe and Piano (1938), first movement, mm.66-74 ...................................... 46
25. *Ludus Tonalis* (1942): *Interludium* No.8, mm.14-16 ............................................. 47
26.1. Sonata for Violin and Piano (1939), third movement, mm.21-28 ................................ 48
26.2. Sonata for Clarinet and Piano (1939), second movement, mm.12-25 ........................... 49
27. *Ludus Tonalis* (1942): *Interludium* No.8, mm.34-42 ............................................. 51
28.1. Octet (1957/58), first movement, mm.154-156 .......................................................... 52
28.2. Sonata for Oboe and Piano (1938), first movement, mm.1-11 ..................................... 52
28.3. Sonata for Oboe and Piano (1938), first movement, mm.66-74 ................................... 53
29.1. Sonata for English Horn and Piano (1941), sixth movement, mm.93-104 ..................... 54
29.2. Sonata for Oboe and Piano (1938), first movement, mm.78-83 ................................... 55
29.3. Sonata for Oboe and Piano (1938), first movement, mm.58-65 ................................... 55
30.1. Sonata for Violin and Piano (1939), third movement, mm.1-4 ..................................... 56
30.2. Sonata for Violin and Piano (1939), third movement, mm.169-193 ............................ 57
31. Sonata for Horn and Piano (1939), first movement, mm.140-162 ................................ 59
32.1. Sonata for Violin and Piano (1939), third movement, mm.1-4 ..................................... 64
32.2. Sonata for Violin and Piano (1939), third movement, mm.12-13 ................................ 64
33.1. Sonata for Violin and Piano (1939), third movement, mm.45-48 ................................ 64
33.2. Sonata for Violin and Piano (1939), third movement, mm.94-116 ............................. 64
34.1. Sonata for Violin and Piano (1939), third movement, mm.117-120 ........................... 66
34.2. Sonata for Violin and Piano (1939), third movement, mm.144-148 ............................ 66
35. Sonata for Violin and Piano (1939), third movement, mm.169-208 ............................. 68
36.1. Sonata for English Horn and Piano (1941), sixth movement, mm.1-8 ........................ 72
36.2a. Sonata for English Horn and Piano (1941), sixth movement, mm.31-35 ................. 72
36.2b. Sonata for English Horn and Piano (1941), sixth movement, mm.48-53 .................... 72
36.3a. Sonata for English Horn and Piano (1941), sixth movement, mm.59-62 ................... 74
36.3b. Sonata for English Horn and Piano (1941), sixth movement, mm.72-75 .................... 74
37.1. *Ludus Tonalis* (1942): *Interludium* No.8, mm.17-19 ........................................... 75
37.2. *Ludus Tonalis* (1942): *Interludium* No.8, mm.19-21 ........................................... 75
37.3. *Ludus Tonalis* (1942): *Interludium* No.8, mm.41-43 ........................................... 75
38.1.  Sonata for Oboe and Piano (1938), first movement, mm.36-39 ................. 78
38.2.  Sonata for Oboe and Piano (1938), first movement, mm.84-86 ................. 78
38.3.  Sonata for Oboe and Piano (1938), first movement, mm.94-99 ................. 78
38.4.  Sonata for Oboe and Piano (1938), first movement, mm.133-138 ............... 79
38.5.  Sonata for Oboe and Piano (1938), first movement, mm.206-224 ............... 79
Acknowledgement

I would like to express my sincere appreciation to Professor John Roeder for his many valuable suggestions and comments, without which this thesis could not have been completed. All musical examples are reprinted by kind permission of European American Music Distributors Corporation.
Introduction

In pre-twentieth-century tonal music, rhythms tend to be metrically regulated while pitch and textural processes provide most of the direction, form and structure. These rhythmic and pitch characteristics persist in much twentieth-century music. For example, the music of Paul Hindemith (1895-1963) is replete with simple and regular rhythmic configurations. Yet out of this surface simplicity he subtly creates metric ambiguity and rhythmic complexity. This study attempts to identify the rhythmic interest in Hindemith's compositions with particular reference to metrical dissonance.

The concept of metrical dissonance has its origins in treatments of metrical conflict in tonal music. In brief, metrical conflict arises when accent and grouping contradict the notated meter, for instance in hemiola. There are numerous applications of this concept in the analysis of tonal compositions by various composers. For example, Roger Kamien analyzes metrical conflict as an important compositional resource in the music of Mozart and Beethoven.\(^1\) Floyd Grave treats many short metrically dissonant passages by Haydn.\(^2\) And William Rothstein refers to the secondary meter formed by a series of regularly recurring accents as “shadow meter” in Beethoven’s compositions.\(^3\)

Hindemith’s music is often said to be influenced by Classical and Romantic composers, and it is associated with neo-classicism. It is plausible that he also assimilated the idea of metrical conflict into his compositions from some earlier composers such as Beethoven, Schumann, and Brahms. Given Hindemith’s obvious

---


attempts to emulate tonal structures and forms, it is surprising that analysts have paid little attention to metrical conflict in his music. Consider, for instance, David Neumeyer's substantial study on Hindemith, which uses Hindemith's own compositional theory to analyze a number of the composer's works. He says nothing about Hindemith's use of rhythm. Gary A. Sprague's research finds that the rhythm of Hindemith's music is conventional and orthodox, but his conclusions about the composer's rhythm are lacking in focus since metrical conflict, which is a prominent feature in Hindemith's music, is completely neglected in his study.

Only one article, by James C. Kidd, investigates in detail this topic with regard to a short passage from the second movement of Hindemith's Sonata for Clarinet and Piano (1939). Kidd explains how Hindemith creates metric ambiguity from two concurrent pulses of different durations. He finds rhythmic-melodic patterns that have a characteristic duration in conflict with those of the notated 2/2 meter. In mm. 12-15, as shown in Example 1, the clarinet conforms to the metric half-note pulse, but in mm. 16-17 and 19-20, Kidd says that the two-octave leaps combined with accent and displacement of register provide an unexpected rhythmic grouping of three eighth-notes, which imply 3/8 meter. Thus, the metric pulse is temporarily shortened in the clarinet from a half-note to a dotted-quarter-note. Simultaneously, Kidd notes, the piano's ostinato, accents, static harmony, uniform melodic patterns and phrasing

---

5 Gary A. Sprague, "Rhythm in the Theory and Music of Paul Hindemith" (Ph.D. diss., Michigan State University, 1997), 123-133.
Example 1. Sonata for Clarinet and Piano (1939), second movement, mm. 12-21
in mm.12-15 articulate a dotted-half-note pulse, which conflicts with the half-note metrical pulse. Also, in mm.16-21, because of the dotted-quarter-note attacks, a change of pulse division from triple to duple is evident in the piano (from $\frac{\text{j}}{\text{j}}$ to $\frac{\text{j}}{\text{j}}$). With respect to the long and slow meters, Kidd points out the unusual proportional groupings in the clarinet (four $\frac{\text{j}}{\text{j}}$ in the time of three $\frac{\text{j}}{\text{j}}$) at mm.16-17, 19-20, and in the piano (four $\frac{\text{j}}{\text{j}}$ in the time of six $\frac{\text{j}}{\text{j}}$) at mm.13-15, 16-18. He tries to prove that these rhythmic techniques represent an adaptation of certain fourteenth-century mensural procedures, and asserts that Hindemith was striving for an effect of metrical ambiguity.

Kidd’s work is a starting point for my research that goes beyond merely locating “ambiguity,” and aims to understand more the specific functions of metrical conflict in Hindemith’s music by referring to recent rhythmic theories. A close examination of Hindemith’s compositions will show that metrical conflict is his favorite means to create rhythmic interest, and he conceives some of his pieces rhythmically as large-scale processes. The compositions I survey in my present study are: String Quartets Nos.1-6 (1919-1943), several sonatas for orchestral instruments (1919-1948), the Kammermusik Nos.1-7 (1921-1928), the Kleine Kammermusik, Quintet for Wind Instruments, Op.24, No.2 (1922), the Clarinet Quintet, Op.30 (1923), the Sonata for Piano No.2 (1936), Theme and Four Variations: “The Four Temperaments” (1940), Ludus Tonalis (1942), the Septet for Wind Instruments (1948), and the Octet (1957/58). They were composed between 1919 and 1958, and so cover the composer’s three style periods.

---

Chapter One
Methodology

To characterize metrical conflict in Hindemith's music, Harald Krebs's methodology seems to me most pertinent. Most of the terminology and definitions used herein originate in his writings.\(^1\) Also, John Roeder's concept of pulse-streams, and Fred Lerdahl and Ray Jackendoff's theory of grouping are employed to clarify a few musical passages.\(^2\) Therefore, I first briefly give an account of these rhythmic theories before starting the musical analyses.

Krebs defines "the meter of a work as the union of all layers of motion (i.e., series of regularly recurring pulses) active within it."\(^3\) To produce a layer of motion, a minimum of three equally spaced pulses are required; the omission of a few pulses does not dissolve a layer once it is well established. The layers of a work consist of the pulse layer, micropulses, and interpretive layers. The pulse layer is the most quickly moving pervasive layer, typically the tactus; micropulses move quicker than the pulse layer, and interpretive layers move slower than the pulse layer, and are more important in the metrical interpretation since they group the pulses into larger durations. Each interpretive layer is denoted by an integer and labeled as an "n-layer"; this cardinality "n" refers to the constant number of pulses between two adjacent attacks of the interpretive layer.

---


\(^3\) Krebs, *Fantasy Pieces*, 23. In this most recent work, Krebs adopts a different wording for some terms used in his earlier articles. For instance, he substitutes the word "layer" for "level." Hence, "level of motion" becomes "layer of motion."
Example 2. String Quartet No.3, op.22 (1921), third movement, mm.73-77

These concepts are illustrated in Example 2. Here, the pulse layer proceeds in quarter notes. A micropulse in eighth notes is offered by the first violin. Two interpretive layers are simultaneously active. The second violin and viola articulate a 3-layer that is a series of dotted-half-notes, in which there are three pulses between consecutive attacks. In the cello, a motive lasting $6 \frac{3}{4}$ s with slur is sequenced: this grouping structure determines a 6-layer, since there are six pulses between two consecutive beginnings of the motive.

Regularly recurring accents may also contribute to the formation of interpretive layers. As Joel Lester notes, accents are emphases on points of initiation and musical
events are needed to mark off these accented timepoints. These “phenomenal” accents (so named by Lerdahl and Jackendoff) are crucial in delineating the interpretive layers.

The main categories of accentuation include durational or agogic accents (long notes), dynamic accents, contour accents (registral high and low points), density accents (thicker texture attacks), and new-event accents (harmonic and melodic changes). As shown in Example 3.1, the horn generates a 4-layer by durational accents. In the piano, the regular recurring dynamic accents, density accents (seven-note chord attacks), and new-event harmonic accents (B minor-G\# major-F minor-D minor) also mark off a 4-layer. In Example 3.2, a 3-layer arises from the durational, dynamic, and contour (low-point) accents in the cello.

Example 3.1. Sonata for Horn and Piano (1939), first movement, mm.152-153

---


The concepts of consonance and dissonance originated, of course, in pitch theory; first Yeston, then Krebs, extended these concepts to the domain of rhythm. Krebs points out that layers of motion either align or do not align. Alignment occurs when each pulse of every interpretive layer synchronizes with a pulse of every faster layer, and this state is referred as "metrical consonance." In most pre-twentieth-century tonal music, the notated meter is the "primary metrical layer" and its interaction with the pulse layer constitutes the "primary metrical consonance" of a particular work. This primary metrical consonance assumes great significance for it acts as a reference point for all metrical perceptions.

"Metrical dissonance" obtains when the pulses of interpretive layers do not concur with each other or their attacks do not coincide. There are two types of non-alignment in metrical dissonance. "Grouping dissonance" refers to the superposition of

---

layers of different, relatively prime cardinalities; while “displacement dissonance” is the superposition of non-aligned layers of the same cardinality. For convenience, Krebs uses a simple method to label these dissonances. The label G4/3, for instance, means a grouping dissonance arising from the combination of a 4-layer and 3-layer; while D3+1 means a displacement dissonance arising from the non-alignment of two 3-layers, one pulse apart. In these dissonances, when the interpretive layer (e.g., the displaced layer) conflicts with the metrical layer, Krebs sometimes describes it as an “antimetrical” layer.

The following musical excerpts demonstrate these dissonances. In Example 4.1a, the cello and double bass establish a 3-layer by attacking every dotted-half-note (\( \uparrow \uparrow \)). But the solo cello, alternating with other instruments, articulates an antimetrical 4-layer by repeating a four-note motive. The interaction of these two layers gives rise to grouping dissonance G4/3, in which the attacks rarely align (see Example 4.1b).

In Example 4.2a, the bassoon creates the metrical 3-layer by dotted-half-note attacks, while the oboe and the clarinet initiate an off-beat 3-layer by dynamic accents and the reiteration of a two-note figure (\( \uparrow \uparrow \uparrow \)), respectively. Both layers are one pulse apart and so create the displacement dissonance D3+1. Example 4.2b shows that their attacks never coincide.

Another aspect of metrical dissonance is the difference between direct and indirect dissonance.\(^7\) Direct dissonance results from the superposition (or concurrence) of layers of motion, while indirect dissonance is formed by the juxtaposition (or succession) of layers. Superposition means the layers are active simultaneously. Juxtaposition occurs when one layer stops and is only conceptually maintained by the

\(^7\) Krebs, “Some Extensions,” 105, and *Fantasy Pieces*, 45-46.
Example 4.1.

a. *Kammermusik No. 3* (1925), second movement, mm. 23-25

b. Grouping dissonance G4/3

* shows the rare but periodic alignment of attacks in the grouping dissonance
Example 4.2.
a. "Kleine Kammermusik," Quintet for Wind Instruments, op.24, no.2 (1922), fifth movement, mm.14-16

\[
\begin{align*}
\text{Fl} & \\
\text{Ob} & \\
\text{Cl} & \\
\text{Hn} & \\
\text{Bsn} & \\
\end{align*}
\]

b. Displacement dissonance D3+1

\[
\begin{align*}
\text{j} & \quad \text{j} & \quad \text{j} & \quad \text{j} & \quad \text{j} & \quad \text{j} & \quad \text{j} & \quad \text{j} & \quad \text{j} & \quad \text{j} & \quad \text{j} & \quad \text{j} \\
\text{j} & \quad \text{j} & \quad \text{j} & \quad \text{j} & \quad \text{j} & \quad \text{j} & \quad \text{j} & \quad \text{j} & \quad \text{j} & \quad \text{j} & \quad \text{j} & \quad \text{j} \\
\end{align*}
\]

listener while the second layer is actually sounding; the temporary conflict between these two layers results in indirect dissonance.

Related to indirect dissonance is subliminal dissonance. When all the musical events of a given work mark off only one interpretive layer which is in contradiction with the primary metrical layer (notated meter), it is said to be in subliminal dissonance. Subliminal dissonance usually lasts longer than indirect dissonance.

Krebs also distinguishes between simple and compound dissonances. According to Krebs, simple dissonance consists of a pulse layer and two conflicting interpretive layers; while compound dissonance is composed of more than two incongruent

\[9\] Krebs, Fantasy Pieces, 59-60.
interpretive layers. For example, in the combination of 7-, 4-, and 3-layers, simple dissonance G7/4, G7/3, and G4/3 can be expressed as a compound grouping dissonance G7/4/3.

Another related concept is that of pulse streams, which John Roeder has used to analyze the surface rhythms of Schoenberg's complex middle-period polyphonies. His method reveals that regularly recurring accents from different voices create competing pulse streams. These are roughly similar to Krebs's layers of motion, but Krebs focuses on the metrical states of consonance and dissonance resulting from the vertical interaction among the layers while Roeder is interested in the horizontal, concurrent, and distinct continuities hidden behind the apparently irregular surface. Roeder explains his rhythmic analytical theory as follows:

"A pulse is a series of successive, perceptibly equal timespans, marked off by accented timepoints... every pulse must be consistent with actual attacks in the passage. A minimum of two equal timespans is necessary to activate a pulse... two attacks contributing to the same pulse stream need not belong to the same textural voice... rhythmic continuity and impetus are evident when accents from discrete gestures are heard to connect into pulse streams, even when these accents belong to different classes."\(^{10}\)

Pulse-stream analysis admits such accentual phenomenal parameters as durational accent, dynamic accent, and contour accent, but not density accent, since the method divides the texture into voices.

When analyzing layers of motion, Krebs remarks that, in addition to the aforementioned phenomenal accents, layers are also created by repetition of patterns, individual pitches and grouping structures. Perhaps the clearest definition of grouping structure has been given by Lerdahl and Jackendoff in their Well-Formedness and

---

\(^{10}\) Roeder, "Pulse Streams," 233-235.
Preference Rules, which are part of their generative theory of tonal music. Their two basic principles of grouping are proximity and similarity of elements. Changes in local details such as register, dynamics, pattern of articulation, and length of notes determines grouping boundaries. On a larger-level, symmetry (equal length) and parallelism (motivic, thematic, rhythmic, or harmonic) help define the extent of a group.

Lerdahl and Jackendoff do not discuss layers of motion, but they do treat meter and they explore some musical situations in which the grouping and metrical structures are “in phase” and “out of phase.” Grouping and meter are in phase if successive groups start on the first beat (strong beat) of the notated measure; otherwise, they are out of phase. The authors hear tension in out-of-phase music, and consider this quality to be an essential rhythmic feature in music.

---

Chapter Two
Layers of Motion in Hindemith's Music

According to Krebs's theory, accents, repetition of patterns, and grouping are the main factors that create layers of motion. In addition to these factors, however, Hindemith has other unique ways to mark off layers in his music. They will be considered systematically in this section, in order to characteristic Hindemith's rhythmic style, and provide a basis for the analysis presented hereafter.

Within one single voice, Hindemith creates layers by regular grouping, "oom-pah-pah" accompaniment patterns (a kind of grouping), regular accent, ostinato (pattern repetition), motivic (or rhythmic) repetition, regular attacks, weak-beat durational accentuation, and slurs. These factors are similar to those of Krebs's theory. Between voices, Hindemith establishes layers by the separation of pitch-class content or root content, and by the distribution of regular attacks through several voices (these are slightly different from Krebs's factors). Very often, several kinds of accents act together to generate a layer. For the purposes of clear demonstration, each musical example cited below will deal with only one type of accent.

In Example 5.1, regular grouping in the piano part creates two layers of motion. The notated meter is 3/8, but the quarter-note attacks in the left hand and the slurring of eighth-notes into pairs in the right hand establish a 2-layer. On a larger level, repetition marks off a 6-layer, that is, dotted-half-note pulse. Similarly, in Example 5.2, the grouping structure of the piano clearly articulates a 3-layer, however this is consonant with the notated meter 3/8.
Example 5.1. Sonata for English Horn and Piano (1941), sixth movement, mm. 1-8

Allegro pesante \( (J=66) \)

Example 5.2. Sonata for English Horn and Piano (1941), second movement, mm. 41-44

The “oom-pah-pah” pattern characteristic of piano accompaniment is a kind of grouping that creates layers. In Examples 5.3a and 5.3b the “oom-pah-pah” pattern in the piano determines a 3-layer, while in Example 5.3c the “oom-pah-oom-pah-pah” pattern generates a 5-layer.

Regular accent within a single voice also creates layers of motion. The dynamic accents of Example 6.1 articulate a 3-layer in the piano, while the clarinet in Example 6.2 marks off a 3-layer on the weak beats by dynamic accentuation. In Example 6.3, the flute, oboe, clarinet, and horn articulate a 2-layer by dynamic accents.
Example 5.3.

a. Sonata for Oboe and Piano (1938), first movement, mm. 1-5

\[ \text{Munsterjetwa 120) } \] (1 = \( \text{J} \))

\[ \text{Allegro pesante (} i = 66\text{)} \]

b. Sonata for English Horn and Piano (1941), fourth movement, mm. 9-14

\[ (i = \text{J}) \]

\[ \text{Allegro pesante (} i = 66\text{)} \]

c. Sonata for Oboe and Piano (1938), first movement, mm. 162-166

\[ (i = \text{J}) \]

\[ \text{Allegro pesante (} i = 66\text{)} \]

Example 6.1. Sonata for English Horn and Piano (1941), second movement, mm. 1-6

\[ (i = \text{J}) \]

\[ \text{Allegro pesante (} i = 66\text{)} \]
Ostinato is an effective way to create a layer of motion that frequently occurs in Hindemith's music. In Example 7.1, the ostinato in the bassoon establishes a 3-layer. Similarly, the cello of Example 7.2 and the double bass of Example 7.3 articulate 3-layers through ostinato—in the latter case, despite frequent changes to the notated meter. String Quartet No. 1 also has a 3-layer generated by ostinato in the cello (see Example 3.2).
Example 7.1. *Kleine Kammermusik*, Quintet for Wind Instruments, op.24, no.2 (1922), first movement, mm.39-41

Example 7.2. Clarinet Quintet, op.30 (1923), third movement, mm.59-62

Example 7.3. Octet (1957/58), first movement, mm.75-84
More generally, Hindemith frequently creates layers by motivic or rhythmic repetition within a single voice. For instance, in the left-hand part of the piano in Example 8.1, repeated successive transpositions of the three-note ascending motive mark off a 3-layer. In the right-hand part of the piano in Example 8.2, repetitions of the three-note descending motive similarly activate a 3-layer. In the Cello Sonata example, 8.3, a 4-layer arises from the rhythmic repetition (\( \uparrow \downarrow \uparrow \downarrow \)) in the piano, while in Example 8.4, the rhythmic pattern (\( \uparrow \uparrow \uparrow \uparrow \)) moves between the first viola and the violin to mark off a 3-layer.
Example 8.1. Sonata for Horn in E♭ (or Alto Saxophone) and Piano (1943), second movement, mm. 170-173

Example 8.2. Sonata for Violoncello and Piano, op. 11, no. 3 (1919), first movement, mm. 189-193

Example 8.3. Sonata for Violoncello and Piano (1948), first movement, mm. 143-146
Example 8.4. Octet (1957/58), third movement, mm.79-82
Regular attacks are the simplest technique for creating a layer. The second violin and viola in String Quartet No.3 (see Example 2) and the cello and double bass in Kammermusik No.3 (see Example 4.1a) articulate a 3-layer by the regular attack of dotted-half-notes (\( \text{d.} \)) and half-notes (\( \text{d.} \)), respectively. In Theme and Four Variations: "The Four Temperaments," shown in Example 9, regular eighth-note chords (\( \text{T} \)) in the piano mark off a displaced 4-layer, which contradicts the notated meter.

Example 9. Theme and Four Variations: "The Four Temperaments," third variation, mm.63-68

Durational accents not conforming to the notated strong beats often play an important role in generating a layer. At mm.12-15 of the Clarinet Sonata (see Example 1), the durational accents in the piano right hand mark off a dotted-half-note-pulse, i.e., a 3-layer. In the Viola Sonata, a 3-layer is also determined by durational accents in the piano, as shown in Example 10.
Example 10. Sonata for Viola and Piano (1939), second movement, mm.177-181

The slurring of notes groups them together, and so may create a layer.¹ In Example 11.1, the slurs in the English horn initiate a displaced 3-layer, while in Example 11.2, the slurs in the violin (in combination with contour accents) establish an antimetrical 3-layer.

Example 11.1. Sonata for English Horn and Piano (1941), fourth movement, mm.19-24

¹ Lester, *The Rhythms of Tonal Music*, 36. “In all passages that group notes under articulation slurs, accents arise at the beginning of each slur.” But Krebs argues that slurring seldom creates layers; it reinforces layers that are produced by other means. See his *Fantasy Pieces*, 26.
Although layers are often created within single voices, some layers arise out of more complex interactions of concurrent voices. For instance, one way that Hindemith creates distinct layers is by separating their pitch class content. In an *Interludium* from *Ludus Tonalis*, shown in Example 12, a 3-layer conforming to the notated meter at mm.1-3 is articulated in the right hand. It is the result of a repeated rhythm (\( \text{\texttt{J}\text{\texttt{J}}\text{\texttt{J}}\text{\texttt{J}}} \)) that keeps an A in the uppermost voice as a pedal point, and uses only the white-key chords, so that it seems to imply a D-Dorian mode. Another 3-layer, on the notated off-beat, is articulated by the left hand in the same register. In contrast to the other layer, it contains only black-key chords, and so implies the pentatonic scale. A similar method is used in mm.5-7 of the example. In these few measures, layers are distinguished by interval content: the on-beat 3-layer consists of major and minor triads; the off-beat 3-layer, one single dyad (P4). They also contain different pitch classes: the right hand has \( \{0,1,3,4,6,8,10\} \), and the left hand has \( \{2,9\} \).

Example 13.1 shows that concurrent layers can be distinguished by their different root content. The left-hand chord maintains D as a root, while the right-hand chords have
Example 12. *Ludus Tonalis* (1942): *Interludium* No.8, mm.1-7


Example 13.2. *Ludus Tonalis* (1942): *Interludium* No.8, mm.45-47
other notes (A, F, E) as their roots.\(^2\) A 2-layer is thus clearly articulated by the distinct root D in the left hand, which is in contrast to the displaced 2-layer determined by three different chord roots in the right hand. Another illustration is given in Example 13.2, in which the right-hand chords, providing the metrical 3-layer, have B, A, D and C\(^\#\) as their roots, but the left-hand chord has a distinct root B\(_b\), to mark off the antimetrical 3-layer.

Layers are often created by distributing attacks regularly through several voices. In the Violin Sonata of Example 14.1, a half-note pulse (or 4-layer) is generated by regular durational accents distributed in three voices (piano left hand, violin, piano right hand). The solid line shows the distribution. In Example 14.2, the regular attacks of motivic accent (\(\text{\textit{J}}\text{\textit{J}}\text{\textit{J}}\text{\textit{J}}\)) through five instruments (cello, clarinet, second viola, violin, horn) activate a 2-layer.

Example 14.1. Sonata for Violin and Piano (1939), third movement, mm.94-103

---

\(^2\) Paul Hindemith, The Craft of Musical Composition (New York: Schott, 1970) 53-108. In Hindemith’s theoretical system, the root of a chord is the root of its “best interval.” The intervals are ranked as follows in descending order of root clarity: P5 (the lower note is the root), P4 (upper), M3 (lower),
Example 14.1 [continued].

Example 14.2: Octet (1957/58), first movement, mm.135-138

m6(upper), m3(lower), M6(upper), M2(upper), m7(lower), m2(upper), and M7(lower). To identify the root of a chord, one determines which of its intervals is best according to this list.
Although layers involve regular motion, Hindemith sometimes creates a sense of irregularity by shifting from one layer-cardinality to another within single voices and by gradually shortening or lengthening the group lengths.

A simple illustration is given in Example 15.1 to show a shift in layer-cardinality. At first, the combination of cello and piano stresses the metrical 4-layer with durational accents every whole note. But in mm.167, the durational accents suddenly come every dotted-half-note, supported by dynamic accents in the piano.

Example 15.1. Sonata for Violoncello and Piano, op.11, no.3 (1919), first movement, mm.163-170

A more complex example, involving simultaneous shifts in two concurrent voices, is the one cited by Kidd (see Example 1), in which the clarinet shortens its metrical pulse from a 4-layer to a 3-layer, while the piano lengthens the metrical pulse from a 4-layer to a 6-layer.

Another illustration is in Example 15.2 which extends Example 14.2. The motive transferring from one voice to another activates a 2-layer. But the loud dynamic and density accent on the first quarter at m.139 dramatically change the pulse stream into a 3-layer. Thereafter, the motive is doubled to
Example 15.2. Octet (1957/58), first movement, mm.135-142
emphasize the new layer.

Sometimes the new group length is not maintained, but the lengths of successive groups keep varying, creating irregularity within the voices. In a passage from the Wind Quintet shown in Example 16.1, a 2-layer is determined by dynamic accents, but the group lengths are constantly changing as follows: 12, 9, 12, 9, 12, 12, and 11 $\frac{1}{2}$ s.

Example 16.1. *Kleine Kammermusik*, Quintet for Wind Instruments, op.24, no.2 (1922), fifth movement, mm.39-50
In the development of Piano Sonata No.2 in G (Example 16.2), the left hand creates a 3-layer by reiterating a three-eighth-note *ostinato*, and octave doubling emphasizes the beginning of each group. In mm.73-84, this *ostinato* is maintained, although every note is now doubled, first in parallel octaves; then, at mm.85-89, in parallel sixths. Transpositions of the three-eighth-note *ostinato* establish some large group lengths, each characterized by a distinct key. The groups are 24, 18, 12 (three times), 9, and 18 $\frac{1}{2}$'s respectively. That is, the lengths gradually decrease until the very last group.

With all these means of creating layers, there are many interesting and artistic ways to combine them in metrical consonance and dissonance. Some of these combinations are like those covered by Krebs, but Hindemith invents other combinations as well.

A short passage from the Wind Quintet, Example 17.1, illustrates one of these unusual techniques. In the clarinet, three 15 $\frac{1}{2}$ groups are prominent. The flute, seeming to be a shadow to the clarinet, has two prominent groups, which result from the repetition of a segment at a temporal interval of 15 $\frac{1}{2}$'s. In the oboe, three groups are prominent, they are 15, 9, and 15 $\frac{1}{2}$'s (the horn and the bassoon have the same first two groups, but the third group retains 9 $\frac{1}{2}$'s). All these group boundaries from different voices are out of phase as indicated in the example.

In another passage shown in Example 17.2, the groups established by the transpositions of the three-eighth-note *ostinato* in the left hand are 24, 18, 12 (three times), 9, and 18 $\frac{1}{2}$'s (as explained in Example 16.2). However, the grouping structure in the right-hand part is completely different. The first three notes, F-G-A$^b$, a diminution of
Example 16.2. Sonata for Piano No.2 (1936), first movement, mm.63-89
Example 17.1. *Kleine Kammermusik*, Quintet for Wind Instruments, op.24, no.2 (1922), fifth movement, mm.89-96

Example 17.2. Sonata for Piano No.2 (1936), first movement, mm.63-89
the left-hand motive, suggest a three-sixteenth-note timespan because the running
sixteenth notes can easily be heard as three statements of a three-note, stepwise ascending
minor third F-G-A♭, G-A♭-B♭, E♭-F-G♭, with a D♭-C-D♭ neighbour note figure after the
second statement. The following three dynamic accents, however, mark off two 6 and
one 4 \( \text{\textbullet} \) timespans. On a larger level, the whole (mm.63-69) constitutes a 24 \( \text{\textbullet} \) group.
The right hand in mm.69-73 has similar features, as it is a mostly transposition of mm.63-
69, but its overall timespan is shortened to 19 \( \text{\textbullet} \) s. The timespans determined by grouping
structure in the remaining measures are 10 (twice in a row), 13, 10, 6 (three times) \( \frac{3}{4} \) s; 
the second 10 \( \frac{3}{4} \) group (mm.76-79) is a transposition of the first 10 (mm.74-76); the third 
10 \( \frac{3}{4} \) group is a slightly modified statement of the previous 13 \( \frac{3}{4} \) group (mm.79-82); and 
the 6 \( \frac{3}{4} \) group (mm.85-89) is simply repeated twice.

Although all the rhythmic groups in the development have three-note, stepwise-
ascending minor third beginnings to provide unity, the change in group lengths is very 
striking. The out-of-phase relation of group boundaries in both right-hand and left-hand 
parts create a kind of metrical conflict.

Even when groups are the same length, they are not necessarily in phase. The 
Oboe Sonata provides two clear illustrations. In Example 18.1, pitch-pattern repetition in 
the piano creates two 9 \( \frac{3}{4} \) groups, while the durational accents in the oboe also create two 
9 \( \frac{3}{4} \) groups. The group lengths in the piano and the oboe are the same, but out of phase. 
In Example 18.2, an on-beat 12 \( \frac{3}{4} \) group alternates between the oboe and the piano right-
hand part. But in its third appearance, the timespan is shortened to 9 \( \frac{3}{4} \) s. In the piano 
left-hand part, the “oom-pah-pah” accompaniment pattern can also be cast into two 12 \( \frac{3}{4} \) 
groups, and the third group is also shortened to 9 \( \frac{3}{4} \) s. Here, the oboe and the right hand 
present groups but not clear layers, while the left hand presents a very clear 3-layer and 
its grouping, to some degree, arises as much from the other parts as from its own 
patterning. The resultant piano left-hand groups are evidently off the beat and so order-
corresponding groups in oboe and piano are out of phase.

Grouping dissonance, as defined by Krebs, is demonstrated in the following 
examples. In Example 19.1 the oboe marks off a 3-layer by durational accents, while 
“oom-pah-pah-oom-pah” pattern in the piano articulates a 5-layer making G5/3. In
Example 18.1. Sonata for Oboe and Piano (1938), second movement, mm.106-112

Example 18.2. Sonata for Oboe and Piano (1938), second movement, mm.58-73
Example 19.1. Sonata for Oboe and Piano (1938), second movement, mm.220-226

Example 19.2. Sonata for English Horn and Piano (1941), fourth movement, mm.40-44

Example 19.2, G4/3 arises from the metrical 4-layer in the piano right hand and the
displaced 3-layer formed by the durational accents in the left hand. In the Cello Sonata
(see Example 8.3), the 4-layer in the piano and the 3-layer in the cello give rise to G4/3.

Displacement dissonance is illustrated in Example 20.1. Here, the piano right-
hand part maintains the metrical 3-layer, and the left-hand part activates an antimetrical
3-layer because of durational accents on the weak beats. This is D3+2 (or D3-1) as the
Example 20.1. Sonata for Oboe and Piano (1938), second movement, mm.181-186

\[
D^{3+2} \text{ (or } D^{3-1})
\]

Example 20.2. Sonata for Clarinet and Piano (1939), second movement, mm.59-62

\[
D^{4+2}
\]

two layers are two pulses apart.\(^3\) In Example 20.2, the durational accents in the clarinet reinforce the metrical 4-layer, and the rhythmic repetition (\(\begin{array}{c}
\underline{\text{4}} \\
\underline{\text{4}} \\
\end{array}\)) in the piano, two pulses apart, initiates a displaced 4-layer. This results in D\(^{4+2}\). In the Wind Quintet (see Example 6.2), the clarinet’s off-beat 3-layer and other instruments’ on-beat 3-layer create D\(^{3+1}\).

Recall that “direct” dissonance obtains during the concurrence of layers of

\[\text{---}\]

\(\text{---}\)

\(^3\) Krebs, Fantasy Pieces, 35. Krebs would say that this is D\(^{3+2}\) in “forward hearing” and D\(^{3-1}\) in “backward hearing.”
motion, and "indirect" dissonance arises from the succession of layers. All the
aforementioned grouping and displacement dissonances are direct, because the layers
involved in each excerpt are active simultaneously. Example 21.1 shows an instance of
indirect dissonance in Hindemith's music. A three-eighth-note rhythmic pattern
(\( \text{J}^{\text{J}} \text{J} \)) alternates between the clarinet and the piano to mark off a 3-layer, an
immediate deviation from the primary 4-layer. Since the 4-layer is conceptually
maintained, an indirect G4/3 is created in these three measures.

Example 21.1. Sonata for Clarinet and Piano (1939), second movement, mm.92-97

Example 21.2 shows both direct and indirect dissonance in the Wind Quintet.
The flute, oboe, and clarinet, playing unison at mm.32-34, establish a primary metrical 3-
Example 21.2. *Kleine Kammermusik*, Quintet for Wind Instruments, op. 24, no. 2 (1922), fifth movement, mm. 30-54
Example 21.2 [continued].

layer by a recurring pitch pattern and contour accent. In mm.35-38, an indirect G5/3 is created because a 5-layer, articulated by the repetition of five chromatic descending notes in the clarinet, interacts with the mentally retained 3-layer. Then, the flute, oboe, and bassoon collaborate with the clarinet to mark off a 2-layer by intermittent dynamic accentuation in the following mm.39-50. As the horn resumes the 3-layer at mm.39-44, it creates direct G3/2 with the other four instruments. However, when the horn abandons the 3-layer and joins the 2-layer in mm.45-50, the G3/2 becomes indirect because the 3-layer is now conceptually maintained. At mm.51-54, the 2-layer disappears; the oboe starts to reestablish the 3-layer, and other instruments follow suit. But this still results an indirect G3/2 since the 2-layer is well established previously and is mentally retained by the listener for a few measures.

Subliminal dissonance refers to the dissonance formed by the interaction of one conflicting layer with the notated meter. It differs from indirect dissonance in that it lasts for a longer period of time, and indirect dissonance does not necessarily involve the primary metrical layer. This is best illustrated in the development of Piano Sonata No.2. As mentioned before, in connection with Examples 16.2 and 17.2, the three-eighth-note
Ostinato articulating a 3-layer persists in the left-hand part at mm.63-89. This 3-layer interacts with the primary metrical 4-layer to give rise to subliminal G4/3.

Another illustration is given in the third movement of the Violin Sonata. This movement is a triple fugue whose three sections are each devoted to a distinct subject. In the Second Section, the regularly recurring durational accentuation, resulting from the motion of sixteenth notes to a quarter or dotted-quarter-note (\( \uparrow \uparrow \uparrow \uparrow \downarrow \) and \( \downarrow \downarrow \downarrow \downarrow \uparrow \)), activates both a whole-note pulse (4-layer) and a half-note pulse (2-layer), as shown in Example 22.1. The notated triple meter (3-layer) is sublimated by these duple cross meters. In mm.64-93, the subject is played in stretto in the violin and piano right hand. The overlap results in two out-of-phase whole-note pulses (4-layers) and two out-of-phase half-note pulses (2-layers), as shown in Example 22.2. The persistent continuities of 4- and 2-layers (also results in D4+1 and D2+1), which are transferred from one voice to another, interact with the primary metrical 3-layer to create subliminal G4/3 and G3/2 in this long passage.

As for simple and compound dissonances, compound grouping dissonance seems to be rare in Hindemith’s music. But some of Hindemith’s compound displacement dissonances are more elaborate than Krebs’s examples. In the Octet, as shown in Example 23.1, a recurring pitch pattern marks off four 7-layers among four instruments (violin, first viola, second viola, and cello), and each layer is one pulse apart. This involves four conflicting layers of identical cardinality, and results in D7+1, D7+2, and D7+3. Perhaps D7+1+2+3 is the best way to denote this compound displacement dissonance.
Example 22.1. Sonata for Violin and Piano (1939), third movement, mm.45-48

Example 22.2. Sonata for Violin and Piano (1939), third movement, mm.64-76

\(D=\)Durational accent

Parenthesized notes indicate that the pulse streams or attacks are implied.
Combination of grouping and displacement dissonances is another common

In previous Example 23.1, there are also suggestions of G7/6 arising from the combination

---

4 In "Robert Schumann's Metrical Revisions," 37, Krebs analyzes simultaneous G3/2 and D3+2 in a short musical passage by Schumann, but he does not discuss the combination of dissonance types in "Fantasy Pieces."
of those 7-layers and a 6-layer, which is determined by durational accents in the clarinet. Hence, G7/6 is simultaneously active with D7+1+2+3. In Example 23.2, the reiteration of the three-eighth-note motive in the bass maintains a 3-layer, but the first theme in the top right-hand part supports the metrical 4-layer. This gives rise to G4/3.

Simultaneously, the repeated note G3 and the minor seventh it forms with the bass determine another 3-layer. This leads to D3+1 in the piano left hand. Therefore, grouping and displacement dissonances (G4/3 and D3+1) are concurrent in these measures.

Hindemith creates multiple levels of dissonance out of simplest means. In the closing theme of the Oboe Sonata, mm.66-74 (Example 24), there are three different layers of motions operating simultaneously to produce metrical conflict, and they are articulated by the same motive. The oboe contains a three-note motive F♯-B-E in the rhythm \( \uparrow \uparrow \downarrow \) in 4-layer; the piano right-hand part is a retrograde inversion of the altered oboe motive B-E-F♯ (\( \downarrow \downarrow \uparrow \)) in a different rhythm \( \downarrow \downarrow \downarrow \), the repetition of which creates a 1.5 layer; the piano left-hand part is also a rhythmically modified version of B-E-F♯ (\( \downarrow \downarrow \uparrow \)) with the rhythm \( \downarrow \downarrow \downarrow \) in 3-layer. The G4/3 between the oboe and the piano, and the D3+1 between the right-hand and left-hand parts of the piano are prominent. It is apparent that motivic development among different layers of motion brings about metrical conflict.
Example 24. Sonata for Oboe and Piano (1938), first movement, mm. 66-74

(1 = f)  \[ \text{music staff} \]  \[ \text{music staff} \]
Chapter Three

How Metrical Conflict Creates Musical Form and Process

The quantity and diversity of these examples of metrical dissonance in Hindemith's compositions suggest that it plays an important role in both small- and large-scale form.

Sometimes metrical conflict is introduced simply for intensification. In the eighth Interludium from Ludus Tonalis, a metrical 3-layer is evident from the outset (see Example 12). At mm.14-16, as shown in Example 25, a 2-layer (a faster pulse) is created by the different root content (recall the explanation of Example 13.1). The resulting indirect G3/2 with the conceptually maintained 3-layer intensifies the musical direction to the following metrically consonant section (mm.20-34).

Example 25. Ludus Tonalis (1942): Interludium No. 8, mm.14-16

Metrical conflict can also build expectations of the arrival of a thematically significant timepoint such as the entry of a subject. In an episode of the Violin Sonata, mm.21-26 (Example 26.1), the piano establishes a five-quarter-note pulse by its grouping structure. In comparison with the preceding six-quarter-note or dotted-whole-note pulse, established by repetitions of the first subject, the five-quarter-note pulse here quickens
the pace to the first subject entry at m.27. The heightened pace is highlighted with metrical dissonance: other pulses created in the violin, shown in the example, are displaced from the one in the piano right hand, and the left hand 2 pulse adds a grouping dissonance. The brief D5+1 and G5/2 between the piano and the violin are “resolved” by the entry of subject, which restores the normal grouping.

Example 26.1 Sonata for Violin and Piano (1939), third movement, mm.21-28

Metrical conflict is also used to prepare for other sorts of change. In the Clarinet Sonata, the tonal centre of the second movement is B♭, and the opening measures are metrically consonant. At mm.12-21 (Example 26.2), metrical conflict prepares for the change of tonality from B♭ to F. In these measures, the clarinet shifts between a 4-layer
Example 26.2. Sonata for Clarinet and Piano (1939), second movement, mm. 12-25
and a 3-layer, while the piano shifts from a 4- to a 6-layer, and their attacks do not coincide (recall Kidd's explanation in Example 1). After that, the accents of the clarinet and the piano start to coincide on the second quarter note of m.22. The tension is resolved in mm.22-25, and this metrically consonant passage ends with a F minor chord (minor dominant of B♭) in m.25 showing the arrival of another tonality.

Example 27 shows the transition (mm.34-40) of the eighth Interludium from Ludus Tonalis in which the preceding measures strongly maintain a 3-layer. A 2-layer is created by different root content of chords. In mm.34-35, the left hand asserts F♯ as the chord root; in mm.36-37, G; and in mm.38-40, B♭. Throughout these measures, the other chords in the right hand divert the listener's attention from the chord roots established by the left hand, recalling a similar metrical dissonance in mm.14-16 (see Example 13.1). The 2-layer creates an indirect G3/2 with the preceding layer. Moreover, in mm.34-37, the piano establishes two rhythmic groups because of motivic parallelism, each of which has a 9 J timespan. As the first beat is not the strongest beat in the group, the grouping and metrical structures are out of phase. After that, different positions of B♭ major triad (root position, first inversion and second inversion) in the left hand mark off 3, 4(two times), and 8 J groups while the similarity of triads in the right hand activate 3(two times), 5, 8 J groups. The right-hand and left-hand groups are also out of phase. Therefore, out-of-phase groups collaborate with the indirect G3/2 to heighten metrical dissonance in this transition. The following metrically consonant passage in B♭ beginning at m.41 "resolves" this dissonance.

Sections of Hindemith's pieces are often characterized strongly by the various rhythmic processes, or changes of pulse, within them. For instance, transfer of pulse
from voice to voice is one process Hindemith is fond of. Example 28.1 shows an interesting pulse transfer that results in two conflicting 2-layers arising from the same motive (\(\square\square\)). The first 2-layer begins in the violin, and the pulse transfer is indicated by a solid line in the example. Another 2-layer starts in the cello, and a dashed line indicates the pulse transfer. This motive, transferred from voice to voice, creates D2+1.

Example 28.2 shows how pulse transfer can be formally significant. At the opening of Oboe Sonata, the first theme in the Exposition is characterized by a specific metrical conflict: the oboe has a 4-layer that is displaced at m.5, while the piano moves at a 3-layer initiated by an “oom-pah-pah” accompaniment pattern, giving rise to direct
Example 28.1. Octet (1957/58), first movement, mm. 154-156

Example 28.2. Sonata for Oboe and Piano (1938), first movement, mm. 1-11
G4/3. In m.9 the 3-layer in the piano is transferred to the oboe. This pulse transfer is supported by the dynamic accents in the oboe, and the G4/3 becomes indirect as the 4-layer temporarily stops.

The closing theme recalls the first theme, not so much thematically as by a similar presentation of metrical dissonance and pulse transfer, as shown in Example 28.3. In mm.66-70, the layers are in a G4/3 as explained in Example 24. In mm.68-70, the three consecutive broken perfect fifths in the piano left hand activate a 2-layer, while the 3-layer is momentarily switched to the oboe, where the one measure of 3/8 accommodates the pulse transfer. The interaction of these 2- and 3-layer subtly creates hemiola. The layer transfer is repeated in mm.72-74.

Example 28.3. Sonata for Oboe and Piano (1938), first movement, mm.66-74
Another pulse process used to strongly define sections is a simultaneous lengthening and shortening of group lengths in two different voices. In Example 29.1, the grouping structure of the piano offers 6, 5, 4 groups, which provide a written out accelerando leading to the immediate metrically consonant passage. In Example 29.2, pitch recurrence (E5) in the piano right hand creates 4, 6, 8 groups which establish a written out rallentando leading to the final E major chord at the end of the exposition.

A good illustration of the simultaneous combination of these two rhythmic processes is in the Oboe Sonata excerpt of Example 29.3. Here, a succession of 10, 10, and 12 groups, resulting from chord repetition in the piano, provide a rallentando; by contrast, the decreasing series of durations between durational accent in the oboe offers an accelerando. The groups between the two instruments are out of phase, and the simultaneous rallentando in the piano and accelerando in the oboe are resolved by the establishment of the following closing theme.

Example 29.1. Sonata for English Horn and Piano (1941), sixth movement, mm.93-104
Example 29.2. Sonata for Oboe and Piano (1938), first movement, mm.78-83

Example 29.3. Sonata for Oboe and Piano (1938), first movement, mm.58-65

Weakening an established layer is another pulse process important for form.

Example 30.1 shows the first half of the first subject (mm.1-2) of the triple fugue in the Violin Sonata. The durational accentuation on the dotted-quarter notes, marked on the example, results in a 3/2 meter. The second half (mm.3-4), congruent with the notated meter, is grouped into two bars of 3/4 due to motivic parallelism (as shown on the example, <B, A, G#> is heard as <543> in E major, while <G, F, E> sounds like <543> in C minor). This first half has three strong half-note beats (\( \downarrow \downarrow \downarrow \)) and the second half two dotted-half-note beats (\( \downarrow . \downarrow . \)), both of them contributing to a dotted-
whole-note (or six quarter-note) pulse. This rhythmic structure has important consequences in mm.169-193, as shown in Example 30.2, which combines the first subject with the third subject. The dotted-whole-note pulse is evident, in spite of some deviations, through the alternate grouping of three half-note and two dotted-half-note beats in the first subject. In mm.169-180 three consecutive statements of the first subject (two in the piano, one in the violin) activate this pulse stream. Then in mm.181-183 it is briefly interrupted by the beginning motive of the third subject (with octave doubling) in the piano top right-hand part. Throughout mm.181-189 this rhythmic motive and grouping structure in the piano right hand offer 5, 4, 3(two times), and 5(two times) \( \frac{3}{2} \) timespans, weakening the dotted-whole-note pulse while the first subject inversion in the violin in mm.184-187 constantly maintains it. That is, the intrusion of the 2/4 measures at bar 182, 189, and the third subject motive weaken the six quarter-note pulse.

Beginning at m.190, however, the first subject in the piano top part begins to stabilize this pulse.

Example 30.1. Sonata for Violin and Piano (1939), third movement, mm.1-4

_Fuge_
_Ruhig bewegt (\( \text{d\textsuperscript{bis} 89} \))_

![Fugue example](image-url)
Example 30.2. Sonata for Violin and Piano (1939), third movement, mm.169-193
The following extended analysis of the coda from the first movement of the Horn Sonata illustrates how Hindemith combines some of the rhythmic processes I have demonstrated into a musically convincing structure.

Consonant with the 4/4 meter signature of this movement, the most prominent metrical layer of the horn within the metric hierarchy is the 4-layer (half-note pulse), as shown in Example 31. However, there are some divergences from this metrical layer. In mm. 148-151 the three horn A♭s (concert pitch) are syncopated against this meter because of their durational accents on the weak beats (marked by Ds on the example). Two temporary metrical dissonances are thus created here by the durational accent, contour accent and grouping structure of the notes. The first cross pulse is the shifted half-note
Example 31. Sonata for Horn and Piano (1939), first movement, mm. 140-162

\((1 = \uparrow)\)

Lebhaft \((d\ biss144)\)

Notational 4-layer concept is maintained \((mm. 148-151)\)

Harmonic change:

\[ D = \text{Durational accent} \]
\[ C = \text{Contour accent} \]
\[ G = \text{Grouping structure} \]

Parenthesized integers indicate that the layers or attacks are implied.
beat offered by the A♭s in mm.148-149; the second cross pulse is the dotted-half-note beat on the A♭, B, and G♯ in mm.149-151.

In the last system, the final three notes in the horn, E♭4, F4 and F3 are syncopated against the metrical half-note pulse. All of them have durational accents, while F4 and F3 are added with contour accents. The gradual increase in the length of these three melodic notes (6, 8, 14 \times spans) provides a \textit{rallentando} at the end.

As for the piano, the dynamic accents, density accents, and rhythmic grouping of notes (\begin{music} & | & & | & \end{music}) at the opening of the coda (m.140) are consistent with the notated meter, and therefore reinforce the 4-layer. But like the horn, the piano has divergences from this metric layer. In mm.148-151 the piano switches the accent from every half-
note (4-layer) to every dotted-quarter-note (3-layer); the dynamic accents and the new reiterated rhythmic pattern \( \text{\dottedtwo} \) substantiate the change to a faster pulse. As a result, both the horn and the piano deviate from the metrical 4-layer in the same measures. Basically, their accents do not synchronize (they coincide only on beat 2 of m.149), and thus they conflict with each other. Also, the conceptually maintained 4-layer (metrical half-note pulse) mostly contradicts the horn’s two temporary cross pulses (they coincide only on beat 3 of m.150) and contributes to an indirect G4/3 with the piano’s 3-layer (dotted-quarter-note pulse).

Simultaneously, changing group lengths are evident in the horn part. In mm.145-148 the pitch pattern repetition creates group lengths of 8, 6, and \( \text{\dottedthree} \) in succession. This gradual decrease in group length gives an effective \textit{accelerando} which heightens the sense of direction to the immediate metrical conflict between the horn and the piano in mm.148-151.

Throughout these four measures, the lines of the horn and the piano ascend towards a climax on the first beat in m.152. The metrical conflict created by the horn and the piano helps intensify the build-up of this climax. At the climactic timepoint, the horn reaches the highest note D5 of the coda; the piano is also in a relatively high register. Furthermore, the horn and the piano synchronize at this timepoint with a root position B minor chord (major and minor chords are most stable according to Hindemith’s theory), and start to resume the normalmetrical accentuation in 4-layer. Interestingly, we can hear an indirect hemiola arising from the interaction of the half-note pulse and the horn’s previously established dotted-half-note pulse at mm.152-153.
In the middle of m. 153 the horn restates the beginning of the first theme but with a metrical shift. The restatement begins at the point where the half-note pulse and the mentally retained dotted-half-note pulse coincide. However, in mm. 154-156, the metrical shift of the piano’s rhythmic grouping of notes (\(\text{\texttt{\textasteriskcentered}}\)) with its dynamic accents immediately conflicts with the horn’s rhythm. Once again, the accents of the two instruments do not synchronize. This gives rise to a brief D4+2 in mm. 154-156.

Beginning in m. 157, the piano further switches from the shifted 4-layer to a 6-layer; this time the continuously reiterated rhythmic pattern (\(\text{\texttt{\textasteriskcentered}}\)), dynamic accents, density accents, and harmonic change substantiate a slower dotted-half-note pulse (6-layer). The horn’s 4-layer and the piano’s 6-layer give rise to G6/4.

Starting from the third beat of m. 160, the piano resumes the half-note pulse with attacks on the strong beat of the original meter. If we hear the dotted-half-note pulse to persist, an indirect hemiola is created in mm. 160-161. Both pulses are coincident with the low F octave on the notated downbeat in the final measure.

A clear design involving metrical dissonance is perceptible in this coda. It begins with a strong metric 4-layer, but is followed by intense metrical dissonance. The decrease in group lengths provides a regular accelerando without altering the tempo. The horn’s two temporary pulses are set against the metric pulse, while the piano’s shift to 3-layer creates indirect G4/3 with the conceptually maintained 4-layer. The resulting metrical conflict between the horn and the piano is employed to build up a climax. Hemiolas (indirect dissonances) are subtly created. The metrical shift of 4-layer in the piano leads to D4+2, and the change to 6-layer brings about G6/4. All these lend excitement and variety to a coda that thematically is simply recapitulative.
Hindemith prefers traditional, thematically characterized forms, such as fugue, variation, and sonata. There are certain qualities expected of the sections and of the relations between the sections in these forms. In sonata form, for example, one expects the development to be less stable, and to lead convincingly to the recapitulation of the exposition. Hindemith's skill is being able to satisfy these expectations using metrical dissonance and consonance, sometimes in surprising ways. The following analyses will illustrate how metrical conflict functions in a whole movement.

Conflict as a textural characteristic of an entire movement: the duple/triple conflict in the Violin Sonata. As the third movement of this sonata is a triple fugue, there are three sections together with three distinct subjects, each of which is four measures long. The First Section is in mm.1-44, the Second Section in mm.45-116, and the Third Section in mm.117-208. Each subject delineates a duple/triple conflict in a distinct way.

Example 32.1 shows how the first subject alternates every two measures between accent patterns of three half-note and two dotted-half-note beats (see the explanation referring to Example 30.1). Throughout the First Section, hemiolas created through the interaction of three (\( \frac{3}{2} \)) in time of two (\( \frac{2}{2} \)) arising from this subject are evident. For instance, as shown in Example 32.2, the violin begins the subject early in m.12, overlapping the last measure of the subject (four measures long) offered by the piano left hand. This is the first instance of hemiola in the movement.

Example 33.1 shows the second subject, which activates both a whole-note and a half-note pulse (see explanation referring to Example 22.1). These duple cross meters are
Example 32.1. Sonata for Violin and Piano (1939), third movement, mm.1-4

Fuge
Ruhig bewegt (d bis es)

Example 32.2. Sonata for Violin and Piano (1939), third movement, mm.12-13

Example 33.1. Sonata for Violin and Piano (1939), third movement, mm.45-48

Example 33.2. Sonata for Violin and Piano (1939), third movement, mm.94-116

D = Durational accent
p = attack from other accentuations

d. = accent from the second half of the first subject
Example 33.2 [continued].
set against the 3/4 background, and override the notated triple grouping of beats in the Second Section. Thus we hear subliminal G4/3 and G3/2 in mm.64-93 (see Example 22.2). In the following mm.94-116, as shown in Example 33.2, the superimposition of the first and second subjects generates a direct confrontation of the 3-layer (dotted-half-note pulse) and the 2-layer (half-note pulse).

Shown in Example 34.1, the third subject, after one measure lasting a dotted-half-note, creates a half-note pulse by durational accent. In the third section, the subjects' overlap delineates intermittent duple/triple conflict. An illustration is given in Example 34.2.

Example 34.1. Sonata for Violin and Piano (1939), third movement, mm.117-120

Example 34.2. Sonata for Violin and Piano (1939), third movement, mm.144-148

\[ D = \text{Durational accent} \]
Moreover, the intensification of dissonance in the final climax (mm.169-189) provided by the superimposition of the three subjects is most interesting. In spite of their different rhythmic qualities, the interaction of these subjects continuously activates regularly recurring accents to create three prominent concurrent pulse streams, which are shown in Example 35. First and foremost, the half-note accent of the first subject in the piano right hand of m.169 creates the first half-note pulse. This pulse is transferred every two bars from voice to voice and marked off by the half-note attacks of the first and second subjects. Then the third subject in the piano bass of m.170 initiates a second half-note pulse, also transferred from voice to voice. The 2/4 measures at m.182 and m.189 seem to accommodate this second pulse. The first subject changes at m.190 to support the second half-note pulse, while the third subject in the following measure changes to reinforce the first half-note pulse. In the last system (mm.204-205) the half-note attack of the first subject in the piano left hand coincides with the second pulse. Simultaneous with these two pulse streams, the first beat of m.169 with accentuation from the third subject marks off a metrical dotted-half-note pulse, which is mostly maintained by the dotted-half-note attacks of the first and third subjects. Here, the intense intrusion of two duple cross pulses into the triple context is very entertaining and riveting.

The surface rhythms of these fugue subjects offer diverse conflicting accents that enhance the rhythmic complexities. However, underneath these surface irregularities, the concurrent, active and competing pulse streams derived from the subjects provide

---

1 As Krebs seldom considers "pulse transfer" in layers of motion, Roeder’s pulse-stream seems to me more relevant to reveal the rhythmic subtleties of this movement.
Example 35. Sonata for Violin and Piano (1939), third movement, mm.169-208

C = Contour accent
D = Durational accent
Parenthesized notes indicate that the pulse streams or attacks are implied
Example 35 [continued].
regularities to the music. In the final measures of the movement, the metric dotted-half-note pulse remains strong while the duple cross pulse streams start to weaken.

To sum up the entire movement: we hear the alternation of three-half-note and two-dotted-half-note beats in the First Section. In the Second Section, the subject marks off half-note and whole-note pulses that overshadow the notated triple grouping of beats. At the end of the Second Section, the superimposition of the first and second subjects features the direct confrontation of half-note and dotted-half-note attacks. In the Third Section, the subject establishes a half-note pulse, after one measure of dotted-half-note. The subject overlap creates occasional grouping dissonances G3/2. In the last part of the movement, the superimposition of the three subjects builds up the greatest dissonance through the interaction of duple and triple pulses. Although the first and second half-note and dotted-half-note accents are transferred from voice to voice, they remain as constant, competing continuities to increase the focus on the duple/triple conflict, which is thus exploited as a textural characteristic in the large-scale plan of this movement.

Contrasting types of layer combinations create a sense of variation, which may also help articulate large-scale form. A good example is the six movements of the Sonata for English Horn and Piano. The whole sonata is a large binary form AB repeated twice (ABA'B'A''B''), considering each movement as a section, such that movements three and five (A' and A'') are variations of the first movement; and movements four and six (B' and B'') are variations of the second. As the main variation technique does not involve metrical conflict in the first, third and fifth movements, the following discussion will focus only on the even-numbered movements.
In the second movement, the English horn presents three rhythmic groups, and they are restated with metrical dissonance in the fourth and sixth movements. In the fourth movement, the first rhythmic group is treated in canonic imitation between the English horn and the piano right-hand part. To enhance the rhythmic interest, the piano left-hand part determined by durational accent marks off a 3-layer which results in G4/3 with the metrical 4-layer (see Example 19.2).

The second group is played by the English horn (see Example 5.3b). Here, the "oom-pah-pah" piano accompaniment initiates a 3-layer. With the conceptually maintained 4-layer, this gives rise to indirect G4/3 in the first half of the second group. Later, this first half of the second group is repeated in the piano right-hand part while the 3-layer is maintained by the regular eighth-note chord attacks in the left-hand part (see Example 11.1). In addition, the new motivic accent (three-note descending perfect fourth), and slurring of eighth notes in the English horn activates a shifted 3-layer. Therefore, the piano left-hand part and the English horn give rise to D3+1 for the second group.

The notated meter 3/8 of the second movement returns in the sixth movement. The most significant change is the antimetrical layer marked off by the piano to provide metrical conflict. The first rhythmic group is shown in Example 36.1. The grouping structure of the piano establishes a 2-layer, which is articulated by regular quarter-note attacks in the piano left-hand part and the slurring of eighth-notes into pairs in the right-hand part. This results in subliminal G3/2 with the primary metrical 3-layer.

The second half of the second group is shown in Example 36.2a. The parallel minor sevenths in the piano determine a 2-layer, which contradicts the English horn's 3-
Example 36.1. Sonata for English Horn and Piano (1941), sixth movement, mm.1-8

Allegro pesante ($J = 66$)

Example 36.2. Sonata for English Horn and Piano (1941), sixth movement

a. mm.31-35

b. mm.48-53
layer. In Example 36.2b, the parallel minor sevenths and the broken major sixths in the piano left-hand part also create 2-layer, which is in contrast to the 3-layer offered by the piano right hand and the English horn. These 2- and 3-layers bring about direct G3/2.

Displacement dissonance in the third group is shown in Example 36.3a. Here, the onset of a new motive (\[\text{\textbullet\textbullet\textbullet}\cdot\text{\textbullet}\text{\textbullet}\text{\textbullet}\]) in the piano marks off a shifted 3-layer which results in D3+1 with the English horn’s 3-layer. At the end of the third group, this motive switches the accent from every dotted-quarter-note to every quarter-note, creating a 2-layer. This creates an indirect G3/2 with the conceptually maintained 3-layer to heighten the sense of direction to the following first group (see Example 36.3b).

In summary, the second movement presents three metrically consonant rhythmic groups. In the fourth movement, dissonance is introduced: the first group has G4/3, and the second group has G4/3 and D3+1. In the sixth movement, the rhythms of the three groups do not change (they are the same as those of the second movement), but the first group and the second group has G3/2, the third group has D3+1 and G3/2. Hence, Hindemith uses metrical conflict to create a sense of variation in the restatement of themes.

Sectional contrast and reprise as surprise. In terms of metrical consonance and dissonance, the *interludium* projects a ternary form, ABA. The first section A is in mm.1-19; the second section, mm.20-34; the transition, mm.35-40; and the third section, mm.41-57. The A section contains chiefly metrical dissonance, and the B section metrical consonance.

In the First Section A, D3+1 formed by the separation of pitch class content (see
Example 36.3. Sonata for English Horn and Piano (1941), sixth movement

a. mm.59-62

Example 12), and indirect G3/2 resulting from different root content (see Example 13.1) are perceptible. At the closing measures of this section, as shown in Example 37.1, a series of arpeggiated diminished seventh chords are featured in 5-layer that creates indirect G5/3 with the conceptually maintained 3-layer.

The Second Section is characterized by the primary metrical 3-layer, and is thus metrically consonant. Example 37.2 shows the beginning measures of this section. The first half is a large phrase group, with D as the tonic. The second half, with F♯ or G♭ as the tonic, is a transposition of the first up a third and has a different bass voice.

As mentioned before, the transition (see Example 27) is replete with indirect G3/2 and out-of-phase groups to create metrical conflict. The Third Section recollects the
Example 37.1. *Ludus Tonalis* (1942): *Interludium* No. 8, mm. 17-19

Example 37.2. *Ludus Tonalis* (1942): *Interludium* No. 8, mm. 19-21

Example 37.3. *Ludus Tonalis* (1942): *Interludium* No. 8, mm. 41-43

previous D3+1, indirect G3/2, and G5/3. Consequently, metrical conflict increases the sectional contrast and helps articulate the form of this piece.

Another rhythmic interest is located at the beginning of the Third Section. As this section presents a thematic reprise, we might expect to hear the metrical dissonance of m. 1 again (see Example 12). At the opening measures of this section, shown in Example 37.3, the on-beat 3-layer, conforming to the notated meter, is characterized by the recurring parallel fifths. Articulated by the right hand, this 3-layer has the B♭ in the uppermost voice as the pedal point. However, the left hand does not have the contrasting
material as it did in mm.1-3, it only repeats the lowest notes of the right-hand chords; therefore, the expected metrical conflict does not appear. Hence, this metrically consonant reprise creates a surprise to the listener. After that, D3+1 returns as shown in Example 13.2.

Metrical dissonance can also function to link large sections. In the first movement of Piano Sonata No.2, the G4/3 and acutely out-of-phase groups generate intense tension in the development (recall Examples 16.2 and 17.2). In the recapitulation, out-of-phase groups no longer predominate and G4/3 persists in the first theme (see Example 23.2). It is obvious that Hindemith uses metrical conflict to characterize the development, and the continuation of G4/3 helps link the development and the recapitulation.

One of the most important formal effects of sonata form—the recapitulation—is effectively managed by Hindemith’s use of metrical dissonance. Let us consider the Oboe Sonata, first movement. The first theme in the Exposition has G4/3, as explained in Example 5.3a and 28.2. Example 38.1 shows the second theme. The two-bar 3/4 meter establishes a dotted-half-note pulse (6-layer) in the oboe which is in hemiola with respect to the half-note pulse (4-layer) supported by the piano right hand. As for the accompaniment, the A♯4-G♯4-F♯4-E4 descent in the piano right hand provides a 4-layer while the durational accent in the piano left hand creates a shifted 4-layer. This creates D4+2. A displaced hemiola is perceptible between the oboe and the piano left-hand part. The closing theme has G4/3, D3+1, and subtly created hemiola resulted from pulse transfer (see the discussions of Examples 24 and 28.3).
In the development, the opening measures (Example 38.2) reinforce the metric pulse through the durational accentuation. Later, as shown in Example 38.3, the piano starts to activate a shifted 4-layer on the second beat of the notated measure by means of durational accent while the oboe continues to maintain the original 4-layer. This gives rise to D4+2 in the development. Before the end of the development, Example 38.4 shows the second theme returns in a state of metrical consonance.

In the recapitulation, an “oom-pah-oom-pah-pah” accompaniment pattern in the first theme gives rise to G5/4 (see Example 5.3c) that substitutes for the G4/3 in the exposition. With the elimination of the second theme, the closing theme is now transposed to the G tonal area with the same G4/3, D3+1, and hemiola.

As for the coda, as shown in Example 38.5, the pitch pattern reiteration in the piano left hand part shows seven 10 \text{ rhythmic groups from m.206 to the penultimate measure; the recurring pitch pattern in the piano right hand part shows three 10, one 14, and one 30 \text{ rhythmic groups which constitute a rallentando towards the end. The recurring pitch pattern in the oboe, showing consecutive 6, 8, 6, 7, 6, and 19 \text{ rhythmic groups, also indicates a rallentando towards the end. In mm.211-224 most groups are out of phase, and the change in group length is perceptible. In the last measure, the composite rhythm of the oboe and the piano reinforces the notated half-note pulse.}

Normally in a sonata form, stability would be featured in the exposition, tension in the development, and resolution in the recapitulation. Here, however, these lengthy passages of metrical dissonance override the formal function of sonata form. The metrical conflict associated with the themes is not resolved in the recapitulation, and the three large sections in this piece are characterized by metrical dissonance. It seems, then,
Example 38.1. Sonata for Oboe and Piano (1938), first movement, mm.36-39

Example 38.2. Sonata for Oboe and Piano (1938), first movement, mm.84-86

Example 38.3. Sonata for Oboe and Piano (1938), first movement, mm.94-99
Example 38.4. Sonata for Oboe and Piano (1938), first movement, mm. 133-138

Example 38.5. Sonata for Oboe and Piano (1938), first movement, mm. 206-224
that it is analytically productive to conceive of the work primarily rhythmically.

Hindemith employs metrical conflict as a compositional resource in a large-scale process.

Metrical dissonance, normally a process of tension, becomes the reference; and metrical consonance, normally a process of stability, provides variety.
Conclusion

The forgoing examples have shown that the concepts of metrical consonance and dissonance are a good way to characterize the rhythmic interest in Hindemith's music. We have determined that Hindemith has ways of creating layers beyond those explained by Krebs. Layers involve regular motion, but to create a sense of irregularity, Hindemith makes changes within layers by shifting from one layer-cardinality to another and by making group lengths gradually shorter or longer. Grouping and displacement dissonances are prominent in his creation of metrical conflict. Also, metrical dissonances are achieved through the employment of out-of-phase group boundaries in different voices and same-length groups out-of-phase. Oftentimes, out-of-phase groups appear concurrently with grouping or displacement dissonance to increase the rhythmic complexity.

The gradual decrease in group length without changing the tempo can bring about an *accelerando*, and the gradual increase in group length can lead to a *rallentando*. Simultaneous *accelerando* and *rallentando* can obtain between voices in his music. Underneath the irregular surface conflicting attacks, we can hear the regular, concurrent, and competing pulse streams in his polyphonic works. His consuming interest in hemiola is evident. A faster pulse is created to heighten the sense of musical direction, while a motive may be used to generate a layer of motion and rhythmic groups to provide unity in the piece. In addition to creating metrical conflict, layers of motion may contain contrasting musical materials, help establish a tonality, or be related motivically.

In an attempt to relate the metrical dissonance in his compositions to other musical events, my research reveals that Hindemith manipulates metrical conflict in
certain passages for particular musical purposes, for instance, to prepare for change of
tonality and entry of subject, to create points of tension, to intensify the build-up of a
climax, and to provide link between sections. As a compositional resource, metrical
conflict is used to increase sectional contrast to articulate the form. Also, it is a means of
variation technique in the restatements of a theme, and can be a textural characteristic of
an entire movement. Metrical dissonance may even be exploited to override the formal
function of a sonata form so that the conflict becomes the reference, while metrical
consonance provides variety.

The compositional use of metrical conflict was not a sudden development by the
composer but involved a gradual process of experimentation. My analyses show that
some of his compositions use metrical conflict sparingly and experimentally while others
exploit it systematically in large-scale processes. Metrical conflict is undeniably
Hindemith’s favorite means of creating rhythmic interest, but he does not use it
excessively. It is not surprising that some of his compositions or movements under my
present study entirely lack in this rhythmic quality. Nevertheless, his interest in metrical
dissonance persists throughout his whole life and becomes more prominent after 1933, in
his third style period.

The concept of metrical conflict was hinted in the nineteenth-century rhythmic
theory, and is formulated only gradually and systematically in the twentieth-century.

---

1For example, metrical dissonance is used in the coda of the first movement of the Horn Sonata
(1939), and in a few passages of the second movement of the Clarinet Sonata (1939). However, it is
exploited as a large-scale plan in the Oboe Sonata (1938) and the English Horn Sonata (1941).
2Since Hitler took power in Germany in January 1933, the Nazi regime proscribed modernism and
banned the performance of Hindemith’s music. Finally, the composer was forced to emigrate. There is a
good reason to believe that the composer’s marked interest in metrical dissonance after 1933 may be
related to his affliction arising from the social and political upheavals at that time. But this is not under the
discussion of my present paper.
3See Krebs, *Fantasy Pieces*, 3-21.
Hindemith, of course, was an eminent theorist as well as a composer. In his later years, he attempted to write a book about rhythm, but this failed to materialize.\textsuperscript{4} Perhaps the idea of metrical conflict would have become an essential ingredient in his rhythmic theory had he been able to complete the book.

Bibliography


