TOWARDS A GENERAL THEORY OF MIND:

AN INSPIRED EXPLORATION OF MUSIC AND

ARCHITECTURE

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Mind, Music and eMbodiment

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Abstract

The study examines the similarities between architecture and music in terms of the three principles of silence, space and motion. Silence begets space, space begets movement. A Grateful Dead song is interpreted in the light of these principles. The study borrows from current research in cognitive neuroscience to examine the location and attributes of these seemingly diverse concepts. It is speculated that a conceptual space within the mind, as an emergent property of the brains neurochemistry, is produced which acts as a blending medium for conceptual models. By utilizing the concepts of image schemata, and cross-domain blending, the study posits that architecture and music share a common higher domain and both are abstractions of each other through cross-domain mapping.

Introduction

Music and architecture share common features of the other as both are nested together within the container of a higher conceptual order[1]. It is the purpose of this essay to render this higher order in terms of the cross-axial modalities of space and time. Viewed through the lens of current developments in neuroscience, three principles shared between architecture and music shall be examined; the notions of silence, space, and movement. Silence begets space, and space begets movement. Together, silence and movement inform us of space. Within this higher order, concepts of reality are metaphorically determined by the hierarchical assemblage of learned image schemata (Saslaw, 1996) mapped onto ordinary experience (Zibkowski, 1997). These schematic modules of recurring patterns (Fodor, 1983) (Lerdahl & Jackendoff, 1983) (Peretz & Morais, 1989) (Robbins, 2009) selected through the evolution of frequently utilized neural pathways (Edelman, 1989) formulate our conceptions of, and the

[1] See Figure 2

necessity for, this place of spatio-temporal resolution. Architecture and music, it will be shown are reverberant qualities of this pre-existent higher order of being.

Musical Space, Architectural Time

For centuries, it has been believed that architecture and music share common indefinable qualities (Goethe, 1836), perhaps even that they share common metaphysical origins (Schelling, 1802). Little has been done to advance these speculative notions except in poetic passing. Without a doubt, architecture and music share common worldly concepts of rhythm, tonality, structure, line and the like, but what is it about them that would suggest that beyond these sublunary traits, they share commonalities of a sublime sort? One idea is that music is a fluid medium of language, and architecture is solid and fundamentally still. In this higher conceptual level, the architectural object dissolves into mental imagery and begins to take on the fluid characteristics of music, just as music can solidify and take on the characteristics of ice and stone. Further, it begs the question whether the traits of music can inform the decisions of architectural design, and whether architecture can influence the composer.

The concepts of music and architecture are cross-modal and exist as intrinsically reciprocal notions in time and space. As musical movement is an object moving through time, architectural movement is an object moving through space. One is born of space and the other of time, and both yield to distinct sets of empirical laws unique to their domain. By blending these conceptual domains, an interesting progression from object to image to idea unfolds, ultimately culminating in a motivation to move through the resulting environment.

Image Schema, Conceptual Models and Cross-domain Mapping

Image schemas have been widely discussed by Janna Saslow (Saslaw, 1996), Mark Johnson (Johnson, 1990) and George Lakoff (Lakoff, 1990) and will give us an understanding of the structure of this conceptual space. Image schemas are conceptual units of recurring information that provides structured understanding of various experiences and is available for use by way of metaphoric representation. Salsow separates image schemas into two categories, those derived from the body (container, front-back, etc.), and those derived from the body's orientation with its environment (force, source-path-goal, etc.). (Saslaw, 1996, p. 218). The former is pertinent to spatial concepts, the latter, which will be addressed later in this essay, to movement and position within space. The mind is a container in so far as it contains images. Beyond the image is the world of ideas, a limitless, immeasurable world of patterns. The container of mind should be seen relative to the containers that it contains and those that it is contained within. If we can understand a container to be metaphor for space, then we must necessarily understand the nesting of containers.[2] These containers each are flexible envelopes of thought and action and have the ability to expand to encompass an infinite array of raw data that floods the body through the senses. This expansion gives us the capacity to learn.

A conceptual model is an abstract "cognitive structure that is used to guide inference and reason" (Zibkowski, 1997, p. 200). It is a theoretical construct that represents a schematized set of ideas or concepts, and a category of experience. They are clusters of memories retrieved in response to environmental stimuli to structure our understanding of events and

[2] See Figure 3

situations in the world. We use these clusters of cognitive structures to inform our day-to-day decisions, and on a higher level, to analyze data across complex domains. Some require the computational abilities of the brain in order to access the higher functions of conceptualization, as in the case of metaphorical representation. We utilize image schema to understand and communicate our experiences in the world (i.e. marching *into* the night). Furthermore, the conceptual model brings together diverse objects of memory to create coherent schemes of knowledge and theory. In this case, the models engender our knowledge of the spatio-temporal environment and allow us to analyze one in terms of the other.

Cross-domain mapping is a transfer of one conceptual model onto another so that the attributes of the source domain are integrated with the target domain. (Zibkowski, 1997) It is how image schemata articulate meaning. This exchange of attributes between the domains of architecture and music elevates them up to coalesce on a higher plane. (Gjerdingen R. O., 1990). Through conceptual integration (Turner & Fauconnier, 1995), the process of blending conceptual models in a shared mental space, hereinafter called "mind-space", architecture and music, as well as language and literature, can come together in their own private tête-à-tête. This shared mental space claims the edge of our perceptual experience, and is limited only by the imagination. [3]

Space

It must understand that architecture and music, though co-existing and source-located on the material plane, are experienced only an act of perception in the conceptual locus of the

[3] See Figure 3

virtual mind. Our physical sensations and mental perceptions comingle in this field of conceptual mind-space. In this sense they occupy a singular subjective plane of conception where images are experienced as internalized objects of perception. The sensual hardness of their objectivity in the world evanesces and become abstract impressions within the mind, nothing more than memories. The mind therefore does not exist, except as a virtual container of unresolved images and themes. At this level, architecture and music become related because they have been re-presented as conceptual models of experience and are thus able to be plotted on top of each other. Thus when McDermott speaks of conceptual musical space (McDermott, 1972), he is not addressing a "place" where music occurs, but rather the cognitive ability of the brain to create apparent space within itself,. Space is not perceived as something "out there", but rather as a reconditioning of our brain to the physical undulations of reality poised within the brain itself.

For fear of being labeled a dualist, consider the interior architectural space. It can fit within mind-space, and, it can become mind-space. The two modes are inseparable, folding and reversing structure, reverberating, as one is a container and the other one is the contained, irrespective of their locus. This mind-space is the space of subjective meaning; it is interpretive and descriptive. It is the space of "I-ness" and the locus of our perspective, and is the space of apparent motion in music. (Gjerdingen R. O., 1999) It is undifferentiated, unoccupied space in a state of latent potentiality. Speculatively, this space evolves as an emergent property of the neurology of the brain (Edelman, 1989) as frequent differentiation between the self and the other begets an amplification of their common characteristics in the mind. Within this space, "objects" become images and dissolve in a multi-dimensional

ethereal condition of re-presentation. This metaphoric re-presentation, a decomposed impression, if you will, hierarchically correlates the image of the actual source in object-space with its co-determinant within this space of imagination.

Perhaps with links to Schafer's soundscape (Schafer, 1993), musical space is a spherical immersive state. It appears linear but for all intents and purposes, its only directionality is towards the perceiver. The creative manipulation of time and space in music confers our understanding of silence and movement within mind-space. This is easily recognized in the spectral orchestrations and improvisations of the Grateful Dead, of syncopated and contrapuntal harmonies and dislocated swirling figures in the field of shadows. For example, referring to the rest occurring at 1:42 in the song *New Potato Caboose* (Lesh & Peterson, New Potato Caboose, 1968)[4], we are given a fleeting look at the processes occurring in our own contemplative mental state. Music moves, but it also has the capacity to hypnotize, and our thoughts tend to follow beyond the musical progression. As the D major key moves across several metrical thresholds, changing speed and intensity, settling in on high arching acappella harmonies, the music stops, mid-verse, to highlight the following phrase, to emphasis the importance of the next phrase and a symbolic return to the tonic three measures later. From the arching Bb to the Gm, the phrase *"All graceful instruments…"* waits for the verse yet to be completed. The rest occurs, and the final verse is completed on the languishing F, *"... are known*". (Lesh & Peterson, New Potato Caboose, 1968) . This stop halts the apparent forward motion of the song allowing our thoughts to catch up with the music. It acts as a threshold through which we cross; a threshold of silence. Indeed, the entire

[4] See Figure 6.

phrase is surrounded by rests. It begins and ends with rests, with the crossing of thresholds, and in-between is framed this schematic experience of motion. The breadth and depth of music coincides with the songs topography.

Does architecture have the power to compel us as music does? Consider this same vignette in architectural space, the space of gravity and light. This narrative could be used to describe the musical passage in the *New Potato Caboose*, and in the conceptual mind, the blending has already occurred. We enter across a threshold, and walk across a bending wooden floor. We ascend a grand staircase to a balcony with a breathtaking view, and as we walk to the balustrade and look out over the wilderness, we are instantly swept to a suspended place of awe. Perhaps a study in semantics, perhaps a testament to the omnipotence of language, the counter-transformation of one into the likeness of the other captures a portrait of the event in time in the metaphoric pantheon of mind-space.

Silence

Silence is outside of time. Space is the progeny of silence. Space comes from and through silence into the world of objects. Absent of form and object, nothingness exists as the source of creative images. Some conceive silence as the ground of being behind the object-space of earthly existence (Koffka, 1922). In architecture, silence is a poetic gesture that compresses the imagination and suspends the worldly idea of time. It is the notion of *Ma* in Chinese, as the all pervasive concept of nothingness, the fertile ground for our imagination and an inspiring notion of living softly on the earth. It is the essential quality of threshold as silence is glimpsed at the crossing from one moment to the next. In music, silence can be construed

as a frame. (Cone, 1968) (Margulis E. H., 2007) (Margulis E. H., 2007a) Like architecture, it occurs at the beginning and ending of a piece, between phrases and notes, at a break in melodic line, and at the passage of a motif. It occurs intentionally as manufactured moments that define intervals of repose and temporal momentum. In other instances, the pause is placed to divide songs and scores into segments, for rhythmic punctuation, as counterpoint, as changes in keys, or as bridges to adjoining parts of the piece as in the case of *New Potato Caboose*.

As Margulis notes, musical silence "constitutes the ultimate seat of active listening" and "since literally nothing happens for the extent of its duration, all of our various percepts, reactions, surmises, and senses reveal things we have brought to the silence" (Margulis E. H., 2007) as a projection of self (Childs, 1967) (Buckner, 2007). This mind-space, this space not reliant upon notation and beyond perception and empirical examination represents the other, the mirror into which we gaze with wonder, revelry and anticipation. Self-other discrimination occurs in early development as a means to hasten our experience of the world. The mirror reveals our secret selves, the self projected from the shadow of our unconscious, reverberating endless reflections of our selves in the eyes of the other. As Bachelard supposes, "[I]n this reverberation, the poetic image will have the sonority of being" (Bachelard, 1958, p. xii).

Though Margulis states that silence is not a blank canvas upon which the music is composed (Margulis E. H., 2007, p. 501), Leonard Meyer draws a finer distinction between visual ground and musical ground stating that,

> *"It is difficult, if not impossible, even to imagine a visual figure without also imagining the more continuous, homogeneous ground against which it appears. But in 'aural space', in music, there is no given ground; there is no necessary, continuous stimulation, against which all figures must be perceived. The only thing that is continuous in aural experience is unorganized, timeless silence – the absence of any stimulation whatsoever."* (Meyer, 1956, p. 186)

It comes to reason that the silence itself is perhaps sculpting the music in ways quite similar to the way an object will sculpt the space it contains or the way water will conform to a glass. Figure 1, a stylized Rubin's vase, demonstrates how form is created by its resultant void. The balustrade shaped to emulate the female figure in the void is not manifest as a figure-ground relationship, but rather as a three-dimensional sculptural relief. The void sculpts the object and in turn is sculpted by the object; each caresses and is caressed by the other. The relationship of form to void infers the presence of spatiality.

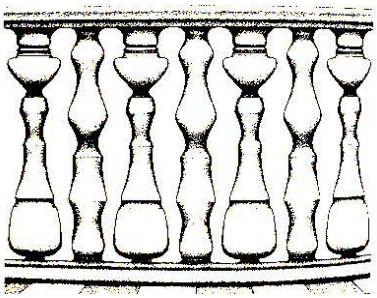

Figure 1 – Stylized Rubin's Vase

Movement

The passage from one level of being to this higher order marks the boundary between time and space; it is a mark of movement, both actual and implied. As space occurs within silence, movement occurs within space. There is wide speculation over the concept of movement in music (Zuckerkandl, 1956); whether it exists, and if it does, where? Indeed as Gjerdingen surmises "*In hearing the subject of a Bach fugue, however, it is not at all clear what is moving or where that motion takes place"* (Gjerdingen R. O., 1999, p. 336)**.** He has shown that musical movement can be computed graphically as traces of motion through time

(Gjerdingen R. O., 1999), while traditionally, to explain the source of musical motion, researchers have turned to musical structure, which by most accounts is abstract (i.e. harmonic progression, resolution, etc.) and does not account for musical intention as suggested by Edward Pearsall. (Pearsall, 1999) As previously mentioned, Salsow separates image schemas into two categories, those derived from the body and those derived from the body's position within its environment. (Saslaw, 1996, p. 218). We consider our bodies *in* the world, or get our mind *around* an idea. These image schemata are fundamental to understanding metaphoric motion in music, and allude to a higher order categorization of movement mapped across many domains. Similar to image schemas, schematic representations, including deceleration/acceleration, succession, tension/relaxation, stability/instability of pitch, directionality, and consonance/dissidence have been suggested as possible evidence of musical motion. (Shove & Repp, 1995) This has led some to believe that the motion heard is virtual or illusory, existing in time but not in space. (Cohen, 2001) However, it is hard to imagine a static musical environment.

On the other hand, we speak of timeless architecture, but just as music moves through space, whether implied, apparent, or actual, architecture moves through time. It is the changing perspective of our ambulating selves as we navigate architectural space in search of the other, the eyes of recognition and the seat of the mind. The body moves through space, typically in motion around objects situated in that space. Music, on the other hand, is in the body. We feel it both rhythmically and kinesthetically as a pulse in the sinew and muscles of our flesh. Movement is the temporal aspect of space. It is the causal outcome of mind-space, the ambulatory aspect of architectural space, and the reflective space in music.

Space necessitates our movement through it. It implies movement, literally demands it and our perception of others moving through space recruits our own central motor system into action. In musical space, music, as well as the performer's gestures, recruits our central motor system to activate in empathetic response to the motion and to the emotion of the piece (Molnar-Syakacs & Overy, 2006).

> *"Thus, a range of current evidence suggests that a human fronto-parietal mirror neuron system shows properties consistent with the ability to represent the actions and intentions of others, across modalities, by recruiting one's own motor system.* (Molnar-Syakacs & Overy, 2006)

Our mirror neurons inform us of the actions and intentions of others, and ours inform them in return. Speculatively, by projecting our selves on to the other our image is reflected in their mirror neurons, and theirs in ours. In fact, we send reverberant signals back and forth with information on location, size, intent and demeanor. These are all useful evolutionary skills for survival but they also connect us to the other on a higher order of being, in the imaginative and conceptual space of mind.

Summary

Architectural and musical space belies similar origins within the state of mind-space. Each is an abstraction of the other on the material plane that coalesce into a singular concept on higher planes of cognition. On the level of neurology, this imagined space is illusive. It does not occupy an actual place in the mind but rather a conceptual space that emerges from the neuropathology of the brain, and perhaps the frontal-parietal mirror neuron system. By examining the nature of this space, and assigning the quality of silence and the potential for

movement as traits of the space, we are able to see that the similarities between architecture and music go beyond the physical structures of rhythm, melody, and so forth, into a higher order of integration.

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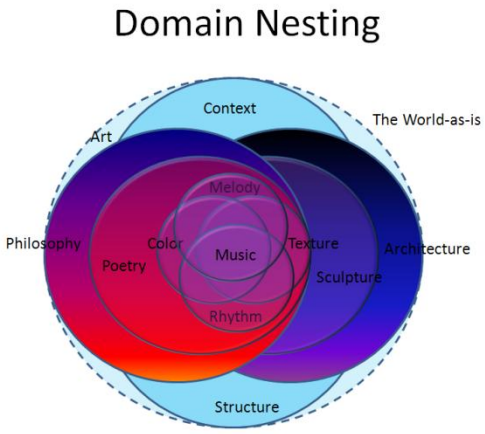

Figure 2 – Domain Nested across multiple modalities

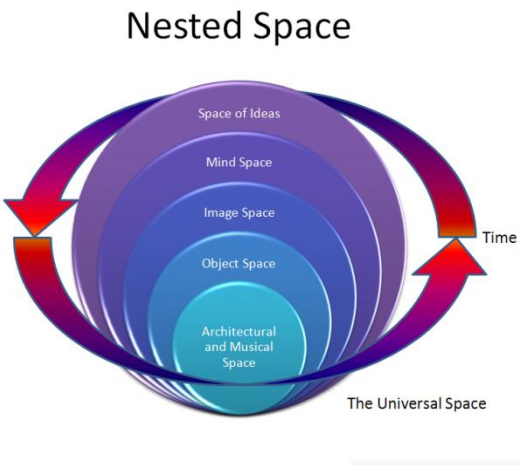

Figure 3 – Domain nesting of object space within mind space in relation to time, beyond the space of ideas is the unknown

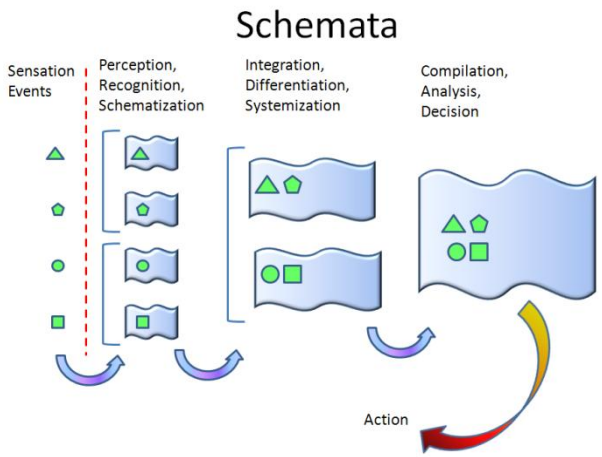

Figure 4 – Schematic integration of conceptual models on higher levels

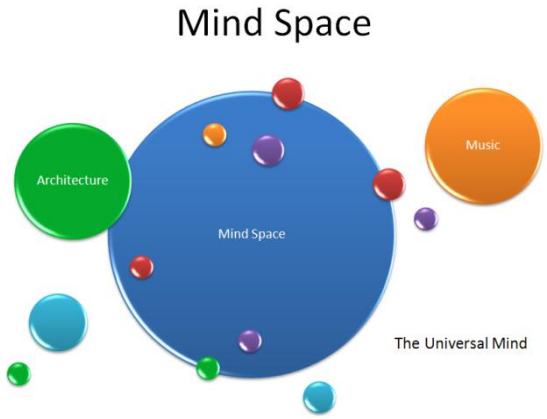

Figure 5 – Mind space as the higher order space of assembly between architecture and music. The smaller, unidentified nodes presume that all lower physical concepts emerge and rendezvous in mind space. Beyond mind space is the unlimited dimensions of infinity.

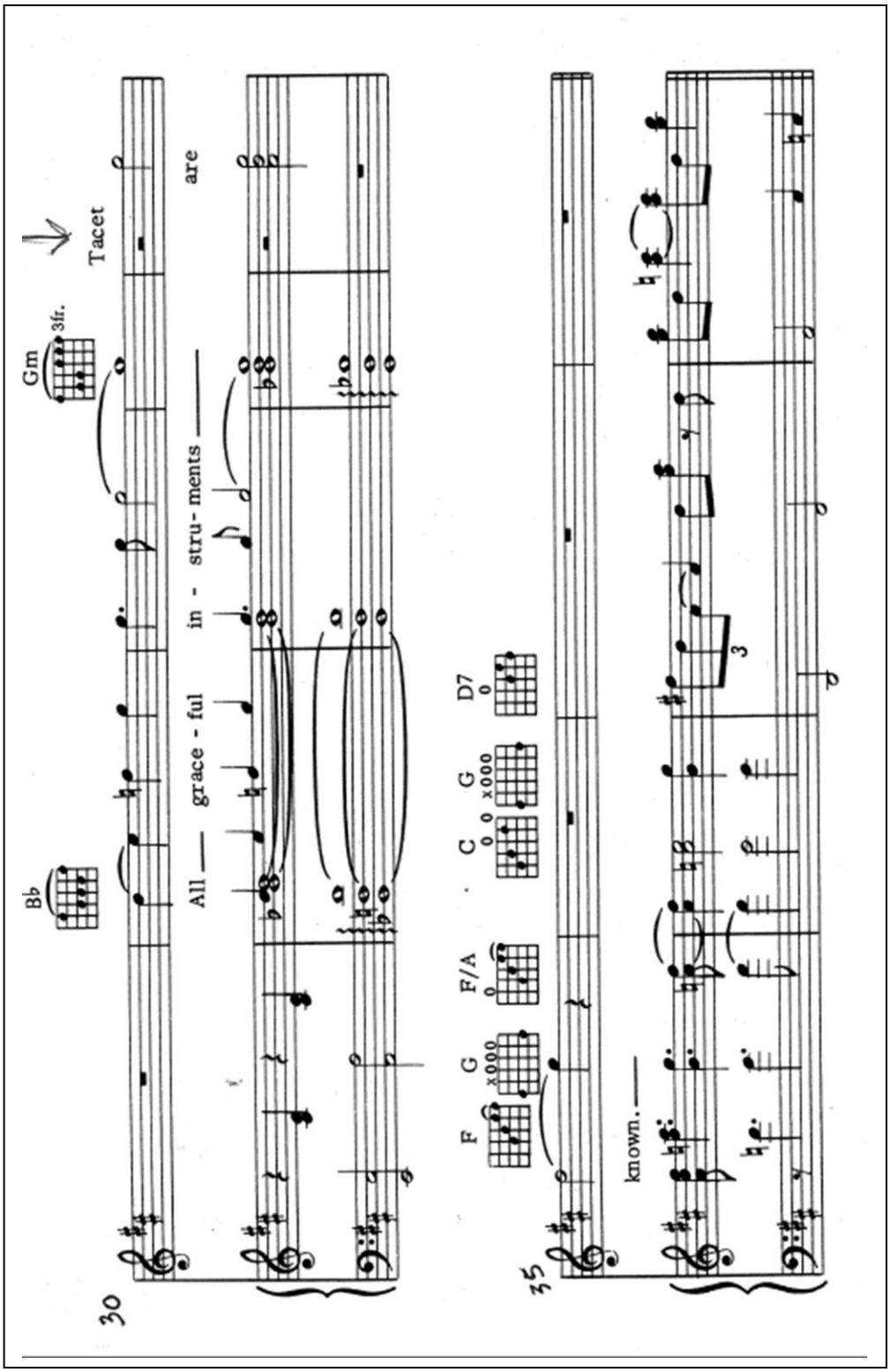

Figure 6 – *New Potato Caboose*, Grateful Dead, m. 30 - 38