THE AESTHETIC OF THE INDIVIDUAL UNCONSCIOUS

by

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Note: I've created a Google Drive folder titled "Reference materials" (https://drive.google.com/drive/folders/1hyg3Q6mY8drLL1fmSvAwfP9XzZ0BPaWR?usp=sharing). In that folder you will find Images, Audio files, and a Google Doc with links that I refer to. When, in the body of this text, I say "follow link #*" that link can be found in the Google Doc title "Links". When I say, "listen to *" the file can be found in the "Audio" folder (https://drive.google.com/drive/folders/1zmHTjfL_WMm--Lgos6kPOE3SGEAvLU7B?usp=sharing). Likewise, when I say "see *" the images can be found in the "Images" folder (https://drive.google.com/drive/folders/1U_UgTYM6zybtSp4M5uZbTdWw2dGiSnHt?usp=sharing).

I. Generative Music

The process of composition itself can be thought of as a generative process. Studies have likened all of composition to, among other things, a generative process of problem proliferation and subsequent solution implementation. The term generative music was popularized by Brian Eno's systematic compositional processes in the creation of their "Ambient" works. However, the idea of composing music in this way precedes Eno's work, and can be thought of as going as far back as the Medieval and Renaissance times, and perhaps even earlier.

Systematic composition, algorithmic composition, automated composition, adaptive and procedural audio, computational creativity: all of these terms are similar in that they construct an abstract model, or system, that sits beneath the surface of the musical material it creates. In all of these approaches, the common goal is to create a work that exceeds the limited horizon of our individual knowledge. Models, algorithms, and systems allow composers to work with materials and processes that they specify, but generate combinations and interactions of material that they otherwise could not have.

The utilization of generative processes might be regarded as a loss of subjective autonomy. But on the other hand, it can also be seen to afford an artist the opportunity to investigate musical worlds beyond that of their ingrained musical preference and expectation; reaching beyond themselves into an expanded world of music possibility.

In a more experimental heritage, generative music builds on a rich history of generative processes in the creative arts; these might take place using only text instructions on paper, as in text compositions by LaMonte Young and John Cage, or the conceptual visual art pieces of the 1960s and 1970s. These practices have shown that instruction sets are often provocative and engaging catalysts for creative practice.

Systems based composition, however, is not without potential pitfalls. Trevor Wishart, a prominent electroacoustic artist, claims that "it isn't music". Blunt provocations of this sort illustrate the rather charged positions between artists who work using traditional methods and those that utilize generative processes. The notion of process vs product continues on in critical debate and there is a clear difference between the performance of a work through the manipulation of a physical or digital instrument and the manipulation of the material of a work through the manipulation of a system. Though the same debate can easily be seen with systematic composition of that past, serialist music, for example. Every composer uses a personal process of some sort, and it seems quite obvious that some are able to utilize those processes to make "music" and others are not.

For the purpose of this discussion, I will define "generative processes" as any extra-musical, systems-building process that results in material that can be used in, or transformed into, musical material. This musical material can be subsequently developed and used in a

musical work. In some cases, artists translate, directly, the material derived from the generative process. Others use the material as something that can then be manipulated in the more traditional sense of composition. In a section that follows, I will explore the works of two different composers who treat the generative process quite differently. There exists a continuum here between "objective generative creativity" and "subjective generative creativity"; composers who utilize generative processes rarely utilize just one form or the other, and likewise rarely utilize processes that fall on the extremes of that scale.

Objective generative creativity could be defined as the use of a process that generates material notwithstanding the composer's subjective evaluation of the results. Subjective generative creativity, on the other hand, would be used to satisfy a musical function; the process itself is malleable and at the service of the composer's intent. As it relates to human creativity, subjective generative creativity is most often the types of processes that are utilized. Composers adapt the system or model in ways so that the musical material generated suits a particular musical function or affect. In a systems building process of composition, the data fed into the algorithm can be modified to produce desirable results. Since most often composers use subjective generative creativity, I will focus on that form of generative processes in this discussion.

Aesthetic of the Archetype

Arvo Pärt is a well known composer that has developed quite rigid compositional systems. Theorists are quick to represent Pärt's works in terms of numbers and graphics that show harmonic relationships and transmutations. Though, Leopold Baruneiss focuses on the effectual intent of Pärt, and likens that intent to Carl Jung's ideas on the unconscious.

Carl Jung identified three layers of consciousness: (from "top to bottom") the conscious, the individual unconscious, and the collective unconscious. Jung believed that much of our conscious motivations were influenced by the unconscious. They also believed that the lowest level of unconsciousness—collective unconscious—is something inherent in all humans, something of a disposition that is acquired at birth. Jung likens it to crystals that form in a mother liquid. The crystalline structures that can form once an over-saturation is reached are a form, or trait, that is inherent in the mother liquid as a possibility of form, but is unrealized. The crystals that do form reach up through the unconscious and into the conscious and are observable as a reflection into the unconscious. Jung believed that there were a number of these "potential crystalline forms" and called them archetypes.

Arvo Pärt talks about their own music in a strikingly similar way. They discuss the effect they are trying to elicit by creating, in their music, what Pärt calls a reflection of "human geometry", which sounds strikingly similar to Jung's crystalline forms. Pärt believes that, at the core of our beings, humans are all similar in composition and contain the "inner seclusion of our soul". The basis of this belief, for Pärt, is that very complex and diverse substances—music, for example--have similar patterns when examined very closely at the micro levels.

Pärt believed that, by creating music that reflected these basic patterns, one could create a powerful affect that gears into the human soul in a somewhat regulative fashion: an assertion that would seem to be accurate given how their music is often received as being overtly spiritual, even by audiences that do not identify with Pärt's religious beliefs. Baruneiss called Pärt's practice the "aesthetic of the archetypes". That is, music that intentionally attempts to reflect the human, collective unconscious.

Aesthetic of the Individual Unconscious

I would argue that another aesthetic, which is inherent in a large number of generative or algorithmic works, is the "aesthetic of the individual unconscious". A great deal of research in the field of music cognition illustrates that we indeed do develop an individualistic sense of musical expectation and musical preference. An article in the Oxford Handbook to Music Psychology called "Universals in Musical Processing" discusses how non-musical sounds contribute to our development of musical preference and expectation: for example, spoken language affects our preference for melodic shapes and musical expectation for half cadences (question) and cadence (response). etc. I believe that the effectiveness of those musical techniques lies in its ability to represent some form of behavior, behavior with which we are all familiar, but in a musical way.

This behavior could be the way parents spoke to us as children, the way wind sounds as it blows through trees, or traffic patterns of the street where we grew up. I believe that music that reflects these types of behavior is "understood", as the patterns they employ are patterns of which we are already familiar. With that, we have a tendency to entrain to this type of music in similar ways that our bodies do to the referenced behavior. The behavior is not understood at birth, and thus is not an archetype, but rather is something that we build an individual understanding of as we encounter it throughout human development, and is thus a part of the individual unconscious.

A great number of notable works employ forms of behavior as a means of creating impactful musical works. The Great Learning, particularly "Paragraph 7", by Cornelius Cardew is one such example. The Great Learning utilizes a system, conveyed in written instructions, and

illustrates psychological and physical properties performers encounter in the space where they perform. Alvin Lucier's work I'm Sitting in a Room functions in a similar way.

In both of these works, something that is at play in almost all listening experiences, namely acoustic, is made the aesthetic pursuit of the work itself; with startling results I might add. Both of these works turn the extant processes into the main aesthetic of the work, which is also a behavioral process we all internally understand. Despite these processes not being a prominent feature of our cognitive faculties in the day to day, I believe that we intuitively understand the work in terms of this behavioral process, at the level of the individual unconscious. And so, in a similar way to Pärt's works, these works can be thought of as utilizing the aesthetic of the individual unconscious.

I believe that the aesthetic of the individual unconscious largely defines works that utilize generative processes, though, this is not always the case. One defining feature of works associated with the aesthetic of the unconscious is that the processes must be perceptible. Whether or not a process can be perceived depends largely on the scale of time it occupies and how it is represented audibly. For a process that is largely unembodied, say the rotations of planets around the sun, audiences will not likely perceive it when transformed into a musical representation. In some cases, however, additional knowledge of the process or visual representation can help audiences bridge that gap.

An example of this is Brian House's Quotidian Record (follow link #1). In this piece, House tracked their global positioning coordinates for an entire year. The distance between that location and their home was translated into a tonal system and composed out into a work. Typically the distance one is from home over the course of a year could not be "felt" in a musical

work lasting 12 minutes, but Brian House does a number of things to mitigate this. First, they describe the process they used extensively. The work is also released on vinyl and the entire year is compressed onto one side of the album. In that way, the needle of the record player helps one see where House is as they move through the year. Additionally, House prints onto the vinyl disk in such a way that each month is delineated visually and the name of the state or country where House visited is printed onto the vinyl itself. With all of this combined, audiences can actually hear House's movement around the globe.

II. Case Studies

Keeping in mind subjective generative creativity and the aesthetic of the individual unconscious, let us now look more in depth at two composers: Brian Eno and Richard Beaudoin. Brian Eno is a notable composer that made popular the term generative music. Eno's generative processes, while still subjective, align more closely with objective generative creativity than most. Eno's motivation for doing so lies in their desire for each "performance" of their piece to be generated in real time.

Since much of Eno's generative music shares compositional techniques and aesthetic qualities to their ambient music, I will include a description of Eno's Ambient Music here as well. With ambient music, Eno sought to create a music that was fully immersive, in a space, so that listeners could "get lost inside" of it. This was a somewhat different artistic pursuit than others at that time. Eno wanted to create music that was continuous as part of one's surroundings so that it would become intertwined with the ambience of the listener's lives. These works were intended to be played in a particular space, at particular times, and in different situations. Eno

sought to create a small, but versatile, collection of pieces that were suitable for a wide variety of moods, occasions, and architectural spaces.

As a result of this pursuit, Eno looked to systematic processes as a method of composition. One of their goals was to create music that largely would not repeat. To that end, Eno made extensive use of tape loops at variable lengths. These tape loops would make use of melodic cycles, of different durations, which were allowed to overlay with other loops' melodic cycles in a pseudo arbitrary and asynchronous way. This is the system that Eno specified; the moment by moment relationship of each loop is something that arose, in the generative sense, though the system, not directly by the composer.

If the length of the loops had a very large common denominator, Eno could create loops that interacted with each other in desired ways, but would not come back into synch until a very long time. One of Eno's sound installations utilized looping cassette tapes of varying length, each feeding their own amplifier and speakers, distributed throughout a space. Because of the variation in their length, these cassette tapes would come back into sync with each other approximately once every fourteen years.

A problem arises with the distribution of this music of this sort. A recording made available on vinyl or cassette of music that could produce endless variations inevitably would need to be truncated into a sell-able chunk that could fit onto one side of a record. These recordings would, invariably, playback the same way each time.

In order to overcome this problem, Eno teamed up with Peter Chilvers to create a number of applications that exist as a way of distributing the system itself, not the music per se, so that users can create their own generative works using Eno's system of looping. With the distribution

of the system itself, what is heard is truly generative, that is, it is created in real time by the user's interaction with the system and is unique every time it is realized. One could liken this to the user providing "seeds" from which the music will grow. Eno and Chilvers provided the interacting set of rules and parameters, rather than instructions for precise musical material, and the seeds the user provide grow and interact with the system and also each other.

The means by which Eno and Chilvers distribute these systems is through tablet and phone applications. They have created a number of apps. Some, such as Bloom and the second version Bloom: 10 Worlds utilize asynchronous looping as is described above. In Bloom, each world contains a different mood, which relates to the scale of pitches used and the relative duration of each loop. Users tap on the screen to provide the content of the loop. The rhythm the user taped in is directly the rhythm that is played back, and the location the user taps on the screen relates to the pitch. These sounds then begin to repeat. Each time a user presses on the screen, this happens again, but the repetition occurs at differing intervals. These then cycle to create different combinations as the music is generated. The loops steadily slow down so the notes slowly drift further and further apart. One interesting feature is that the more notes a user adds, the quieter it gets. The interface encourages users to listen more, as opposed to play more. Other apps developed by Eno and Chilvers provide objects, which users can place on screen in any combination, with much more specific rules for interaction. For example, the app Scape allows users to create a "background" by selecting and placing graphic patterns from a library onto the screen. These background patterns each possess their own sound, which continuously plays throughout the session. Users are then able to place "foreground" objects onto the background, which produces discrete sounds. Each of the objects placed onto the screen possess

sets of rules for their own, independent life cycle based on what I can only assume is a probability model, and also how they are to interact with each of the other objects. For example, one object's rules might be to play two notes every ten seconds. Another's rule might be to only play when all other objects are silent, or to react to the time of the day. The result is similar to that of Bloom, except that the system behind the user's interaction is far more varied, and thus produces a wider variety of results.

In these apps, we can see a feature of Eno's music that is rather unique. The vast majority of the focus is on the system itself. A great deal of effort goes into making sure that the minimal interaction a user has with the system produces desired, audible results. Additionally, the sonic results the system creates are not available for manipulation; all manipulation of the sonic material occurs at the systems level. As we will see in Richard Beaudoin's music, a different approach is to utilize a rigid system to generate data, and then extensively manipulate that data to produce sonic material.

Richard Beaudoin

Richard Beaudoin's generative process is quite different from Eno's, both systematically and aesthetically. Beaudoin begins with an iconic recording of a musical performance. They then work with highly precise "microtimings" of the recorded performances as a means of extrapolating elements of the "live" into a data set.

The microtimings come from a software program called the Lucerne Audio Recording Analyzer (LARA), which analyzes the onset and amplitude of sonic events in an audio recording down to the millisecond. Beaudoin then uses this data, in tandem with the original score, to transcribe the performance in traditional music notation. This transcription is, again, accurate

down to the millisecond, so accelerandi, intentional asynchronous onset of right and left hand material in a piano piece, as well as the interpreted dynamics are all present in the notated transcription. This new object, both a representation of the original score and the performance of the same score, exists as a new musical object that can then be manipulated in such a way as to form a new musical work. The results of the microtinings, which contains aspects of the live performance and original score, are translated into a graphic representation that includes millisecond proportions and amplitude of the sound as it progresses in time (see the image "Beaudoin, Microtimings").

Beaudoin's work is primarily focused on acoustic science and how the context of sound changes throughout time. These works have a multi-layered relationship to time. On the sonic level, one can hear two different layers of time simultaneously. In the background there exists a time stretched version of the original performance. In the foreground, a much faster layer is heard, which consists of the musical material Beaudoin has composed above the background. On the historical level, you hear three different layers of time simultaneously: the oldest being the original piece of written music, the middle being the recording of a performance that same work, and the most recent being the music that Beaudoin composed alongside these other two historical artifacts.

Beaudoin often augments these microtimings as they incorporate them into their own rhythms. They then manipulate the material, reorganize it, compose above, below, before, after, and inside the original score, in a process that many refer to as photorealism, paralleling the process often used for image editing. In this way, the new work resembles the original in a pseudo recognizable way. I say pseudo recognizable way because Beaudoin's works often are

drastically different on the surface level of the sound, but contain hints at the original work. While listening to these pieces, I occasionally do not recognize the original work that has been built upon, but afterwards find myself humming the original piece. I only then know what piece Beaudoin's was based on.

What I find most interesting about Beaudoin's process is that they do not limit themselves to transcribing the notes and dynamics that come from the original score. For instance, in Beaudoin's work New York Mikrophon, even the chair creaks heard on the recording of a Glenn Gould performance make their way into the piece. In La fille dérivée the hiss heard on the recording Beaudoin used, recorded on a phonograph disc and player, find their way into the newly composed work as Beoudoin asks the wind players to make breath noises. In this way, Beaudoin transcribes the entire live performance as a complete translation into a new work of art.

In that sense, Beaudoin is adding an additional layer of translation and making the live elements of an existing recording the generative source itself, as a reflection of the already present translation process inherent in performing and recording an existing, notated work. To elaborate, in order to arrive at a performance of a piece of music, a composer needs to translate their ideas into notated music. A performer then needs to interpret those symbols and translate them into sound using their instrument. A recording translates those sound waves into electrical voltage (and again to discrete, digital format when using a micro processor). When listening to such a recording, the translation process happens again but in reverse, the sound waves pass over our ear drums, and our brains process this into perceived sound; different, but similar to where it began in the composer's mind.

Beaudoing side steps this process, part way through, and moves it forward along another branch of translation. They take the recording itself, as a document of the processes prior, including the performer interpretation, room noise, sonic attributes of the recording medium, and so forth, and utilize that as an object in a generative process.

Since I was unable to acquire a score for any of Beaudoin's works, I wish to mention two different works: one where the system is readily heard, and another where it is not. The first work is titled Etude d'un prelude I—Chopin desseche. In this particular work, Beaudoin's use of microtimings is transparent (follow link #2 and listen to "Etude d'un prelude I—Chopin desseche.acc"). This is the first in a number of works where Beaudoin utilizes the microtimings taken from a performance of the same Chopin prelude. Beaudoin augments the microtimings substantially and transcribes them into a new work where the nuance of timing in that particular performance can be heard. As the series of works progresses, the generative process of microtimings becomes less transparent as musical material is added with increasing complexity. The second work I would like to look at is the fourth and last piece of a series. The series is titled The Artist and his Model, and the last work in this series is titled La fille dérivée (2014) (follow link #3). The series takes as its starting point Debussy's La fille aux cheveux de lin and a 1931 performance of that work by Alfred Cortot (follow link #5). As is to be expected, this work is based on the original score and microtimings of the recording. Framework of the score and microtimings are augmented at a scale of approximately seven times slower than the original performance. With that, the original 3 and a half measures in the original performance, which lasts around 11", lasts around 1' 16" in the recording of La fille dérivée. To get an idea of what that looks like notated, follow link #4. The first six measures are shown in that snippet.

There are a number of prominent d-flats in those first six measures, which represent the initial d-flat of Debussy's work, which last three eight-notes in the original score. In Beaudoin's work, those first six measures all fall in the duration between Debussy's first d-flat and the second note of b-flat. From this we can see and hear that much of the musical material presented merely hints at the original framework; score and recording.

What is perhaps even more interesting are the air and noise we hear as instrumentalists blow through their instruments or are asked to scrape sand paper on resonate boxes. This "white" noise serves to represent the hiss we hear of the phonograph on the original recording. Beaudoin writes this into the work, even to the extent of a crescendo at moments where there is a pause in the music of the recording and we hear more hissing because of compression. Not only does Beaudoin's work capture Debussy's composition, and Cortot's recording, but also the medium of the recording itself.

Beaudoin's system of composition incorporates three layers of information: the original work, the performance of the work, and the medium of the recording. Then a fourth layer is added as Beaudoin manipulates the context of those three layers, but creating music that "surrounds" the systematic framework of the microtimings. This system for composition bears semblance to what I have called the aesthetic of the individual unconscious. Each layer of translation in Beaudoin's system encodes some form of human or mechanical behavior that we have an internal and subconscious understanding of. Compositions that do this highlight the way by which humans develop musical preference and expectation, which resides, according to Carl Jung, in our individual unconscious.

III. Generative Processes in My Own Work

Many of my recent works utilize some form of generative processes. I first became interested in using such techniques after reading Iannis Xenakis' book Formalized Music, where they describe the many ways in which they systematically generate and modify musical material. I had heard Xenakis' work a number of years prior to that, and was immediately enthralled. Jonchaies was the first piece I heard, and I was astonished by how the piece was one of the most engaging that I had ever heard while occupying a sonic world so unfamiliar. How could I respond in such a corporal way without a prior understanding of how to navigate that sonic terrain? Up until that point, modernist music was what I found myself engaged with most often and intellectually understanding works by Berg and Boulez fulfilled a cerebral curiosity I desired; but Xenakis was different: I wanted to understand why.

While the notion of pure chance remains undefined in the sciences, graduated levels moving from purely deterministic to the border of indeterminism can be described using statistical theories. Music's response to this expanded causality was the emancipation of dissonance; however, it was quickly confined by strict determinism with the advent of serialism. The result is a musical surface that bears no relation to the traditional polyphonic techniques of transformation utilized in composition.

Xenakis responded by exploiting these new statistical theories found in physics to generate and control continuous transformation of musical material. In doing so, he reestablished a connection between music and the expanded theory of causality. In consequence of writing music that utilizes statistical equations, he introduced the concept of behavior in music. That is music that mimics the relationship, interaction, change, or motion of a non-musical entity in such

a manner as to be thought of as a translation of the non-musical entity's behavior into musical material itself.

Research in music cognition suggests that our experiences with non musical sounds influence the way by which we understand music, our musical preferences, and musical expectation. Behavior such as speech influences the way we create and listen to phrasing in music, and so forth. Additionally much research has been done to understand which and what elements of music are universally found in music making cultures; unsurprisingly, a number of such elements have been found.

These universals in music processing suggest that there are non-musical motivations inherent to humans that cause us to create and listen to music in particular ways. Research on the subject is far from conclusive, but it does shed some light on Arvo Pärt's belief that, at the lowest level, humans are made of the same fabric and that music can be written to align with this fabric and stir these depths.

Pärt and Xenakis' pursuits are, on the surface, quite different. Xenakis sought the theoretical and physical, Pärt sought the metaphysical. However, I believe that they arrived at very similar conclusions: music that penetrates the mind and elicits psychophysiological responses. For Pärt, this was a primary aim, for Xenakis it was a byproduct of his systematic approach to composition. In both cases, their music aligns with preexisting cognitive and physiological responses humans have to music and is thus quite impactful. I believe that these differences can be summed up as aesthetics of the individual unconscious and that of the collective unconscious.

Many of my musical pursuits stem from a belief that music, when well crafted, has the

ability to influence our consciousness and thus shape our experience in a meaningful way. While my focus has mainly been on utilizing generative processes, which utilize behavior, as a means of cultivating an aesthetics of the individual unconscious, preparing for this essay question has piqued an interest in the collective unconscious as well. With each new work I write, I develop and hone my compositional techniques, which often utilize behavioral based generative systems. To illustrate this, I will present methods used in a completed work and some that I am currently using in an unfinished work. In all of my own works, I utilize these systems based processes as a way of generating musical material that I can then manipulate in more traditional ways: they are much more akin to Beaudoin's process than Eno's.

Sieves

As a means of creating resonant and structured pitch collections, I frequently utilize Xenakis' ideas on sieves. A sieve is a collection of numbers that can be used to represent pitch collections, rhythmic structures, and more. In Formalized Music, Xenakis describes the basis of the construction of sieves as multiples of a modulus shifted by an offset. For example, multiples of the modulus of 3 would produce the numbers 0, 3, 6, 9, 12, and so forth. With an offset of 1, the series would become 1, 4, 7, 10, 13, and so on. A sieve is made up of the combinations and interactions of any number of these numerical series. Interactions of these series can be either the union, intersection, or compliment of each other. Let us take another series created by a modulus of 4 with transposition of 0. That series would be 0, 4, 8, 12, 16, … A union of the two series shown above would result in a new series consisting of 0, 1, 4, 7, 10, 12, 13, 16 … An intersection of them would leave just 4, as the only number common to both series is 4 based on the small extent I developed the series here. In that manner, sieves can be created, and a number

of sieves can be used in a piece. I typically use these sieves as a way of establishing new "scales". One interesting feature of sieves is that, when using moduli greater than twelve, scales can be created that repeat at an interval greater than the octave.

I have also expanded my use of sieves to include manipulations that Xenakis did not. I developed a simple Python program that generates sieves based on user input. Those sieves are then stored in a text file that a program I created using Max/MSP reads. In the latter program (see "Sieve(M4L, transformations)"), I can interpolate between two adjacent sieves, stretch them around a given "center", toggle between a sieve and its complement (the inverse), and so forth. With this program, I have dynamic, real time control over the selection and manipulation of sieves. The way that I use these programs is by passing MIDI notes through the program, the program finds the MIDI pitch value in the sieve closest to the note that has been input, it shifts that note to the one found in the sieve, and passes the note back out (see "Sieve(M4L, MIDI Select)"). With that, I can focus on rhythm and gesture while I write music, and then pass that through a variety of sieves to "discover" what pitches I will eventually use (see "Sieve(GUI).

Clip Launching and Transposition

A process that I recently used in a piece titled A Veil of Tiny Points is that of dynamic clip launching and randomized transposition within a given range. This process uses the digital audio workstation Ableton Live. In the "session" view of ableton live. "Clips" are used to contain short segments of MIDI. In the Beethovian sense of the word, I created motives and variations of those motive that I would use for a particular section of music. I developed a Max for Live patch that, when a MIDI key was pressed on my keyboard, a voice was allocated (one instrument in the ensemble) and a random clip was launched, which contained the motives I

19

developed earlier. When a clip was launched a random transposition was generated based on a range that I had dynamic control over via sliders on my keyboard. In essence, the clip is launched and a motive plays at a transposition within a range that I specify.

When using this process, I can focus on the density and register of the music and perform it in real time. I typically improvise with the process and record the results. I then take sections of the results and piece them together in a way that I find compelling. The MIDI that is generated is also sent through the Sieves program I created. Follow link #6 for a recording of this work. Timestamp 3:07 through 6:03 was entirely generated using this process, though, the sieve function was not active since the section is entirely chromatic.

Audio to midi

The latest technique that I have developed is the creation of Sieves that are based on spectra of sound. I have been working on a complex time stretcher that uses frequency analysis instead of the rewriting of a waveform. The main goal of this project is to focus on the spectrum of the recorded sound, and eliminate artifacts that are typically produced in large expansions of waveforms. To hear what this program does, listen to "Heaven [original]" and Heaven [Time Stretched]". What you hear in the time stretched version is just the "h-e-a-v" in the word "Heaven" spoken in the original recording.

From the frequency and amplitude analysis that occurs in this program, I have added the functionality to converting the most prominent of these frequencies, the number of which is input by a user, into MIDI pitch and velocity values (see "Audio To MIDI"). A collection of MIDI values is taken approximately every 10 milliseconds and output as a list of pitch and velocity pairs. The lists produced every 10 milliseconds are indexed and combined into a single list with

thousands of these MIDI note collections. I can then do a couple of different things with this list.

The first thing that I can do is use each list as a sieve in the program I described above. A commission that I am currently working on is for soprano and cello. I recorded the soprano reading the text we are using for the work and processed it in the time stretching program I created. I then selected the 30 most prominent partials and output the entire recording as a list of thousands of snippets of 30 most prominent frequencies present in the recording as MIDI note values. When loaded into the sieve program I wrote, I can then run MIDI through these sieves, using the original recording as the source for a sieve. Listen to "Sieve 23" and "Sieve 82". These are random sieves I selected. What I played on my MIDI keyboard is a c-major chord in root position, first inversion, second inversion, and then a g-major chord. What is heard are the MIDI notes in the sieves generated from the soprano reading the text.

Another thing that I can do with the MIDI I generate from the audio recordings is play them back as a giant chord. Listen to "Audio to Chord Progression". In that recording, I created a small Max for Live patch that uses the incoming MIDI note value from the keyboard to reference the index of a particular sieve and play all of the notes at the same time; each MIDI note playing a different sieve. With this, I can then choose to reconfigure the spectra of the recording to generate "harmonic progressions". I can also run this through an "additive" arpeggiator that I created to create single lines from these "chords" (listen to "Cello Arpeggiation").

With these processes, in a process similar to Beaudoin's, I employ a series of "translations" to generate material. The text we have chosen to work with is interpreted by the soprano as it is read. That reading is translated into digital signal. That digital signal is translated into a spectral analysis that consists of frequency and amplitude information. I then translate that

to MIDI notes, and then use those notes to create, what was originally printed text on a page, into a cello line. Each translation encapsulates some form of behavior.

Again, in all of these processes, I am using generative processes to create a bank of musical material that I can pull from in composing a work. Oftentimes I find that, after generating content, I begin to internalize that musical material and composing with it by ear, abandoning the systems entirely. The generative processes are a means of extending my creativity to musical sound worlds that exist outside of anything that I have ever heard. I find this process rather compelling as a means, one might argue the only means, of creating anything ever truly outside of my engrained musical preferences. This is not a significant motivation of mine, but I find it compelling regardless. More important is my pursuit of using these generative systems to incorporate behavioral processes into my music, thus tapping into the aesthetic of the individual unconscious.

IV. Conclusion

Generative processes, while common in much of music composition, remain somewhat stigmatized. And while it is possible to place too much emphasis on the process of creating a musical work, the same can be said for compositional processes that do not utilize generative systems. In all cases, the resulting sound must be the ultimate aim, supported by conceptual, systematic, or programmatic inspirations. I do believe, however, that the aesthetic of the individual unconscious is something that should be explored further. It is something that arises in consequence to generative processes that translate behavior into music, but need not be relegated to that. In fact, the idea of the aesthetic of the individual unconscious could be used as a new

approach to understanding phrasing in Mozart or the use of dynamics in Beethoven. The

implications of such are potentially far reaching in the fields of music theory and musicology, in

addition to composition.