Nature: Happiness, Anger, Sadness, and Joy

AN ORIGINAL COMPOSITION FOR ORCHESTRA

by

JI EUN MOON

(Under the Direction of Leonard V. Ball, Jr.)

ABSTRACT

The dissertation consists of two parts. The first part is an original composition for orchestra. The work is scored for 2 piccolos, 2 flutes, 2 oboes, 2 clarinets in Bb, 2 bassoons, 1 contrabassoon, 4 horns in F, 2 trumpets in C, 2 trombones, 1 bass trombone, 2 tubas, 5 timpani, bass drum, tambourine, suspended cymbal, 4 tom-toms, 2 triangles, gong, glockenspiel, harp, piano, 10 first violins, 8 second violins, 8 violas, 6 cellos, 6 contrabasses. The second part of the dissertation presents stylistic discussions, including musical aspects, instrumental techniques, and analytic studies that focus on the influence of harmony, and orchestration on the structure of the work. These studies explore the fundamental compositional ideas of Nature and use analytical tools to guide the listeners to a comprehensive understanding of the work.

INDEX WORDS: Original Composition, Korean Philosophy, Korean Music, Krzysztof Penderecki, Tan Dun, Karel Husa, Luciano Berio, Timbre, Register, Extended Techniques, Chromatic Harmony
Nature: Happiness, Anger, Sadness, and Joy

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JI EUN MOON

B.A., Ulsan University, South Korea, 2002

M.M., Brooklyn College, CUNY, 2007

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JI EUN MOON

Major Professor: Leonard V. Ball, Jr.
Committee: Adrian P. Childs
Roger Vogel
Evgeny Rivkin

Electronic Version Approved:
Maureen Grasso
Dean of the Graduate School
The University of Georgia
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1. INTRODUCTION

In order to complete the requirements for the degree Doctor of Musical Arts in music composition, this dissertation is divided into two sections:Nature, an original composition in four movements written for orchestra, and an analytical study. This document, the aforementioned analytical study, will discuss elements of musical style such as timbre, harmony, and orchestration, and will compare the original composition to works by selected composers after 1950.

The original composition, Nature: Happiness, Anger, Sadness, and Joy, is written for large orchestra. The inspiration for this composition comes from the remembrance of the great love displayed by the first generation of Koreans after the Korean War, a generation which endured intense suffering while valuing and supporting family. Nature symbolizes the restrained emotions of that generation – a restraint that allowed them to endure suffering and conflict.

Nature: Happiness, Anger, Sadness, and Joy projects the primary emotion of human beings according to ancient Korean philosophy. Four primary feelings in human life are symbolized by Chinese characters from ancient Korea. They are waviness (Hee), sadness (No), joy (Aea), and rest (Rok). Translated into English, they are happiness, anger, sadness, and joy. Each Chinese character is represented, as shown in the work’s title, by one of its four movements. Contrasts in each movement’s character are achieved through different choices of instrumentation, extended techniques, and texture densities. Additional strong expressions of a primitive sense are made by adding human voices supplied by the members of the orchestra.
The work is scored for 2 piccolos, 2 flutes, 2 oboes, 2 clarinets in Bb, 2 bassoons, 1 contrabassoon, 4 horns in F, 2 trumpets in C, 2 trombones, 1 bass trombone, 2 tubas, five timpani, bass drum, tambourine, suspended cymbal, 4 tom-toms, 2 triangles, gong, glockenspiel, harp, piano, 10 first violins, 8 second violins, 8 violas, 6 cellos, and 6 contrabasses.

The second portion of this dissertation is divided into four chapters that primarily explore the techniques, harmonies, forms, and styles of the orchestral work. Chapter two is a brief survey of the important orchestral works and other pieces that influenced this composition and led to the rethinking of traditional instrumental techniques in orchestral writing. Compositions were selected that use new sonorities, new instrumental methods, and innovative instrumental techniques from other cultures. Selected works attempt to synthesize the composers’ own national concepts of construction and timbre with contemporary Western European procedures. The included orchestral works are Capriccio for Violin and Orchestra (1967) and Symphony No.3 (1988) by Krzysztof Penderecki; Death and Fire: Dialogue with Paul Klee (1995) by Tan Dun; and Symphony No.2, Reflection (1970) by Karel Husa. Other works from the repertoire of Luciano Berio containing new sonorities and extended instrumental techniques are also discussed. This chapter examines interesting compositional techniques and orchestration in these four composers’ works, which form distinct colors through instrumental groupings and extended techniques.

Chapter three focuses on aspects of orchestration and register. Basically, the chapter explores structure that is established through different groupings of instruments and contrasts between low and high registers. Musical structure is achieved in Nature by using sound effects such as vocalizing and breathing, percussive techniques, and by changes of register employing shifts from extremely low to extremely high pitches. Each movement of Nature differs slightly in
instrumentation in order to generate particular musical effects and to create different atmospheres through sudden shifts of timbre and texture. This chapter will detail how the musical structures were formed in *Nature*, and how dramatic moments were reinforced with other musical material in addition to orchestration and register shifts.

An analytic approach to *Nature* applying pitch class set theory follows in chapter four. Basic structures of pitch intervals, harmony, and referential collections for each movement are explored in this chapter, and the relationships between movements in the development of thematic ideas in pitch and harmonic structures are discussed. The primary reference for this analytical approach is *Introduction to Post-Tonal Theory* by Joseph N. Straus.¹ As a whole, *Nature*’s four movements are connected by chromatic sonorities. The third and fourth movements, “Sadness” and “Joy,” include massive dissonant chords and chromatic clusters. They create and convey various emotions and atmospheres through a range of textural densities. In addition to a discussion of each individual movement, this chapter will investigate how unity of *Nature*’s structure is achieved through the use and connection of chromatic thematic pitch material.

Finally, Chapter 5 will briefly state the aspects of orchestration, musical timbre, extended techniques, register, and harmony that serve as elementary sources for creating the structure of *Nature*. The chapter will summarize how chromatic pitch materials and cluster sonorities unify the movements through the motivic idea.

2. SURVEY OF RELATED LITERATURE

This chapter discusses and analyzes the musical aspects of compositions that provided inspiration and guidance during the composition process for Nature: Happiness, Anger, Sadness, and Joy. These aspects include realizing the potential of traditional instrumental techniques, extension of those techniques, instrumental makeup of the orchestra, musical styles, and the approach to timbre. The examined pieces reflect the development of new techniques and new sonorities in the composers’ works, delivering enormous power by extending musical expression in the instruments. The composers whose works influenced Nature are Krzysztof Penderecki, Tan Dun, Karel Husa, and Luciano Berio.

Tan Dun’s orchestral work Death and Fire: Dialogue with Paul Klee incorporates the natural voice, Chinese traditional vocalization, and the low pitches of instruments in the orchestra. Orchestra members are requested to shout, breathe heavily, and provide vocal drones with or without instruments, providing a sense of ritual and theater. Similar techniques are used in Nature. The first and fourth movements, “Happiness” and “Joy,” employ vocal techniques achieved by speaking a specific syllable through the instrument’s body while simultaneously performing percussive key clicks. In the opening section of “Happiness” and the final section of “Joy,” vocal interjection by the ensemble constitutes a primary element of the composition.

“I Portrait,” the opening section in the Death and Fire: Dialogue with Paul Klee, introduces vocalization by all wind and percussion players. Unvoiced vocal techniques like

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breathing and whispering in the section increase tension and build dramatic expression for the next section. The use of vocalization creates an interesting musical scene. In the final section of the first movement of Nature, all instrumentalists participate by shouting for three measures, while long glissando sections are performed in the percussion part. In addition to the opening of movement one and the end of movement four, these effects were used in various ways throughout Nature.

Extended techniques are explored in Nature especially through the woodwind instruments. Nature’s primary resource for new techniques in woodwinds is Berio’s Sequenza series for solo instruments, which is characterized by verbal and instrumental sound performed in a virtuosic manner. Specifically, the twenty-minute stretch of continuous bassoon sound in Sequenza XII was achieved by circular breathing and different uses of the tongue. The alternation of key click and flutter tonguing in Sequenza I for solo flute achieves polyphonic sound on a monophonic instrument. In Nature, the techniques used in the woodwind section are key clicks and simultaneously blowing air or whispering through the mouthpieces of various woodwind instruments. The opening sections of the first movement and the fourth movement use two layers of woodwind techniques: vocalization and key clicks. They create various timbres and emotional layers, as the percussive noises of clicks combine with breathing and whispers performed through the instruments.

Another source for the extended techniques found in Nature was Penderecki’s single movement concerto, Capriccio for Violin and Orchestra. In this work, the string and brass
sections play massive clusters. Each member of the brass and string sections takes a different note, and when performed simultaneously, large dissonant sounds and unique timbres generating great density are created. These cluster effects are applied in the third and fourth movements of *Nature*. Clusters in the third movement accompany thematic materials and, in effect, constitute the overall musical atmosphere of “Sadness.”

The large cluster section in the fourth movement of *Nature* is used in a different way than Penderecki’s approach in *Capriccio for Violin and Orchestra*. These clusters develop the musical tension and provide various atmospheres incorporating additional musical conflict between the different sizes of ensemble groups. One finds, for example, soli with large instrumental sections or woodwind groups with the string section. These cluster effects also provide tension and musical drama by contrasting low and high registers between various ensemble combinations, or even in the same instrument. This registral conflict is demonstrated in the brass, piano, and string parts in mm. 73-74 of “Joy” (Example 2.1, on page 7).

Penderecki’s *Capriccio for Violin and Orchestra* employs various idiomatic effects in the string and woodwind sections: rapid bowed tremolo, playing behind the bridge, using only the mouthpiece, flute sound with voice, and tapping on the body of the instrument with fingers. The opening section of the first movement of *Nature* shares these technical effects in the string sections.

Karel Husa’s *Symphony No.2, Reflection*, consists of three movements, but mainly explores tone clusters in the string section during the first movement in mm. 1-33. They employ a moderately dissonant sonority using harmonics at a soft dynamic level, and these harmonic cluster sonorities, combined with the harp, take up the first half of the initial movement. Husa’s

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clusters create a mysterious mood, while supporting a melody in the woodwind section at mm. 3-13. The final movement of Nature shares similar cluster techniques with the Husa example. Measures 85-90 of this movement contain clusters in the first and second violin sections that accompany the woodwind section. Here the violin passages are scored with ottava signs instead of using harmonics—different from the Husa work—to project the distinct effect of the register. The pitch range of Husa’s clusters is less wide and extreme than the clusters in the fourth movement of Nature.

Example 2.1 “Joy,” mm. 73-74, Registral contrast of cluster effects in the brass, piano, and string parts of the fourth movement.
Orchestration in *Nature* is similar to Tan Dun’s overall orchestration in *Death and Fire*, which emphasizes low pitch sonorities by adding contrabassoon and the frequent use of low strings. Low range sonorities are mainly presented in the third movement of *Nature*. While it is similar to Tan Dun’s orchestration, the low range in *Nature* is reinforced by adding bass trombone, two tubas and a contrabassoon to the orchestra.

The introductory section of “I Portrait” of Tan Dun’s *Death and Fire* is scored with extremely low range passages in the double bass at mm. 1-5 and high pitches in the cellos at mm. 20-26, and it incorporates two principle string effects: glissandi and microtones. His glissandi, opposing low and high pitched gestures, create a significant contrasting timbre. The significance of Tan Dun’s entrance is his focus on the melody in the monophonic texture of the low strings. In order to emphasize the melody, he only employs basses in a slow tempo. The opening statement of “Sadness” is somewhat similar in approach, but its emphasis is melody carried by the flutes and oboes in the middle range. Its opening creates a sensitive and mysterious atmosphere through woodwind instruments in a mixture of homophonic and polyphonic textures.

The orchestration of the final movement of *Nature* is written in the style of a concerto grosso from the baroque period, and it involves the contrast of small and large ensemble groups. This concept came from the *Capriccio for Violin and Orchestra* by Krzysztof Penderecki. The *Capriccio* is written for large orchestra including four saxophones, a contrabass clarinet, musical saw, electric bass guitar, harmonium, and piano. This large orchestra continually focuses on the alternation between solo violin and various ensemble groups involving lightly accompanied, cadenza-like passages for the solo violin. Similarly, the final movement of *Nature* features the interplay between soli sections, group sections, and combined ensemble groups. In the fourth movement, all instrumental sections are equally virtuosic and, perhaps, as difficult as the solo
violin passages of Penderecki’s *Capriccio for Violin and Orchestra*. The most important similarities between Penderecki’s work and the fourth movement of *Nature* are the colorful timbres and varied sound textures obtained through clusters, chromatic harmony, and extended techniques. These clusters and chromatic sonorities are also the major source for the overall structure of *Nature* (Example 2.2, on page 10).

Two solo trumpet passages found in “Happiness” and “Joy” are similar to Penderecki’s approach to the solo trumpet and trombone lines at mm. 22 and 51 in the second movement of his Symphony No 3. In the second movement of that work, both solo lines are accompanied by strings and brass instruments. Penderecki’s solo trombone passages in the second movement also alternate with solo trumpet, marimba and viola sections, all accompanied by a powerful string and brass sound throughout. In the first movement of *Nature*, the first trumpet alternates with the second trumpet in a passage accompanied homophonically by other instrumental groups. Penderecki’s accompaniment for the solo passages, on the other hand, is characterized by more independence in a contrapuntal texture. Both the solo passages of Penderecki’s second movement and those in the first movement of *Nature* are difficult.

Another trumpet solo passage in the fourth movement of *Nature* has similar aspects to Penderecki’s trombone solo section from the second movement of his Symphony No 3. Penderecki’s solo trombone passage in mm. 51-64 is accompanied by instruments in their middle and low ranges, and combines chromatic scales in the trombone parts with the linear chromatic motion of the string section. As the moment proceeds, more instruments are incorporated. Two trumpet soli parts in “Joy” are more difficult than Penderecki’s virtuosic trombone solo section, combining the low and high ranges of the trumpet and using dissonant leaps from mm.

43 to 47 (Example 2.3 shows part of the referenced passage on page 11). The woodwind accompaniment of this passage contains rhythmic complexity and a polyphonic texture, but it ends very quickly.

Example 2.2 “Joy,” mm. 66-68. Two primary sonorities: vertical cluster chords in the brass section, percussion and piano, and linear chromatic figures in the upper woodwind parts.

The lower woodwind part also synchronizes chromatic chords with the lower instruments of the brass section. The major difference between the works is that Penderecki’s solo section features
a prominent melody with an accompaniment part, whereas the trumpet solo sections in *Nature* are treated as a part of the ensemble, creating various timbres.

Example 2.3 “Joy,” mm. 45-47. The virtuosic styles of the two trumpet soli.

The second movement, “Anger,” employs a small form structure and is the shortest movement in *Nature*. The idea of such a short duration for this movement comes from Tan Dun’s orchestral work, *Death and Fire: Dialogue with Paul Klee*, which consists of ten movements that last, individually, from a little over one minute to nearly seven minutes. In the second movement of *Nature*, timbral contrasts are achieved through various ensemble combinations and vocal effects in mm. 25-29 and 39-40. The length and timbral contrasts are the most similar ideas to Tan Dun’s orchestra work.

The second movement of Karel Husa’s *Symphony No.2* presents various ensemble combinations prominently involving the percussion and brass instruments. The colorful sonorities formed through the interaction of these sections are emphasized by the string’s pizzicato in the improvisatory section in mm. 60, 103, and 115. Husa’s percussion section (mm. 1-50) of the second movement begins with a rhythmic motif that forms the basis of the movement. The composer continually develops rhythmic motives incorporating various small ensemble groups through canonic imitation. The percussion in the middle section of *Nature’s* third movement, “Sadness,” while based on the Husa, contains more complex rhythms and wider pitch ranges, and uses a larger percussion set up (four timpani as well as other non-pitched
percussion instruments). These rhythmic passages create dramatic energy against brass groups that are sustaining syncopated rhythms.

The major similarity between Husa’s second movement and the third movement of *Nature* is that both discover new sonorities through similar ensemble formats in the orchestration. The two pieces, however, use different approaches in developing the percussion and brass sections. The opening material and thematic motives in Husa’s second movement are canonically imitated by a few ensemble groups and then expanded to all parts of orchestra. The middle section of “Sadness” develops thick, heavy sonorities in low pitch ranges with chromatic clusters in the brass.
3. THE INFLUENCE OF ORCHESTRATION, TIMBRE, AND REGISTER ON STRUCTURE

A. Orchestration and Timbre

Orchestration and instrumental effects in *Nature* were briefly discussed in the previous chapter. The special effects and timbres were achieved through extended instrumental techniques, tone clusters, and various combinations of orchestral instruments. Changes in instruments are made in conjunction with important musical events in other parameters, and are used to introduce crucial thematic ideas, new ideas, or textural changes, like solo sections to tutti to various small ensemble groups. These changes help to define structural boundaries and establish musical form. In this chapter, timbral changes through instrumental combination and registral contrast between instruments will be examined.

1) Happiness

“Happiness” is mainly structured in four sections: Introduction: tutti, A Section: tutti, B section: solo-tutti, and A’ section: the repetition of the introduction. This structural format is achieved through major changes of instrumental combinations and timbres. Changes from one group to another, or from soli section/small ensemble group to tutti/ large instrumental group, produce timbral changes that coincide with the formal partitions of “Happiness.” The deployments of major instrumental changes, which are related to formalizing the primary structure, are presented in Figure 3.1 seen in page 14.

Two distinct timbres are projected in the first five measures of the introduction section: first actually playing woodwind instruments; and, second simultaneously blowing into them. This
combination of instrumental and breath/vocal sounds becomes an important timbre in *Nature*, providing the musical coherence throughout all movements of the work except the third movement, “Sadness.” Blowing air material introduced in mm. 1-2 is picked up and sustained by the brass section through m. 8. The continuation of this material is blended with other special effects through percussive techniques in the string section and the piano’s inside techniques. At m. 26, a link connects the introduction with following A section using a distinct cluster chord in the piano (Example 3.1, on page 15).

<table>
<thead>
<tr>
<th>Formal Plan</th>
<th>Introduction</th>
<th>A</th>
<th>B</th>
<th>A’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure</td>
<td></td>
<td>---</td>
<td>---</td>
<td>----</td>
</tr>
<tr>
<td>1</td>
<td>*Woodwinds</td>
<td>26</td>
<td>73</td>
<td>115</td>
</tr>
<tr>
<td>Instruments</td>
<td>*Strings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>*Piano + other percussion.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>*Brass- hn, tbn, and tba.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>*Strings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>*Woodwinds-fl, ob, cl, bsn, and cbsn.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>*Mm. 58-73 piano, brass, and strings are closing A section and preparing for B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>*Double trumpet solo (m. 73), *Piano and string and brass–trombone, b.tbn and tba.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>*Orchestra tutti (m.104), and vocalization by all orchestral members (mm. 109-114)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Techniques</td>
<td>*Whispering through the instruments *Inside the piano *Percussive techniques for strings *Introduction closes and A section’s beginning overlaps</td>
<td>*Tempo changes, Introducing thematic pitches</td>
<td>*Tempo change *Homophonic texture (solo improvisational section from mm. 99-104) *All instrumentalists shout (mm. 110-112)</td>
<td>*Tempo change, *Repetitions of vocal effect</td>
</tr>
</tbody>
</table>

Figure 3.1. Instrumentation and Timbre in “Happiness.”
Example 3.1 “Happiness,” mm. 25-26. The mixture of inside the piano techniques and clusters link the introduction and section A.

In the introduction (mm. 1-26) there are various special effects containing percussive attacks: beating the body of the string instruments, tapping the fingerboards of string instruments, and hitting the strings inside the piano with fingers and palms. Special effects occur simultaneously at important moments to help to create structural division. The close overlapping of parts in mm. 10-12 produces prominent timbre mixtures: combinations of vocal and instrumental sounds, percussive string effects, and clusters through inside the piano techniques. There are also contradictory rhythmic patterns in the string section in mm. 10-16. Measures 10-16 cover the range of dynamics from piano to fortissimo, and mm. 16-26 build musical tension through the combination of previous timbre effects with glissandos as the introduction ends and elides with the beginning of the A section.

The A section of “Happiness” is characterized by the statement of a thematic idea and its varied repetition through transformation and changing instrumentation. Thematic pitch material, consisting of chromatic pitch structures, is first introduced by the second violin and the bassoons at m. 34, and then spread through other instruments as the thematic idea is modified. For example, the motivic idea is repeated continually in different instruments and transformed throughout mm. 34-57. The section ends with nearly a tutti sound.
The instrumentation of the B section (mm. 73-114) marks the entrance of duo trumpet passages accompanied by the brass and string families. Some thematic characteristics from the A section are exhibited in mm. 90-96 in percussive rhythms performed by the piano and doubled by the timpani. The duo trumpet section creates intensity by using wide skips in the trumpet parts such as diminished fifth and augmented octave intervals, and by incorporating chromatic harmonies in the string section and brass instruments (mm. 88-94) that produce intense and dissonant sonorities. The sub-section of B from mm. 99-114, which builds into the full orchestral complement, introduces a successive leaping passage in the second violin. This new passage functions like a bridge, returning to a part of the introduction’s theme. It is immediately imitated in the piano and first violin, and then stretched to the whole woodwind family in varied rhythmic patterns. The full brass family and low string parts support the thematic material in the rest of the string section (mm. 103-108). These brass and low string textures announce the climatic moment at m. 110, and mark the level of musical atmosphere and timbre change through articulations: successive staccati and accents in the eighth-note rhythmic repetition with added percussion in mm. 106-109 (Example 3.2, on page 17).

The end of the B section (mm. 109-113) presents the unique timber mixtures in full tutti passages. The timbre’s complexity is created using vocalization through the body of instrument or freely performed by instrumentalists, the timpani’s successive glissandos, sustaining various rhythmic gestures in the other percussion instruments, and percussive attacks on the strings inside the piano. Unspecified pitches for piano and timpani at mm. 110-114 hold great potential to create novel timbres as they are combined with human voices (Example 3.3, on page 18). These improvisational effects by the piano and the timpani are incorporated with human voices to promote color changes. The coherence of the orchestration is achieved through the
Example 3.2 “Happiness,” mm. 106-109. Successive staccati in the brass, with added percussion, forms the climatic moment of the B section.

different instrumentation using persistent similar thematic timbres. The repetition of vocalization, which was previously performed by the woodwind family (mm. 1-2 and 9-11), is now performed with almost the entire orchestra.
Example 3.3 “Happiness,” mm. 110-114. Diverse timbre mixtures created by the timpani’s glissandi, inside the piano work, and voiced special effects performed by the rest of players starting at m. 110.
2) Anger

The structural format of “Anger” basically consists of two condensed sections: an A section and B section, followed by a closing section. Changes of instrumental combinations and timbres form the musical structure of “Anger” (Figure 3.2).

<table>
<thead>
<tr>
<th>Formal plan</th>
<th>A</th>
<th>B</th>
<th>44 (closing section)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure</td>
<td>1</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>Instruments</td>
<td>*Introduce thematic pitches E and F in the string and woodwind sections, progressing to near tutti at m. 25</td>
<td>*Woodwind and brass group, *Sustained E and F through upper strings and low strings</td>
<td>*Woodwind group, string section, piano and timpani</td>
</tr>
<tr>
<td></td>
<td>*The piano enters clusters on white keys in the low register at m. 1</td>
<td></td>
<td>*M. 44 the piano enters the minor 9\textsuperscript{th} chord in a low register and clusters are initiated to other instruments</td>
</tr>
<tr>
<td></td>
<td>*M. 52 nearly the full orchestra when brass instruments join</td>
<td></td>
<td>*M. 52 nearly the full orchestra when brass instruments join</td>
</tr>
<tr>
<td>Techniques</td>
<td>*Create space from the registral contrast between violin and contrabass, *Pizzicatos *Piano’s clusters *Clusters in strings section *Timpani’s glissando with the pedal</td>
<td>*Blowing air through the body of instrument, *Beat the body of string instrument with bow *Glissandos with only the reed of oboes *Mixtures of various timbres</td>
<td>*Alternate clusters in strings and woodwinds *Later add clusters in the brass section at m. 52 *Building musical tension</td>
</tr>
</tbody>
</table>

Figure 3.2. “Anger,” Changes of instrumental combinations and timbres correspond to the musical structure.

“Anger” begins with the strings, piano, harp, flutes, and clarinets. At m. 1, E and F, the primary pitch sonority for the structure of “Anger,” is taken by these various instruments. In processing, the minor second sonority is shifted to diverse new sonorities by placing the dyad in different registers. This creates, at times, large intervals between instruments, such as the space between F in the violin and E in the double bass at m. 1.
Example 3.4 “Anger,” mm. 24-26. Distinct timbre mixtures through the piano, harp, and percussion and the vocalization from the woodwind group correspond to a sectional division at m. 26.
The viola and cello parts restate the E and F the minor ninth, rearranged from the minor second, and the pitch is emphasized through repetition and sustained note in different instrumental groups.

Another primary musical event occurs at the end of the first section in mm. 23-25, where tutti sonorities are proceeding. Here the opening dyad of “Anger,” E and F, is expanded with other chromatic pitches until a thick dissonant timbre is created. The melodic motion of E and F that was played by the pizzicato through the violas and cellos at m. 1 is transferred to the horns and trumpet parts in sustained chords in mm. 21-22. The gestures in mm. 21-25 prepare for the end of the first section, again sounding an almost full orchestral sonority.

At m. 26, right after the end of the first section, a vocalization section again provides a connection to other movements of Nature. This time it is synthesized with the sustained dyad in the piano, while the glissandi of the harp and percussion generate a mysterious atmosphere at mm. 24-26 (Example 3.4, on page 20). This mixed timbre corresponds to the point where the B section enters in mm. 26. The closing section at m.44 distinctly presents the intense cluster timbre and dissonant sonority through combination of the chromatic pitches and the opening dyad’s variants. The section builds intensity until nearly the full orchestral sonority is present.

3) Sadness

The overall form of “Sadness” consists of three sections: A-B-A’. Each section presents distinct changes in instruments, tempo, register, and orchestration, as seen in Figure 3.3, on page 22.”Sadness” presents distinct mixtures of the primary melodic line and accompaniment material through wide varieties of instrumental combinations. These mixtures constantly affect the musical format and texture of “Sadness.” The orchestration is similar to other movements in Nature except that it omits the piano part. The primary melodic line (D-flat, C, A, A-flat),
consisting of two semitones encompassing a perfect fourth, is transposed and emphasized at mm. 14-17 by the second violin and trombone. The recurrence of the motivic figure in transposition corresponds to the point where a new phrase is stated. Such transpositions also occur with changes in the instrumental groups and timbre (mm. 30-32, 33-45, 66, 85).

<table>
<thead>
<tr>
<th>Formal plan</th>
<th>A</th>
<th>B</th>
<th>A’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure, sub sections</td>
<td>1-33</td>
<td>33</td>
<td>93</td>
</tr>
<tr>
<td>Instruments</td>
<td>*Primary melodic line enters (Db, C, A, Ab in flutes in the unison) in mm. 1-6</td>
<td>*Horn and lower parts of the brass instruments, doubled by lower parts of string and woodwind group plus percussion section.</td>
<td>*Allegro to Adagio in m. 92</td>
</tr>
<tr>
<td>Tempo change</td>
<td>*Adagio to Allegro at m. 30 with full string section, lower parts of woodwinds and brass instruments</td>
<td>*M. 46 Allegro to Allegretto</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*Enter the secondary theme at 46 in string section ,</td>
<td>*Enter the secondary theme at 46 in string section</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*M. 52-66 orchestra tutti and preparing for another transitional section at m. 66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Events</td>
<td>*The mixture of melodic line and accompanying harmonies</td>
<td>*Mm. 66-76 transitional section connecting to the repeated secondary theme in m. 76</td>
<td>*Keeps the primary theme in the original register at m. 93</td>
</tr>
<tr>
<td></td>
<td>*Continued transpositions of the melodic line</td>
<td>*Meter change from 2/2 to 4/4 at m. 76</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*Orchestra tutti in m. 29</td>
<td>*Tempo changes at m. 76</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*The ending of A section overlaps the B section in m. 33</td>
<td>*Register conflicts at mm. 85-89</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Focuses on the lower parts of each instrument section in mm. 95-100</td>
<td></td>
</tr>
</tbody>
</table>

Figure 3.3. The musical structure of “Sadness.”
In mm. 14-29, for example the change of orchestration affects timbre (the trombone and the second violin enter, while the woodwinds and other strings exit) and texture (soli to tutti). At m. 33, the start of a new section, there are changes in texture (from full strings in m. 32 to lower brass instruments and percussion in m. 33) and timbre (two trombones, tubas, timpani, cello, and double bass enter, while the horn, viola, and two violins exit), as may be seen in Example 3.5, on page 24.

The climax of the B section at mm. 52-66, which is the preparation for the major transitional passage (at m. 66), is marked similarly by changes in texture (from tutti: woodwinds, trumpet, viola, and low strings to low woodwinds, brass, and strings). Timbre also contributes to the change (doubling upper woodwinds, trumpet, and a sustained chord by the low string section enter at m. 52; two trombones of brass family doubling notes in the cello and contrabass exit in m. 56). Full tutti passages never occur in “Sadness,” but there are near-tutti, where extreme register conflicts between low and high pitched instruments (mm. 28-29, 59-68, 85-88) occur, as seen in Example 3.6, on page 25.

Brass and woodwind instruments are pervasive throughout the B section. Specifically, the frequent use of the low register in instruments like the two bassoons, one contrabassoon, two trombones, two tubas, cellos, and double basses, provides a rich and dense timbre with chromatic clusters that contrasts sharply with the stepwise motion in the high register of the upper string instruments at mm. 44-45 (Example 3.7, on page 27). These register conflicts between the brass and string parts builds musical intensity through the chromatic linear motion and diminished chords, and the dissonant sonority is resolved on a G-sharp diminished chord at m. 46. Brass instruments are prominently used to create distinct colors, especially when combined with other instruments: trombones are prominently mixed with strings, clarinets, or bassoons at the entrance.
Example 3.5 “Sadness,” mm. 32-34. The texture change corresponds to the entrance of a new section at m. 33. The new phrase in trombones and tuba enters, overlapping the end of the A section in strings.
Example 3.6 “Sadness,” mm. 59-68. A major transition is signified by the timbre change from high-range instruments to lower-range parts in each instrumental family.
of important thematic melodies at mm. 14, 51, and 68, and trumpets are paired with the bassoons and clarinets mm. 31, 42, 56, and 74. At the same time, intense compressed clusters in the low register instruments create a striking atmosphere and introduce new melodic material for ending phrases.

The musical format of “Sadness” is shaped by the assignment of instrumental timbres and the musical coherence of the structure is served by the relationship of important thematic ideas or passages with certain instrument combinations. For example, the opening theme is presented and then repeated by two flutes in unison (mm. 1-4) (Example 3.8a on page 28). A transformation of the opening theme by the oboes accompanies the flutes using the same rhythmic figures. This melodic line [D-flat, C, A, A-flat] is transposed a half-step down and given to trombone I and the violins at m. 14. This change of timbre to a different instrument combination (violins and trombone) corresponds to where the new phrase in the transposed thematic line enters (Example 3.8b, on page 28).

This opening theme of “Sadness” in the flutes is widely used in various transformations throughout the movement. Most variants use simple transposition, inversion, or other operations involving the chromatic collection. Such transformations reassigning timbre by using different instrumental combinations often emphasize or announce major points of structural importance, such as the previously mentioned climax of the B section in mm. 52-66. The example of the transformation is found in mm. 52-55 (Example 3.9, on page 29).

4). Joy

“Joy” contains three primary sections: A-B-A’ as seen in Figure 3.4, on page 29. “Joy” mainly integrates three ideas when forming structure: vocalization through the instrument with improvisation (mm. 81-92), the use of clusters, and diverse textures and orchestrations. In “Joy,”
changes in orchestration usually coincide with significant musical events in other parameters such as dynamics and rhythms.

Example 3.7 “Sadness” mm. 44-45. A rich and tense sonority is formed through clusters in brass and low registral instruments contrasting to the chromatic motions in the upper strings.
Example 3.8a “Sadness,” mm. 1-4. The opening theme enters in unison with a transposed and transformed accompanimental line in the oboes.

Example 3.8b “Sadness,” mm. 14-16. The transposition of the opening theme at m. 14 is emphasized by a change of orchestral timbre.
Example 3.9 “Sadness,” mm. 52-55. Thematic transformation at m. 52 is continued through the selection of different instruments.

<table>
<thead>
<tr>
<th>Formal plan</th>
<th>A</th>
<th>B</th>
<th>A'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure</td>
<td>1-31</td>
<td>31-80</td>
<td>80-99</td>
</tr>
<tr>
<td>Subdivisions</td>
<td>*Introduction (mm. 1-7)</td>
<td>*Section 1 (mm. 31-36)</td>
<td>*Restatement of the introduction of A</td>
</tr>
<tr>
<td></td>
<td>*Section 1 (mm. 1-15)</td>
<td>*Section 2 (mm. 37-55)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*Section 2 (mm. 16-31)’s ending overlaps to the beginning of the B section</td>
<td>*Section 3 (mm. 56-80)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>*Blowing air techniques (m. 5)</td>
<td>*Two trumpet solo section (m. 44)</td>
<td>*Extending blowing air techniques with key clicks(m. 83)</td>
</tr>
<tr>
<td></td>
<td>*Descending chromatic motions m. 9</td>
<td>*Tense piano cluster (m. 58)</td>
<td>*Piano’s improvisational part (m. 82)</td>
</tr>
<tr>
<td></td>
<td>*violin soli section</td>
<td>*Full orchestral tutti (m. 70)</td>
<td></td>
</tr>
</tbody>
</table>

Figure 3.4. The formal structure of “Joy..
One musical element, which unifies all movements of Nature except “Sadness,” is vocalization. It is the primary timbre that is achieved through shouting and breathing into the body of instrument. The passages with vocalization and clusters happen at the same time as major structural divisions and textural changes. The opening section of “Joy” is similar to the introduction of “Happiness” in that it uses vocalization throughout the woodwind family. Percussion instruments play a long sustained note, and the woodwind players echo a similar rhythm while whispering a syllable through their instruments, as shown in Example 3.10, on page 32. The piano hits a cluster at the end of the whispering in the woodwind group, and takes the continuing sound with the timpani and the double bass. With the timbre change, a new phrase is prepared where the piccolo and flute enter carrying energetic rhythms and chromatic scales in a high register at m. 7 (Example 3.10, on page 34).

“Joy” shares similar features of orchestration observed in previous movements regarding the relationship of timbre, orchestration and musical structure. However, the exceptional thing in “Joy” is the prominent contrasts and competition between various ensemble groups.

The entrance of the woodwind section in mm. 7-13 is rhythmically complex and explores chromatic gestures in high registers. Each instrument of the woodwind section takes a different rhythm and pitch pattern, generating a massive dissonant harmony which becomes a distinct sound in “Joy.” This passage is synthesized with the piano clusters in the upper register and the violin soli section that begins at m. 10. The violin soli section executes a difficult passage, which initially contains successive wide leaps, but is later reduced to stepwise motion (mm. 11-12). The arguments between the soli violin section and the woodwinds build more tension. The woodwind group lightly accompanies the soli string line with more independent rhythm thus maintaining its independence from soli violin.
The orchestration of “Joy” is characterized by constant changes of the instrumental color that occur in virtually every phrase, and sometimes within a couple measures (see Appendix A. mm. 96-97). Changes in the orchestration usually coincide with formal partitions indicated by special timbral effects (as seen in the A section in Figure 3.5). For example, the piano distinctly functions as an important signal device indicating a change in primary musical events, and therefore assists in defining the musical form of “Joy.”

At m. 16 the upper part of the woodwind group enters with similar rhythmic and chromatic thematic repetitions to the opening section. This woodwind statement with rhythmic and pitch modification recalls the opening theme in mm. 7-13. The cluster chord in the black keys of the piano at m. 16 accompanies the new phrase in the first violins, which recalls the previous violin soli section (mm. 10-12). The continued brass part from the previous phrase at m. 13 with the woodwinds, piano, and first violins generates a unique timbre and a more energetic sound that prepares for the climax at mm. 25-30.

<table>
<thead>
<tr>
<th>Section</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub division</td>
<td>Section 1 (mm. 1-15)</td>
</tr>
</tbody>
</table>
| Orchestration | *Blowing air by woodwinds  
*Horns  
*Violin soli  
*piano’s cluster | *Woodwind group  
*Brass and string section  
*piano |
| Event | *Short introduction mm. 1-7  
*Vocalization  
*Chromatic gesture  
*Clusters  
*Register contrasts | *Expanded register contrast  
*Extreme dynamic levels  
*Wide cluster range  
*Rhythmic complexities  
*The end of the A section overlaps the B section’s beginning at m. 31 |

Figure 3.5. Formal division for the A section of “Joy” as supported by changes in orchestration and special timbral effects.
The B section of “Joy” consists of three parts. Each part contains distinct orchestration and timbre. The first part begins with the violin soli, low range woodwinds, and string instruments in a polyphonic texture. This section builds tension through thick chromatic clusters and rhythmic complexities in the lower strings and woodwinds. The violin soli part contains contrasting registers resulting in wide leaping motions. The arguments between the soli violin section and the lower instruments end with the cluster chords in the piano part at m. 36, and the second part of the B section starts with only the string section at m. 37. This demonstrates the importance of the instrumental placement and timbral effects to the formal division of “Joy,” as seen in Figure 3.6, page 33.

The piano part, reserved for signal roles that indicate significant musical changes, is tied to dramatic passages involving major timbre shifts, structural divisions, and texture changes. Such a piano statement can be seen at mm. 30-31 where a thick cluster chord in a very low register announces the end of the first primary section and, simultaneously, the beginning of B section. Brass instruments and low woodwinds in mm. 30-31 finish with dense, thick cluster chords and are joined by additional percussion instruments: timpani, bass drum, and triangle. The extreme volume in m. 31 emphasizes the cadence of the section. The first ending section is overlapped with a reduced number of instruments (two bassoons, contrabassoon, and the first violins) in addition to new thematic material at m. 31. Measures 36-37 present another musical division that is announced with an initiating cluster in the piano part, followed by an articulated tone-cluster in the low-register strings. This mixture becomes more intense when the timpani is added. The new section at m. 37 starts with the string section that is joined by a tense sonority produced by a chromatic cluster in the brass instruments at mm. 40-43. After that, a new timbre by the woodwind and brass sections is stated in mm. 43-48, and its passage ends with a diatonic
chord in the piano part at m. 48. A new chromatic line with complex rhythmic motion follows in
the tutti string sonority at m. 49.

| Section | B                  | 2
|---------|--------------------|---
|        | 1st section (mm. 31-36) | 2
|         | 2nd section (mm. 37-55) | 3
|         | 3rd section (mm. 56-80) |

| Orchestration | *Eight violin soli | *String section | *Clusters by brass parts and lower woodwind, string parts and the piano’s cluster |
|               | *Lower parts of woodwinds and lower parts of strings | *Upper woodwind part | *Full orchestra tutti |
|               | *Trombone duo | *Trumpet duo | *
|               |               | *Woodwind and brass groups’ contrasting |

| Events | *Compressed tensions thorough complex rhythmic contrasts in low range instruments in the string and woodwinds | *Sustained pitch set (012) by the horn and trumpet | *Repetitions of (0123) chromatic descending gestures by the first violin (m. 56) |
|        | *Contrasts between group and soli sections | *Expanded chromatic sustained notes by contrabassoon, horns and trombone. | *Contrasts low and high register in the piano. |
|        |               | *Piano clusters | *
|        |               |               | *B section close and A’s beginning overlaps at m. 80 |

Figure 3.6. “Joy,” The diverse mixtures of orchestration present in the woodwind, brass, piano, percussion, and strings as related to the structural ideas.

Significant piano statements functioning in signal roles often appear in chromatic clusters with extremely contrasting registers and are frequently combined with the string instruments.

The end of section three at m. 80 presents a huge cluster in the piano part in intense dissonant sonorities continued from m. 70 (Example 3.11 on page 35).
Example 3.10 “Joy,” mm. 1-8. Blowing air techniques connect to all movements except “Sadness.” The piano cluster at m. 6 links the introductory measures to the entrance of the new section in the woodwinds at m. 7.
As previously stated, thematic and timbral effects in *Nature* include vocalization with key clicks by the woodwind players, inside the piano techniques, and clusters in the piano part. Such timbral effects (mm. 81-90) provide more complex sonorities and timbres through extended instrumental techniques and expanded instrument groups than the movement’s opening section, which contained only a short statement of vocalization and clusters (mm. 1-7). The piano’s role as a signal device is also evident at m. 91, where the piano clusters in the upper range of the bass clef are mixed with the string section holding long sustained tone-clusters in the cellos and contrabasses in their high ranges. The first and second violins also repeat the high-pitch chromatic figures first seen in m. 21, blending with the dissonant chords from the two lower string parts and the piano to create complex mixtures that are finally resolved to one cluster chord in the piano at the end of “Joy.”

Example 3.11 “Joy,” mm. 79–81. The piano’s clusters at m. 80 play a significant role signaling the primary structural change to the A’ section.

B. Register

Register plays an important role as one of the primary sources, other than timbral effects, for structural division in *Nature*. It is a distinct parameter, independent from the harmony or rhythm. Registral contrast between the highest and lowest pitches, both by itself and in combination with other elements, provides structural delineation for the thematic materials of each movement.
All movements feature this register aspect; however, registral contrast is approached in a slightly different manner for each movement. After the introduction in “Happiness,” the A section begins with a strong chord attack followed by a theme consisting of set class 3-5 (016) in the bassoon at m. 34. This theme is simultaneously doubled two octaves higher in the second violin part.

This thematic material, D, C-sharp, and G in the bassoon and violin, recurs, altered by transposition until the end of the A section. For example, the thematic gesture of m. 34 is presented an octave lower when it reappears at m. 40 in the horn. It reappears again, transposed an augmented fourth higher in the bassoon part at m. 42.

The opening of “Anger,” the second movement, is propelled by the primary pitch interval of a minor ninth, which is maintained through the end of the movement. This minor ninth sonority is initially presented in the viola and cello parts, which are immediately joined in the same register by the bassoon in mm. 1-2 (Example 3.12a, page 37). At m. 6, the minor ninth sonority reoccurs in an expanded number of instruments, and the pitch interval is emphasized by transposing it a half-step down in the cello part. In the opening dyad’s repetition starting in m. 15, the piano and harp take part in this minor ninth sonority using a much wider range than the original statement at m. 1, the minor second is inverted to a major seventh in the brass section, and the dyad is inverted to a minor second in the violin part at m. 18 (Example 3.12b, on page 37).

The opening theme (D-flat, C, A, A-flat) of “Sadness” is restated an octave lower at m. 8 in the horn and clarinet. By m. 24 it is varied and manipulated using transposition, inversion, and retrograde, and can be found in combination with other chromatic and diatonic materials. The varied return of the original theme, corresponding to the beginning of the final section, occurs in
the same register and instruments of the original statement at mm. 93-95. (Example 3.13, on page 38).

Example 3.12a “Anger,” mm. 1-2. The original thematic sonorities of a minor ninth in the strings and bassoons at m. 1.

Example 3.12b “Anger,” mm. 15-18. The minor ninth figure, minor second, and major seventh are written in an expanded and compressed range through the brass, harp, and the second violins.

37
The A section of “Joy” consists of two subdivisions starting at mm. 16 and 30. At m. 16, the opening rhythmic figures of the woodwinds are repeated, keeping the same register as the woodwinds in the introduction at m. 6. The high register figures in the woodwind section at mm. 16-20 gradually descend to the middle or low range, and are then replaced by the mixed low and middle ranges of the brass and the higher figure in the first and second violins at m. 21. Repetitions that occur in the second sub-division are different from the first in that there is more musical motion and the length of the second statement at m. 16 is much expanded. The repetition

Example 3.13 “Sadness,” m. 93-95. The varied return of the thematic melody in the same instruments and register as the original statement at m. 1. This also corresponds to the start of the final section.

of the first sub-division occurs in timbral and registral mixtures between orchestral groups, and the range conflicts between high and low registers are expanded and made even more complex in the second division of the A section (mm. 16-31).

All movements of Nature maintain thematic ideas using the specific registers of the previous statement. The repetitions of thematic ideas are emphasized by not only keeping registers similar to the original statements, but also through creating more complex timbre
mixtures by adding different instruments. An example would be the final statement at mm. 93-95 of “Joy,” where a previous passage from mm. 21-23 is repeated with more tense timbres created by adding the piano, cellos and double basses for the closing section (Example 3.14a and 3.14b).

Example 3.14a “Joy,” mm. 21-23. The original register of the passage that returns in m. 93.

Example 3.14b “Joy,” m. 93-95. The repetition of the passage at m. 21 in a similar register presents the connection between register and form, since it corresponds to start of the closing section.
It must be stated that the musical structure of all movements in *Nature* are not governed by register alone, but they are realized in combination with other musical parameters: instrumental timbre, texture, metric accent, and harmony. Still, register’s role in determining the overall structure of each movement should not be denied or diminished.
4. THE INFLUENCE OF HARMONY ON THE STRUCTURE

In previous chapters, elemental sources used to establish the structure of Nature were explored, including non-pitched parameters such as orchestration, timbre, extended techniques, and register. In this chapter, the primary focus is on the harmonic influence on structure throughout Nature. Pitch structure in distinct motives that serve as resources for the composition’s thematic material are identified, and an analysis focusing on the formal coherence through the thematic pitch material will be revealed in the interconnection with other musical and non-musical parameters.

A. Happiness

After the introduction, the beginning passage of the A section presents a major seventh/minor second, prominent pitch intervals, in the string and trombone parts at mm. 26-30. Measure 30 presents two primary pitch sets, one in the piano part and the other in the bass trombone and tuba. The piano presents a chromatic figure eventually containing the pitches [D-flat, D, E-flat, and E-natural] in a near-ostinato pattern, while the bass trombone and tuba maintain the vertical chord [D, E-flat, A-flat] in m. 30. An additional pitch, D-flat, is added in m. 31 in connection with the chromatic statement in the piano part. [D-flat, D, E-flat, E] in the piano is the tetrachord 4-1 (0123), and [D, E-flat, A-flat] is the trichord 3-5 (016) (Example 4.1, on page 43). These two sets together create the pitch class set 5-5 (01237), and serve as a source for the harmonic structure and motivic sonority of “Happiness.”

The primary intervals taken from set class 4-1 are a major seventh, the ascending motion between E-flat and D, and the descending augmented second between E and D-flat in the piano
at mm. 30-31. The important intervals derived from set class 3-5 are an augmented fourth, a minor second, and a major seventh. These three intervals are presented in the bass trombone, tuba, piano, cellos, and contrabasses at mm. 31-35 (Example 4.1). These two intervals are consistently used throughout the movement.

Example 4.1 “Happiness,” mm. 31-35. The primary pitch intervals: major seventh, minor second, and augmented fourth in the piano, bass trombone, and tuba parts in the first movement.
Thematic pitch sonorities such as (0123) and (016) are developed through transformation and manipulation of the pitch relationships. At mm. 35-39 the bass trombone and tuba sustain the set 3-5 and are integrated with the chromatic set, 3-1 (012) in the oboe. The combination of these two sets forms a new pitch set, 6-5 (015678) at m.39, as seen in Example 4.2. Also, in the example, a D-sharp diminished chord, set 3-10 (036) in m. 37, sounds in three woodwind instruments to harmonically accompany the melodic line in the oboe. This diminished chord creates a rich and tense sonority, 8-5 (01234578), blending with two sets: 3-1 and 3-5 at m.39. The hexachord 6-5 (012367), which is the mixture of two sets: 3-1 and 3-5, is a subset of the octachord 8-5. The set 6-5 persistently occurs with the diminished chord, supporting the chromatic melodic gesture (3-1 or 4-1) in “Happiness.”

Example 4.2 “Happiness,” mm. 35-39. Thematic sonorities (016) and (0123)’s development of combination with other pitches.
Another primary musical passage at m. 41 contains melodic chromatic gestures in the first and second violins. Two chromatic melodic gestures, (C, B, B-flat and G, F-sharp, F) are formed using trichord 3-1 (012). They combine with other vertical chords of set classes (0167) and (0124) at mm. 41-42, and these chromatic gestures are continuously transposed and expanded to the cadence of A section at m. 55. The end of this chromatic passage corresponds to the beginning of the transitional passage at m. 58. Chromatic motions, projected through the major seventh and augmented fourth dyads, span all woodwind and string groups, simultaneously creating more tension and strong dissonant sonorities with increasing dynamic levels.

The transitional passage in m. 58, which leads to the trumpet solos at m. 73, continues the mixture of the whole tone scale [E-flat, F, G, A, B] and the chromatic scale present in mm. 55-57. The chord in the piano at m. 58 consists of set class 3-15(016), and it is combined with the indicated whole tone scale and chromatic pitches from mm. 58-65. These sonorities are emphasized in the piano’s tremolo effects with an accent mark in mm. 58-65 and irregular arpeggio patterns in the improvisational notation at m. 66. The repetition of the augmented fourth between E-flat and A in the piano and other parts at mm. 68-70 connects to previous material using thematic pitch set (016). Other low register instruments such as the bassoons, contrabassoon, trombones, tubas, cellos and contrabasses continue the previous chromatic content, blending mixed sonorities of whole tone scale and an A diminished chord in the piano. The resulting tension is resolved by the repetition of the augmented fourth in the following solo trumpet lines.

The final section at m. 99 combines a tetrachord collection and chromatic material. Tetrachord 4-16 (0157) appears in the second violin part [E, F, A, B]. It is accompanied by the
viola part in successive rising perfect fourths: B-flat, E-flat, and A-flat. The latter is melodically and harmonically expanded into a mixture of chromatic and diatonic pitch sets when joined with tetrachord 4-16. These intense sonorities push forward to the later culmination at m. 109.

Tetrachord 4-16 is continued with the chromatic pitch material, which takes on a dominant role at m. 102. In this measure two chromatic (012) trichords span all string instruments. Brass instruments join and gradually build the chromatic cluster. This passage is supported with complex mixtures of timbres by spreading the chromatic and diatonic material to multiple instruments while increasing the dynamic level. These complex pitch materials are repeated and spread to include nearly a full orchestral sound as the climax at m. 110 approaches. The melodic gesture in the first violin presents the augmented fourth, while the woodwind group repeats chromatic figures in sextuplets. The repetition of the sextuplet figures appears to speed up the tempo, as do the improvisational sections in the upper string parts. This reinforces the dramatic moment when the orchestra is finally at tutti. This moment involves a compressed semitone clusters in the brass family between E-flat 4 and G4, creating massive dissonant sonorities. The continued energy through these chromatic chords connects to the closing vocalization section.

B. Anger

As stated earlier, the second movement’s opening starts with the dyad E and F. Two intervals are held through the flutes, clarinets, violins, and double basses: one is a minor ninth in the flute and clarinet, and the other, a minor second, is placed in large registral space from F5 in

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9 In this document, the octave starting with middle C is designated as the fourth octave. The octave immediately below is the third, and two octaves below is the second. G5, therefore, indicates the pitch one octave and a perfect fifth above middle C.
the violin to the E1 in the double bass. Repetitions in the violas, cellos, and bassoons in sixteenth note rhythmic figures emphasize this semitone/minor ninth. The minor ninth, a primary pitch idea in this movement, is expanded at m. 3 by adding two pitches, E-flat and F-sharp, creating tetrachord (0123) (see Example 4.3, on page 47). These chromatic figures are pervasively used at the musical surface level of “Anger,” and appear later in the thematic idea of the fourth movement in a variety of guises.

E and F permeate the opening section of “Anger” and, with its repetition, E is established as an important pitch center in the movement. The expanded four pitches from the original dyad E-F establish an inversionally symmetrical set, [E-flat, E, F, G-flat] in the oboes, clarinets, and bassoons at m. 3. These pitches are then transposed to [B, C, C-sharp, and D], corresponding to where the first phrase ends on at m. 5 (also Example 4.3, on page 47).

Major seventh and minor ninth leaping gestures are inverted to the minor second and expanded to a chromatic tetrachord in a dense sonority. Pitch set 4-1 is varied through transposition, inversion, and by synthesis with other chromatic pitch materials. The set spans multiple instruments, and is used to generate increased pitch density. At mm. 8-10 the semitone figure occurs in chromatic trills performed by the woodwind instruments conjoined by two pitch sets: 3-3 (014) and 3-7 (025). These two trichords, subsets of 4-4 (0125), a set formed with two successive minor seconds and one minor third, are used in the melodic lines of most woodwinds in mm. 10-14. The first flute part, for example, consists of three descending pitches: C, B, G-sharp (014), which are combined with C-sharp, C, B (012) in the same gesture (m. 10). The chromatic trichord (012) is mostly used in major seventh and minor ninth leaping gestures through all the orchestral parts. The two distinct sonorities (014) and (012) continue throughout as repetitions of minor seconds and minor thirds.
The chromatic gesture, set 4-1 (0123), is mainly explored in mm. 21-23. Chromatic pitches of the tetrachord are expanded as more instruments are introduced to the texture. The synthesized pitch content integrates set 3-3 (014) at m. 21 into the first flute and clarinet parts. Pitch class set 3-3 [G, A-flat, B] occurs on the last beat of the second flute part at m. 21, and the first flute part at m. 22 presents the same content [G, A-flat, B]. Also at m. 21, four different brass instruments contribute to the minor second/minor ninth harmonic intervals, which are identical to the opening gesture of the string section at m. 1.

Example 4.3 “Anger,” mm. 3-5. The expansion of dyad E-F and transposition at m. 5
The initial dyad of “Anger,” E and F, is also presented in mm. 26 and 44, where the B and closing sections begin, respectively. At the beginning of the B section, the dyad is placed in the piccolo and double bass parts creating large registral space, and emphasized through repetition in the low register of the piano. The B section’s entrance reveals an interesting sonority through blending the chromatic pitches, [E, F, G-flat] and the blowing air techniques of the brass section at m. 28.

In m. 44, the piano part presents the augmented eighth and minor ninth intervals, transferred from the opening, but in different registers. Representing the closing section, the final measures have, as their primary sonority, clusters, which are created and expanded by combining transposed dyads to other pitches. The resulting dyads are then spread throughout the different instrumental groups and registers to create the intense atmosphere that closes the movement.

C. Sadness

The major seventh which, when inverted, becomes the minor second, is widely used in the previous two movements. This minor second is formed in pitch set (013), consisting of one semitone, one whole tone, and a minor third. This set is significant in that it is used to connect all movements. The prime forms (013) and (014) in Sadness build the formal unity for its harmonic structure, but they mainly interact in the melody, expanding largely mixed pitch units into chromatic pitch material.

The primary melodic motive (D-flat, C, A, A-flat), consisting of two semitones separated by a minor third, has the prime form (0145), pitch-class set 4-7. These four pitches are divided into two trichords: (D-flat, C, A) and (C, A, A-flat), which are an intervallic mirror image of each other. The two subsets of pitch class set 4-7 can be written in the integer notation [9,0,1] and [8,9,0]. The sum of the corresponding notes of the two sets is 9, which is their index number.
The two trichord subsets have the prime form (014), and are inversionally related to each other at T9I. This prime form (014) is a subset of (0145) and is widely used as the primary thematic pitch material in “Sadness.”

<table>
<thead>
<tr>
<th>Mm. 1-4 Flute part PCS</th>
<th>D-flat, C, A, A-flat (1,0,9,8)</th>
<th>Prime Form 4-7(0145)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triad segmentation</td>
<td>(9,0,1) (A, C, D-flat)</td>
<td>Pf: 3-3 (014)</td>
</tr>
<tr>
<td></td>
<td>(8,9,0) (A-flat, A, C)</td>
<td>Two sets are inversionally related at T9I</td>
</tr>
<tr>
<td></td>
<td>9 &amp; 9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The sum of two sets: 9</td>
<td></td>
</tr>
</tbody>
</table>

Figure 4.1 “Sadness,” m. 1. The pitch structure of thematic line.

The other important pitch set, initially found in m. 4, has the prime form (013), which consists of one semitone, a whole tone, and a minor third. The pitch set [D-flat, D, E] in the first flute part is transposed a half step higher [D, E-flat, F] at m. 5. The trichord 3-2 (013) prepares the ending of the phrase at mm. 6-7 in the flute. It is also found in the transitional passages. The first clarinet part of the passage where the opening phrase’s cadential gesture is formed from mm. 8-12, features the trichord 3-2. It occurs with diatonic and chromatic materials. Trichord 3-2 is mixed with (0146) in the third horn part, which is a part of the diatonic collection in mm. 7-12, and sounds with chromatic pitches in the second clarinet and trombone. The conflict between chromatic materials (012) in mm. 8-12 in the second clarinet, bassoon, and trombone and (0146) in the first clarinet in m. 10 generates an increasing tension and timbral mixture approaching the first cadential section on the G half-diminished seventh chord in m. 12. The increased number of instruments supports and carries the chromatic trichord (012) through various transpositions in the passage.
These two pitch set classes, (012) and (013), are used through the closing of the first section at m. 30 and mixed with other pitch materials preparing the new section at m. 33. The three measures following m. 28 consistently project the modified thematic material with the alternation of chromatic figures in the first violin. The modified pitch set (0156), similar to the opening gesture (0145) in that the subsets are an intervallic mirror image of each other, is played two octaves higher than the original statement at mm. 29 and 30. The augmented fourth sonority, which is the primary motivic interval of the new section at m. 33, is restricted to the string section and emphasized through the repetition by using the tremolo effect in the second violins and violas. These two augmented fourths: E-flat to A and G to C-sharp, are continued into m. 32, and then are stated vertically in the sustained notes of the cellos, trombones and bass tuba at m. 33, where the new section starts. The source material in this transitional section (mm. 26-33) consisting of set class (0156), the augmented fourth, and chromatic pitch set 4-1, forms a strong link between the A section and the new section beginning in m. 33 (Example 4.4).

Example 4.4 “Sadness,” mm. 26-33. The primary sonorities in the transitional closing passage of the first section.

In the new section at m. 33, one of the primary pitch source materials is the augmented fourth, which is previously presented in the tremolo chord of the second violins, violas, and

50
cellos in the closing passage of the first section (mm. 29-33). The augmented fourth interval is emphasized in the low register instruments: two trombones, tuba, cellos, and contrabasses in m. 34. In mm. 36-39, the augmented fourth is horizontally presented again in the low register melodic lines of the two trombones, and from there it spreads into the horn, bass tuba and timpani parts.

Although the augmented fourth at m. 34 was already used for the opening theme’s accompaniment in the first oboe at m. 1, the new pitch material is distinctly written for this section and forms a musical connection to the opening of the movement. A and E-flat are projected not only through the low ranges of the brass instruments, but also in the percussion. The interval A to E-flat is continually repeated in the timpani at mm. 34-37. The timpani passage is rhythmically very independent from the brass and woodwind groups, which have sustained tied notes. The timpani plays more complex rhythmic figures which mixed sixteenth notes, sixteenth-note triplets, and sixteenth-note sextuplets. The repetition of A to E-flat in the timpani is expanded with an E in m. 35, and then, as part of the three-pitch simultaneity [E-flat, E, A], pitch set 3-5 (016). This set is articulated through the contrasting dynamic expressions and tremolos in the timpani from mm. 35 to 41.

The second section’s cadence occurs on the D-sharp fully-diminished seventh chord at m. 45, relating to the “cadential” G half-diminished seventh chord in mm. 12-13. The new section at m. 46 is harmonically connected to the previous passage ending in m. 45 through the repetition of a D-sharp diminished seventh chord in the upper woodwind parts. This new section contains the prominent harmonic structures formed by employing two different chords at m. 45. These polychord sonorities, essentially the G-sharp and D-sharp diminished seventh chords, are projected through the strings and upper woodwinds and mixed with pitch sets 4-7 (0145) and 3-1.
(012) in mm. 45-47 (Example 4.5, on page 52). However, these mixtures of various chords are covered by the B half-diminished seventh chord at m. 52. A B dominant ninth chord distinctly stands in the strings in mm. 56-60 as a pedal chord with other chromatic contents, and then the section ends on a whole-tone sonority: G, A, B, C-sharp, and E-flat spread through the flutes, clarinets, and bassoons at m. 65 (Example 4.6, on page 53).

Example 4.5 “Sadness,” mm. 45-47. Polychord sonorities involving the G-sharp and D-sharp fully-diminished seventh chord.
Example 4.6 “Sadness,” mm. 60-65, A whole tone sonority acts as the cadential formula for the second primary section of B at m. 65.

The thematic pitch class set 3-3 [A, C, D-flat], a subset of tetrachord 4-7 (0145) that is found in the first flute part in m.1, is continuously used from mm. 52 to 64. The repetition of pitch set (014) is varied through transposition and inversion, and is used in combination with other chromatic pitch materials such as (012) and (013). Such repeated figures are able to make the musical connection between earlier sections and this new section of “Sadness.”

Finally, the movement's major pitch materials solidify the thematic elements and define the distinct formal sections. Specifically, one of the primary chromatic sets, (013), most often occurs as the result of the manipulation of sets associated with other pitch materials. The
fragments of the superset and chromatic genus are usually involved in the transitional passages, and they play an important role in identifying potential material for upcoming sections. A whole tone sonority and fully-diminished seventh chords function as formal cadence formulas of the primary sections, with or without other chords, at mm. 12, 65, and 89. Such primary chords and pitch class sets define the structure of “Sadness.”

D. Joy

The chromatic set is dominant in the fourth movement and serves as the source material for the structural foundation of “Joy.” The opening section starts at m. 8 after the introduction with the chromatic set class tetrachord 4-1 (0123). In the piccolo part, the initial descending chromatic motion (A, A-flat, G, F-sharp) is continually stretched and expanded through transposition and inversion to the other upper-voice woodwind instruments. Pitch class set 4-1 is continually used in the horns beginning in m. 13 and expanded to set 6-1 (012345) with the addition of the trumpets at mm. 13-15 (Example 4.7).

Example 4.7 “Joy,” mm. 13-15. The expansion of chromatic pitch set 4-1 to 6-1.

Set 4-1 (0123) is emphasized through modified repetition using different registers, instruments, techniques, and transpositions. The chromatic descending melodic gesture (A, A-flat, G, F-sharp) in the piccolo at m. 8 is transposed a major third lower and presented in the chromatic chord (F, E, E-flat, D) in the horns. The repetition of the chromatic descending gesture appears at m. 16, and it occurs with an increased number of instruments from the previous
statement. Measure 16 presents more advanced harmonies and rhythmic figures than the previous section, and it generates compressed and tense timbres through the extended chromatic gestures. The first violin and piano join the ensemble at m. 16, with the piano emphasizing chromatic clusters. This section ends on hexachord 6-1 (E-flat, D, D-flat, C, B, B-flat) at m. 30, which again can be considered an extension of pitch set of 4-1. Here the cluster chords of the piano create a unique timbre by blending with the hexachord collections of the brass and low range woodwinds in m. 30 (Example 4.8).

Example 4.8 “Joy,” mm. 30-31. Distinct sonorities generated by mixing the piano’s cluster in the bass range and the hexachord in the brass and low range woodwind groups at m. 30.
Pitch class set 4-1 (0123) permeates the entire fourth movement and is used in interaction with other pitch class sets to form most of the new harmonic and melodic sonorities or timbres. A supporting example for the preceding statement can be found in m. 49. This section is mainly played by the strings and set 4-1 is expanded through the successive sixteenth-note rhythmic figures. The first group of sixteenth sextuplets uses sets (012) and (013), both subsets of the 4-1 (0123). The successive transpositions of set (0123) occur on the third beat of sixteenth sextuplets in m. 49: (E, E-flat, D, D-flat), (F, E, E-flat, D), and finally (F-sharp, F, E, E-flat). Subsets (012) and (013) of set 4-1 are expanded first to the hexachord (6-1), and then to octachord (8-1) through these successive transpositions.

The horizontal chromatic lines, which span from the clarinet to the bassoon parts, are kept in the passage that follows, only in different instruments. Horizontal chromatic gestures carrying combinations of (013) and (012) by the upper woodwind instruments, and tense vertical chromatic gestures from the bassoons and brass instruments, create a compressed cluster sonority from m. 48. Added to this are the piano’s low register clusters at m. 52 (Example 4.9, on page 57).

The brass chord at m. 52 consists of pitch sets from hexachord 6-1 (012345), which, as noted above, is an expansion of pitch class set 4-1, the fundamental pitch idea for the movement. The piano’s cluster sonority (01368) is taken from the diatonic collection and emphasizes the low register of the piano. These two sonorities, the horizontal chromatic gesture and vertical chromatic cluster, are persistently transposed to the upper register and gradually expanded to more instruments. Horizontal chromatic gestures employing (012) are repeated and developed with other pitch class sets in irregular stepwise motion. These chromatic gestures and the diatonic clusters from the piano create a forceful link to the next section and move toward the climactic moment of the movement.
Example 4.9 “Joy,” mm. 52-53. The expansion of the pitch class set 4-1 and 6-1 at m. 52, combined with the cluster chords of the piano and melodic gestures in the upper woodwinds.

The prominent use of thematic pitch set 4-1 is again applied at m. 56 in the first violin part. This chromatic tetrachordal figure is emphasized through the use of extremely high register, fast rhythm, and pitch repetition. It is later repeated in the same instrument and melodically and harmonically expanded in massive chromatic sonorities through the full orchestra at mm. 69-70 (Example 4.10, on page 58).
The primary cadence of the middle of section B at m. 78 contains three primary harmonic elements; a hexachord, a chromatic triad, and a diatonic cluster. Measure 78 also contains a distinct tension through the combination of extremely loud dynamic expression with changes of texture and rhythm. Increasingly intense sonorities generated through the complex rhythmic

Example 4.10 “Joy,” mm. 69-70. Thematic pitch set 4-1’s expansion both melodically and harmonically through the orchestra.
gestures and the polyphonic texture from previous passages reach a climax and prepare for the resolution at mm. 78-80. At that point, a sustained harmonic, twelve-beat sonority heightens the climatic moment. To create this dense sonority, the woodwinds hold pitch set 6-Z36 (012347), the brass hold 6-Z12 (012467), and the string section contains hexachord 6-33 (023579). The harmony gets more complex with the entrance of the piano’s cluster in its extreme low range. These three hexachords, consisting of the chromatic triad (012) and diatonic pitches, project rich and tense sonorities. Specifically, the distinct diatonic pitch class set 6-33 in the string instruments finalizes the sonority with the piano’s cluster at mm.78-80 and creates an intense musical moment that contrasts with the following new section in m.81 (Example 4.11, on page 61).

In the final section, there are distinct gestures at m. 81 in the piano, all taken from the previous chromatic tetrachord 4-1 (0123). The repetition of descending chromatic motion occurs in the highest register of the piano, and echoes the same compositional approach previously voiced in the first violin at m. 56 and m. 70. Although the chromatic pitch materials are pervasively used and integrated with the other materials in various ways throughout this whole movement, this cardinal four chromatic pitch set is very distinct.

This motivic tetrachord in the final section is expanded to an octachord through freely varied pitch materials found between mm. 83-90. These harmonic sonorities are exceptional, despite the similar approach for synthesizing the fundamental chromatic fragment with other pitch material, due to distinct changes occurring in the instrumentation, texture, and the extended techniques at mm. 85-86 (Example 4.12, on page 62). Thus, the overall structure of this movement is shaped by the varied use of the chromatic descending gesture drawn from pitch sets, expanded to larger supersets, and modified through various operations such as 4-1.
Example 4.11 “Joy,” mm. 78-81. The climactic sonorities of the B section are formed through the diatonic hexachord in the strings and chromatic cluster in the piano.
Example 4.12 “Joy,” mm. 85-86. The chromatic pitch set 4-1’s pitch expansion and the exceptional harmonic sonorities through distinct changes occurring in the instrumentation, texture, and the extended techniques.

This primary idea is often combined with other transposition and inversion. This linear motivic material permeates the vertical sonorities as well, and is blended with clusters introduced in the low register of the piano. The sharp arguments between horizontal and vertical chromatic
gestures and simultaneities generate distinct sonorities and also delineate the structure of this final movement.
5. CONCLUSIONS

The study of *Nature: Happiness, Anger, Sadness, and Joy* reveals aspects of orchestration, musical timbre, extended techniques, register, and harmony as elemental sources for creating the structure of the work. The structural role of timbre is seen in the various instrumental combinations, special instrumental techniques, and the use of extreme registers. Changes of timbre or the introduction of new timbres were shown to coincide with formal partitions in all four movements.

The same approach is found in the use of pitch material in *Nature*. Each movement’s musical content is defined through motivic ideas, and the shared idea of the whole work is the consistent use of the chromatic cluster as one of the principal sonorities. This sonority while related to the overall musical structure, is also used to represent and present various emotional dimensions through its distribution within the orchestration, employed dynamic levels, and registral conflicts. The pervasive use of chromatic pitch materials, primarily the members of trichords (012) and (013), provides the musical unity for the four movements. These pitch materials are varied and synthesized with other sets and/or collections to provide the pitch content for the entire work.

In addition to the chromatic pitch materials, another important sonority is achieved by the orchestral members employing extended instrumental and dramatic techniques such as vocalizing, audible breathing, work inside the piano, and the use of percussive methods for strings and woodwinds.
Finally, the structural format of *Nature* is primarily achieved in timbral changes through instrumental combinations, extended instrumental techniques, tone clusters, and registral contrasts. The harmonic influence on the musical structure of *Nature* is featured in creating the formal coherence through various transformations of the thematic pitch material as they interconnect with other musical and non-musical parameters. The overall structure of *Nature’s* movements is unified through the musical aspects examined above.
BIBLIOGRAPHY


Appendix

Nature: Happiness, Anger, Sadness, and Joy

For Orchestra

I. Happiness
II. Anger
III. Sadness
IV. Joy

c.a. 20 minutes

By

Ji Eun Moon
Instrumentation

2 Piccolos
2 Flutes
2 Oboes
2 Clarinets in Bb
2 Bassoons
1 Contrabassoon

4 Horns in F
2 Trumpets in C
2 Trombones
1 Bass trombone
2 Tubas

Percussion
1: Timpani (5) 30 inch, 28 inch, 25 inch, 23 inch, and 21 inch
2: Bass drum (as large as possible), Tambourine
3: 2 triangles, Gong
4: 4 tom-toms, Glockenspiel
5: Suspended Cymbal
Piano
Harp

Violin I (10)
Violin II (8)
Viola (8)
Cello (6)
Contrabass (6)

The score is written in concert pitch.
Program Notes
1) Blow strong air through the instrument with no pitch sounding
2) Strike mouth piece
3) Speak words through instrument in unmeasured rhythm for specified winds and brass
4) Blow air through instrument with sounding pitch
5) Key clicks for winds
6) Piano clusters: white keys only, black keys only
7) For strings, improvise pitches, following the indicated direction
8) Inside the piano – pluck string
9) Tap the string with finger tips inside the piano and play the glissando
10) Tap approximate pitches on string with finger nail
11) Play Col legno while simultaneously performing the glissando on any strings by the left hand for the string
12) Strike the body of instrument with palm
13) Play glissando upward – inside the piano
14) Rub Db string with finger nail – inside the piano
15) Col legno from top of the finger board to the bridge
16) Tap string with the finger tip inside the piano
17) Tap the body of instrument with bow
18) Use palm, switch to the brush, then switch to the mallet
19) Each stand of the string section takes one note
20) Rub drum head with the brush in the indicated direction
21) Bracketed pitches are taken by the indicated stands of the cello and double bass section
22) Use the mouth piece separated from the instrument body
23) Perform indicated pitch only using the reed separated from instrument body
24) Descending glissando and ascending glissando with the reed separated from the instrument
25) Fast glissando attack for the timpani,
26) Hit cello body near the sounding board *col legno*
27) Use extreme bow pressure to create distorted sound
I. Happiness

Andante – 72

Ji Eun Moon

Piccolo
Flute
Oboe
Clarinet in Bb
Bassoon
Horn in F
Trumpet in C
Trombone
Tuba

Cymbals
Gong

Percussion

Violin I
Violin II
Viola
Viola da Gamba
Double Bass

Tap the strings with finger tips.
1. Start low string with pulse and increase volume moving to high string.
irregularly play four pitch patterns
place the Chinese bowl on the middle of timpani
rub strings near the tuning pins with fingernails
play glissando upward on same string for inside the piano
rub strings near the tuning pins with fingernails