

Music + Architecture: The Spatial Translation of Schenkerian Analysis

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Architecture and music share unexplored design and analytic frameworks. In tonal music, Schenkerian Analysis is a method that demonstrates the hierarchy of the composition's musical structure. This methodological approach provides an understanding of the composition's most basic framework and its most refined ornamentation. This paper argues that reductive analysis can be applied to architecture to generate a similarly systematic approach in the design process. Ultimately, reductive analysis can be used to develop new methodologies in the process of design.

INTRODUCTION

Both music and architecture are mediums through which creativity is expressed. Music is defined as the art of sound in time that expresses ideas and emotions in significant forms through the elements of rhythm, melody, harmony, and color. While the origin of these ideas cannot be defined, they can be expressed in many forms. A creative idea expressed through one medium, such as music, can be expressed through another medium, such as architecture. Both the architect and the composer utilize these mediums in order to have an effect on the audience. Ultimately, it is up to observers to determine how they experience the musical composition or space. However, a successful piece of work can help guide one through the work with the same perception as the creator. To make this happen, one needs to understand the very fundamentals of expression as they apply to music and architecture.

The research process began with precedence studies of architectural works that are influenced by various fundamentals of music as well as architectural works that inform musical compositions. A comparison was then made between these works in order to understand how these musical elements translate into the formation of a space. Through this analysis, a new methodological approach known as Schenkerian Analysis was found to successfully translate a musical composition into a space architecturally.

PRECEDENCE STUDIES

Long String Instrument

Previous comparisons between architecture and music showcase different approaches as to how architecture is defined through music as well as how music is defined through architecture. One method explores the spatial qualities of a construct through elements of sound, noise,

and its acoustic qualities. In this case, music is defined through architecture. An example of this approach is Ellen Fullman's *Long String Instrument* (Figure 1). Inside a warehouse in Austin, Texas exists 120 long strings that are suspended at waist height. The occupant of the space becomes the performer as one enters the installation and moves along the wires in order to create music.¹ The different movements of the audience within the space result in a musical composition that is unique to the occupant's interaction with the space. Here, the audience and the architecture define the musical composition.



Figure 1. The Long String Instrument. Source: *The Austin Chronicle*

The Stretto House

The next example illustrates how architecture is defined through music. The Stretto House by Steven Holl narrows the relationship between music and architecture to number, rhythm, notation, and proportion.² Holl perceives music and architecture as two unknowns, and through the Stretto House he creates an equation in order to solve for the unknowns:³

$$\underline{\text{material}} \times \underline{\text{sound}} = \underline{\text{material}} \times \underline{\text{light}}$$

time space

The house is based off Bela Bartok's *Music for Strings, Percussion and Celesta*. The layering system that exists within the piece is composed of Bartok's musical

expression along a structural framework based on the Fibonacci sequence.⁴ The contrasting elements of musicality and a rigid framework within a multi-layered system create a systematic approach in the design of the house. The sketches in Figures 2 and 3 show the process of how Holl begins to spatially define these contrasting elements.

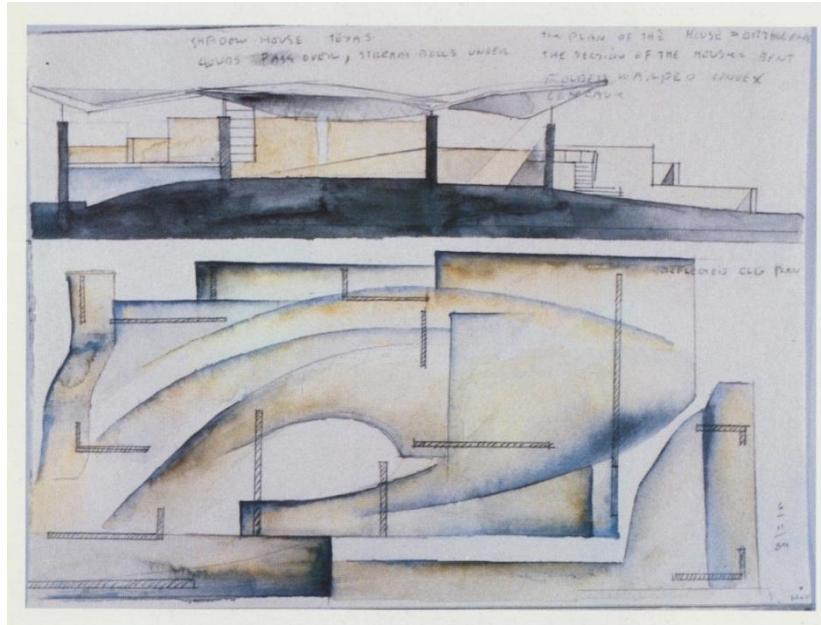


Figure 2. Spatial diagram of the Stretto House. The linear grid represents the proportions of the Fibonacci sequence and is juxtaposed against the curvilinear formations that represent Bartok's musical intent. Source: Steven Holl, *Stretto House*.

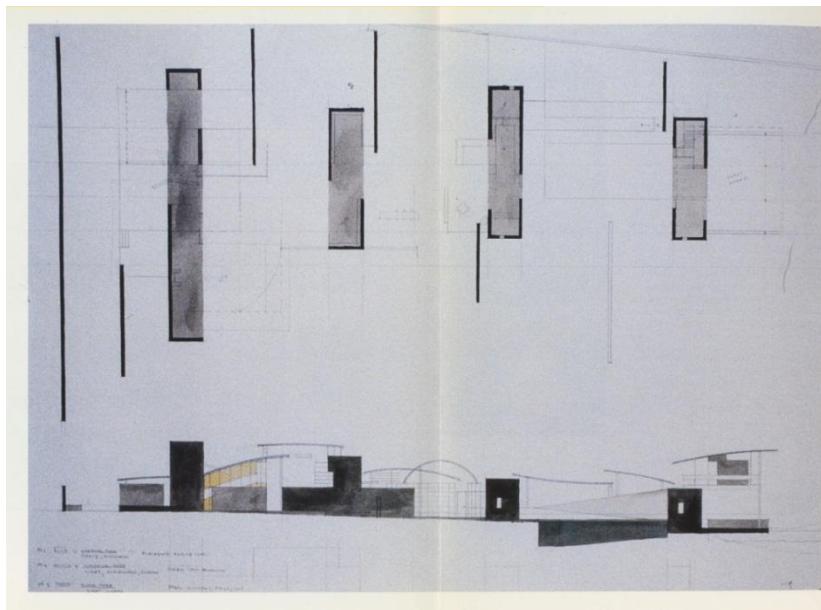


Figure 3. Plan and section diagram of Stretto House. The plan and section represent the different components of the house. It is composed of four sections to reflect the four movements of the piece. Source: Steven Holl, *Stretto House*.

In the process of forming a musical composition, certain guidelines exist that help create a systematic approach. In Bartok's *Music for Strings, Percussion, and Celesta*, the piece is composed of four movements, with the first movement following the structure of a fugue.⁵ In architecture, a similar approach exists when forming a construct. Figure 3 demonstrates how Holl spatially interprets the structure of the piece by dividing the house into four different constructs.

While the structural makeup of *Music for Strings, Percussion, and Celesta* influences the spatial development of the Stretto House, other systematic approaches in music can help spatially influence a design. The process of Schenkerian Analysis is one method that can successfully contribute to design. Similar to Bartok's *Music for Strings, Percussion, and Celesta*, Schenkerian Analysis consists of a multi-layered system that provides a structural backbone as well as musical expression in order to influence design.

SCHENKERIAN ANALYSIS

Austrian pianist and music theorist Heinrich Schenker developed Schenkerian Analysis in order to reveal the intuitive nature through the analytical framework of a tonal composition. What sets apart Schenkerian analysis from other systematic approaches of analyzing music is the consideration of the composer's natural ability to control all structural levels of a piece simultaneously.⁶ In the process of design, there also exists a structural backbone as well as the intuitive design intent in the development of a space. When taking a closer look at the structural levels of Schenkerian Analysis, there exists a hierarchical layering system that can be applied to the formation of space.

Structural Levels

In Schenkerian Analysis, the structural form is composed of the background, middleground, and foreground.⁷ The background is composed of the *Ursatz*, meaning the fundamental structure. The *Ursatz* is made up of two components: the *Urline* (the fundamental descent) and the *Bassbechung* (the bass arpeggiation). The *Urline* is the top line of the *Ursatz*, consisting of a stepwise descent from the 3rd, 5th, or 8th scale degree to the tonic. The *Bassbechung* is the bottom line of the *Ursatz*, consisting of the basic harmonic progression of I – V – I.⁸ Figure 4 depicts the *Ursatz* with the *Urline* descending from the 3rd scale degree.

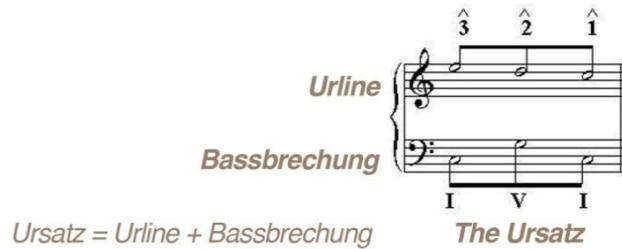


Figure 4. The Ursatz—The Fundamental Structure

The middleground layers explain how the background builds in complexity and reaches the foreground layer. The number of layers present in the middleground is based on the length and complexity of the composition.⁹ The foreground layer consists of the most refined qualities of the composition, which can be broken down into three types of ornamentation: the passing tone, the neighbor tone, and arpeggiation.¹⁰



Figure 5. Elements of the foreground layer

When forming a space, the structure begins with a primary system and is then layered with additional systems (secondary, tertiary, and so forth). These systems that exist in an architectural construct can be defined through the hierarchical layering of Schenkerian Analysis. A space

begins with a fundamental framework (background), develops in complexity through intermediate layers (middleground), and is refined through ornamentation (foreground).

Figure 6 provides the breakdown of J.S. Bach's Chorale *Ich Bin's, Ich, Solite Buesse*. By means of Schenkerian Analysis, the chorale is broken down into the background layer, three middleground layers, and the foreground layer. The watercolor studies in Figure 7 take the principles of background, middleground, and foreground in order to create a spatial diagram of J.S. Bach's Chorale *Ich Bin's, Ich, Solite Buessen*.¹¹ These studies show that a hierarchical layering of tonal analysis can inform the different systems of a spatial form. In this comparison between music and architecture, the approach of both a

musical composition and spatial form develop through a similar progression. The background of a tonal composition can be spatial translated into the spatial proportions of a structure, providing its physical support system. The middleground layers can then be defined to form different systems of circulation and programmatic elements within the construct. The final layer, the foreground, can then be defined as the detailing of the construct. In Schenkerian Analysis, this is defined as passing tones, neighbor tones, and arpeggiation within the tonal composition. In architecture, these principles are defined as the final detailing of the spatial elements of a construct. Such detailing serves the purpose of adding scale to the structure. In both music and architecture the foreground layer adds a refined quality to the overall composition.

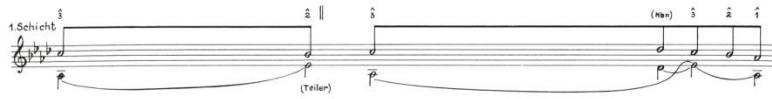
J.S. Bach Choral: "Ich Bin's, Ich Sollte Buessen"

Background

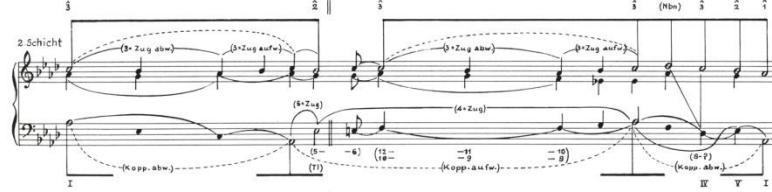


Middleground

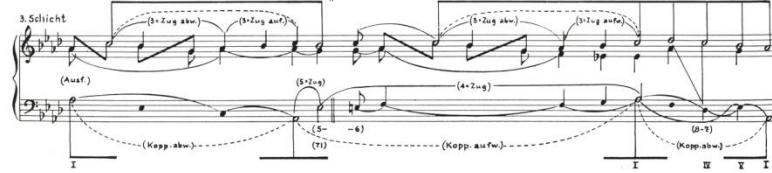
Layer 1



Layer 2



Layer 3



Foreground

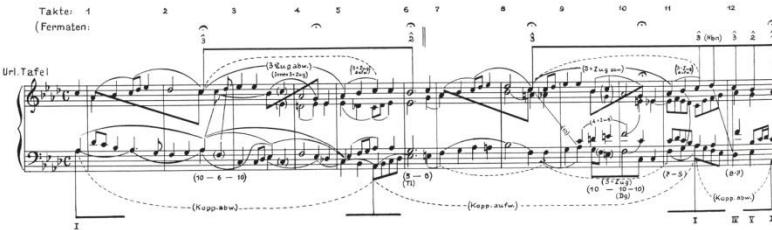


Figure 6. Schenkerian reduction depicting the background, middleground, and foreground layers. Source: Heinrich Schenker, *Five Graphic Music Analyses*.

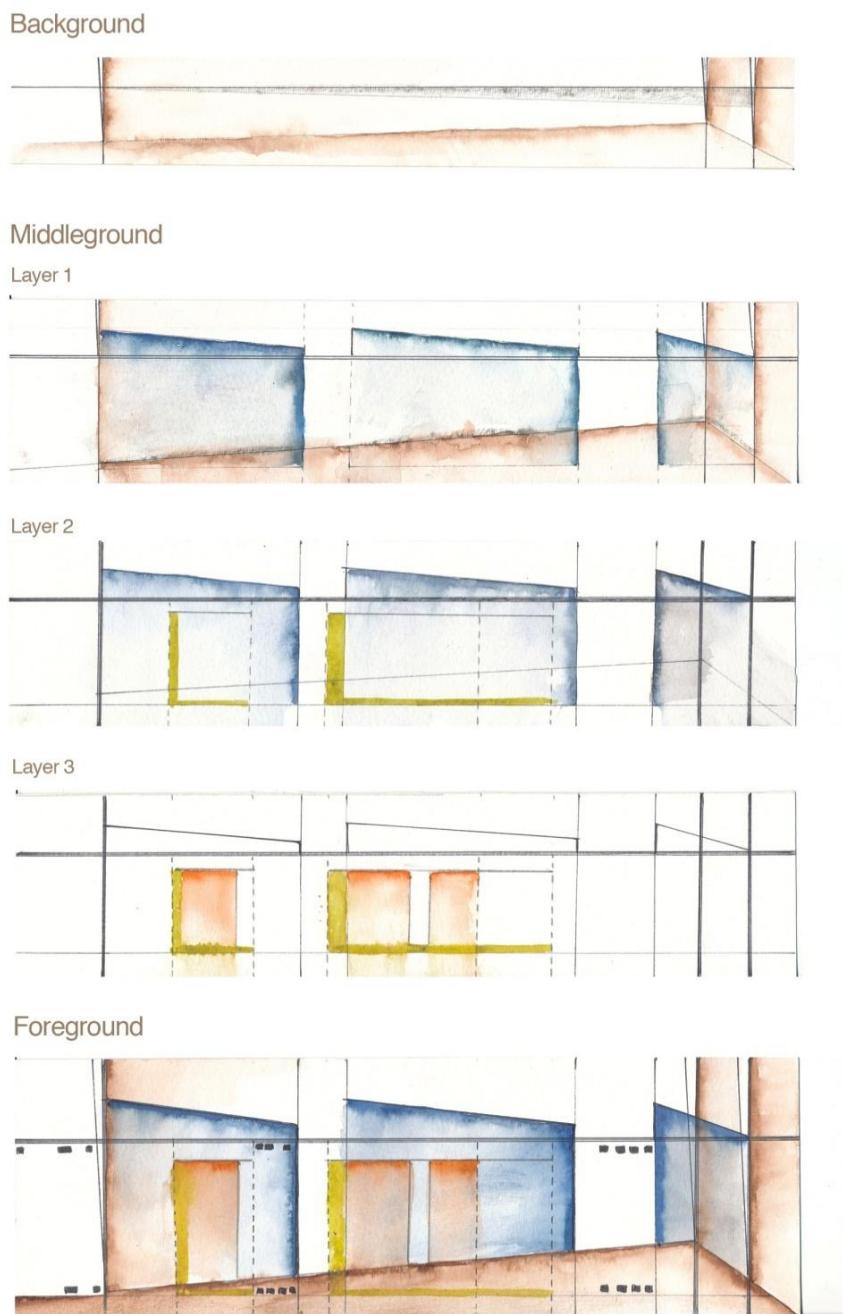


Figure 7. Watercolor diagrams of J.S. Bach's Chorale *Ich Bin's, Ich, Solite Buesse*.

In these watercolor studies, the structural framework of the analysis of the chorale has been spatially defined. The next step in the translation of music to architecture is to capture the intuitive nature and musicality of the composer. While its layering system of Schenkerian Analysis provides the framework for the spatial form, the experience of the occupant must be considered. Just as one experiences the musicality of a piece through the sense of hearing, one can experience this same element through a visual phenomenon in a space.

Musical elements, such as dynamics, phrasing, and timbre, can be used to visually inform architecture. In music, dynamics enhance what the notes are trying to express. For example, a forte marking is one way to support a tense passage. Phrasing helps the listener to understand the continuation of a passage until it reaches a moment of pause or rest. The timbre of a piece adds to the character of the passage. In architecture, these musical elements of dynamics, phrasing, and timbre can then be translated into the luminosity, the movement, and the materiality of a

space, respectively. Similar to dynamics, the luminosity influences how the space is felt. Even in a small construct, the space can visually be enhanced through its brightness. The phrasing of a piece can compare to the occupant's movement through the space. In music, phrasing can accelerate or slow down the passage in order to communicate a musical idea. This same concept can be felt spatially by how the occupant of a construct moves through the space. There could be transitional elements in which the occupant may pass by at an accelerated pace, or perhaps slow down or pause in order to experience a particular moment. The timbre of a composition can be defined as the materiality of a construct in architecture. Different instruments are used at particular moments

within a composition in order to express a certain character. In architecture, this character can be understood through the materiality of the construct. While the space is based off a concrete analysis (the layering system of a Schenkerian Analysis), its character can be developed through the materials used to create the construct.

The relationship between music and architecture provide a wide spectrum of ways to define music through architecture as well as architecture through music. Specifically through Schenkerian Analysis, a musical composition can define a spatial formation. Schenkerian Analysis provides a structure in which both the composer and architect can develop intuitive motives into a complete musical or spatial form, respectively.

NOTES

¹ Elizabeth Martin, *Pamphlet Architecture: Architecture as a Translation of Music* (New York: Princeton Architectural Press, 1994), 46.

² Ibid., 56.

³ Ibid.

⁴ Ibid., 58.

⁵ Ibid., 59.

⁶ David Neumeyer and Susan Tepping, *A Guide to Schenkerian Analysis* (New Jersey: Prentice-Hall, Inc., 1992), 1.

⁷ Allen Forte, *Introduction to Schenkerian Analysis* (Toronto: W.W. Norton & Company, 1982), 131

⁸ Tom Pankurst, *Schenker Guide* (New York: Taylor & Francis Group, 2008), 54.

⁹ Ibid., 21.

¹⁰ Forte, 7.

¹¹ Schenker, Heinrich. *Five Graphic Music Analyses* (New York: Dover Publications, Inc., 1969), 32.