Review Article

Music Theory at the Turn of the Millennium and *The Open Space Magazine*

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The Contextualizer

Years ago my Cultural Anthropology Professor at UC Davis told our class a story that resonated with concepts I was learning simultaneously in Cognitive Psychology and issues I was confronting as a young composer of "contemporary" music. One of the first anthropologists to do field work with the Mbuti of the Ituri discovered that the group he was working with had never traveled beyond the boundaries of their forest. An important facet of this story is the extremely dense forest the Mbuti inhabited. One could almost describe it as a cave of trees. Since this tribe had never been beyond the forest's borders, he thought it might be interesting to take a small group on an expedition to a plain, the inverse of their environment. As the anthropologist expected, the Mbuti, having lived their entire lives in the embrace of their dense forest, were uncomfortable with the openness of the plain. What caught the anthropologist by surprise was a question asked by one of the hunters of the group. He wanted to know the name of the very tiny animal at which he was pointing. The anthropologist looked puzzled, because the animal in question off in the distance was rather large. He finally realized that the very dense nature of the Mbuti's forest had inhibited the development of their depth perception. To the hunter, the creature was not perceived as a large animal off in the distance; it was perceived as an unknown small animal nearby.

The implication of the phenomenon described in the story indicates that conditioning determines some perceptions, or put another way, some perceptions might be dependent on conditioning. This conclusion has colored much of my musical

thinking.[1] First, it resonates with my own intuitions about the "problems" concerning the perception of contemporary music that leaves the forest of tonality to explore the vast plain of which tonality is a subset. The "principle of conditioning" has also generated a curiosity about the experiential portion of the phenomenon. What would it be like to have or witness this type of reality bending perceptual phenomenon? One quickly realizes that one must understand the structure of the processes the brain undergoes to generate the phenomenon, perhaps by recreating those processes and their structure, to answer the question. This new realization generates another question: how are the experiential portion of the phenomenon and the physical processes taking place in the brain connected?[2] My desire to experience this type of perceptual shift, therefore, is ultimately motivated by the intuition that to understand the phenomenon completely (i.e., model all of it's parts) and to perhaps recreate it, I would have to understand the experiential as well as the theoretical aspects of the phenomenon and the connection between them. To understand how the brain transforms the perceptual data, it would be necessary to formulate a theory about the phenomenon's machinery. Understanding the

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[1] My adoption of the "principle of conditioning" is one reason I prefer the Babbittian referential/contextual approach to music theory rather than adopting either a Platonic approach or an approach that relies on a foundation of universals. This is not to say that universals do not exist. The fact that humans cannot perceive infrared light with the naked eye is one example of a perceptual universal. No amount of conditioning will likely change this ability, since the ability or the lack of the ability is determined by the physical properties of the eye. A conceptual universal, on the other hand, stands on a much less solid foundation. The concept of cause and effect, for example, may appear to be a universal, a universal with "law" like properties. According to Hume, however, the concept is merely the product of conditioning, since a cause and effect do not have a necessary connection.

[2] The connection between a process and its manifestation is not always direct; therefore, understanding the connection is vital to understanding the process. For example, plaque build-up in the arteries may lead to a myocardial infarction, which manifests itself as numbness or pain in the left arm. Treating a patient for "pain in the left arm" and not treating them for myocardial infarction may lead to their death. However, understanding that "pain in the left arm" is a manifestation of myocardial infarction leads a doctor to a treatment appropriate for the underlying process a patient is undergoing.

phenomenon's experiential edifice, on the other hand, leads to an understanding of how the phenomenon is psychologically manifested. Therefore, the necessary information required to understand the structure of the phenomenon as completely as possible would include a model of its foundation, the structure built on the foundation, and demonstrating how one supports the other. The necessary and sufficient information required to completely understand the phenomenon would perhaps include the impact it had on the social interactions or culture of the individual or individuals who share in the perceptual event.

Language, more properly discourse, adds another interesting layer to exploring this particular perceptual phenomenon. One can imagine the anthropologist trying to explain the "mistake" in perception, and using discourse (specifically some form of technical discourse) in order to bring about a change in perception. This raises an interesting question: could the anthropologist bring about a change in perception without some form of discourse? In other words, could discourse be a *necessary* and effectual tool for breaking a perceptual habit? Here is where the "fit" of the discourse would be especially important, since it would have to connect with the experiential aspect of the phenomenon and lead to a change at the physical level in the brain's "wiring" or, at minimum, change the pathways and connections processing the data. It simply would not be sufficient to show someone a magnetic resonance image, an MRI, of their brain and say you should be activating this area rather than the area you are currently activating, since one is pretty much unaware of which part of one's brain is currently undergoing synaptic activity. The technical discourse employed would have to connect the theoretical to the experiential. A biofeedback machine would probably greatly aid the development of such a discourse for the current example.[3]

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[3] A perfect example of the interdependency and linkage of the theoretical with the experiential and discourse is learning to see a Magic Eye image. If you are not familiar with these images, you can view them at www.magiceye.com or refer to Baccei, et al., 2004. A Magic Eye image essentially consists of what appears to be repeating patterns of shapes, colors, and/or images. They resemble images produced with Mandelbrot sets. Although the surface of the image is complete (i.e., it could stand on its own as a form of abstract art), embedded within each image is another three-dimensional image. The three-dimensional object

The Contextualized

When I was asked by the reviews editor of *Intégral* to write a review of *The Open Space Magazine*,[4] I found myself in the same position as the hunter in the story. After spending years with my

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embedded in the image only becomes visible when one "learns" how to see it. Learning to "see" the hidden image is not always easy for people, and some people never learn to see it. The technique of seeing the embedded image is essentially learning to alter the way your brain integrates the data perceived by each eye. If you do learn to perceive the embedded object, you will have an altered perceptual experience similar to the Mbuti. The two-dimensional image you saw a minute ago consisting of only repeating patterns of shapes and colors has been replaced by a new three-dimensional object that appears so real you can almost reach out and touch it. Once you become good at perceiving the embedded object, you can look around the entire image as if you were examining a room without loosing this altered state of perception. Magic Eye uses a patented algorithm to create these images. One can hardly imagine trying to teach someone how to perceive a Magic Eye image by only explaining the algorithm or the brain theory to him or her. On the other hand, the algorithm could not be created without having experienced some sort of perceptual illusion and having some theoretical notions of how the brain changes its perceptual state. The algorithm is also essential, because one could not create new images without it. This does not mean, however, that the algorithm is the best tool for teaching one to perceive the embedded image. The discourse developed to teach someone to perceive the embedded image would have to combine elements taken from the brain theory, the production theory (the algorithm used to generate the images), and the experiences of people who have successfully mastered viewing the embedded images. The experiential could play another crucial role in generating the phenomenon. The algorithm will undoubtedly be able to create the three-dimensional illusion by embedding the image of any object in the repeating pattern of shapes and colors in the surface image. This in itself does not guarantee the perception of the embedded image. Experience may refine the algorithm so any image may be successfully encoded, or it may help create classes of objects determined by their embedding properties. Although the Magic Eye images are commercially produced, established artists have explored their function of highlighting the perceptual component of art. Salvatore Dali, for example, could be considered the first magic eye painter. His paintings "Invisible Bust of Voltaire," "The Hallucinogenic Toreador," and "Dali from the Back Painting Gala from the Back Eternized by Six Virtual Corneas Provisionally Reflected by Six Real Mirrors," all explore embedding one image in another.

[4] Contributions and requests for subscriptions may be sent to *The Open Space Magazine*, 29 Sycamore Drive, Red Hook, NY 12571. Email: postmaster@the-open-space.org. Fax: (845) 758-5785.

head buried in traditional music theory journals, reading the articles in *The Open Space Magazine* produced an experience analogous to walking out onto a vast plain. And, like the hunter in the story, my own "theory journal conditioning" has been challenged by nearly every one of its articles. On the open plain of its pages, I have encountered reality-bending thinking about music that has satisfied the seeds of curiosity planted so long ago. One thing the experiential facet of this exploration has confirmed for me is that encountering points of view vastly different than one's own is not always pleasant. Having lived in the comforting embrace of a forest, moving to a plain will undoubtedly produce a certain amount of anxiety, as almost all the survival skills one has acquired prove ineffectual in the new environment. The equation, of course, also works in the other direction: moving from plain to forest can produce an equal amount of anxiety, as one feels strangled by the claustrophobic clutch of the forest. The questions several articles in *The Open Space Magazine* raise about the nature of musical reality are the source of the exhilaration and anxiety I feel. Confronted with this situation, one can either run back to the comfort of the familiar, or one can enjoy the adventure of exploring the vast unknown territory to see if there is something to be learned. The majority of this essay will focus on how these questions about the nature of musical reality influences the theoretical enterprise.

Before beginning our exploration, I would like to address a potentially problematic issue underlying this project. Does one journal reviewing another journal constitute a conflict of interest? If the goal of the review has the same goal as consumer report; i.e., helping the consumer decide whether or not to buy a product, then, of course, one should be immediately suspect of the reviewer's findings. If the goal of the review is to provide information or draw attention to an underemphasized perspective on a field of study—which is the goal of this essay—then, I believe a conflict of interest does not exist. This project will, however, move beyond the review/informational goal and address some important issues the articles in *Open Space* raise. Volume 14/15 (2000/2001) of *Intégral* contained a forum titled "Music Theory at the Turn of the Millennium" that asked contributors to speculate on future directions in music theory. It is fortuitous that this review/essay appears in *Intégral*, because it is my belief that *Open Space*

represents one answer to the question posed by the editors. Furthermore, I believe it is imperative that theorists address and engage the issues raised in some *Open Space* articles, or as Matthew Brown has written "future scholars may have another kind of dinosaur to study: the discipline of music theory."[5]

Although the preceding warning may imply that *Open Space* is devoted to the subject of music theory, its reach is actually much broader and its focus less sharp. Perhaps the range of its subject matter accounts for the "magazine" in its title rather than the more traditional "journal." In fact, that is the only inference one should draw from the word exchange, since many of the articles achieve the same scholarly standard found in more traditional journals. The subject matter of *Open Space* articles is wide ranging. The magazine includes articles focusing on analysis of works both inside and outside the canon, such as Dora Hanninen's excellent piece on form in two works by Wolpe,[6] Michael Missiras's work on film music,[7] and Leslie Kearney's piece on blues singer Marcia Ball.[8] Articles also appear that focus on the philosophy of music and the philosophy of music theory, such as Martin Scherzinger's piece on the interconnections and shared methodologies used by both the new 'cultural' and 'historicist' approaches to thinking musically and their antithetical counterparts the more 'aesthetic' and 'formal' approaches to thinking musically.[9] The magazine also includes articles focusing on traditional and non-traditional music theory, both traditional and text-based compositions, poetry, aspects of performance, literary works, musings on literary works, visual art, commentary on visual art, and reviews of books, music, and concerts. Finally, sprinkled throughout the issues are little gems that could best be called reflections on life as a creative person, such as John Rahn's piece on composing and the self,[10] Ross Feller's essay on busking,[11] and Robert Paredes's introspective piece on

[5] Brown 2000/2001, 76.

[6] Hanninen 2004.

[7] Missiras 1999.

[8] Kearney 2000.

[9] Scherzinger 2002.

[10] Rahn 1999.

[11] Feller 2003.

preparing a performance of Harry Partch's *The Bewitched*.[12] In spite of its vast and diverse range, this essay will appear in a theory journal and be read primarily by music theorists, so the perspective taken by the author in this essay will be how some of the information presented in *Open Space* impacts the theoretical enterprise.

The benefit of this environment for music theorists (or anyone that specializes in a sub-field of a larger field) is twofold. First, if you publish in *Open Space*, your work will reach an audience beyond your area of specialization. This could inspire inter-sub-disciplinary interest and possible collaborations. The necessity of inter-sub-disciplinary interest and possible collaborations will probably be obvious to anyone that teaches in a large school of music. One would imagine that this environment would be fertile ground for cross-pollinations of all types. Nevertheless, the sub-disciplines within a school of music can be as isolated from each other as the schools of business and music might be within the larger university environment. The importance of overcoming this inertia is reflected in the recent trends within the theory community. Special interest groups within the Society for Music Theory, such as the Group for Analysis and Performance, demonstrate the value of theoretical work to the larger musical community by collaborating with other sub-groups within the discipline. Often the members of these special interest groups have dual affiliations, such as theorist/performers or composer/theorist.

Second, if you become an active supporter of *Open Space*, you will automatically be participating in an inter-sub-disciplinary *and* inter-disciplinary collective. One might ask, "How would this be different from participating in an SMT special interest group?" I think the crucial difference is that one will be exposed to points of view that value other origins for musical exploration and thinking than the theoretical, for example the experiential, social, or cultural perspectives.[13] One potential benefit of inter-sub-disciplinary and inter-disciplinary associations would be connecting the theoretical

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[12] Paredes 2000.

[13] Here is a sample list of articles approaching music from different angles that are extremely interesting: Roberts 1999b, Crilly 2000, Peterson 2001, Scherzinger 2002, Becker 2003.

perspective to these alternative points of view. It is imperative as theorists that we explore or understand theory's connection to other perspectives, such as the cultural, because this apparent gap is the source of much criticism of theory's value to music, especially by some in the Postmodernist community.[14] Exploring the *Open Space* territory one finds articles that attempt to marginalize theory just on these positions, as well as some other choice subtopics, such as cultural relevance.[15]

One can either ignore work written from this vantage point, treating it as a political manifesto, or one can address and integrate the criticism into the theoretical perspective. Because *The Open Space Magazine* does not appear to be driven by, endorse, or be a platform for a *single* ideology or approach to musical thinking, it appears to be an excellent avenue for a more inclusive or broader type of exploration and research. Therefore, while many articles are critical of theory, other articles incorporate the criticism of theory, and use it as a point to expand or understand both the nature of theoretical inquiry and its relationship to other forms of musical investigation, such as intuition.[16] The opportunities *Open Space* affords a researcher to expand the scope of theory are crucial to any work that purports to demonstrate its applicability and necessity to alternative approaches. How does structure, for example, directly or indirectly connect to the perspective of someone experiencing music from a cultural or social perspective, especially if the structure as modeled by the theory is not immediately or directly perceptible?

Musical Realities

One article in particular, by Benjamin Boretz, investigates the nature of theoretical inquiry and its relationship to other forms of

[14] The need to connect theory to the larger music community is also expressed in Cherlin 2000/2001.

[15] Here are several articles that either tacitly or overtly marginalize theory: Coulombe 2003, Burt 2000, Hamessley 2000, Kernohan 2001.

[16] A good example is Gleason 2002.

musical explanation.[17] Although the main thrust of the "text piece" is exploring the relationship between the theoretical perspective, alternative points of view, and "music, as a music," the piece implicitly connects the two apparently orthogonal approaches (theory and its alternatives) through their discourses. The nature of the connection effectively eliminates the gap generating the criticism of theory's value to music, from a cultural point of view, for example. Yet, the resolution of the conflict does not resort to arguing for the superiority of one discourse over the other, nor does it exonerate theory from the criticism that its approach is possibly detached from experience. Likewise, Boretz demonstrates that alternative approaches to theory, for example the post-modern perspective, cannot claim a closer proximity to experience than their theoretical counterparts, because the discourses of alternative approaches occupy the same relational position to music as the discourse of the theoretical perspective. Boretz states that both forms of discourse are co-opting music:

> So what discourse is desired to do, and is read as doing, whether it's theoretical or metaphorical in style, is ascribe meanings to music, essentially transferring meanings it specifies into the ontological space of music itself. Read this way, theoretical discourse is not descriptive, or analytical, and so-called metaphorical discourse is not metaphorical; rather they are directly, aggressively *ascriptive*: they transfer into music itself the very characteristics and functions of representation and metaphor they attribute to it. So verbal configurations like 'scale-degree chord numbers,' 'Sonata form' 'Schenker-level,' 'Fibonacci series,' 'combinatorial set structure,' 'masterpiece' do not, in their most pervasive applications, function to represent musical phenomena; nor do metaphors like 'violence,' 'crystallization,' 'loneliness,' in their most pervasive usages, function to describe anything necessarily in music; most of the time, it seems that music is being conscripted to stand for them. In both cases, the theoretical and the metaphorical, what happens is a reversal of what you might call the 'descriptive relation:' rather than the words 'I-chord' or 'repetition' being used to represent something which is in music prior to their application, what happens, by the alchemy of discursive application, of ontological transference, is that something in music caused to be, and to represent, the I-chord or the repetition: some moment of music becomes a I-chord moment, some moment of music becomes a repetition moment, some music becomes a repetition-structure, it's cognized, perceived, experienced, ontologized as such, reduced to being that...Discourses, stories, and theories, unlike music are highly explicit and as powerfully determinate within the realm of verbal-language reality

[17] Boretz 1999.

as music is indeterminate within that realm. So the ontological transference between text and music goes only one way: you can cause the theoretical construct, or the metaphorical image, to be heard in the music, but you can't really read the music out of the discursive text, so long as it's still perceived as *discursive*.[18]

The conscription of music by discourse is perhaps one of the etiologies or interconnections between text and music that Boretz finds alarming.[19] Since he claims that discourse inserts itself as a metalinguistic partner into the musical experience, and since discourse is aggressively ascriptive, it has the power to alter musical experience or to appear to be identical to musical experience. To experience "a music" is to experience it in terms of its meta-partner, discourse. Expanding upon Boretz's alarm, the conscription of music is troubling for another reason. The creators of discourses can have conscious or unconscious agendas, such as, verifying the truth-value of one discourse while falsifying the value of another. In this context, the creator of the discourse consciously or unconsciously transfers the identity of a text (i.e., its meaning) into the identity of a music conflating the two identities. Once the fusion of identities takes place, it becomes easy to claim or believe that the discourse is capturing something in the music, rather than structuring the music in terms of the discourse. This imbues the discourse with a degree of truth, according to its creator. Once the truth-value of a discourse is established, it can be used to deny the truth-value of other discourses.

The criticism from a segment of the post-modernist community of theory's value to musical practitioners appears to function along these lines. For example, the subject of much theoretical work is the structure of music. Since many will not or choose not to cause something in the music to be heard as a particular theoretical structure, they conclude the discourse of theory has little connection to the music. Instead the music contains the cultural codes that form the foundation of much post-modernist discourse. However, as Boretz's ascriptive paradigm

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[18] *Ibid.*, 59-60.

[19] "What I do have are some thoughts about the etiologies and interconnections of some things I've noticed recently, which you may or may not regard, as I do, as alarming" (*Ibid.*, 58).

illustrates, neither discourse can claim its veracity stems from representing something in the music that exists prior to the application of the discourse. Therefore, if the gap generating the criticism of theory's value to music is based on the belief that the post-modernist discourse is more truthfully representing something in the music than the theoretical discourse, then there is no gap and no viable criticism of theory as a discourse for musical practitioners. Each approach simply allows a music practitioner to experience the music via a different discourse, and each music practitioner must choose their meta-linguistic partner based on the value that discourse imparts to their musical experience.

However, is experiencing music via a meta-linguistic partner the same as experiencing music, as a music? This is a central question Boretz's tries to answer. He postulates that music may be "an experiential 'primitive'...an input/output behavior acquired transactionally, mimetically, not through other language systems."[20] If, as an experiential primitive, musical behavior is not acquired through a meta-language, then it may be possible to have, as Boretz calls it, a single-valued single-consciousness experience of music, an experience of music that is not mediated by or accompanied by a meta-text. Although one implication of the experiential primitive view of musical experience could be eliminating musical discourse as unnecessary, this is not the conclusion Boretz (nor I) want to draw. The direction he takes the relationship leads to a new view of discourse. We all ultimately may be alone with music as we commune with it preter-linguistically, but language allows us to understand and share single-valued single-consciousness experiences with others in a multi-valued multi-consciousness group. The moment one falls in love may be a single-valued single-consciousness experience, but it is a single-valued single-consciousness experience that needs to connect to the single-valued single-consciousness experience of another. More often than not, the connection is established through language. Boretz acknowledges that music fills us with things to say, which is probably why we want to or must have a musical discourse:

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[20] *Ibid.*, 56.

At the fading point of intense experience, discourse is a way to feed off of vivid experience, to try to hold on to it, to have it beyond its live-action-time, to maybe re-position it (and maybe yourself) so as to be able to re-experience it, perhaps to fix it as a permanent renewable asset of consciousness. And relevant discourse happens in any expressive-linguistic mode: poetry, mathematics, acoustics, physics, psycho-science, socio-science, anthropology, medicine, metaphysics, theology, analogy, metaphor, musical composition, graphic art—even music theory: people's discourse needs to assume the images of their obsessions; and meaningful music stories will get told in every mode of telling.[21]

A single-valued single-consciousness experience of music transforms the necessary connection in the music/linguistic dyad into a Humian connection of association. The new relationship can have a profound effect on the creation of musical texts and discourses. Instead of creating texts that imbue music with linguistic qualities, texts can be created that imbue discourse with musical qualities. Boretz proposes a discourse that does not mediate experience, a discourse that does not turn music into text but turns text into music:

Why does the 'truth' of ascription, according to either the pre-postmodern intellectual paradigm of physics, or the post-postmodern intellectual paradigm of law, seem a more plausible reading of musical discourse, by so many of its makers and users, than the creative imagery of description, of self-defining responsive intellectual drama—why is it counterintuitive to musical practitioners to read musical discourse more like poetry, say, than like mathematics or geology? Why is discourse read as if it was seeking to be true, rather than just expressive, interesting, engaging, creative, imaginative?...Non-ascriptive description looks but doesn't touch—like poetry, it is appreciable but inapplicable...any discourse can be received as either ascriptive or non-ascriptive, can be read either way, used either way: it can be regarded as a valuable access to someone's vivid ideas and visions, read as someone's internally self-formed verbal-intellectual drama, rather than as an objectified prescription, instruction, or proposal for application...My own personal mode of resistance, apart from strenuous ear training in the form of explicitly focused real-time music making, has been to radically immerse discourse in music, to saturate it with my own music-sense and voice, to enfold it within music by making it be music.[22]

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[21] *Ibid.*, 57.

[22] *Ibid.*, 58, 60-61.

Boretz's postulation on the relationship of music to its discourses is exactly the kind of reality-bending thinking about music that challenges my theory conditioning and compels me to re-examine the postulates that have guided my own approach to creating discourses about music. For example, I had always believed that my contextual approach to music shielded me from the unintended consequences of ascription. According to Boretz, however, "'contextuality,' supposedly a liberating music-ontological revolution, is really just another verbal-reality hook, another mode of representation reductively ascribable to music, something that, like its complementary twin 'indeterminacy,' inheres in the domain of discourse rather than in the ontology of music."[23] Although the seismic impact of experiencing music, as a music is sufficient to completely change the topography of one's theoretical landscape, Boretz leaves it up to the readers to decide what shape the newly reformed landscape will take should the readers decide to work out these issues for themselves.

Since Boretz admits that any discourse could be read and used either ascriptively or non-ascriptively, one has a choice of perspective to guide the creation of their musical discourses. My own approach to this dichotomy is to create a discourse that has features of both non-ascriptive and ascriptive texts. While Boretz has effectively decoupled music from its meta-texts, I am not ready to cut the tether. I view discourse, especially in its theoretical guise, as an essential and effective self-fulfilling tool to both hear music as a thing and lead one further to hear what you hear as music.[24]

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[23] *Ibid.*, 61.

[24] Lewin 1986 includes theoretical discourse as an essential component of his model of a musical perception: p = (EV, CXT, P-R-LIST, ST-LIST). One aspect of the contextual component of the model, CXT, is actually a theory that facilitates hearing events, EV, through its vocabulary as particular constructs: "CXT is...a culturally conditioned theoretical component that makes us responsive to categories we call beats, keys, tonics, dominants, et al" (335). It is interesting to note how Lewin's and Boretz's approaches to discourse intersect. By stipulating that the theoretical component is "culturally conditioned," Lewin leaves open the possibility of substituting many different theoretical components into the model. Consequently, the veracity of the theoretical component does not stem from representing something in the music that exists prior to the application of the discourse. The theoretical component simply makes us responsive to the

Therefore, even though contextuality may be just another verbal-reality hook, it can still be a very useful hook that can alter habits of listening and possibly lead to a preter-linguistic music experience. Furthermore, I also find a meta-text a useful catalyst for creativity in my compositional activities. The non-ascriptive facet of this discourse realizes that the linguistic component is essentially heuristic in nature, so it does not make claims to truth outside of the truth that the text I present has been useful to me in my musical explorations and might be useful to others who are struggling to ride the same tiger. I see text and music as parallel dancers who can never touch each other, but the movements of each dancer creates ripples in the ether that binds them and effects the movements of both. It should be clear now that the earlier discussion of how conditioning determines some perceptions represents my thoughts on how to walk the tightrope of discourse creation in the context of the ascriptive versus non-ascriptive paradigm.

A New Community (?)

With the publication of *The Open Space Magazine*, the original editors, Benjamin Boretz and Mary Lee Roberts,[25] have cleared a path for the creation of many types of discourse about music from all points along the ascriptive versus non-ascritptive continuum. They have also landscaped a conceptual vista for exploring the interaction and cross-fertilization of disciplines that usually occupy their own dimensional bubbles:

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possibility of categories, without permanently and ascriptively fixing those categories.

[25] As of the most recent issue, the list of editors has grown to include Tildy Bayar and Dorota Czerner. The contributing editors are Tom Baker, Martin Brody, William Brooks, Warren Burt, Renée Coulombe, David Dunn, Keith Eisenbrey, Jean-Charles François, Kyle Gann, Brad Garton, Scott M. Gleason, Daniel Goode, George Lewis, Peter Monaghan, Robert Morris, Mark Nelson, Robert Paredes, Susan Parenti, Jann Pasler, Craig Pepples, George Quasha, John Rahn, Martin Scherzinger, Charles Stein, Martin Supper, Ann Warde, and Alicyn Warren.

The *Open Space* magazine is a new periodical for people who need to explore or expand the limits of their expressive worlds, to extend or dissolve the boundaries among their expressive-language practices, to experiment with the forms or subjects of thinking or making or performing in the context of creative phenomena. We want to create a hospitable space for texts, which, in one way or another, might feel somewhat marginal or invasive—or too "under construction"—for other, kindred magazines. The people we envisage as populating our contributing/editing/reading community are composers (in whatever medium), performers, historians, ethnologists, theorists, critics, philosophers, scholars and seekers of any kind who feel drawn to participate in this venture.[26]

As their invitation makes clear, the eclectic nature of each issue, the inclusion of many points of view, the cross-fertilization of ideas, and the diverse backgrounds of the magazine's contributors are not accident epiphenomena.

As a music practitioner who occupies several of those dimensional bubbles, the invitation to write this review has inspired me to explore the creative connections that may flow from *Open Space*'s implied endorsement of a more holistic approach to musical activities; it challenges me to investigate the consequences of pursuing specialization, the complementary twin of a holistic approach; it also provokes me to defend and consider the benefits of specialization; and it compels me to understand their interconnection as a way of defining the boundaries, limits, and interactions of both approaches. Put another way, I interpret the editors' call for submissions as having the unstated goal of asking contributors to examine the limits of their expressive practices with the aim of discovering any unintended implications that may be a consequence of the specialized nature of their practices. Interpreted a little more aggressively, its unstated goal is to counterbalance the potentially insular effect of specialization and to dissolve the potentially calcifying effect pursuing specialization can have on a discipline.

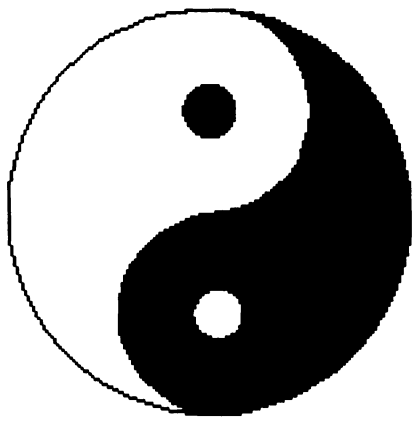
Furthermore, by integrating each field into a larger conceptual structure a holistic approach may limit the ability of any single area of study from marginalizing another area. Specialization, in other words, contextually limited by its integration into a larger

[26] Boretz and Roberts 1999.

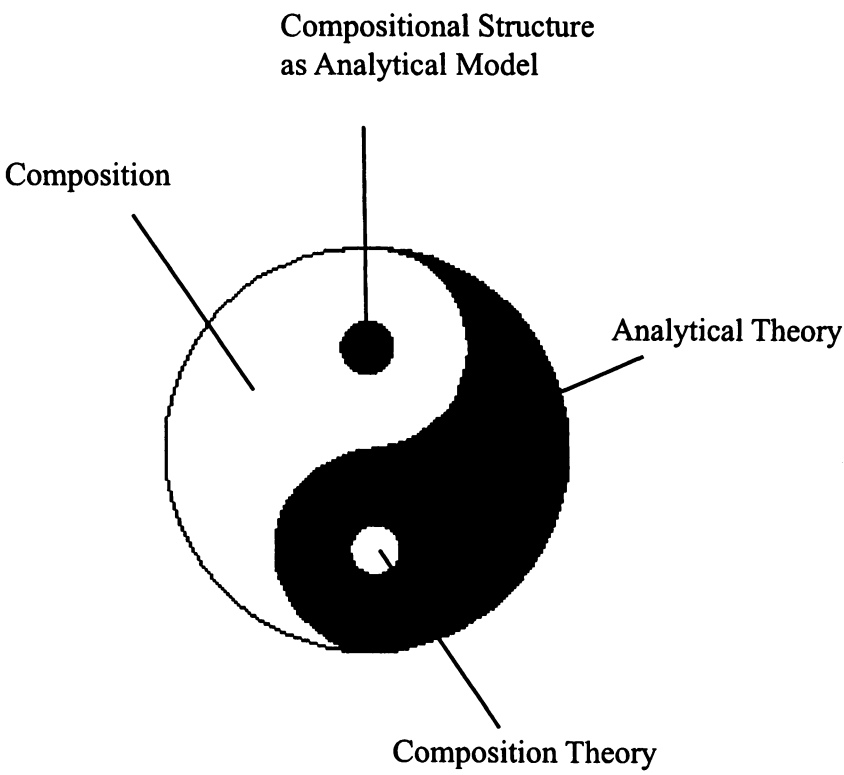
conceptual structure, does not deterministically produce an insular field, and it does not have to lead to the marginalization of any area that does not share its focus. However, a holistic approach also can be prone to the same imperialistic tendencies as specialization. The conceptual structure absorbing specialized areas into its holistic field may contain an implicit hierarchy. The structure of the hierarchy may marginalize an area of study, because it does not make a significant contribution to achieving the goals of its holistic host. The structure of the hierarchy may also marginalize an area of study by limiting its range to its host's teleology. In this context, specialization is an important defensive tool. It protects an area of study from being marginalized by demonstrating that what appears to be a benign holistic container is actually another form of insular specialization. A practical example of these interactions is worth pursuing.

Within the academic discipline of music, composers and theorist were traditionally members of the same departments. The holistic nature of this relationship could be symbolized by the Chinese ying-yang symbol: two complements that create a whole wherein each complementary part contains a portion of its complement (see Example 1a). The modern academic trend, however, has shifted towards specialized departments for theory and composition. It is more than a cosmetic change. The separation often physically limits the contact of composers and theorists, and it conceptually forces a practitioner of both disciplines to hierarchize the two activities. The relationships, in other words, created by the interlocking parts of the theory/composition ying-yang network disappear as the four parts of the symbol split off from the whole to become specialized fields: analytic theory, composition theory, composition, and compositional structures used for analysis (see Example 1b). It would be nice to occupy a composer/theorist space rather than just the mutually exclusive spaces allotted to composers or theorists at

Example 1a. Tai Chi Symbol.



Example 1b. Holistic Model of Composition/Analysis



present in many institutions.[27] It seems to me that work generated by music practitioners occupying the larger holistic space addressing issues specific to the larger space and outlets for the work generated by those practitioners have been shrinking.[28] Of course, *Perspectives of New Music* is still an avenue open to this line of inquiry, but even here the flow does not appear to be as strong as it once was. Therefore, the editors' invitation and *The Open Space Magazine* are welcome additions for music practitioners that wish to address issues specific to the larger theory/composition space.

Simply put, it would be nice as a composer/theorist to once again talk shop.[29] This is one reason I enjoy watching cooking shows, especially when two master chefs are working in the same kitchen and collaborating. As each chef inspires the other, the discourse becomes technical, because each chef queries the other to find out how and why a particular procedure is being used. The technical discourse facilitates the rapid exchange of ideas and improves comprehension. As a viewer of the show, I am expected to have some basic understanding of the skills associated with the art of cooking, if I am to fully benefit from being privy to the cooking lesson. When I have acquired a sufficient skill level, I can more rapidly comprehend or see the implications of a particular technique. Therefore, in my estimation, the most stimulating cooking shows are those that provide some insight into the theory of cooking, which includes investigating aesthetic choices and why

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[27] In case anyone wants to read too much into the order of the disciplines, I could just as easily substitute theorist/composer for composer/theorist skewing the priority in the other direction. The point, which the linearity of language in both its traditional written and oral form obscures and in fact appears to change, is that it would be nice to work in an environment that does not hierarchize the relationship of the disciplines or views them as mutually exclusive.

[28] Perhaps one reason this space has become smaller in recent years is there seems to be far fewer composers interested in pursuing theory as part of the compositional craft, at least in a public forum. The reticence of composers may be a direct consequence of increased specialization.

[29] Harrison 2000/2001 deals with some of these issues from another perspective. I also think it is an important article for theorists to read, since its implications for the theoretical enterprise are far reaching. Severing the connection with composition, for example, will certainly hasten progress down the path he outlines.

some choices are made and not others. This type of knowledge can stimulate creativity in a way that just following a recipe can never duplicate.

The promise of stimulating composer/theorist shoptalk surfaces in several articles in *Open Space*. Two articles in particular by Robert Morris, "Musical Form, Expectation, Attention and Quality"(issue 4, Fall 2002) and "Some things I learned (didn't learn) from Milton Babbitt, or why I am (am not) a Serial Composer" (issue 3, Spring 2001), exhibit the qualities just under discussion. In the latter article, Morris very candidly talks about the function 12-tone aggregates and arrays perform in his compositions, and he talks about his early musical experiences that lead him to adopt these particular techniques. He simultaneously aligns and distances himself from another famous serial composer, Milton Babbitt. The purpose of this positioning is two-fold. First, Morris is paying homage to many features of Babbitt's music that have inspired and influenced his own compositions. Second, he is attempting to dispel the negative connotations associated with being a serial composer. He wants to dispel the notion being a serial composer means you "write a 'cerebral' and 'unpardonably complex' music, designed to 'intimidate' the listener, to express 'horrific' or other unpleasant emotional states (or on the other hand, to express nothing at all), and/or form a 'Club' of in-group composers in order to suppress all other kinds of new music."[30]

Morris has tried to overcome the prejudices surrounding serial composers and their music by demonstrating both in his music and theoretical work that compositions not considered serial actually share many structural affinities with the compositions created by composers that employ serial techniques. To help dispel another popular misconception about serial music, I am careful here to avoid lumping together all "serial composers." Along with the negative connotations mentioned by Morris, another popular belief is that the music is driven by mechanical procedures and dogmatic systems. In fact, nothing could be further from the truth, since there is no system that one follows like a recipe to generate pieces:

[30] Morris 2001, 59.

There is no such thing as *the* twelve-tone system. All that's there is the pitch-class space and definitions of the aggregate, ordering, and a set of transformations. All other constraints are defined by the composer. Many of these constraints are communal. For instance, composers may share the use of rows, row-classes, local aggregate saturation, certain operations, order and content invariances...Twelve-tone technique can be systematic or not. If systematic, the twelve-tone system functions in the role of language. Language enables the coordination of phonology (specific collections of sound), syntax (specified sequences and timings of sounds, local continuity) and semantics (relations among sound complexes, form).[31]

If there is a 12-tone or serial system, it consists of all the techniques created by all the composers that employ some technique that could be considered serial or have a connection to a person that is known to be a serial composer. This is the path that Morris follows through his article, tracing the links that join and *separate* Babbitt, Webern, Schoenberg, and himself and tracing the contributions of each composer to a compelling body of music. Morris's network could, of course, be extended to include many more composers. One implication I draw from this presentation is that a technique or label can often obscure the individuality of composers, which can in turn lead to unfortunate generalizations about any work that bears the label. For example, if we treat serial composers as individuals rather than members of a political party, we would find that "serial" pieces that are not compelling are less a failure of the "system" to produce good music than they are a failure of the individual composer to create compelling music. Composition with pitch-classes is not for everyone; some composers are simply not inspired by the aesthetic. That is fine. However, because some composers don't see the value of composing serial music, this should not imply that no composers should see its value.

A Separate Reality

In spite of their close connection, theory and composition have always had a somewhat tense alliance. Therefore, it is understandable that as the field of theory grows and compositional

[31] *Ibid.*, 66.

aesthetics undergo a metamorphosis, the disciplines may diverge as they establish individual identities. As the new identities of each field solidify and the goals of each field become more specialized, the disciplinary gap grows wider, and theory becomes separated from its historical partner, composition. Although completely uncoupling the parts in our network initially may appear to be an inevitable development for both fields, the separation may produce unintended consequences. Completely independent and specialized disciplines could, for example, exacerbate the gap often-cited, especially by composers,[32] between theory and practice (composition activities) as theorists shift their focus to developing tools only for the analysis of music, and composers focus less on creating tools to make more music, and perhaps rely more on intuition as the generative force of their music making. In this scenario, theory does not follow composition; it is divorced from it. Therefore, it becomes easier to claim that the fields no longer have much in common, because each field is approaching music from opposite directions: generation or production (compositional idea to score) versus analysis or post-production (score to model).

Unfortunately, if composers, especially younger composers, only view theory as a tool for analysis (i.e., a post-production apparatus), it becomes easy to conclude that theory has little to do with or cannot inform the compositional process. Once composers adopt this position, they are depriving themselves of a useful instrument for speculative play that can be a catalyst for creativity pulling the craft of composition in new directions. Composers of this ilk are also devaluing theory's close conceptual ties with composition.[33] Theoretically inclined composers, by contrast,

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[32] See, for example, Sessions 1979, "...creation—the end—is a subconscious process, while technique—the means—is the conscious or superconscious one; musical theory therefore that is before the fact can have no conceivable value to the musician, and can only be poisonous to him if he allows himself to be really exposed to it...musical theory is valid for the musician only insofar as it is practical and not speculative" (264).

[33] To be sure, non-theory oriented practices, for example intuition, are also instruments for speculative play that can be catalysts for creativity pulling the craft of composition in new directions. When intuition stalls in the face of a compositional problem, theory offers a pragmatic approach to possibly overcoming problems, such as "how are two events connected?" Likewise,

provide themselves with an extra tool for the construction of substitute musical grammars, especially grammars that radically depart from the traditional syntax of music. Likewise, theorists may only view compositional theory as an intuitively inspired production apparatus, or a production apparatus that only specifies the syntax of musical grammar (i.e., the entities and their out of time relations). In this limited role, they may conclude that compositional theory has little to offer analytic theory, since it does specify what the music does with those relations in time. Structure, as opposed to syntax, is the domain of analytic theory, which is in the domain of theorists. Like ships heading to opposite shores on a transatlantic crossing, the discrete and specialized disciplines of theory and composition pass each other sailing on the same sea, but they have no contact.

Although theory and composition approach music from opposite directions, they can either travel along parallel lines in their specialized roles, or they can travel along the same line in their generalized roles. In other words, the relationship between the disciplines can be either discrete and parallel or more unified and mono-linear. Robert Morris, for example, presents a model of the compositional process that proceeds linearly from left to right (see Example 2a).[34] He updates a more traditional version of the model with the addition of stages titled "compositional space," and "compositional design." Compositional designs will be familiar to readers of Morris's book *Composition with Pitch-Classes* as sequentially ordered pitch-class arrays that represent completed compositions ready to be realized in pitch and contour space in various time formats.[35] A compositional space, on the other hand, is an area containing out-of-time relationships connecting musical entities. The instances of any T_n/T_nI Type are a compositional space, since the entities are the collections of pitch-classes, while the

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intuition can spur theory to find connections where the theory, in its present state, says no connection exists. Both approaches are useful, so the adoption of one approach should not implicitly exclude the other approach.

[34] Morris 1995, 329.

[35] Morris 1987, 233.

relationship connecting the entities is either the operation T_n or T_nI.[36]

Morris added the "compositional space" stage to an intermediate model that just included compositional design, because he perceived a gap between the "ideas-knowledge-skill" and "compositional-design" stages. Compositional spaces facilitate the construction of compositional designs from the "ideas-knowledge-skill stage." We can close the gap even further by positioning "theory" as a mediation stage between the "ideas-knowledge-skill" and "compositional spaces" stages (see Example 2b). Ideas, skills, and knowledge in the initial stage of the process are more like unconnected entities that through the application of a theoretical apparatus are transformed into a compositional space. That is, theory can be the process of creating relationships between entities that transforms them into a space.[37] Similarly, another theory may transform the compositional space into a compositional design. Morris's *Composition with Pitch-Classes*, in fact, contains a mediating theory that performs this function, as well as building a theory space that transforms "ideas, knowledge, and skills" into compositional spaces, if read carefully. The expanded model of the compositional process presents an integrated view of theory's role in the activity. It also demonstrates theory's importance for speculative composition, because theory-play (theoretical improvisation?) can be a catalyst for creativity pulling the craft of composition in new directions by creating new compositional spaces. At this point, however, analytical and compositional theories are still moving on parallel paths in opposite directions.

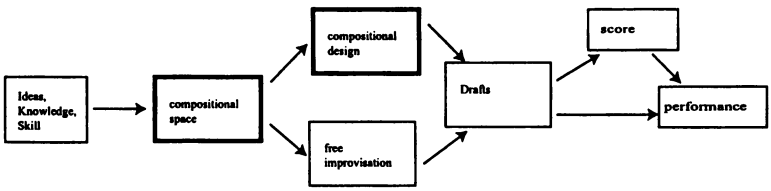
Although a composer's goal is to transform "ideas, knowledge, and skills" into a score for performance, the process is not strictly linear. Therefore, Morris observes that besides the gaps filled by his "compositional space," and I will add that besides the gaps filled by "theory space," the lack of feedback between stages is another of the model's weaknesses.[38] The simplest way of introducing nonlinearity into the process is to change each arrow into a double-

[36] Morris 1995, 336.

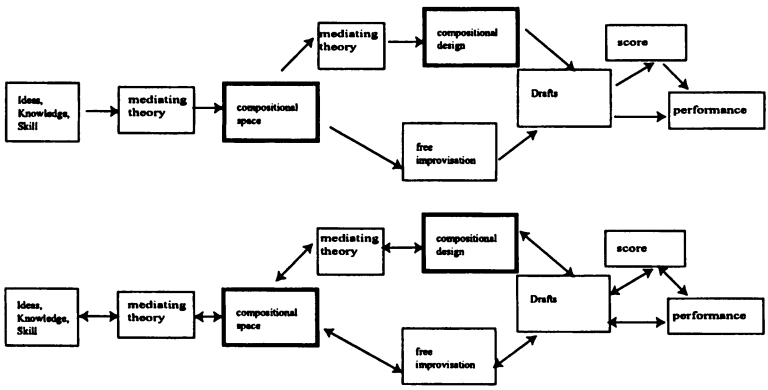
[37] We could also cast this discussion in a more transformational light by giving the arrows "theory" labels to signify the transformative effect theory has on each space.

[38] Morris 1995, 336.

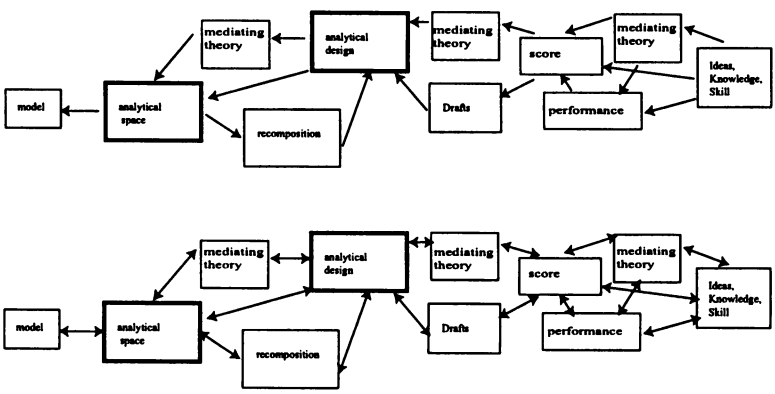
Example 2a. Model of the Compositional Process by Robert Morris.



Example 2b. Model of the Compositional Process with Theory Component and Feedback



Example 2c. Model of the Analytical Process; Model of the Analytical Process with Theory Component and Feedback



headed arrow, or add a complementary left arrow for each rightward pointing arrow. Leftward Arrows could also be added between any stages in non-sequential order, from the draft to compositional space stage, for instance. The importance of leftward arrows, no matter how they are introduced, is that they indicate a shift of direction and the introduction of an analytical component into the compositional process.

A performance may reveal a flaw in the realization of a "compositional design," such as, a section that lacks motivic association resulting from contour- and/or pitch-space choices that detract from the work's coherence. A more interesting feedback loop can occur between the compositional space and compositional design stages. Perhaps issues arise during the construction of the compositional design that force a rethinking and reformulation of the compositional space.[39] To correct the problem, the composer must shift directions and move leftward changing the process from composition to analysis as the composer tracks down the source of the inconsistency in motivic design, for example. Perhaps the inconsistency exposes trends in the compositional design that the compositional space inhibits. Taking advantage of these new compositional opportunities may entail reformulating the compositional space.[40] A composer may, in fact, produce analytical

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[39] Schoenberg's attempt to finish the piece *Jakobsleiter* reveals the presence of both compositional space and compositional design as elements of the composing process. He apparently attempted to transform the piece from a non-serial twelve-tone to twelve-tone serial composition. His serial compositional space only included combinatorial row pairs related by inversion. The compositional design of the work, however, could not accommodate this space, since the two hexachords that open the piece cannot combine with inversional forms to generate an aggregate. Presumably, the conflict between design and space was a contributing factor to Schoenberg's abandonment of the project. As is well known, a retrograde inversion transformation of the *Jakobsleiter* "series" will produce a combinatorial aggregate. Perhaps if Schoenberg reformulated his compositional space to include combinatorial pairs related by retrograde inversion, he could have completed the project. Nevertheless, the *Jakobsleiter* problem appears to be an example of how a compositional design could lead to reformulating the compositional space.

[40] For example, Babbitt's solution to the "*Jakobsleiter* problem" was to reformulate Schoenberg's compositional space to include combinatorial pairs produced by any of the twelve-tone operations. Babbitt's own compositional space only includes

models that may facilitate the redesign of the compositional space. A composer may also produce analytical models to determine the effectiveness of either the compositional space or design.

The analytic theory or leftward moving counterpart of the composing process reorders some stages, and it has a different goal (see Example 2c). The analytic theorist also begins the leftward process from the "ideas, knowledge, skill" stage. Instead of leading to a compositional space and design, the initial stage is applied to a performance or score. Therefore, for the analytic theory side of the coin, the "ideas, knowledge, and skill" stage is a way of contextualizing the score/performance information. The initial contextualization may involve categorizations, such as tonal, atonal, serial, and octatonic, for example. The drafts stage is on the analytic side too, since theorists often refer to drafts during the analytic process. Compositional design becomes analytic design, while compositional space becomes analytic space. The end product for the analyst is a model of the composition.

As it did in the rightward model, theorizing can close the gaps between several stages. For example, inserting a mediating theory between "ideas-knowledge-skills" and "score/performance" demonstrates the initial contextualization process of the "score/performance" takes place through a theory.[41] A mediating theory may also assert itself between the "score/performance" and "analytical design" stages to transform score information into the in-time relationships between entities producing an analytical design. Similarly, a theorist may insert another mediating theory between the "analytical design" (a network of relationships) and "analytical space" (the things that can be organized by those relationships) stages to transform the in-time analytical design relationships into the out-of time relations of the "analytical space." This process may reveal properties of the "analytic space" that do

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hexachords capable of generating combinatorial pairs under all twelve-tone operations.

[41] Once again the CXT term in the model of a perception from Lewin 1986, p = (EV, CXT, P-R-LIST, ST-LIST), is a theory that initially contextualizes the "score/performance" stage: "CXT is...a culturally conditioned theoretical component that makes us responsive to categories we call beats, keys, tonics, dominants, et al." (335).

not manifest themselves in the analytical design. A model is simply the aggregate of all previous stages.

Composition in the Analytical Process

Adding double-headed arrows or adding complementary right arrows for each leftward pointing arrow introduces feedback into the model of the analytic process. Rightward Arrows could also be added between any stages in non-sequential order. The importance of rightward arrows is that they indicate a shift of direction and the introduction of a compositional component into the analytical process. Adding a "re-composition" stage between the "analytical space" and "analytical design" stages, for example, could be very useful to an analyst. While the former stage includes the full range of choices available to a composer, the latter stage represents a subset of those choices. Re-composition by an analyst could be useful in producing better analytical designs, since an examination of the road not taken may lead to greater insights and understanding of the road taken. Learning to compose is one of the best ways I know of uncovering the questions that form the foundation and boundaries of analytical models. Those questions and boundaries uniquely shape an analytical system and guide its development. A compositional view of analyzing structure, therefore, sees analysis as a dynamic process akin to composition, rather than the static application of a structural mold.[42]

Although the models of the composition and analytic processes begin at opposite ends and move in opposite directions, the introduction of feedback loops begins to erode their apparently dichotomous relationship. Additional correspondences reveal an even more unified and mono-linear view of the disciplines. If we imagine the stages of each model as a two-sided card with the compositional label of the stage written on one side and the analytical counterpart label of the stage written on the other side, flipping the card would transform a stage into its disciplinary complement. The "analytical space" under a flip transformation,

[42] For another perspective on how composition can inform theoretical work, see Mead 2000/2001.

for example, would become a compositional space, because it changes its function from modeling to generation. Now the main thrust of motion is rightward and the feedback loop is leftward. Similarly, a "compositional space" under a flip transformation would become an "analytical space," because it changes its function from generation to modeling. The new "analytical space" as part of the "model" of the composition then can become part of the initial "theory space" between the "ideas, knowledge, skill" and "score/performance" stages in a new analysis. Rather than becoming a structural mold that is statically applied in a new analysis, the model contextualizes the new score (i.e. primes the theoretical pump) to set in motion the analytical process leading to at minimum a new analytical design within the present model or, at maximum, a new analytical space and model.

Although their inputs and outputs are at opposite ends, the flip transformation collapses the parallel lines of each discipline into a single line capable of carrying current in two directions. The disciplines now have a deep connection:

> For Lewin, musical form arises out of the way a composer dances, as it were, through a space. And while Lewin tends to consider only the part of an entire space that is verifiably used in a specific composition, there is no essential structural difference between transformational networks uncovered by analysis and those constructed for composition.[43]

Structurally identifying transformational networks for analysis and composition has some important implications. Since the mono-linear model establishes a strong connection between the analytical and compositional directions, the two fields are part of larger network consisting of two complements that create a whole wherein each complementary part contains a portion of its complement. An analysis, therefore, can help uncover a composer's compositional grammar. Another composer can modify the compositional grammar or use it unchanged and generate new works. The mono-linear holistic model of the disciplines is essentially the traditional model of composition pedagogy, where a composer learns to create new works by reverse engineering other

[43] Morris 1995, 356.

compositions. Analysts, on the other hand, can formalize syntactic relations in order to categorize pieces. They can also trace changes in syntactic relations as a way of comparing compositional grammars.

However, structurally identifying transformational networks for analysis and composition can also create some unintended and undesirable consequences for analysis. Viewed myopically, the strong structural connection linking transformational networks for analysis and composition can impose a hierarchy onto the non-hierarchic holistic dyad that limits the range of one node to the teleology of the other node. Furthermore, structurally identifying transformational networks for analysis and composition could make the deep connection linking them seem necessarily exclusive. That is, the myopic view would suggest that the transformational networks revealed by analysis must be the networks constructed by the composer to create the work. When a biconditional relationship exists between the two types of transformational networks, the compositional network can possibly substitute for the analytical network. Put another way, the compositional network can also function as an analytical network. The myopic view, therefore, limits the scope of the analytical enterprise to the range specified by a compositional system. That is, it constrains the role of analysis to uncovering the pre-compositional materials of the composer. In this context, analysis becomes a subsidiary branch of composition; what appeared to be a benign holistic container for both actually spurs another form of insular specialization.

The biconditional relationship between networks for composition and analysis can also create some undesirable consequences for composition. When the networks are not isomorphic or the analyst's *a priori* knowledge of a compositional network cannot be reconciled with an independently derived analytic model, or the compositional network cannot function as an analytical model because the piece cannot be "heard" through the model, the necessity of the connection becomes problematic. One problem arising from establishing or supposing a biconditional connection between networks for composition and analysis is the often-cited gap between the perception of a work and its

compositional system.[44] If the compositional network cannot be perceived, reconstructed, or reconciled to the analytical model, more often then not, the compositional system is cited as causing the fault. If the only possible relationship determining the interactions of analytical and compositional systems were the myopic mono-linear model, claiming a defective compositional system as the source of the open circuit would be justified. In an odd twist of fate, the myopic mono-linear model is weighted toward the analytical pole limiting the scope of the compositional enterprise to the range specified by an analytical system. That is, only compositions whose grammar is isomorphic to the grammar of the analytical system can satisfy the biconditional relationship. In this context, composition is limited by and a subsidiary node to analysis, because the analytical system determines the boundaries and limits of the compositional space, and the analytical system's filtration process determines which compositions achieve grammatical status.

If a compositional network cannot be perceived, reconstructed, or reconciled to an analytical model and vice versa, the problem may not be the fault of the compositional or analytical systems. The gap could arise from imposing an unnecessarily restrictive perspective on the relationship of composition and analytic systems that limits the view to the myopic mono-linear model with its necessary connection structurally identifying transformational networks for analysis with transformational networks for composition. Since, in the myopic mono-linear model, the compositional system must be connected to the analytical system, no gap is possible, and a given compositional system will uniquely determine an analytic system and vice versa.

However, neither a compositional space/design nor an analytic space/design is determinate. That is, they do not and cannot limit

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[44] Fred Lerdahl's attack on serial composing theories, for example, relies on the biconditional relationship: "...it becomes quite possible for the 'compositional grammar' to be unrelated to the other rules, the 'listening grammar' and 'intuitive constraints.' If this happens, the 'input organization' will bear no relation to the 'heard structure.' Here, then, lies the gap between compositional system and cognized result.... This gap is a fundamental problem of contemporary music. It divorces method from intuition..." (1988, 234-35).

all the possible relations between entities to only those relationships explicitly designated by the space/design and suppress any relationship that the space/design does not verify. It could be the case that a particular space contains within it the seeds of another unrelated space. It could also be the case that seemingly random points within one space may actually cohere within another space and generate an analytical model unrelated to the underlying compositional space/design. Analytical and compositional systems can be completely independent of each other, so the myopic mono-linear relation is not valid exclusively. Rather, it is just one possible relationship among many that determines the interactions of analytical and compositional systems. An analytical model does not have to be "wrong," if it produces results that do not support or verify an *a priori* compositional network. Likewise, a compositional system does not have to be irrelevant, ineffectual, or opaque because it is not verified by a particular analytical system. The myopic mono-linear relation with its necessary connection between the analytical and compositional directions tends to prioritize the truth-value and justification the connection provides the chosen direction over the contribution independent and not necessarily connected approaches from either direction may make to a more balanced model.

Paul Hindemith's analysis of measure 19-21 from Schoenberg's Op. 33a in his book *Craft of Musical Composition* is certainly one example of an analysis that is independent of a work's compositional system. Hindemith's harmonic analysis of the passage is based on his theory of tonal relationships.[45] Of course, the piece is also easily modeled as a succession of twelve-tone rows according to Schoenberg's method of composition. If the composition/analysis dyad is weighted toward the composition node, then Hindemith's analysis is wrong. It is wrong, because it does not emphasize the types of relationships generated by twelve-tone compositional systems, and it does not verify those relationships as analytically relevant. If the composition/analysis dyad is weighted toward the analysis node, then the compositional system generates a gap between the perception of the work and its compositional system. In other words, we cannot "hear" the twelve-

[45] Hindemith 1942, 217-219.

tone relations, because the analytical node prioritizes tonal relationships. In a more balanced perspective, Hindemith's analysis simply demonstrates another type of coherence and continuity by which events can possibly be related.[46] These new analytical relationships do not have to deny compositionally generated relationships. They can coexist with each other. In this view, a musical work is a multi-dimensional space of compositional and analytical networks. Such a multi-dimensional space may explain the gap that non-deterministic models leave between compositional and analytical networks.

There is another explanation for the gap, and correspondingly another possible solution: substituting one network for another could also generate a gap between analytical and compositional systems. The strict mono-linear model of the interaction of compositional and analytical networks allows the networks to substitute for each other under a flip transformation. The substitution is possible because the strict mono-linear model asserts a biconditional relationship between the networks, and biconditionals are symmetric.[47] Although the biconditional relationship establishes functional equivalence through substitution, compositional networks trying to function as analytic networks can still fail to produce an adequate analytical model. The compositional network, trying to function as an analytical model, might not adequately explain how two events are related, why event A progresses to event C rather than to event B, or how

[46] Hindemith was certainly aware of the fluid relationship that exists between compositional and analytical theories as is demonstrated by his comments on his analysis of Op. 33a: "It will be objected that no analysis of the present sort was in the mind of the composer when he wrote this piece. Although this objection applies to all music, since this type of analysis has never been in use before, let the piece be divided, in order to illuminate the viewpoint of the technique according to which it was written, into the sections into which it falls by the rules of the twelve-tone system. These sections are indicated by roman numerals, and bounded by dotted lines. In almost every one of them, all the twelve tones are conscientiously included, although obviously individual tones may be repeated. So far as I am able to judge this technique, group II seems to have been badly slighted, for it must get along without the tones e♭, f, a♭, and b♭" (1942, 219).

[47] A relation R is *symmetric* if aRb implies bRa. Since a biconditional is an equivalence relation standing between two propositions, it is, by definition, *symmetric*, one of the four requirements for an equivalence relation.

background structures uniquely determine surface details. Or the compositional network might not adequately demonstrate the transformational levels that connect surface structures to a background structure. If, as in any of these cases, a compositional network fails to function as an analytical model, the failure is often taken as proof of a compositional system's structural defectiveness, giving rise to complaints that the compositional structure is faulty because it cannot be "heard," But really this just means the compositional model does not function effectively as an analytical model, which means it fails under substitution: the biconditional relationship does not hold. This means the mono-linear model did not accurately depict the situation in the first place.

I emphasize that the failure is not of the particular compositional or analytical model but rather of the supposed mono-linear model, which tries to insist that compositional and analytical models are interchangeable. Just as compositional and analytical spaces/designs do not determine each other, they also cannot form biconditional relationships without first being modified. Therefore, strict substitution is not really possible, and a compositional network's failure to function as an analytical model is not proof that the compositional system is structurally defective. Compositional and analytical theories can differ in their level of specificity, which is why they cannot *directly* substitute for each other, and it is also the reason why the strict mono-linear relationship is not an accurate model of their interaction. Compositional spaces/designs are just frameworks or partial theories indicating how entities are related to each other to some degree, but they do not specify a complete set of relationships. They do not enumerate every possible relationship or structural construct, because the creative process of composing generates new structures, and it inspires new theories about how those structures are related that the compositional framework does not necessarily specify. If compositional theories were "complete," then it would be possible to rewrite them as algorithms and computer programs, and consistently generate works that would be judged as grammatically correct examples of the compositional style.[48]

[48] The composer David Cope from the University of California at Santa Cruz has been working on a musical intelligence project that has as one of its goals

Augmenting a composing theory can transform or flip it into an analytical theory. That is, by adding what is left unspecified by the compositional space/design, a composing theory can become an analytical theory. Development of a third, mediating theory, in other words, will demonstrate how the compositional space/design connects to an analytical theory by filling in the gaps between analytical and compositional structures. An analytical theory, on the other hand, must lose specificity to function as a composing space/design; it must become compatible with additional compositions, even some not yet composed. It must generate new structures not just model existing ones, so it must include a component that demonstrates how new structures (new compositions or passages) can be generated from existing structures. If an analytical theory was able to function as a compositional framework without the addition of this generative component, then it would—as with the hypothetical "complete" compositional theories mentioned above—be possible to rewrite an analytical theory as an algorithm and computer program, and consistently generate works that would be judged as grammatically correct. To generate new structures, an analytical theory must be more flexible, thus less specific, about the types of structures it can model.

The lines of analysis and composition are in a fluid relationship. At any given time, their connection can be strictly mono-linear in appearance, loosely mono-linear, parallel, skewed, or orthogonal, and the correlation of the lines determines whether the fields are collapsed with one field subsuming and dominating the other, interdependent but weighted towards one node, teleologically independent and specialized, specialized but cooperative, or balanced and collaborative. Most importantly, the goals of the practitioner determine the relationship of the parts. My own holistic view of their interaction is that the two lines of theory and composition in the orthogonal relationship have a circle drawn

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computer generated composition in the styles of various composers. While his program does generate works that can be judged as grammatically correct within the chosen style, it also generates works that can be judged as grammatically incorrect. The program does not consistently produce grammatically correct compositions, so the program does not completely specify the compositional theory as an algorithm.

around the outside of the lines transforming the orthogonal relationship into a cyclic relationship. We can also add dimensions to the space by transforming each cycle into a spiral. In a spiral relationship, every time a compositional network is transformed into an analytic network it moves 180 degrees and up a level. From this vantage point, it looks down to the level below from outside the lower level. When the new analytical theory is itself transformed into a compositional theory, it moves another 180 degrees and up another level. From this vantage point, it looks up to the next level, which is still undefined. In the spiral relationship, theory and composition are parts of a dynamic engine driving both fields onward and upward.

Although the present article is not the place to formalize the spiral model, I can develop a short fiction to illustrate the point. I can imagine Liszt examining Wagner's compositions from a level up and outside Wagner's compositional network to understand the development of his syntactic relationships with regard to the diminished seventh chord. I can imagine Liszt from his analytical perspective creating an analytical network of relationship that might resemble the syntax developed by Boretz in Part IV of "Meta-Variations."[49] Liszt sees new possibilities for a new musical grammar in his analytical network. At this point, his perspective shifts 180 degrees, so his analytical network serves as the foundation for a compositional network. Now he is looking up to the next level, since his grammar is only a partial theory. The product of this work is his composition *Bagatelle without Tonality*, with its diminished seventh chord syntax. I can imagine Schoenberg, at some early point in his life, finding this composition. He begins the process once again. He sees even further possibilities for the development of musical grammars, where the syntax developed by Liszt gives rise to similar syntactic constructions, but with new and different partitions of the aggregate. He shifts 180 degrees to composition mode looking up to the next level and composes "Der kranke Mond" from *Pierrot lunaire*. This work exploits what he learned about syntax with diminished seventh chords from Liszt, but takes the syntax to its limits. This early work in interweaving lines that partition the

[49] Boretz 1972 and 1973.

aggregate into subsets becomes a part of Schoenberg's serial grammar as well. I can imagine Milton Babbitt, 180 degrees shifted from Schoenberg (on the same side of the cycle as Liszt but many levels up), noticing Schoenberg's partition schemes. From his analytical observations, he studies the group properties of rows and develops his combinatorial syntax. Shifting up 180 degrees and up a level, Babbitt creates new compositional networks that have their roots in Schoenberg's compositional networks. Of course, new analytical models have to be developed for Babbitt, because the 180-shift ensures that the analytical models appropriate for Schoenberg will not be adequate for Babbitt.

When the fields of analytical theory and composition are in a parallel relationship, each field no longer confines the other, and compositional grammars and analytical models are free to develop along their own internally generated path. When the field of theory is free to grow and extend its range, it will perform a function and establish an identity that is not necessarily determined by its former holistic partner, composition. But if theory in its specialized analytical function does not model compositional networks or uncover pre-compositional structures, what does an analytical system model?

A New Field

Although it is not the main thread of his article, John Rahn's investigation of the relationship between music and mathematics in issue 6 of *The Open Space Magazine* creates an independent path for theory to pursue.[50] He essentially approaches music as a dynamic system consisting of two forces, being and becoming. The historical roots of these forces are planted in the soil of the pre-Socratic Greek philosophy. One group, whose members included Lucretius, seeks to understand the universe by identifying the unchanging essence of things giving rise to a state of Being and a world of Platonic forms. The other group, whose most famous member is Heraclitus, views the universe as in a constant state of flux, change, and flow giving rise to a process of Becoming. Rahn

[50] Rahn 2004.

identifies the flux, flow, and fire of Becoming with the flow, spark, and swirl of music. As independent and dichotomous as these two world views and views of music appear, he also demonstrates their interdependence by weaving together the strands of these concepts:

> Lucretius, following Epicurus, modeled the universe as a frame of atoms of Being Falling (naturally, according to their weight) forever in parallel lines, with this important tweak: occasionally, for no reason, an atom will *swerve* in its fall (the *climamen* or *ekklisis*). The frame of structural (or divine) order and the Swerve of free and artistic will...One could easily paint a picture of artistic endeavor as one whose nature is bound up with the Swerve. Without the frame, there cannot be a swerve: there is a need for both frame and swerve.[51]

The tapestry of frame and swerve serves as a backdrop for an important issue raised by Rahn, what should a theory of music model? Should a theory model the frame or the swerve of music? He correctly observes that theory has traditionally paid more attention to the frame, those invariant elements of music that helps musicians make more music. Composition theory falls into this category, but, as the previous discussion on theory and composition revealed and Rahn's discussion supports, those same theories used to model the swerve tend to just uncover the frame:

> Most of the American music theory of serialism has derived from compositional theory, theory by composers, such as Babbitt and Morris, thinking about what might be useful theory for their compositional activity. Although this can be used for analysis, such analysis tends to uncover the "precompositional" structures that were, or could have been, used by the composer.[52]

Rahn carves out another path for theory to follow, one that moves in step with the turbulent flow of music:

> It is the relations set up between the entities and how these relations play as the music moves along in time that better sketch the flight of the beast...Not all music theory aims to analyze a given piece of music, or to provide a theoretical framework within which it would be possible to set up a plausible model of some piece of music as it is experienced in time. Analysis is a recent addition to music

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[51] *Ibid.*, 235, 237.

[52] *Ibid.*, 239.

theory...A good analytical theory would need to model the dynamic of musical experience, which is a very difficult undertaking.[53]

Although the main thrust of his argument is demonstrating the benefits of using mathematics to model the swerve, his argument also carves out an independent teleology for music theory: creating analytical theories that model music as it is experienced in time.

Rahn never explicitly states what experience is being modeled. However, it is clear from the context of the article what experience is the object of the model. Since he claims mathematics is the best tool for modeling structure, the goal of an analytical theory must be modeling the experience of musical structure. In my view, the most important component of Rahn's model of an analytical theory is its container. That is, an analytical theory has a boundary that provides the theory with a function. For Rahn's analytical theory, the boundary or container is experience, and an analytical theory's function is to model the experience of musical structures. We would not, therefore, expect an analytical theory with the expressed goal of modeling experience to model structures we do not experience. Compositional theories also have a boundary or container. A composition theory's potential to help composers generate more music is the boundary that guides compositional theorists in the development of their work. The boundary for theories of musical perception is, of course, whether or not the theory models the cognition of a particular musical event.

Besides modeling experience, theory in its parallel and specialized analytical function can have another boundary, modeling structure. Although the boundary of modeling structure may appear to be the same container specified in Rahn's analytical theory, it is actually more generalized in its function. Rahn's modeling of structure is limited by whether or not the structure is experienced, but a container of simply modeling structure has no such limit. The end game of an analytical theory whose boundary is modeling is generating a model. In this context, the success of the model is not determined by how well experience is modeled, by the potential of the model to help composers generate more music, or by how well the cognition of a particular musical event is modeled.

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[53] *Ibid.*, 237.

The success of the model is determined by the model's own structure. Analytical theories whose boundary is modeling shift the focus of the theory from the thing being modeled, music, to the model and its structure. When the focus of analytical theories shifts to the model, the extreme specialization can create an insular field of study, and theorist will face the same criticisms concerning their systems of analysis that composers have had to answer about their systems of composition.

A New Identity

Theory's growing independence increases the potential for generating another problem, an identity crisis. Boretz hinted at this at a more general level in his assessment of the types of discourse and their relationship to music. The need or desire to have a forum titled "Music Theory at the Turn of the Millennium" could be seen as evidence of the crisis, since it underscores the potentially fractured nature of our discipline.[54] As theory moves further away from its historical roots, theorists increasingly apply techniques adapted from other disciplines.[55] This practice, by its very nature, makes theory an interdisciplinary and potentially fractured field of study. To make this point apparent, we can re-contextualize the *Intégral* forum by renaming it "What is Music Theory?" The change of context, in my opinion, would not change the content of any of the forum articles. The search for theory's future direction, therefore, is equivalent to a search for theory's identity. This search can become a problem if the unspoken or unconscious agenda for the project is either to establish a single identity or a single goal for theory as a discipline or to open the field so it has multiple identities without considering all the implications of a unilateral move in either direction. I believe the quest for a singular identity or the acceptance of its multiple

[54] This concern is expressed in Forte 2000/2001.

[55] Of course, theory has a long history of interdisciplinary borrowing. Its association with mathematics, for example, begins with the Greeks. However, theorists in the 20th century have increasingly borrowed methods from other fields.

identities is a tension underlying much of the music theory enterprise.

The multifaceted nature of theory as a discipline, taken at its best, could fulfill the desire of the editors of *Open Space* to "extend or dissolve the boundaries among expressive-language practices." Theory, in other words, as a discipline has the potential of being an open space, since it is built into the core of theory to foster the inclusion of many avenues of investigation into the enterprise called music. This is to be applauded, celebrated, and made clear to other people interested in music. Rather than limiting the field of view, theory can expand it. Nevertheless, even if we desire a limit-dissolving model of theory, we must recognize that in spite of its interdisciplinary and fractured nature and in spite of our desire to tear down fences, boundaries are important as long as their function furthers understanding. That is, do boundaries serve the function of demarcating distinctions between objects and concepts that expands our understanding of those objects and concepts, or do they serve the function of a fortress wall limiting the field by limiting its access to ideas and concepts outside the boundary wall?

No one, of course, will consciously want the latter type of wall building. An unconscious or conscious desire, however, for theory to be a unified field or to view only one avenue of inquiry as valid could become a path to fortress building, since the fortress wall protects one viewpoint and marginalizes all others. While the single identity model of theory has the potential to marginalize viewpoints not aligned with the center, the all-inclusive model presents another problem. A flavor of the week mentality, for example, could become the guiding principle of theoretical inquiry. That is, theorists will continuously adopt the latest trends from other disciplines. The endless cycle of the new can lead to another type of marginalization, excluding whatever is not in fashion. Of course, these examples are speculative and are only meant to illustrate the possible extremes of the continuum, but they serve to highlight the very real possibility that theory as an endeavor has a dual nature that is both creative and scientific.

Besides subjecting theory to a fashion mentality, the dissolution of boundaries could also deepen theory's identity crises to the point that it completely loses its individuality. Theorists borrow from Mathematics, Literary Theory, Philosophy/Logic,

Cognitive Psychology, the visual arts, Genetics/Biology, Sociology, and many other fields. Since the interdisciplinary nature of our field fosters alliances with other disciplines, at what point do we simply become branches of these other fields? For example, is the person using mathematics in their work a music theorist using mathematical concepts to explain a musical construct because that is the best way to formulate and make the concept clear, or is the person a mathematician studying music? Is the person using concepts borrowed from cognition a music theorist using concepts from cognition to elucidate a musical construct, or is the person a cognitive psychologist studying music?[56] Of course, many theorists would say that the distinction is irrelevant, and many would say this is exactly where boundaries need to be established. The former viewpoint can lead to the loss of theory's individuality and the misapplication of concepts from one discipline to another, and the latter viewpoint applied too rigorously may blind theorists to the insights afforded by the perspective of another discipline. These points are worth exploring in more depth.

If you are mathematician studying music, your goals and guiding principles are essentially mathematical in nature. That is, the cultural and disciplinary constraints of mathematics, not music, determine the nature of the inquiry and the relevance of its findings. For example, for a mathematician the model may be more important than the thing modeled. Similarly, if you are a composer or theorist that uses mathematical concepts to either structure your music or create an analytical system, your goals and guiding principles are still essentially musical in nature. That is, the cultural and disciplinary constraints of music, not mathematics, determine the nature of the inquiry, the relevance of its findings, and the fit of the model. The former position could lead to music theory's loss of individuality, since the cultural and disciplinary constraints of mathematics are hierarchically prior to those of music and one

[56] Although I am using the field of mathematics and cognition to illustrate a point, any of the previously mentioned fields could perform the same function. Therefore, using mathematics and cognition to illustrate the point should not be seen as an attack on using either resource as a music theoretical tool. However, the power of mathematics and cognition does pose some potential problems for the field of theory. This issue will be addressed shortly.

discipline is morphed into the other. The latter position does not lead to music theory's loss of individuality, since the cultural and disciplinary constraints of music theory are hierarchically prior to those of mathematics. The music theorist must wrestle with issues of "good fit," in the latter case. If the goal from either perspective, however, is to dissolve the distinction entirely and flatten the hierarchy, then a radical and fundamental change takes place in both disciplines. Mathematics now becomes a *necessary* part of music study, and music study becomes a *necessary* part of studying mathematics creating the conditions that are necessary and sufficient for this new field.[57] In this situation, the cultural *and* disciplinary constraints of music and mathematics form a network rather than a hierarchical relationship.

Apparently, the invitation of *Open Space* stimulated and afforded one author, John Rahn, the opportunity to publish an extremely clever article titled, "Chloe's Friends (a symposium about music and mathematics)" a work that explores many of the issues just under discussion.[58] In fact, although the article introduces some very high-level mathematical concepts and examines their relationship to music, such as you might find in any journal devoted to music theory, the *Open Space* environment uniquely conditioned the presentation of those ideas. As well as demonstrating the relationship between mathematical and musical concepts, the work also creates a fictitious culture that dissolves the distinction and flattens the hierarchy between mathematics and music producing a radical and fundamental change in both disciplines creating a new discipline where mathematics is a necessary part of music study and music study is a necessary part of

[57] The type of new field I am envisioning would be similar in structure to the development of Psychohistory by Hari Seldon in the original Foundation trilogy by Isaac Asimov. Hari Seldon created an exact science, Psychohistory, that predicted the behavior of very large populations by combining mathematical statistics, psychology, and history, Knowledge of all three fields are both necessary and sufficient to be a Psychohistorian, and developments within the subfields would be constrained by the other subfields. History, for example, may become a field that no longer develops along it own cultural and disciplinary constraints. History may become a field that records events based on their usefulness as mathematical data.

[58] Rahn 2003.

studying mathematics. The piece not only illustrates how the new discipline would change musical inquiry, it illustrates how the cultural and disciplinary constraints of one field can overtake another, and it also illustrates how this new discipline would change the culture of musical discourse.

The article takes the form of a Platonic dialogue set in the fifth century BC in Athens. The personae are "Chloe (a very smart woman in her late 20s); Xanthippe (an underestimated housewife); Hermione (a hermaphrodite in love with Chloe); Xanthus (a fun young man with nice buns, and a musician); Iesus (an immigrant from the Near East); and Megakephalos (a senior Academician and a music theorist)."[59] At the beginning of the story, the group has just returned to Chloe's house after hearing a lecture by their friend "Meg" on the relationship between math and music. Xanthus, the musician, is excited by the connection, but Xanthippe is skeptical:

> Well, it seems to me there were several kinds of confusion in the talk. For one thing, there were those ratios of string lengths which were supposed to extrapolate to all sorts of comic, I mean cosmic extremes—I think he even talked about modes of vibrations of atoms, or parts of atoms, as if they were sounds, and there was some obscure reference to cosmic strings vibrating in more than the usual number of physical dimension. Teeny, teeny cheerios humming away, so to speak. Now, I'm tempted to say, they don't hum for me, but that would be facile. For all I know, they really do snap, crackle, and pop. My point is, the connection with music is broken somewhere—we don't actually hear those teeny cheerios.[60]

Although she dismisses her own judgment as facile, Xanthippe's concern is extremely important for the discipline of music theory. Her problem with the connection between music and math is one of verifiability, a problem that has some important implications. It is the same problem that many physicists have with string theory. Physicists wrestle with the issue of good fit with the math they use to model the physical nature of the universe. Physicists may start from the observable, but sometimes the math predicts some phenomenon that is not yet observable or verifiable, such as strings. The job of the experimental physicist is to verify the existence of the phenomenon. However, what happens when the

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[59] *Ibid.*, 202.

[60] *Ibid.*, 203.

math provides a solution to a problem, such as a theory unifying the standard model in physics with quantum mechanics, which cannot be verified by experimentation? For example, the question is not only whether those teeny cheerios are connected to music, but also whether they exist at all. According to some physicists, this is the point where physics leaves the sciences and becomes philosophy. The defining disciplinary constraint of the field, prediction and experimentation, has been replaced by what Peter Woit calls "an approximation of a theory."[61]

Although Rahn very shrewdly avoids taking us down the road leading to theory's loss of individuality, we wind up facing the issue from a different perspective. As the group discusses later, the issue of whether the vibrating cheerios of string theory are connected to the vibrations of music is a red herring meant to stimulate

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[61] Woit 2006, 18-19. Woit is a mathematician and physicists at Columbia University. He has a web blog devoted to the topic of string theory called "Not Even Wrong" (http://www.math.columbia.edu/~woit/wordpress/). He has also published a book with the same title. Here are some excerpts from the *Discover* interview: **D: You have a Ph.D. in physics. Why are you in the math department?** W: Well, one reason actually had to do with string theory. After I received my doctorate in theoretical physics, it became clear that if you wanted to keep working in theoretical physics, especially in the mathematical end of theoretical physics, you would pretty much have no choice but to do string theory. And I really wasn't very interested in that, so I thought joining the math department would be a better idea. **D: Why are you so interested in what's wrong with string theory?** W: In the mid-1980's, when I got my Ph.D., string theory didn't seem that promising to me. There were all these other smart people doing it, so I thought, they'll work on it, that's great. It seemed like a perfectly reasonable thing for people to be doing then. But as the years went on—and we're now 21 years past this—it became more and more disturbing. It reached a critical mass and totally took over the field. I think much of it has gotten to the point where it's not even a legitimate science anymore. **D: Why not?** W: At this point no one has a plausible idea about how to ever make a prediction out of this, or how to use this in order to really explain anything about the world. So there's an ongoing discussion now almost at the level of philosophy: Is this even a science? **D: And yet string theorists are clearly working with math, which is scientific.** W: Science writer John Horgan has a nice line about this. He calls it science fiction in mathematical form. String theorists are certainly using mathematics, and they are building models and writing down equations for them, but the models they are working with just aren't connected to the real world. There isn't even any plausible way you could imagine that they are going to be able to use these models to explain some experiment we are seeing.

discussion on exactly how math connects to music. This leads the discussion in the direction outlined earlier: "What makes good application of math, and bad application of math? In particular, application to music—how do we make it good rather than bad?"[62] Xanthus makes the case that the application of math to music is an art in itself, and two of the criteria for proper application of math to music are the math has to be well-formed within the mathematical universe and you should not use more than you need. Xanthus's conditions keep the cultural and disciplinary constrains of music theory hierarchically prior to those of mathematics. However, the group discovers that the border created by the "use/need" condition is not fixed, since it can move along a continuum in either direction. The connection between math and music becomes either stronger or weaker as this border moves along the continuum. Eventually, the border disappears as music and math morph into a new unified entity. As Xanthus discusses applying Michael Leyton's work to music,[63] we move so far along the continuum that several individual disciplines morph into new field of study:

> Well, the application I have in mind comes from a mathematician from niork. He's an artist as well, and a machine theorist, and he's come up with a theory which he says explains the structure of perception, of cognition, really of the world as we take it in, and therefore also aesthetics, music, quantum mechanics, the structure of scientific theory, and so on. The primary areas he applied it to are visual perception and computer-aided design...The theory has two guiding principles called transfer and recoverability. The idea of transfer is that large, more complicated (and in some sense less symmetrical) structures are built up in levels from simpler ones which are "transferred" up. So it has the hierarchical level principle in common with music theory. Recoverability means that given a large, complicated structure, the generative history can be recovered—it can be parsed according to the levels of transfer from simpler structure (though the parsing is in fact not generally unique). This parsing models cognition, so a theory of construction can also serve as a theory of cognition—you get two for one.[64]

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[62] Rahn 2003, 207. The question is asked by Xanthus, the musician.

[63] Leyton 2001.

[64] Rahn 2003, 210.

Rahn's view of music theory as filtered through the lens of Leyton's work begins with a plurality of views that become a singularity that collapses several fields to a point and creates a new field.

We can characterize the differences between the singular and plural views of theory by asking one question: is theory a creative act, or is theory an investigation into the nature of musical reality? Perhaps theory has a dual nature in which it can be both a scientific and creative endeavor. Xanthus' view that the application of math to music is an art in itself expresses a more creative approach to interdisciplinary borrowing, while Leyton's parsing models express a more scientific approach, since the theory models cognition. Although it may appear that one must choose between the approaches, this is not the case. Rahn presents us with a slider or fader that we are free to adjust either towards the creative or scientific side of the continuum. My own answer to this question is that it is both, and I work from a pragmatic point of view.[65] What problem am I trying to solve, and what is the best way to solve it? In other words, I acknowledge theory's dual nature rather than tipping the scale in favor of one point of view or the other. I am more interested in exploring how these two views of theory interact rather than taking up the flag for one viewpoint over the other.

Closing the Circle (?)

Essentially, our journey through the open space has brought us back to our point of origin, raising questions about the nature of musical reality, and this is as good a place as any to end the trip. Rather than simply reporting the details of *The Open Space Magazine*, I have tried to demonstrate how my contact with its pages, ideas, and challenges have inspired me to critically evaluate issues I might not have considered before the encounter. The journey has been extremely helpful to me, since it has also aided me in sorting out issues that have been like splinters in my mind. Although I have selectively chosen to discuss in detail the works of only a few authors, the choice was determined solely by the focus of the essay. The articles that either directly or indirectly contributed

[65] Cross 2000/2001: 20-25.

to my exploration are too numerous to mention. However, I feel compelled to end by mentioning four works that have given me courage to give voice to concerns often kept hidden for protection. Two works by Mary Lee Roberts[66] really capture how the predisposition for feeling alone changes one's view of communities. I share her need to connect things that others persistently separate:

> There's the classic Cage/Babbitt division/clique enabler (one I have never understood—both composers have presented us with the most interesting musical processes, each tackling the same subject: the development of processes to control sound).[67]

Elaine Barkin's review of Burmese Piano Music is truly amazing. Rather than just dismissing a music that does not mesh with her musical gears as non-music, she strains to find a way in:

> Somewhere along the way, a listener determines her best way to hear and listen-in as not-yet-music/music unfolds. Some like to have a scenario in hand, others don't. My uncertainties about listening to and 'getting' Burmese Piano Music "as a music" would not be mitigated by reading liner notes or the available literature—however fascinating that might be—, nor by accounting for it as having been transcribed from Burmese harp, xylophone, or tuned gongs or drums. To paste such recognition onto/into my experience of listening might get me somewhere but would remove me from what I want to have as "music". Which is not "not-music": which is "my 'someone's' music".[68]

The last work is J.K. Randall's letter to a New Jersey Township Committee.[69] However, rather than quoting an excerpt or discussing its impact, I will leave it for the readers to discover personally what spaces it opens.

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[66] Roberts 1999a and Roberts 2001.

[67] Roberts 2001, 254.

[68] Barkin 2002, 116.

[69] Randall 2001.

References

Baccei, Tom, et al. 2004. *Magic Eye: 3D Hidden Treasures.* Kansas City: Andrews McMeel Publishing.

Barkin, Elaine. 2002. "...at times as if..." *The Open Space Magazine* 4: 115-118.

Becker, Howard S. 2003. "The Power of Inertia." *The Open Space Magazine* 5: 49-55.

Boretz, Benjamin. 1999. "Music, as a Music." *The Open Space Magazine* 1: 56-63.

———. 1972 and 1973. "Meta-Variations: Studies in the Foundations of Musical Thought, Part IV: Analytic Fallout (I-II)." *Perspectives of New Music* 11,1: 146-223 and 11, 2: 156-203.

Boretz, Benjamin and Mary Lee Roberts, eds. 1999. *The Open Space Magazine* 1: title page.

Brown, Matthew. 2000/2001. "Music Theory, Music Cognition, and the 'The Case of the Iguanodon's Thumb'." *Intégral* 14/15: 72-76.

Burt, Warren. 2000. "Georgina Born: *IRCAM, Boulez, and the Institutionalization of the Avant-Garde.*" *The Open Space Magazine* 2: 135-143.

Coulombe, Renee. 2003. "The Tao of (Free) Improvisation." *The Open Space Magazine* 5: 56-69.

Cherlin, Michael. 2000/2001. "Three Challenges for Music Theory in Our Time," *Intégral* 14/15: 4-10.

Crilly, David. 2000. "Wittgenstein, Music, and Language Games." *The Open Space Magazine* 2: 103-105.

Cross, Ian. 2000/2001. "Music(s), Science(s), and Post-Positivist Pluralities." *Intégral* 14/15: 20-26.

Feller, Ross. 2003. "On Busking, or, The Body and Soul of Street Performance." *The Open Space Magazine* 5: 159-163.

Forte, Allen. 2000/2001. "Music Theory: Today and Tomorrow." *Intégral* 14/15: 2-4.

Gleason, Scott. 2002. "Musical Intuitions and the Functions of Music Theories." *The Open Space Magazine* 4: 185-213.

Hamessley, Lydia. 2000. "*Audible Traces*: Introductions." *The Open Space Magazine* 2: 183-190.

Hanninen, Dora. 2004. "Association and the Emergence of Form in Two Works by Stefan Wolpe." *The Open Space Magazine* 6: 174-203.

Harrison, Daniel. 2000/2001. "A Story, An Apologia, and A Survey." *Intégral* 14/15: 29-37.

Hindemith, Paul. 1942. *Craft of Musical Composition.* Mainz, London, New York, Tokyo: Schott.

Kearney, Leslie. 2000. "Sad Songs and Sudden Danger, or Marcia's Balls." *The Open Space Magazine* 2: 124-134.

Kernohan, Linda. 2001. "Talking About Music: A Little Song of Dissent." *The Open Space Magazine* 3: 224-227.

Lerdahl, Fred. 1988. "Cognitive Constraints on Compositional Systems." *Generative Processes in Music*, ed. John A. Sloboda. Oxford: Clarendon Press, 231-59.

Lewin, David. 1986. "Music Theory, Phenomenology, and Modes of Perception." *Music Perception* 4,3: 327-392.

Leyton, Michael. 2001. *A Generative Theory of Shape*. Berlin: Springer Verlag.

Mead, Andrew. "The 'Sweet Spot': What Composing Has Taught Me about Teaching Theory." *Intégral* 14/15: 48-56.

Missiras, Michael. 1999. "The Transformative Power of Film Music: Non-Diegetic Musical Considerations in the Film *East of Eden*." *The Open Space Magazine* 1: 97-103.

Morris, Robert. 2001. "Some things I learned (didn't learn) from Milton Babbitt, or why I am (am not) a Serial Composer." *The Open Space Magazine* 3: 59-127.

———. 1995. "Compositional Spaces and Other Territories." *Perspectives of New Music* 33, 1/2: 328-358.

———. 1987. *Composition with Pitch-Classes*. New Haven and London: Yale University Press.

Paredes, Robert. 2000. "Dangling Reflections on *The Bewitched*." *The Open Space Magazine* 2: 78-90.

Peterson, Eric. 2001. "The Tangible Scientific Model as Quasi-Experiment: Applying the 'Mediating Model' Concept of Johns-Hopkins-Style Clinical Sexology of Gender Identity Formation." *The Open Space Magazine* 3: 171-198.

Rahn, John. 2004. "The Swerve and the Flow: Music's Relationship to Mathematics." *The Open Space Magazine* 6: 234-244.

———. 2003. "Chloe's Friends (a symposium about music and mathematics)." *The Open Space Magazine* 5: 202-217.

———. 1999. "Composing and the Sense of Self." *The Open Space Magazine* 1: 42-52.

Randall, J.K. 2001. "To the Township Committee." *The Open Space Magazine* 3: 280-284.

Roberts, Mary Lee. 2001. "Review of *American Music in the Twentieth Century* by Kyle Gann, *Arcana musicians on music* Edited by John Zorn." *The Open Space Magazine* 3: 254-259.

Roberts, Mary Lee. 1999a. "As I Understand it: Group Psychology (Felix Guattari, Electroacoustic Music Composition, and Social Isolation (the Unabomber)." *The Open Space Magazine* 1: 28-32.

Roberts, Mary Lee. 1999b. "music/consciousness/gender." *The Open Space Magazine* 1: 127.

Scherzinger, Martin. 2002. "Rethinking Music as/in Musical Rethinking: Proscriptions, Opportunities." *The Open Space Magazine* 4: 26-38.

Sessions, Roger. 1979. "The Function of Theory." In *Roger Sessions on Music: Collected Essays*, ed. Edward T. Cone. Princeton: Princeton University Press.

Woit, Peter. 2006. "The Dean of Debunkers." *Discover* 2: 18-19.