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(In)Determinacy:

Incorporating Openness in Programmed Music and Performance

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INTRODUCTION

Artist Statement

It is my belief that the function of art is to help us understand ourselves and the world around us. The basis of most of my work lies in a fundamental desire to take an object or concept, break it into small, more palatable portions, and attempt to reconstruct them according to self-determined rules. This process of simplification, re-contextualization, and juxtaposition helps to make sense of objects or concepts of discernment in new ways.

I am very interested in the logic and chaos of human thought processes and social interactions, and much of my work experiments with topics of psychology, communication, and the systems within which we live. Through technology, an abundance of information and artifacts of popular culture can be accessed through recorded media and internet resources, and used as source material or inspiration for a composition. Technology serves as my medium, my process, and my presentation.

When I learned to code, I found fragmentation to be a key process in troubleshooting a broken program. When something is not behaving as it should, I break the code into small independent snippets to see how they function, before piecing them back together into a larger program structure. Object oriented programming itself is, by nature, modular, and created from interchangeable, re-usable blocks of code. This resonates with my attraction to fragmentation and reconstruction as analysis. In my work, I often re-purpose code and methods across projects and media.

Computational processes allow one to intentionally randomize variables, introducing indeterminacy. Even when one does not intend to be random, conflicting processes and programming errors sometimes produce chaotic results. This process of experimentation—of trial and error using fragmented code and concepts to process and re-construct image and

sound—is key to my artistic process. Each project begins with a general starting point, be it a text, concept, or computational method, and I experiment until a result resonates. I then take these favored results and develop them into larger scores and performance systems.

Through programming, an artist gains the ability to make image and sound react to a viewer's presence or actions. The concept of augmented reality, of creating digitally enhanced physical environments that a person can move within and interact with, excites me. This makes the digital more real, and the real less ordinary.

Working in collaboration with live performers allows me to incorporate human thought processes and social interactions as variables in my compositions. In the same manner in which I create indeterminate programs, I create scores and interactive systems to be completed by collaborators and performers. These systems often utilize similar concepts across audio and video, transcribing processes and information between media. The actions and directions performers choose in their translation of scores and interactions with technology become an additional experimental factor in my works.

In order to create video or audio that reacts to a viewer or performer, the source material needs to be broken into its smaller components, classified, and reconstructed according to predetermined patterns with specified triggers. In the same manner in which I break code into simpler parts to better understand the whole, I feel that with audio and video, I gain a new perspective from breaking media into smaller segments. A note or word of a performance which seems in tune within a recorded melody, when juxtaposed with another segment in the same key, sometimes no longer seems right. A gesture or movement in an actor's performance can take on new meaning when taken out of context, isolated, or juxtaposed with previously unassociated imagery. Through fragmentation, juxtaposition, and mechanization, a new appreciation for the fluidity and adaptability of human performance is

formed. When the juxtaposition is randomized, the profound, the absurd, and the banal are highlighted. These fragments become building blocks for new compositions and compositional systems.

Because of my affinity for fragmentation as a method of experimentation, I am strongly attracted to collage aesthetic, both in the Dada political sensibility of creating a work in which the elements are also the means,[1] harnessing the communications of mainstream media as a means of subverting it by making nonsense of it,[2] and in the Surrealist psychological enquiry into subconscious associations of combined symbols, creating sense from the apparent nonsense of the internal mind.[3]

With digital tools, such as code, digital imagery, digital audio, and sensor technology, it is possible to extend Dadaist and Surrealist ideas of collage to incorporate moving image, sound, physical spaces, and live performance. Through code, one is able to create works that transcribe processes across media. In my work, I view each element of a performance - video imagery, architecture, sound, and performers - as separate elements, held together by transcoded ones and zeros instead of by glue.

The collage aesthetic of my work seeks a balance between chaos and control. Chaos is generally defined as confusion and disorder.[4] In mathematics, chaos is said to be the result of feedback in systems.[5] Feedback, depending on how it is used, can be either a stabilizing or destabilizing factor within a system.[6]

According to David Olson, programming in itself is a chaotic process. Programmers learn through trial and error, and one's failures and successes will shape one's view of and approach to programming accordingly.[7] Chaos, in useful terms, is bounded within a system that recognizes and allows for variation and feedback, within defined terms.[8]

Utilizing this idea of bounded chaos in my compositional process, through digital means I create what Umberto Eco terms an 'open work,' or a 'work in movement:'

> "…the work in movement is the possibility of numerous different personal interventions, but is not an amorphous invitation to indiscriminate participation…the author offers the interpreter, the performer, the addressee a work *to be completed*. He does not know the exact fashion in which his work will be concluded, but he is aware that once completed the work in question will still be his own. It will not be a different work, and, at the end of the interpretative dialogue, a form which is *his form*, will have been organized, even though it may have been assembled by an outside party in a particular way that he could not have foreseen. The author is the one who proposed a number of possibilities which had already been rationally organized, oriented, and endowed with specifications for proper development.[9]

In my visual and compositional work, I create systems and frameworks, and then allow randomized variables, real-world data input, or the creative agency of performers and collaborators to work independently within these parameters. I seek or create this system both in the collaborations I initiate, and within those I choose to join.

I believe that the Western world today is driven by an unhealthy reverence for personal image and personal narrative. This personality worship permeates art and politics. In art I care more about the work than about the artist. In politics I care more about policy than about personality. I feel that today, those that receive funding for art and those that are elected to political positions are often rewarded more for their charisma than for being skilled in their trade. If you have a good narrative, facts and skill are irrelevant.

I believe this is what drives me to deconstruct these carefully constructed media images, musical forms, and social structures, and to relinquish a level of agency within my own work. I wish to break the spell of charisma and traditional narrative and to study what remains. I have no intent to impart my will or my agendas on my audience. Instead, I wish to learn from the processes I create, from my collaborators, and from my audience.

Influences

As my own work spans music composition, video art, performance art, installation art, and computer science, my influences span decades and genres. My work is primarily rooted in the New York avant garde and contemporary art scenes. Space, process, and liveness are all important aspects in creating my work. This is a selection of artists who have influenced me the most in these aspects of my work.

Space

In 2006, I went to Dia:Beacon in Upstate New York. There I saw two of Bruce Nauman's video works, *Mapping the Studio I (Fat Chance John Cage)* (2001)[10] and *Corridor Installation (Nick Wilder Installation)* (1970),[11] which changed the way I viewed video as a medium. *Mapping The Studio* was a multi-channel projection across several walls depicting various angles of Nauman's studio, as recorded by security cameras. Not much happened in the video, except for the occasional cat or mouse that would enter the frame. Despite this, I spent a considerable amount of time in the room, sitting in the chairs provided and trying to make out the forms in the studio, listening to the ambient sounds, and enjoying the dark space lit only by projection. The piece seemed to be more about the environment and ambience than

about what was happening on screen: it seemed like it wanted to make you feel something more than wanting to tell you something. It seemed like a meditation of sorts, or an excuse to just sit still and absorb the visceral experience.

Corridor Installation had the opposite effect, and was quite stressful. Narrow, sterile, brightly lit white hallways were set up with surveillance cameras at the end of some, and televisions depicting the surveillance feed at the end of others. On the screens, at times you could see people in other corridors, and occasionally you would catch a glimpse of your own back, very small, from a distance. The view was never particularly satisfying, and always seemed slightly out of reach, creating a sense of paranoia and uneasiness. The piece drew me through it, with the hope that I might discover something new if I moved to a new vantage point.

Nam June Paik's video sculptures were similarly influential on how I view video as a spatial element. I saw a few of his pieces in various museums in New York, and in 2009 I was able to see a large body of these works in *Nam June Paik: Live Feed: 1972 -1994* at the James Cohan Gallery.[12] I was attracted to his use of the physical properties of video display units to create video objects that a viewer can walk around and perceive at different angles, as well as his use of chaotic juxtapositions of looping imagery and live video feed from surveillance cameras. Like a conventional sculpture, a viewer's perspective changed as one circumnavigated the objects.

These video pieces have influenced how I choose and create environments for my installations and performances. The physical allowances and constraints of a particular space, and how objects and people are situated within, inform and influence the overall atmosphere of a work and how it is experienced by an audience.

Witnessing Alvin Lucier's *Music for Solo Performer* at the New School as part of the 2011 *The New Music: John Cage Centenary Concert*[13] was influential on my treatment of sound as a spatial element. Lucier's percussive instruments were placed throughout the auditorium, creating a soundscape that came from all angles and reverberated according to the architecture of the auditorium. The soundscape was all-encompassing and could be felt through vibration as well as heard.

John Cage's *Roaratorio: An Irish Circus on Finnegans Wake*,[14] as performed in the Cork Opera House, Ireland, in 2012, was also influential on my perspective of sound as collage, and as a theatrical and sculptural element. Performers were placed across a stage surrounded by black masking, with a multitude of speakers distributed across a grid above the performance space. The audience was asked to navigate the performance space, moving between performers and speakers at will. In this manner each audience member could, in a way, curate their own experience within the piece.

These works introduced me to the use of sound and video as a three-dimensional element, mapped spatially or demanding physical interaction through form and installation. All of these works were experiential, and needed to be witnessed in person to receive the full effect. These works led me to think of place and placement, both of installation and performance elements and of the audience, as key elements in my work.

Process

Also at Dia:Beacon, I was introduced to Sol LeWitt through *Drawing Series,*[15] an installation of fourteen drawings. These works were made of simple shapes and lines created by technicians and assistants from sets of instructions by the artist. The size of the installation

and the repetition within the imagery created something much greater than the simple elements from which they were constructed.

Later, I was introduced to the Processing programming environment. Through Processing I learned about algorithmic art and interactive video practices. At Bitforms Gallery in NYC, I saw several of Reas's installations, including *TI, a.k.a. Process 10 (Installation 1)*[16] a series of lilypad-like circles of video placed on the ground depicting organic imagery of growth and decay, *Process 14*,[17] created on variations of parameters given to circles, and *Process 18*,[18] created with quadrilaterals. These works were based on simple computational processes repeated with randomized variations of predetermined patterns.

I was intrigued by the parallels between these programs and the drawings of Sol LeWitt. Both were comprised of simple instructions carried out in a mechanical fashion by an agent other than the artist. Both were created with simple geometry, made intricate through repetition and scale. The results were aesthetically vastly different. The time-based aspect of Reas's work added a new dimension and texture to this concept, as these geometries moved and evolved over time, creating organic patterns that seemed to be alive.

In 2008, I interned at Eyebeam and worked under Steve Lambert and Jeff Crouse in the creation of ABYSML (A Bullshit Markup Language), an xml framework Jeff created to give speech to a robotic Chimpanzee, James Chimpton. Jeff and Steve then used this robot to interview artists during the 2008 Whitney Biennial.[19]

This language system consisted of predetermined sentence structures into which verbs, nouns, adjectives, and the like were plugged in at random. Sentence structures were triggered by a behind the scenes operator according to the flow of the conversation, and the specific words of each sentence were chosen at random from banks of predetermined word choices.

This process of creating a structure, and allowing an agent, whether human or machine, to complete the process, has become an important element in my work. I am interested in how these structures are implemented across various forms of media.

Liveness

I am attracted to liveness for the element of anticipation that is created by uncertainty; for the physicality of human achievements in music, theater, and dance; and for the opportunity to transform a physical space and work it into an implicit narrative.

Musical compositions which were created through technical or mathematical processes, such as Steve Reich's Piano Phase[20] and Conlon Nancarrow's studies for player piano,[21] become a physically and mentally challenging endeavor for any musician brave enough to attempt to play them. The physical performance of these pieces, as well as the potential for unpremeditated deviation that is part of any live performance, lends an additional level of interest to me that I would not find in recorded sound alone.

My approach to space and collage is also influenced by Big Dance Theater, and The Wooster Group. During an internship at The Kitchen, I worked on *Comme Toujours Here I Stand*, by Big Dance Theater.[22] This piece was created from intertwining fragmented narratives. A vintage black and white film, *Cléo from 5 to 7*,[23] was used as source material to create a play about the filming of the movie. Original footage was fragmented and juxtaposed with live feed of the narrative unfolding on stage through the actors' speech and choreography. These videos were further fragmented across the stage via an elaborate system of rolling projectors and screens, highlighted by an intricate and dynamic lighting system. The piece was chaotic, with each element constantly disrupting the others in a whirlwind

performance. In this, the technical became physical, and physical space was constantly being re-structured along with the plot.

The Wooster Group influenced the way I view theater, particularly through *House Lights*[24] and *Hamlet*.[25] The Wooster Group is famous for combining multiple, parallel narratives into one disjointed play. The performers devise performances collaboratively, through trial and error, under the direction of Elizabeth LeCompte. The performers use personal television monitors of source material not meant for the audience, as scores and inspiration during the course of the live performance.[26] The result is a fragmented narrative with frequent abrupt juxtapositions, often highlighting the absurd.

Because of my interests in space and collage, I have found theater to be my ideal venue of multi-media practice. Image, music, and interactions are the building blocks of theater: technology allows me to build upon and extend these practices.

Through theater, I am interested in creating multimedia collages combining projections, digital sound, musical composition, and human performance. In the creation of these pieces, I utilize programming, collaboration, and open scores to create works that are indeterminate within a devised structure.

Future Work

I intend to continue to experiment with themes of isolation, connection, psychology, and sociology through composition and live performance. As I continue to learn more tools, I integrate these into the structures and methods I have been developing over my career as an artist.

I intend to continue to work on the technologies that I have harnessed in my work so far. I have plans to streamline my use of sensor data received remotely from performer actions, in order to receive more detailed and more reliable data to use as triggers for sound and video. I will then improve the programming behind these technologies to include digital memory and pattern recognition.

I have worked with Kinect Cameras to gather distance and location of performers and viewers in several exercises, and I intend to continue working with this technology until I have a reliable framework to use in live performances.

I would like to better harness available data as source material for my works. Much of what I have done so far has included hand-selected, carefully edited source material. I intend to research data mining and methods of gathering information in a live or automated manner, in order to harness the processing power of computers in my collection of source material for my collages.

Object oriented programming is modular and reusable by design. Because of this, I continue to re-use and build upon processes that I began a decade ago, using books, tutorials, forums, and my own logic to expand, transform, and reimagine the resulting themes and visual aesthetics of my work.

I wish to continue working with music and dance, as these, even in their traditional forms, tend to be more abstract in their transmission of narrative. Dance provides ample opportunity to harness data from expressive motion and translate these to audio and visual compositional environments. Neither dance nor music require explicit narrative.

Through my work I seek to look for answers rather than to impose my opinions on my audience. I wish to create works that take effort on the part of the viewer to decode and analyze, but can, regardless, be experienced on a visceral level. I seek to create deconstructive systems that allow technology, my performers and my audience to reconstruct the pieces.

Notes

1. In his *Dada Manifesto*, Tristan Tzara describes Dada artists who create work "whose elements are also its means, a sober, definitive, irrefutable work."

2. See Tristan Tzara's *Dada Manifesto*, as well as Nathan Moore on Gilles Deleuze: "...cut the word and the sense bleeds (437)."

3. See Stokes on Freudian theories in the imagery of Max Ernst (199-204).

4. See Chaos.

5. See Olson (1).

6. See Olson (2-4).

7. See Olson, page 5, Box 2.

8. See Olson, *Bounds of Chaos* (34-37).

9. See Eco (172).

10. See Nauman, *Mapping the Studio I (Fat Chance John Cage)*.

11. See Nauman, *Corridor Installation (Nick Wilder Installation)*.

12. See Paik, *Live Feed: 1972 -1994*

13. See Lucier, *Music for Solo Performer.*

14. See Cage, *Roaratorio: An Irish Circus on Finnegans Wake*.

15. See LeWitt.

16. See Reas, *TI, a.k.a. Process 10*.

17. See Reas, *Process 14*.

18. See Reas, *Process 18*.

19. See Crouse

20. See Reich, *Piano Phase*.

21. See Nancarrow

22. See *Comme Toujours Here I Stand*.

23. See Cléo from 5 to 7.

24. See *HOUSE/LIGHTS*.

25. See *Hamlet*.

26. See Dafoe.

PARANOIA

Introduction

Paranoia[1] was created for percussionist Alex Petcu, as part of a composition workshop at the UCC School of Music. I felt personally on edge at the time, and I wished to use repetitive, irregular rhythms to portray a stressful uncertainty... to create a sense of tension and unease. The piece was later played again by Alex as part of *Quarter*, an event by Makeshift Ensemble on February 1st, 2014 in the Corcadorca Theatre Development Centre in the Triskel Arts Centre in Cork.

Theory

The score for *Paranoia* was derived from the concept of a graphic score as musical notation, as well as from algorithmic visual programming.

The piece was initially inspired by Steve Reich's phasing techniques, in which two separate voices progress at separate speeds, and the challenges of notating irregular rhythms. When approaching the notation of such a phenomenon to be played by human performers on traditional instruments, Reich was faced with the issue of notating timings that didn't conform well with traditional notational standards. In *Piano Phase*,[2] for two pianos, his solution was to combine notation with written commands.

Piano Phase begins with both pianos playing the same one-measure, twelve 16th-note sequence. The notation is segmented: traditionally notated segments, each consisting of a twelve note measure, are joined by un-notated, loosely timed segments. In these un-notated segments, piano 1 is instructed to 'hold tempo 1,' while piano 2 is instructed to 'accelerate very slightly' over a number of measures.

Excerpt from *Piano Phase*

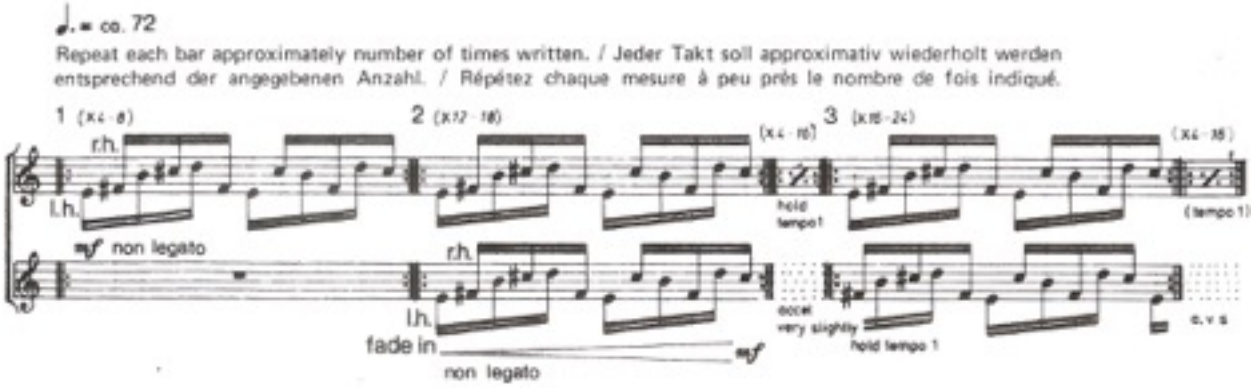


Figure 1

When traditional notation resumes, the first note of the second piano's original twelve note cycle has phased to the second note of the measure, while the 12th note of the previous cycle becomes the first note of the new cycle. In this manner, the second piano incrementally accelerates, causing its twelve-note cycle to slide forward until it returns to its original placement in regards to the repeated, unchanging cycle of the first piano.

Pattern of *Piano Phase*



figure 2

When invited to compose a percussion score, I decided to experiment with similarly sliding tempos. I did not pursue the phasing of musical phrases as Reich did, but instead pursued a more purely mechanical acceleration of tempo using only rhythms of three one-note ‘voices,' more similar to Conlon Nancarrow’s *Canon X*.[3] Though *Canon X* was created for player piano, the score was written in standard notation, *sans* measures, with only a delineated segment marked to represent half a second. The notes on the upper stave gradually become more spaced apart, while the notes of the lower stave gradually become closer together.

Excerpt of first measures of *Canon X*

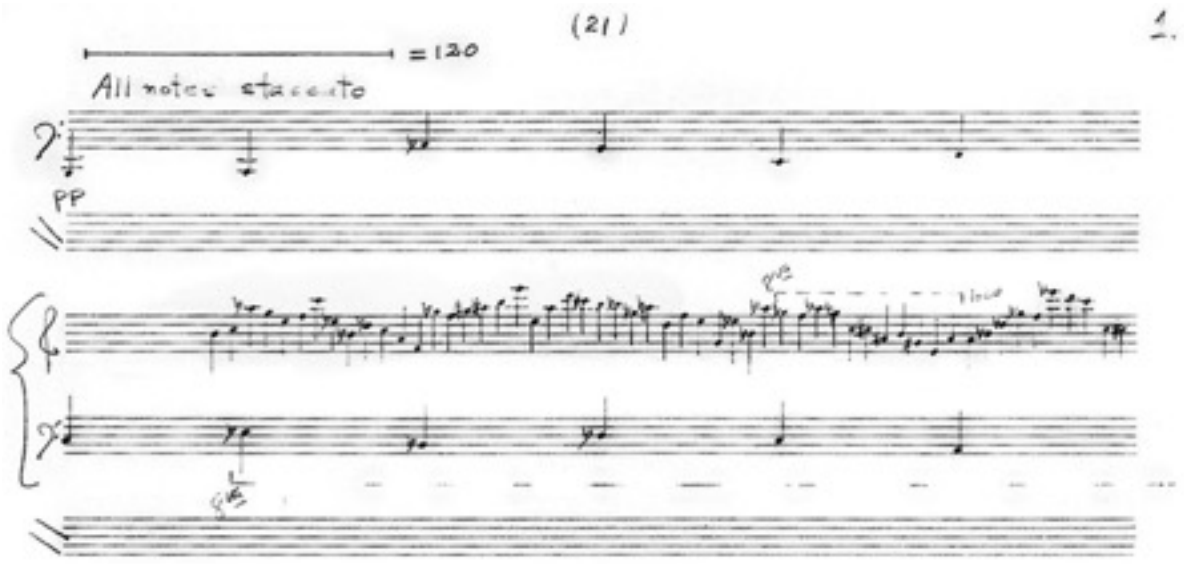


figure 3

In *Paranoia*, I wished to create a different notational language using imagery that would illustrate this method without the need of words. To do this, I used the idea of Earle Brown's composition *4 Systems*,[4] written for David Tudor, in which each piano note is

notated in horizontal black lines, with the vertical position delineating the note's position on the keyboard, and the horizontal position, as in classical notation, delineating time.

Excerpt of *4 Systems*

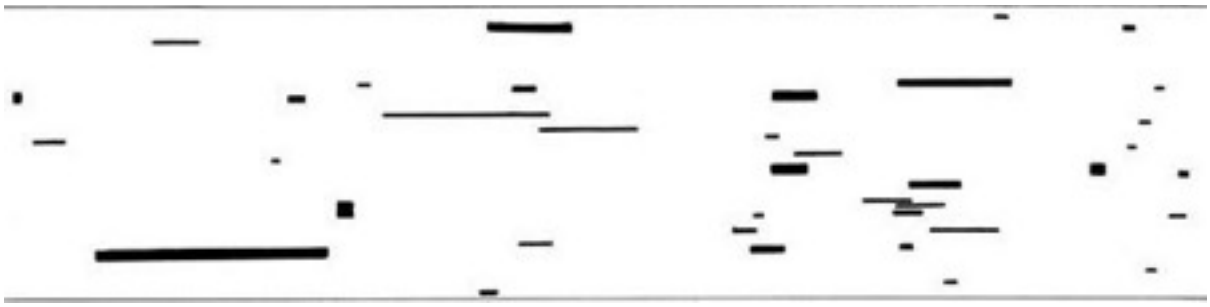


Figure 4.

The score has a short note at the bottom, stating: “May be played in any sequence, either side up, at any tempo. The continuous lines from far left to far right define the outer limits of the keyboard. Thickness may indicate dynamics or clusters.”[5]

This form of notation allows the performer more room for interpretation than classical notation as the given notes are suggestive rather than explicit dictations. Therefore, tempo, dynamics, and even, to a point, what notes are played, are all determined by the pianist. In an endeavor as tricky as phasing tempos with oneself, I decided that this form of openness was ideal.

In creating the score, I decided that in my piece, there would only be three 'notes,' or percussive objects, in the piece. Each hit is represented by a dot, and each note is represented by a different color. The three notes are separated vertically according to pitch.

I chose to add dynamics in classical notation, as I felt that, in conjunction with the changing tempos, they would add a sense of ebb and flow to the piece and give it a sense of urgency. I debated including these in the visual language of the score by altering the sizes of the dots, but I felt this would distort the visual harmony of the piece, which I feel is integral to maintaining precision of rhythm. Similar to Brown's piece, I added instructional text preceding the visual score.

Technical Devices

To implement an accurate incremental decrease in the relative locations of beats, I turned to Processing,[6] an open-source creative coding environment created to facilitate algorithmic image and music. I wrote a short program to recursively draw dots, adding an incremental amount of distance between each dot as they are drawn. Using the Processing.pdf library, I exported the results to Portable Document Format (PDF), which is a vector format easily handled by Adobe Illustrator.

Once I had imported the document to Illustrator, I re-arranged the dots in various ways to compose the score. I changed the colors, reversed lines, and re-aligned segments to create a piece with flow and forward momentum.

Summary

Alex Petcu is an extremely talented percussionist, and he added to the piece more than I could ever have hoped. His choice of instruments included three woodblocks, which he played with two hard mallets, one in each hand. His version ended up being about four

minutes. To accomplish the independently accelerating voices, he needed more beats than notated to make smooth transitions between standard rhythmic relationships, mentally envisioning divisions of a notational beat into sextuplets, octuplets, and so on, until reaching the desired speed with both rhythms.

After the initial workshop with the piece, Alex requested another version with larger dots, for a performance as part of *Quarter*. In this new version, I adjusted my parameters in the Processing sketch, and repeated the previous re-arrangement process. I excluded the last two lines of instruction, so that whoever might play the piece could decide for themselves what best suits their preferences and abilities. Thus, instrumentation and tempo are left open to the performer.

Alex's interpretation of the piece had several strengths. One strength lay in the choice of woodblocks for instrumentation. The sharp, clear strikes created interesting echoes in the room. In the quicker, louder segments, from my vantage point in the room during the initial workshop, the ceiling seemed to rattle in harmony with the sound of the woodblocks. Though I was unable to attend the second performance of the piece, I was told it had a similar effect in the Corcadorca space.

Another unpremeditated strength lies in the physicality of the performance of the piece. The struggle to phase smoothly between two hands was apparent both in the music, and in his expression and body language while playing. This added an extra layer of tension to a piece already meant to portray an anxious state.

Conclusion

Paranoia was my first attempt at composing a generative score for a human performer. Though this piece utilized no chance processes in the creation of the score, the visual nature of the score as well as the level of difficulty left it open for interpretation by the preferences and abilities of the performer. Having had a good experience with it, this sense of openness and unreliability intrigued me, and heavily influenced my following works.

Notes

1. On the accompanying USB drive, see Paranoia/audio/AlexPetcu_Paranoia_UCC.wav for UCC recording, Paranoia/score/Paranoia_v1.pdf for the score used in the UCC workshop, and Paranoia/score/Paranoia_v2.pdf for the score used in the *Quarter* show.

2. See Reich.

3. See Nancarrow.

4. See Earle Brown.

5. See Earle Brown.

6. See Ben Fry.

DETERMINATION

Introduction

Determination[1] was created for Percussionist Alex Petcu, as a continuation of ideas developed for the score *Paranoia*, through which I explored generative methods for the creation of visual scores. For this piece, I expanded the parameters of the previous piece, and used different technology for the creation of the score.

Theory

In the development of *Determination*, my original goal was to create a fully generative score creation process, complete with real-time audio and visual feedback. As in *Paranoia*, the rhythm would be represented as lines of dots. Each dot is placed upon one of six straight horizontal lines, each representing a different frequency or percussive voice. For *Determination*, I chose to increase the voices to six, as opposed to the original three in *Paranoia*, to give the piece a larger range. Because a percussionist has only two hands, I wanted to program the piece so that only two notes would ever be played at a given time. Additionally, I wished to create a system to preview the music as it is generated. In this manner I could run through a few versions of the piece, and save the ones I liked best to be given as a score to a percussionist.

The first two pages of this score are entirely generative, excluding a few embellishments given as afterthoughts to improve legibility. On the third page, I became frustrated at how mechanical and monotonous the piece was becoming, and had a strong urge to create a pre-determined ending for the piece with conclusive phrasing.

To do this, I revisited the devices used to create *Paranoia*. I manually arranged the final page in imaging software, again using simultaneously accelerating and decelerating juxtaposed rhythms over five lines, between the first and fourth notes, in order to break up the monotony of the mechanical metronome-driven beats. I then reintroduced order, using the first two pages as source material for a more determinate arrangement for the end of the piece.

Determination, to me, portrays an idea of progress; of steadily working at something until results become apparent. I felt the need for the end to be more determinately structured than my randomly generated compositional tools could offer. In this sense, my own determination to create an entirely generative piece was outweighed by my desire to have an ending that 'felt' musically determinate.

While I could have hard-coded a determinate ending into the program, I felt this to be redundant and unnecessary. My practice uses programming as a creative tool. Once the programming devices I use stop being an asset in the creation of a piece, I no longer feel a need to continue using them. Therefore, I had no qualms creating the final, determinate page in a more pre-determined creative format. In this manner, the composition of *Determination* moves from an indeterminate to a determinate compositional process.

The human element of a piece is important to me, as I believe natural human inclination can lend feeling to a piece unachievable through mechanical means. No bars or horizontal time-keeping devices are given past the line divisions, to give Alex temporal freedom to complete each rhythm at his own pace. Trusting his judgement after working with

him previously, and leaning toward a more open work, this time I did not add dynamics, so that Alex could figure these out as felt natural to him within the piece.

Technical Devices

Unlike *Paranoia*, which was created in the Processing coding environment, *Determination* was created using Max/MSP/Jitter, using jit.lcd as my drawing engine and visual preview window, and Max MIDI as a tool to audibly preview the composition as it is generated.

Jitter, particularly the jit.lcd object, does not currently output to a vector file format as does Processing. Therefore I rendered the dots to print at 300 pixels per inch on A3 sized paper, for printing clarity, resulting in a matrix size of 3210x4650.

I decided to place ten lines per page, with a duration of six seconds each, resulting in each page representing one minute of performance. Giving the page one inch margins on each side, my workable area becomes 3210x4650.

Dividing 4650 by 10, each line should be no larger than 465 pixels. 465 equals 77.5. Therefore, if we made each dot 30 pixels in diameter, with the centers drawn 40 pixels apart, there would be 85 pixels between each 6-voice line.

For the simplicity of even integer divisions I assigned each line to be 3000 pixels wide. For the first page, I generated notes with increasing frequency and note repetitions, first with the lowest note, then with the second lowest note.

The lowest note is color coded blue. I set the metronome (metro) object that drives the bass line to 250 milliseconds, for a driving rhythm of four beats per second, or MM240.

On the first page,[2] the bangs from metro are diverted to both a random object generating a number between 0 and 50, and to a gate which is closed by default. The random numbers are sent to an object comparing these numbers to variable input driven by a line object, set to increase the number from 1 to 50 over the course of 100000 milliseconds, or ten seconds beyond the last line of the page. In this manner, the gate is set to open when the randomly generated number exceeds the current line input: a 1 in 50 chance in the beginning, increasing to close to a 50 in 50 chance towards the end.

The gate is then open for all beats provided by the metronome set at 250. At this point, another random object is triggered to determine how many beats will be displayed before the gate is closed. This too is driven by a line object, setting the maximum random number to a sliding scale from 1 to 8 over 100000 ms. A counter determines when this number of beats has been achieved; the gate is then closed again until the first random number generator determines that it should re-open.

The second note, colored green, is introduced above the first line after 50000 milliseconds, under the same system, with different line parameters. This time, the probability of opening the gate slides from 1:50 to 10:50 (1:5) in five seconds. The range of potential note repetitions slides from one to two in three seconds, causing this line to reach a higher density of notes much quicker than did the first line.

The second page[3] is created in a similar fashion. On page two, the blue base line is set so that if the random number between 0 and 50 is greater than 40, a string of 1-6 notes will be triggered. The second line, this time, is set to generate arpeggios with an increasingly larger range, until all six notes are being used.

For this arpeggio line, a base triggering method is set up similarly to the previous generators. The chance of a string of notes being played transitions from 40:50 (4:5) to 25:50 (1:2) over the course of the first 30 seconds. The duration of the string of notes transitions from 1 to 6 over the course of the first 40 seconds.

There are then three settings with which the behavior of the arpeggios are regulated. From 0-40 seconds, which of the six notes is played is determined by a random number generator. The range of this generator increases from 1 - 6 over the course of 40 seconds. In this way, the notes are introduced gradually, lowest first, and are randomly distributed.

At 40 seconds, control of the arpeggios are transferred from a random object to a drunk object, set to a maximum of 6. Under this setting, the notes will ‘drunkenly’ increase or decrease, in a less-than linear fashion, but still in an ascending and descending order.

At 60 seconds, control is passed to a counter object. This counter object is initiated in palindrome, with a range from 0 to 1. The palindrome parameter causes the counter to count in reverse once the upper threshold is reached, counting forward again once it reaches the lower threshold. Every time a cycle is completed and the counter returns to 0, the upper threshold is increased by one. Once the upper threshold increases beyond the six available notes, the top note is held until the numbers return within range.

I composed the third page[4] using a ramp generator similar to the one used in *Paranoia*, only created in Max/MSP, and segments of dot patterns generated from the previous two pages. I imported several pages of imagery, and using the live trace option in Adobe Illustrator, was able to convert the dots to vector format and work with them independently, rearranging and recoloring them until I was satisfied.

For aesthetic purposes, I live traced the previous two pages, to have them better match the third page in clarity and alignment. In Illustrator, I also added light lines behind each row of dots, for ease of reading, especially if the score ever needed to be printed in black and white and the color coding was lost.

Performance

For the workshop environment of this piece, Alex chose to use untuned bottles arranged on foam for his six voices, again using hard mallets to play them. The choice of bottles lent the piece an atonal quality, with the pitches changing slightly throughout the duration of a given note. These fluctuating ringing tones, combined with the acoustics of the room, blended in a manner that, to me, was harmonically interesting.

Conclusion

Paranoia and *Determination* are very similar pieces, made with similar processes. While I still value the idea of generative composition, I have, through these pieces, realized that I am not a purist in this sense, and I feel that for the pieces to be interesting to me, there does need to be intervention by a human hand. Additionally, it is absolutely necessary for a human performer to play these pieces, as the performative aspect and human struggle to play these rhythms is one of the strengths of the piece. When played by synthesizers, as programmed into the patches for *Determination*, the piece sounds cold, mechanical, and un-nuanced. The imperfection of human hands and rhythmic abilities, combined with the

physical acoustics of real objects, give the piece warmth and subtlety that is not apparent in the programming alone.

Notes

1. On the accompanying USB drive, see Determination/audio/Determination.wav for recording of UCC workshop, and Determination/score/Determination_score.pdf for score.

2. On the accompanying USB drive, see Determination/score/Max/ Determination_1.maxpat for the program, and Determination/score/Max/img/ Determination_p1.jpg for the raw output from this.

3. On the accompanying USB drive, see Determination/score/Max/ Determination_2.maxpat for the program, and Determination/score/Max/img/ Determination_p2.jpg for the raw output from this.

4. On the accompanying USB drive, see Determination/score/Max/ Determination_3.maxpat for the program, and in Determination/score/Max/img/ see Determination_p3_1.jpg, Determination_p3_2.jpg, Determination_p3_3.jpg, Determination_p3_4.jpg, Determination_p3_5.jpg for source imagery.

A:VOLUTION

Introduction

My collaboration with Eat My Noise Productions for *A:Volution* came about by a chance encounter with David Duffy, who had plans for an upcoming show, co-composed and co-directed by him and Peter Power, which was to be part of the Cork Midsummer Festival 2012.[1]

David and Peter are both classically trained musicians: David is a bass player who specializes in jazz, and Peter is a clarinet player, singer, and guitarist. Both David and Peter had recently completed the master's program in composition from UCC, through which they became interested in programmed and interactive compositional techniques.

They intended to use interactive elements within the electronic musical aspect of the show. At my suggestion, David expressed an interest in adding a video element. The intent was to tie all elements—acoustic and electric music, lighting, and video—together through common audio-visual parameters.

Theory & Structure

On our first formal meeting, Peter and David briefed me on the themes behind the music. By definition, a 'volution' is "a rolling or revolving motion," or "a spiral turn."[2] When 'a' and 'volution' are said together, it evokes the word evolution: a process of slow change and development.[3] Peter and David were particularly interested in processes that result in loops or cycles. Peter described weather cycles, Fermat's spiral, Penrose stairs, and the Shepard–Risset glissando as ideas with which he was working in his compositional process.

I presented examples of previous video design and programmed works I had recently completed, including *White Noise,*[4] an installation I had programmed in Max/MSP/Jitter consisting of a polyphonic white noise synthesizer based on motion tracking via a Kinect camera with corresponding video, as well as a few Processing sketches utilizing particle systems[5] and generative processes.

Originally Peter wanted to have the performance in the round, with the audience surrounding the performers in order to make the audience feel as if they were part of the piece. On our first site visit to the Curtis Auditorium in the Cork School of Music, we decided this was implausible in the proscenium rehearsal hall. I suggested a setup in which we would hang panels of fabric varying distances from the back wall, the last of which hung over the audience. This would give the video environment a sense of multiple dimensions, transforming the stage area and bringing it closer to the audience.

After initial discussions of themes, content, and potential interactions, we separated to independently create content, with the intent to regroup intermittently and compare notes, bringing everything together once we were in the performance space. Over the course of the next few months, Peter began to give me MIDI mockups of the music as he and David created them, and I began creating and compiling videos which I felt matched the themes and mood of the music.

In May 2012, Eat My Noise had a one-week residency in the Corcadorca Theatre Development Center to sketch out ideas as a group. I was introduced to Art O'Laoire, the lighting designer with whom I would be working to ensure both the performers and the projections would be visible in key moments. During this residency, Peter and David

workshopped scores with musicians, and we used the input controls of *White Noise* to control parameters of filters on various segments of digital compositions. They liked the video aspect and decided to keep that in the show as well. Peter had written poetry for the piece, but wished to present it in a non-linear or abstract way, either through recorded voice or video. I took to visually abstracting and re-arranging the text in a cut-and-paste fashion.

With an arsenal of videos, compositions and ideas, we all came to the performance space the day before opening night in June to bring it all together. As I had a wide variety of videos created according to a broad subject, and because much of the music was not fully complete until the night before opening, much of my performance structure was based on improvisation in order to maintain flexibility to match the fluid compositional process. Because Peter wished for the performance to feel timeless, with no beginning or end, section beginnings and endings are ambiguously labeled and defined within this piece.

A:Volution is meant to portray cycles, which vary in each iteration. The piece begins and ends with the same piano part, played by different people. Many of the same motifs are used musically throughout the piece, and accordingly much of the projection design recycles and re-works the same video samples across scenes. Peter and David wanted the show to highlight the interactive element, as this would give the impression that the audio, video, lighting, and performance elements were an interconnected system. Because of this, we highlighted the live nature of the video through live camera feed and Kinect sensor input.

However, these highlighted interactive segments, particularly the Kinect scene, came off as ominous. The first and last scenes were reminiscent of surveillance cameras, and the Kinect scene was intentionally dark and brooding musically. The one to one relationship

signified absolute control, and the Kinect video highlighted this idea of a digital a puppet master.

Additionally, we used less video in calmer scenes. This unintentionally created a relationship of video = high tension, and no video = low tension. This may be a manifestation of Peter and David's love affair with, but skepticism about, technology as a creative medium.

Technical Devices

The projection setup for the show required three projectors: one for the back panel behind the performers, and one for each side of panels above the performers and audience.The center projector was mounted on the lighting grid, while the remaining two were placed at the back of the auditorium, as there were no existing lighting bars in a suitable location for these. The hanging panel material was slightly translucent, giving them a sheer look, and allowing light to pass through to objects behind the screens if they were to overlap. In the final set-up, they did not, and each screen caught a different area of video.

I used Isadora to map the videos to the screens, and to program the video structure. As we progressed through rehearsals, I began working out a scene-by-scene video arrangement. A Korg nanoKONTROL provided input parameters for easy improvisation. The video clips used were produced with a variety of methods, including sourcing from open source resources on the web such as archive.org,[6] coding in Processing,[7] and editing and automating with Final Cut Pro or Max/MSP/Jitter.

Because I had originally programmed *White Noise* in Max/MSP/Jitter, and there was no viable method of extending the USB of the Kinect camera to reach the main video

computer at the back of the audience, I chose to set up a computer on stage near Peter's audio station with a modification of this patch, as well as a live feed input from an Xbox web camera facing the piano keyboard.[8] The Kinect input was processed to determine the x, y, and z coordinates of the closest point using jit.freenect.grab[9] and the suckah object, and this data was sent to Peter's computer as MIDI values. The Kinect video input was run through a few jit.slide objects and combined with a jit.noise object to give the video a grainy, ethereal look.

A second Max patch was set up on the computer with the main video control.[10] These two patches were networked so that the main computer would receive the two video signals from the secondary computer, and so that I could send trigger controls to the stage to turn the cameras on and off. From the main computer, the video was sent to all three screens using a TripleHead2Go video splitter.

Several versions of randomized, disjointed video text were used throughout the performance. These were created using a particle system in Processing, which split each text used into small phrases. It then steps through these phrases, randomly placing each within the screen, fading them slowly in and out. Each phrase is a particle: when one 'dies,' or fades completely out, a new one replaces it.[11]

As the section beginnings and endings are ambiguously defined within this piece, for the sake of technical description I will step through my programmed scenes as they are named in the Isadora file.[12] During the performance, I switched between the Isadora file and the Max file using the key command command+tab on the Mac while in a blackout state, to avoid showing my desktop or mouse to the audience mid-show.

The piece begins with three musical states, with *crescendos* in audio pitch, audio volume, and brightness of lights preceding each state transition. For the video element, I created three states of static: 'State 1'[13] was created with outputs from the aforementioned randomized text Processing sketch,[14] with several instances multiplied several times at a low opacity, and masked by a video loop of moving clouds I had created by flipping, reversing, cross-fading, and further multiplying appropriated cloud footage.[15] 'State 2'[16] was uniform static created with the jit.noise object in Max/MSP/Jitter. 'State 3'[17] was a version of 'State 2' run through a 'bad television' filter in Final Cut Pro. I set the number 1, 2, and 3, on my keyboard to skip to each of the three stages, as well as the space bar to scroll through them in order. Each time I heard a crescendo, I would manually trigger a new state at its completion.

A Health and Safety Announcement was mandatory in the performance space. I incorporated this into the video element of the piece via the Processing text sketch, jumbling the announcement and displaying it across the screens as it was announced.

The first scene involved solo piano. For this I switched to Max and turned on the live feed from the Xbox web camera, converted the video to greyscale, and masked it with another, more grid-locked randomized text patch I had created in Processing.[18]

The next segment was a guitar improvisation by James Fortune. For this, I improvised with two videos, the poetry sketch and the uniform static video, controlled by Korg sliders. During the performances I manually faded these in and out according to the feeling and composition of James' sounds.

'9 Lives' begins with projected stars, created in Processing in a similar fashion to the text, consisting of pinpoints of light that slowly fade in and out.[19] When the percussion

enters, these circles erupt into dots animated on the mathematical principles of Fermat's Spiral. As I believe that there is no point in re-inventing the wheel, I first searched to see if anyone else had conquered the challenge of creating a Fermat's Spiral animation in Processing, and came across Anita Lillie's Processing sketch.[20] This was above and beyond what I had had in mind. I downloaded this, changed and automated a few parameters, and rendered this out to create the video used in the '9Lives' Isadora scene.[21] Throughout the piece, I maintained the video of stars in the side panels. At the entry of the spiral, in Isadora I added pulses of blue color, fading in over 1 second and out over .75 seconds, to match the tempo of the music.

After one piece without video, 'Three Really' incorporates several video stages: '3R_clouds' through 'Crazy' in the Isadora file. This scene uses imagery of clouds as well as videos appropriated from the web portraying various cycles. These were greatly modified from their sources through resizing, rotating, layering and desaturation, and worked into loops. To compliment the rhythm later in the scene, they were combined and rendered out in pulses in Max/MSP/Jitter, again according to the tempo of the music.[22]

As 'Three Really' fades, the Kinect Max patch is activated. For a few minutes, the music becomes fully controlled by Peter's hand motions.

For the next scene, labeled 'Jammin' in the Isadora file, I have three video loops on faders: the cloud loop, the video mixture at a slow pulse, and the video mixture at a fast pulse. I improvise with these throughout the scene.

The beginning of the Finale is audibly cued in by sine tones. To match these I have lines entering the screen space from both sides, created in Final Cut Pro. Once these lines

span all of the screens, they evolve into audio waves. The audio waves were created with the Processing Minim example patch "UserDefinedEffect,"[23] using the music file given to me by Peter as source audio. This was rendered to video and edited into a loop in Final Cut to be used in Isadora.[24] For the duration of the Finale, I had four video loops[25] each controlled by a fader, with which I improvise. At the conclusion of the piece, I fade all videos out, and on the re-entry of the sine tones, I reverse the entrance video to have the lines exit in the manner in which they entered.

The final scene was meant to mirror the initial solo piano scene, with the Xbox camera live input once again projected on the screens. Unfortunately, in one of the two performances—the one recorded—the Max patch crashed, and the projections did not appear.

Conclusion

As this was Peter and David's first show of this scale as Eat My Noise, and because it was my first time working with them, the compositional and media-making process for this show was quite messy and last-minute. The majority of the final scored music was given to the musicians a few weeks before opening, and the last song was finished around midnight the day before opening.

Despite this, the final result was impressive in relation to the the last minute nature of the creative process. As our initial meeting was well ahead of the show, I had plenty of time to generate a large bank of relevant video material. My working processes for collaborative endeavors is intentionally open to variation and improvisation, and this show expanded this philosophy and led me to 'perform' the video set more than I normally would. For this show,

I triggered all video cues manually in reaction to musical events, further improvising with video clips within scenes using sliders to control the layering and opacity of predetermined loops. While I would have preferred to program more truly interactive elements, using data from the live musical element to effect video parameters, we were successful in achieving this through the Kinect Max patch, and I was able to give the illusion of interactivity through programming the video rhythms separately using the same tempos as the music.

Notes

1. On the accompanying USB drive, see AVolution/video/AVolution.mov for show documentation.

2. See Volution.

3. See Evolution.

4. On the accompanying USB drive, see AVolution/showdocs/Max/White Noise/ KinectSynth3.maxpat for code and AVolution/showdocs/Max/White Noise/white-noise.mov for video documentation.

5. All particle system patches are modified from the Multiple Particle Systems Processing example. With Processing open, go to File/Examples/Topics/MultipleParticleSystems.

6. See Internet Archive

7. See Ben Fry

8. On the accompanying USB drive, see AVolution/showdocs/Max/Comp2.maxpat

9. See Jean-Marc Pelletier for details of jit.freenect.grab Max external.

10. On the accompanying USB drive, see AVolution/showdocs/Max/Comp1.maxpat

11. On the accompanying USB drive, see AVolution/showdocs/Processing/ poetry_announce/poetry_announce.pde

12. On the accompanying USB drive, see AVolution/showdocs/Isadora/Show.izz

13. On the accompanying USB drive, see AVolution/showdocs/Isadora/media/state1.mov

14. On the accompanying USB drive, see AVolution/showdocs/Processing/ poetry_announce/poetry_announce.pde

15. On the accompanying USB drive, see AVolution/showdocs/Isadora/media/clouds_layers.mov

16. On the accompanying USB drive, see AVolution/showdocs/Isadora/media/state2.mov

17. On the accompanying USB drive, see AVolution/showdocs/Isadora/media/state3.mov

18. On the accompanying USB drive, see AVolution/showdocs/Max/static.mov

19. On the accompanying USB drive, see AVolution/showdocs/Isadora/media/9lives_big.mov for video, and AVolution/showdocs/Processing/firefly/firefly.pde for sketch.

20. See Anita Lillie

21. On the accompanying USB drive, see AVolution/showdocs/Isadora/media/9livesP2_big.mov

22. Videos were take from archive.org (Internet Archive) and edited into a loop in Final Cut. To view Max file, on the accompanying USB drive see AVolution/showdocs/Max/pulse_render/pulse2_bg.maxpat: To view rendered video clips, in AVolution/showdocs/Isadora/media, see 3Really_pulse_bg.mov and staticClouds2_640x480.mov.

23. With Processing open, go to File/Examples/Libraries/Minim Audio/UserDefinedEffect.

24. On the accompanying USB drive, see AVolution/showdocs/Isadora/media/audiowaves.mov

25. On the accompanying USB drive, in AVolution/showdocs/Isadora/media, see audiowaves.mov, state2.mov, ripple_pulse_640x480.mov, and fastbeat_640x480.mov.

MOIETY

Introduction

Moiety was my second collaboration with Eat My Noise Productions, premiering as part of the 2013 Cork Midsummer Festival, in the CIT School of Music Stack Theatre. The performance consisted of nine pieces, based on the Nine Stages of Democracy often attributed to Scottish historian Alexander Tytler: spiritual faith, courage, liberty, abundance, selfishness, complacency, apathy, dependence, and bondage[1]. The music for this project was co-written by Peter Power and David Duffy, to be performed by two percussionists, Alex Petcu and Tomas Gall. As 'moiety' is defined as "one of two equal parts," or "one of two basic complementary tribal subdivisions,"[2] the piece capitalizes on the two performers' differing styles and backgrounds. Alex is a classically trained percussionist, while Tomas is a kit drummer, specializing in rock and jazz. Art O'Laoire and I were to handle the interactive aspects of the performance. My role was as projection designer, and his as lighting designer.

Theory & Structure

As with *A:Volution*, the collaborative structure was to collectively discuss thematic elements, create content separately, and then regroup in the performance space to bring everything together. In the initial meetings, Peter and David introduced the topics, and the idea to video map instruments. I insisted that if we were to map the marimba, there must be a conceptual reason to do so. To have the instrument simply light up when hit would be gimmicky, and difficult to achieve. Alex would not have us attach anything to the instrument, like sensors, and waveform analysis would require careful miking to be accurate. Eventually the composers determined that the electronic elements of the performance —digital music

and projections —came to represent various entities of external control—religion, politics, technology—in opposition to acoustic instruments representing individual agency. They chose to use the marimba map to represent an electronic marimba voice, to avoid the need of waveform or sensor input from live performance, and to fit the overall concept of the piece.

Once in the space, this time with the music composed well ahead of time, the interactive, visual, and lighting elements were built closely around the compositional and live performance elements. The show was performed in CIT's Stack Theatre, which is a black box theater. Because of this, we were able to place the audience on two sides of the performance space. As with *A:Volution*, Peter and David wished to break out of traditional concert staging formats, making the performance more intimate by bringing more of the audience to the periphery of the playing space. As there was no background projection surface in this format, my video design concentrated entirely on animating the stage floor and instruments, using one projector, facing straight downwards from the middle of the lighting grid.

Because Art wished to use a haze machine, I had the additional challenge of designing video not only for the projection surfaces, but for the space in between the projector and the floor, where the haze would reveal the projector beams.

The two percussionists and their equipment were placed mainly along the two sides of the room without an audience. The two composers were stationed with their instruments and controls in the center of the room.

***Moiety*: show structure**		
Act	**Music**	**Video**
Preface	Dark and ambient	Abstracted texts
Spiritual Faith	Light and beautiful. Alex Petcu on marimba	Blurry stained glass, as if light on floor through a window. Red projector light on all marimba keys.
Courage	Bold, rhythmic: forward-moving momentum. Tomas on kit, Alex on supportive percussion. Ambient background electronics	Sharp bursts of shapes: squares and prism-like lines.
Liberty	Compositional balance between Thomas, Alex, and electronic music. Positive, Hopeful. Additive Processes.	Additive Process using white circles, emulating tools and techniques used in lighting design. Ring of circles, tiny moving spotlights, and target-shaped ripple bursts.
Abundance	Primal, heavy-hitting rhythmic piece, consisting of a duet between kit drums and electronics	Explosions on drum hits. Blue grid corresponding with electronics.
Selfishness	Dark and ominous, drone and percussion, pierced by an high pitched melody	'Oily' video compilation, slightly altered by performer input. White spirals emanating from center correspond with high pitched melody.
Apathy	Alex improvises on custom-made glass marimba, Tomas plays blocks and bottles	None
Complacency	Acoustic and electronic marimba	White light illuminating electronic marimba notes on acoustic marimba keys. Dark room to highlight marimba keys.

***Moiety*: show structure**		
Act	**Music**	**Video**
Dependence	***part 1:*** Acoustic and electronic marimba, ambient background electronics.	***part 1:*** White light illuminating electronic marimba notes on acoustic marimba keys. Dark room to highlight marimba keys.
	part 2: Loud and percussive. Electronics and drum kit.	***part 2:*** Colorful grid, triggered by MIDI drum pads. Dark room to highlight pad hits.
	part 3: Mixed acoustic percussion, electronic marimba, additional electronic percussion and melody.	***part 3:*** White spirals, tiny moving spotlights, to compliment lighting design.
Bondage	Electronic drone.	Grid, animated logo.
Spiritual Faith	Light and beautiful, highlighting Alex Petcu on the marimba.	Stained glass, red projector light on marimba keys.
End	Silent	black

Table 1

As the audience entered the performance space, the abstracted poems *No Ladder Needs the Bird but Skies* by Emily Dickens,[3] and O*ne's not Half Two. It's Two are Halves of One,* by E.E. Cummings,[4] were projected across the entire performance space, accompanied by dark, ambient music and lighting. Both poems speak of the duality that the term 'moiety' describes.

‘Spiritual Faith’ features Alex on the Marimba. To match the theme of spirituality, I aimed for a stained glass aesthetic for the video element of the piece. The marimba is subtly lighted with red projector light, matching the yellow, orange and red color scheme of this act.

‘Courage’ highlights Tomas on the drum kit. For this, we create a transformation from ambient, natural looking light to clearly determined bursts of shapes. This is meant to illustrate the musicians beginning to engage with and control their environment in a more determinate manner.

Peter and David intended ‘Liberty’ to be an additive process, musically and visually. ‘Liberty’ utilizes a compositional balance between Thomas, Alex, and electronic music. The highlight of Art’s lighting design lay in four programmable moving lights, placed in each corner. With the projector, I chose to mimic the kinds of designs created with these movers, in an effort to develop a unity between lighting and projection to match the unity in musical elements. The additive process in the visuals included the systematic creation of patterns of white circles.

Up to this point in the show, we have created increasingly defined, complex relationships thematically between external forces and individualism, musically between Alex, Tomas, and the electronic element of the composition, and aesthetically between live action, lighting, and projections. During ‘Abundance,’ the relationships built up over the previous acts begin to break down and simplify.. This piece is a primal, heavy-hitting rhythmic piece. When drums are hit, video explosions burst across the floor. Electronic sounds are visually represented by a blue grid pattern assembling across the stage. This one-to-one relationship between drums illustrates a primal simplicity.

Following ‘Abundance,’ Peter and David wished for ‘Selfishness’ to be dark and ‘oily,’ permeated by ‘electricity’ illustrated by a high pitched melody. I chose white spirals, emanating from the composer’s control panel in the center of the room, to illustrate this electricity. ‘Selfishness’ begins to rebuild the nuanced relationships lost in ‘Abundance.’

For the sake of musical continuity within the show, ‘Apathy’ follows ‘Selfishness,’ leading to ‘Complacency,’ changed from Tytler’s original order of selfishness, complacency, and then apathy.

‘Apathy’ once again returns to simplicity, and is intentionally juvenile and playful. ‘Complacency,’ and its successor, ‘Dependence: part 1,’ are comprised of a duet between electric and acoustic marimba voices. When the electric marimba voice plays, each note of the electric composition is illuminated, in real time, on the physical marimba, lit by the projector on the ceiling. The trajectory of the narrative leads from Alex discovering the electronic marimba as an entity, learning that he can teach it to play his compositions, and then coming to the realization that the marimba might have a mind of its own after all, ending with Alex following the lead of the electronic marimba voice.

In ‘Dependence: part 2,’ Tomas gains control of the electronics, creating bright bursts of projection light across the floor with his drum hits, breaking the momentum of the marimba piece.

In ‘Dependence: part 3,’ Alex temporarily regains control of the electronics with a single marimba hit, sending projected ripples leading from the control panel outward. Peter and David leave the control panel, and join Alex and Tomas on percussion to demonstrate

that the electronics were now self sufficient, and that at this point in the performance, the musicians are a supplementary aspect of the automated environment.

Entering ‘Bondage,’ the lights fade, and the musicians stand still. ‘Bondage’ is dark and ominous: a projected grid appears across the stage, symbolizing that all involved are gridlocked and cannot control the situation. In the center of the stage, around the control station, I used the logo which was used on the promotional material, and animated it to look like gears rotating at varying speeds.

As music, lights, and projections fade, we transition once again to 'Spiritual Faith,’ ending the performance.

Technical Devices

We programmed the show so that the video and lighting were entirely triggered by MIDI via the same Ableton file use to play the digital compositional elements, as well as by two drum pads controlled by Tomas. The live video aspect was structured and programmed to receive these MIDI cues via Isadora.[5]

Additionally, I created the video mask for the marimba using OpenGL and JavaScript within Max/MSP/Jitter, in which each key of the instrument could be independently highlighted with the input of the corresponding MIDI note.[6] This was imported to Isadora via Syphon,[7] and controlled with MIDI from Ableton. The mask was painstakingly matched to the instrument from the ceiling-mounted projector using javascript variables for key width, height, spacing, and 3D keystone correction in Isadora.

To abstract the poetry by Dickens and Cummings, I re-purposed the Processing sketch used in *A:Volution* used to do the same within that piece.[8]

To create a stained glass effect in 'Spiritual Faith,' I created two video states meant to simulate light as it would appear on the floor after entering through a stained glass window, using a combination of Motion and Final Cut Pro. One was a slowly fluctuating overall wash of orange and yellow color.[9] The other formed a circle around the two composers in the center of the room.[10] During the beginning of the piece, while Alex plays the marimba, the stained glass circle slowly fades in over thirty seconds. As Tomas begins triggering digital tones via a midi drum pad, the second video fades in and out over five seconds, triggered by each hit. The marimba is subtly lighted with red projector light using the marimba mask.

The video design for 'Courage' comprised of simple one to one triggering of two videos[11] according to live input from two MIDI drum pads. Envelope Generators in Isadora control the luminance of the videos via an HSL adjust actor. The first video, comprised of squares, is set to go from full luminance to none over one second. The second video, comprised of prism shapes, is set to fade over two seconds. As the videos are looping even when not visible, a different segment of the video appears on each hit, creating variation in the imagery. Halfway through the act, two new videos[12] of similar shape and form to the previous videos are assigned to each drum pad under the same parameters.

For 'Liberty,' I mimicked the kinds of designs created with moving lights with the projector. The opening of 'Liberty' consists of a quartz composer patch given to me by Art.[13] This patch, when viewed on a screen, looks like a generic snow simulation. However, when

projected from the ceiling, through haze, it appeared as if a thousand little moving spotlights were coming from the center of the ceiling, with each beam visible in the haze.

To create an additive process, I programmed a ring of circles,[14] one appearing after another as triggered by the music, around the two composers in the center of the performance space. With Isadora, I made this circle rotate, fade in and out, and fluctuate in diameter triggered by MIDI triggers given by Peter.

On the entry of the final chorus, the ring of circles fades briefly, and is then brought back, accompanied by an animated loop of bursts of target-shaped circles,[15] which erratically cover the entirety of the performance space. Though these circles are in no way triggered by the music in real-time, due to similar rhythmic speeds and previous video interactions, they give the illusion of being connected to the music.

In 'Abundance,' when the MIDI drum pads are hit, the luminance value of a video illustrating explosions[16] is set to full luminance, fading to black over half of a second. When Peter sends me MIDI representing the electronic melody of the piece, a blue grid pattern representing electricity similarly triggered and faded.

In 'Selfishness,' to achieve the 'oily' look Peter requested, I combined two videos given to me by Art from a bank of generic VJ clips he had on file: one which was a smooth, silky-looking dark blue,[17] and one of a swarm of jellyfish swimming underwater.[18] I combined these in Isadora, using the latter as a displacement filter on the former. After slowing both videos to less than half of the original speed, the resulting composition resembled a slowly moving, bubbly oil slick. In Isadora, I programmed MIDI inputs to control the displacement parameters on these two videos. First, I programmed an increasingly

wide range of displacement, with a minimum value increasing from five to thirty, and a maximum value increasing from ten to eighty over the course of two minutes. I then set a MIDI input to trigger a ramp value from the current minimum value to the current maximum value over half of a second, returning to the minimum over two seconds. In this manner, MIDI triggers sent by Peter created increasingly more evident displacements in the video over the course of the first two minutes of the piece. To represent electricity, I created a video in Motion using a spiral generator, further layered and looped in Final Cut for texture, as an additive layer to the existing video composition.[19] On a MIDI trigger from Peter, this video is brought in at full luminance, fading to black over one second.

'Apathy' is simply lighted, with no corresponding video. 'Complacency' is completely dark, save for lighted marimba keys, created with the marimba video map. The lights do not return until the third part of 'Dependancy.'

The first part of 'Dependancy' makes use, again, of the marimba video-mapped keys. The second part of 'Dependancy' is comprised of one video of an animated grid[20] generated with Motion, triggered by the MIDI drum pads. This time, the video is brought in at full luminance on a MIDI note-on message, and turned off with a MIDI note-off message. Each time a note-on message is received, the hue offset of of a HSL actor is randomly assigned, changing the color of the video each hit.

The third part of 'Dependence' is brought in with a short video of a single ripple[21] which I triggered manually on the cue of Alex's marimba note. Subsequently, the marimba map returns, visualizing the electronic marimba part, and the Quartz Composer patch provides tiny moving spotlights. In addition to these, a video created with similar parameters

to that which represented ‘electricity’ in ‘Selfishness’ enters,[22] rhythmically triggered by Peter’s Ableton file.

The video element of Bondage is comprised of a grid, which I created in Motion, and an animated *Moiety* logo. To animate the logo, I separated all elements to different video clips. In each video, the elements rotate from the center at the same speed. Using Isadora, I layer these videos in an additive process so that all are equally visible, and on a trigger from Peter, these slowly fade in over the grid. The speed of each video accelerates at differing rates over the course of two minutes, and decelerates over the course of 30 seconds, before all video fades out, returning to ‘Spiritual Faith,’ which employs the same video setup as used previously.

Summary

Moiety is a piece that deals with balances between oppositions; those between two compositional styles, between two percussion styles, between the competing light sources of stage lights and projections, the opposition between individual will and natural and societal forces, and between digital composition and acoustic musicianship. The piece serves as an analogy to our relationship with technology: how we are involved in its development, and how we develop according to its influence.

The piece uses networked technology to create close relationships between sound, image, and environment. Video is generated and appropriated from a multitude of sources, and then programmed together in an interactive collage triggered by live performance elements.

Conclusion

As at this point all parties involved had a better understanding of each other's aesthetics and creative processes, this collaboration felt more streamlined than the previous year. We were able to create a more solid structural framework with which to work, and we were able to achieve more in regards to interactivity and reactivity within the technology through better planning and closer communication.

Notes

1. See Loren Collins for discussion about attribution, and John Eberhard for discussion of the 9 Stages of Democracy.

2. See Moiety.

3. See Dickinson (1709).

4. See Cummings (72).

5. On the accompanying USB drive see Moiety/showdocs/Moiety_Show1.izz for project file.

6. On the accompanying USB drive see Moiety/showdocs/Max_Marimba/marimba3.js for JavaScript code, and Moiety/showdocs/Max_Marimba/marimba3.maxpat for its use within Max/MSP/Jitter.

7. See Syphon

8. On the accompanying USB drive see/showdocs/Processing/poetry_announce/ poetry_announce.pde on the A:Volution DVD for source code.

9. On the accompanying USB drive see Moiety/showdocs/clips/ripple2.mov.

10. On the accompanying USB drive see Moiety/showdocs/clips/stainedglass4.mov.

11. On the accompanying USB drive see Moiety/showdocs/clips/blockburst1.mov (square) and showdocs/clips/Dan_Wise-AndroidDreams_001.mov (prism).

12. On the accompanying USB drive see Moiety/showdocs/clips/pulse_square2.mov (square) and showdocs/clips/lines_prism.mov (prism).

13. On the accompanying USB drive see Moiety/showdocs/clips/confetti.qtz.

14. On the accompanying USB drive see add0.jpg through add16.jpg in Moiety/showdocs/clips for frame by frame in-order additive process. For ‘random’ additive process, see random00.jpg through random16.jpg.

15. On the accompanying USB drive see Moiety/showdocs/clips/circles_pulse_spiral.mov.

16. On the accompanying USB drive see Moiety/showdocs/clips/lightburst.mov.

17. On the accompanying USB drive see Moiety/showdocs/clips/smooth_curves.mov.

18. On the accompanying USB drive see Moiety/showdocs/clips/jellyfish.mov.

19. On the accompanying USB drive see Moiety/showdocs/clips/electric1.mov.

20. On the accompanying USB drive see Moiety/showdocs/clips/tron.mov.

21. On the accompanying USB drive see Moiety/showdocs/clips/circle_pulse_singleripple.mov.

22. On the accompanying USB drive see Moiety/showdocs/clips/electric2.mov.

DEATH OF A SALESMAN

Introduction

My collaboration with Aleksandar Sasha Dundjerovic and The Drama and Theatre Studies (DTS) department at University College Cork (UCC) began when I approached Sasha in February 2013. I was interested in working with actors to develop multimedia systems for theater, as thus far, in Cork, I had mainly worked with musicians. I introduced myself and my work, and asked how I might be able to work with the Department of Theatre Studies.

Upon our first meeting, Sasha mentioned that he planned to direct a production of Arthur Miller's *Death of a Salesman*[1] in the Everyman Palace Theatre the upcoming May, bringing the Irish-American actor Patrick Cronin, and his son, James Cronin, to Cork to play the main roles of Willy Loman and Biff Loman.[2]

According to Patrick, Death of a Salesman was originally titled *The Inside of His Head*. Sasha asked if it would be possible to have the scenes which take place in Willy's head, based on his—somewhat questionable—memory, portrayed as projections.

This aligned with my own interests at the time in exploring memory and psychology through programmed video. The idea of working in the Everyman excited me as well.

The Everyman Palace Theatre is a highly decorative Victorian proscenium theater. Originally built in 1840, the Everyman has had several identities, including The Cork Palace of Varieties from 1897-1912, where artists such as Charlie Chaplin, George Formby and Laurel and Hardy have performed, as well as later becoming a cinema from 1930-1988.

This historical context of the building as a theater and a cinema drew me in as a video designer. In my work I like to blend the physical and digital—the old and the new. Through

my work, I saw an opportunity to combine these two histories—theater and cinema—in one performance.

Theory & Structure

Our process began with Sasha, Patrick, and I, as well as the costume and stage designer, Lisa Zagone, collectively pooling creative inspirations and ideas. Sasha presented Robert Lepage as an inspiration in regards to multimedia design in theater. He showed us vintage advertisements from the 1950s as inspiration for the overall design aesthetic. I introduced The Wooster Group's *Hamlet*[3] and Big Dance Theatre's *Comme Toujours Here I Stand*[4] as aesthetic inspirations for video backgrounds and characters, proposing the use of fragmented video segments and multiple projection screens of varying sizes. Sasha and Patrick thought this collage aesthetic would work nicely with their concepts of the piece. Lisa was tentative about so much of the stage design being reliant on video, as her aesthetic relies on lighting, shadows, textures, and traditional theater techniques.

Sasha wished for the staging to resemble the inside of a house, as the play is traditionally done. I wanted to keep the set malleable to portray the outdoor and restaurant scenes as well, as this would be possible through projections. Between Sasha, myself, and Lisa, we developed a series of five screens, three in the front and two in the back, which could abstractly be made to represent the rooftops of a house. I planned to use the front three panels for video characters and indoor background scenery, and the rear panels for outside background scenery. Lisa was skeptical that I would be able target the rear screen with the video projections, and throughout the process insisted on adding decorative elements to these such as wallpaper or windows. I did not want to do this, as then the scenery would be

permanently stuck in ‘house’ mode throughout the performance. In the end I convinced her I would be able to project on them, and they remained blank. She convinced me that the screens should be placed some distance apart from each other, with one at an angle, to create a better sense of depth to the stage, despite it making it more difficult for me to target them.

From past experience and from conversations with other actors, I knew that most performers find that altering their own timing to match a pre-recorded video was very difficult: the acting feels forced, and the energy of live performance is lost. Therefore, I proposed to create a system in which the recorded video characters would be filmed and edited in a manner where the dialog of the video characters could be triggered in real time when the stage actors finish their lines, allowing the performers to retain control of the timing of their own delivery. Patrick agreed when I proposed this; he was tentative about working with video up until this point, but was eager to try this method.

We marked all of the scenes that occur in Willy Loman’s memory within the script, and recorded these with a green screen so that I could superimpose backgrounds. We used student actors to portray Willy’s sons as children. The actress who played Willy Loman’s wife was already significantly younger than Patrick, so she remained the same for the filming, and was aged with makeup for the stage. Sasha wished for the film actors to be excessively vibrant and happy, to match the 1950s advertisement aesthetic, and to contrast with the tragic nature of their present-day counterparts.

The collaborative method used in this play was much less open than what I was accustomed to. Beyond my initial push towards a collage aesthetic and a fragmented, multi-screen video layout and triggering process, the play was produced fairly traditionally. Sasha

assumed the role of a traditional director, and had us stay true to the original script and descriptions found within the play. I directed the filming of the video to be used for projections, and was in charge of designing and implementing the interactions of the stage characters with the video characters. Much of the remaining background design consisted of a collage of visual elements mentioned in the script, adjusted to match the aesthetics of 50s television and film, and the stage design.

Technical Devices

Video representing characters and background imagery was edited and montaged using Final Cut Pro and programmed for stage using Isadora.[5] The video scenes were recorded on two separate days due to restrictions on actor availability. Willy Loman was shot first, alone, in the Cork Opera House Half Moon Theatre. All other scenes were shot in the St. John's College production studio without him.

A rough storyboard of the projected character's locations on the stage was determined, and Sasha and I co-directed the video shoot to optimize both acting and programmability. I instructed the actors to look in the general direction of where the stage actors would be in relation to the projected character's location. The dialogs were filmed one line at a time. I instructed the actors to hold still in a resting position after each line, as our production manager spoke the lines which the stage characters would say on stage. In this manner, if the stage actor took longer than the duration of the clip to finish his or her line, the video would stop on the last frame of the clip, and the video character would appear to be holding still and listening.

Using footage from two separate days of shooting in two different locations with different equipment, I set to work on my video collage. I edited the videos to be grayscale with a high contrast. This both added to the highly stylized black and white 1950s aesthetic we were aiming for, and helped the background imagery blend more seamlessly with the video characters.

I edited each scene to be triggered line by line by the video operator (myself), cued by the performance of the live actors. As Patrick Cronin was the only character to interact directly with the projected characters, I worked closely with him in rehearsals, working through the script line by line to get a feel for timing and editing any footage that felt 'off.' For our rehearsals in the DTS studio and the Granary Theatre, I used Isadora to piece together the film actors and tentative greenscreen backgrounds using Isadora's Luma Key feature.

Once we were set up in the Everyman Palace Theatre for tech week, I introduced backgrounds, such as fences, cars, trees, and wallpaper, to get a feel for size and perspective relative to the space. We introduced 1950s cars and wallpaper to give the memories a vintage feel. Once Patrick, Sasha, and I were happy with the overall composition, I solidified these edits within the clips themselves using Final Cut Pro, to save on processing power during the live performance.

In Isadora, I localized the audio coming from specific clips on specific screens to correlate to the nearest speaker. Video characters speaking from the front right panel would be audible via the right speaker: voices of characters on the front left would come from the left speaker: voices from characters in the center would come equally from both speakers. In this manner, audio would match image from the audience's perspective, and the actors could

tell where the video characters were located without having to look back at the screens. As we only had two speakers to work with, We placed these in the boxes to the right and left of the stage: this way the actors could hear them and they were close enough to be convincing to the audience that the voices were coming from the stage.

Additional imagery for the projections was sourced from online sources and montaged within Final Cut and Isadora to be re-purposed for background imagery. For specific New York City background imagery, like project housing and the Brooklyn cemetery, I asked a friend, Oscar Torres, to take high resolution pictures of these and send them to me. I then used warping and duplication techniques in photoshop to adjust them for use in the projections.

To be able to target two planes of screens while maintaining focus, we used two projectors, hung side by side above the audience in the center of the auditorium. Lisa chose a parchment-like material for the screens, giving the projection surface an archival appearance.

Summary

Combined with music composed and performed by Hollas Longton and Neil Quigley influenced by Early American, Eastern European, and Irish influences, the theatrical environment created for this play was a multi-media collage of a wide range of source materials and influences, highly stylized both to match the architecture and history of the theater and the aesthetic of Arthur Miller's play. The media and music channeled aesthetic influences from early 20th century film and 1950s advertising. This was set within a minimalist stage setting and limited color palette as to complement the Victorian architecture.

At times the video imagery was cinematic; other times it served to blend the set with the existing architecture, borrowing its colors and patterns.

Reflections

Through this experience I learned that a term in one field can mean something completely different in another field. Site specific for me means taking a specific space and transforming it; the same term to Sasha means taking a specific space and using it as a narrative aspect of a performance. Interactive in theater terms tends to mean audience engagement; interactive in technical terms means a computer system that requires feedback from an outside user to function. This production drove home to me how important good communication and mutual respect is within a collaboration. Perhaps through communication errors on all ends, or due to our vastly differing approaches to the creation of theater, Lisa, Sasha, and I never seemed to be on the same page. This caused many unnecessary setbacks throughout the production process.

This reinforced in my mind the necessity of choosing one's collaborators based on complementary aesthetic preferences and personalities, as well as the need to, as a director, trust your performers to act in a manner that is true to their talents and specialities. I felt that in several cases within the rehearsal process, over-directing and lack of room for experimentation stifled many potentially beneficial elements of this piece.

Despite this, there were many talented people working on the play, and we were able to overcome most differences in preferences and personalities to create a unified, functional piece.

Notes

1. See Arthur Miller.

2. On the accompanying USB drive, see Death of a Salesman/video/DOAS.mov for video documentation.

3. See Hamlet.

4. See Comme Toujours Here I Stand.

5. On the accompanying USB drive, see Death of a Salesman/showdocs/DOAS.izz to view show file.

VIOLA QUARTET

Introduction

Music tends to be both technical and philosophical, both structure and expression. The structures and forms of specific music are quite definable, but the effects of music in general on the individual and within societies are more elusive and debatable.

As a composer who originated in a visual arts background, my approach to music tends to be out of a need to dissect it, rather than as a means of expression. Viola Quartet is an attempt to reverse engineer several traditional musical constructs in order to deconstruct the emotive, sentimental properties of music.

Theory & Structure

Computer-aided composition has a reputation among the more acoustically inclined as being soulless, unfeeling, and, as the demographics of many computer music conferences would illustrate, inherently masculine. The field of computer music is highly populated by engineers and scientists, many of whom are more interested in building systems than in making music. Oftentimes when creating new musical interfaces and systems, the physicality and temporal presence associated with live acoustic performances are lost.

Acknowledging my own guilt of this, and in an act of counterbalance, for Viola Quartet I chose to use what Marc Hirsh calls the *Sensitive Female Chord Progression*, so named because “it seemed to be the exclusive province of Lilith Fair types baring their souls for all to see.” The progression is used in Jewel's *Hands*, Melissa Etheridge's *Angels Would Fall*, and Nina Gordon's *Tonight and the Rest of My Life.*[1] Thus, this piece becomes an experiment in reverse engineering the chord structure of popular, emotive music.

I chose the viola as the sole instrumentation for the piece due to my own history with the instrument. I played viola in my public school orchestra for eight years as a student, but then abandoned it altogether upon going to college for a visual arts degree. After graduating with my B.F.A. I began practicing again, occasionally playing with amateur and student orchestras. Because of lack of focus and inconsistency of practice, I have never mastered the instrument.

Viola quartet has become a personal mission to reconcile my efforts as a violist with my experience as a digital artist by unifying the two within one piece. It is also a manifestation of my frustration at my inability to master the instrument after so many years, hoping to piece together a composition much more complex than I personally would be able to play live.

Stringed instruments are viewed as beautiful and emotive, and are usually associated with classical orchestras, highbrow cultural events, and highly emotive film scenes. Recorded samples have far more nuanced quality than the synthetic strings frequently utilized in popular music, which tend to sound mechanical and soulless.

As classical stringed instruments often play in quartets, I chose to program this piece in a quadrophonic setup as an allusion to this format, using deconstructed and reconstructed audio and image samples that I recorded. As four is a number that represents stability, I use this theme throughout the structure of the composition, in opposition to the chaotic randomness of the variable elements of the piece.

As I come from a visual arts background, I felt compelled to add a video element to the piece, to inform and correspond with the compositional element. To do this, I chose to

superimpose fragmented images of four buildings, divided horizontally into quarters to represent the four viola sections.

The buildings chosen for the piece are in Berlin, which manifests in my mind both as a seat of classical music history and a forefront of contemporary art practices. They are the Haus der Kulturen der Welt, the Berliner Philharmonie, Kunstquartier Bethanien, and the Konzerthaus, representing a mixture of music and art, classical and contemporary.
The Haus der Kulturen der Welt (The House of the Cultures of the World), was founded in 1989, with the explicit intention of fostering non-European cultural exchange in Germany. The current building was the USA's contribution to the INTERBAU 1957 building exhibition in Berlin, designed in 1955 by Hugh Stubbins to serve as a symbol and beacon of freedom, with a curved, wing-like roof, visible to communist-ruled East Berlin. Today it continues to promote experimentation and learning in art, music, and cultural investigation.

The Berliner Philhamonie is home to the Berlin Philharmonic Orchestra. The current building opened in 1963 in the area known as Kulturforum, at the edge of West Berlin, designed by Hans Scharoun. The building is unique, with an unusual tent-like shape and a distinctive bright yellow color.

The Kunstquartier Bethanien has housed predominantly cultural, artistic and social institutions since 1973. It had originally been constructed in 1847, commissioned by the pious King Friedrich Wilhelm IV as an institute for educating nurses and carers. Ludwig Persius' original design held 500 beds, a training school for the sisters and an orphanage. The hospital was closed in 1970. The building was to be demolished and reconstructed as social

housing projects, but squatters, citizens' initiative groups, and historic building conservationists hindered plans.

The Konzerthaus Berlin was completed in 1821, designed by Karl Freidrich Schinkel, in Gendarmenmarkt, between the Church of the Huguenots and the new German Church. The building features a large front staircase, six iconic portico pillars, and a highly ornamental façade, featuring Apollo, God of the Arts, in a chariot drawn by two griffins. Located in West Berlin, the original building was bombed in 1943. The building that stands today is a reconstruction of the original.

I chose to use indeterminacy as an aid in my reconstruction in order to create endless variations in rhythm and harmonies. I have a personal vendetta against the overuse of unvaried lyrical repetition in popular music, as I feel it makes music predictable and monotonous. In opposition to this, for this piece I created a programmed compositional structure, with randomized parameters within this, with the intent that no moment within the piece would be identical to another.

Technical Devices

Music

Viola Quartet uses Max/MSP/Jitter to categorize and reassemble samples using randomized variable functions in a computer-aided audio-visual composition. I recorded four octaves of the C major scale, each note played individually on a viola, inclusive of all notes

needed to construct the Sensitive Female Chord Progression. Using the chord progression i - VI - III - VII, our chords are a minor, F, C, and G, which employ the notes A B C D E F G.

As an amateur, I find the top octave difficult to play, as it is very high on the A string and small finger movements make a large difference in pitch. Therefore, there is quite a bit of fluctuation and a struggle to maintain a consistent tone is evident.

The individual properties of each clip become more noticeable as they are played over and over again. Any particularly aggressive attacks, fluctuations in pitch or bow pressure, become rhythmic elements. Pitch fluctuations due to human error create, in parts, interesting harmonies and rhythms when played with other notes or repeated frequently in succession.

However, the more frequently a dissonant or highly fluctuating note is selected by the program, the more abrasive the odd sample becomes to the listener. To counteract this, I recorded four versions of each note. The program would then randomly choose one of the four samples each time a given frequency was chosen. This maintained some of the interesting rhythmic properties that repeated samples bring to the piece, while dissipating the intrusive qualities of the abrasive notes.

I recorded the samples with one SM58 microphone, and processed the clips as little as possible in an attempt to keep the recording as raw and true to life as I could. I aimed to make each note last approximately four seconds.

The piece consists of four voices, which are all different manifestations of one subpatcher abstraction.[2] Each voice is designated its own channel and designated to one speaker within the quadrophonic speaker system.

To create contrast, ebb, and flow within the piece, I set a random interval, deciding a time between four seconds and four minutes, at which different variables within each of the four voices would simultaneously change. I call these intervals ‘scenes’. Every time a scene is triggered, the note duration, note to silence ratio, volume, chord, and range are randomly decided.

On each scene change, a random maximum note trigger interval for each voice is chosen within the range of four hundred milliseconds to eight seconds. This maximum note duration is then sub-divided randomly by an increment of one to four, to further vary the voice’s rhythm. Thus, our final minimum possible trigger interval is one hundred milliseconds, and our final maximum is eight seconds. The sub-division increment is changed every time a new note trigger occurs.

To create space within the piece, each scene trigger determines a randomized probability of whether a note trigger will generate a note or a silence of the same duration. One random number generator decides whether there would be four, six, eight, ten, or twelve possible random numbers from another generator. If the random number generated is less than or equal to four, then a note will be triggered. If the number is greater than four, then no note will be triggered. Therefore, there is a randomly chosen note to silence ratio of 4:4 (1:1), 4:6 (2:3), 4:8 (1:2), 4:10 (2:5), or 4:12 (1:3).

On each scene change, the overall level of each voice is randomly decided. A random number is decided between 250 and 1000, which is then scaled to .25 to 1. This volume, as well as the current note duration interval, is then applied the range and domain parameters of a function object. This function is applied to output of a groove object that is triggered for

each note that is played, creating a volume envelope. This envelope is designed to mimic the typical attack and decay of a bowed instrument. The function serves to prevent the clipping and sudden volume changes that occur when cutting off an audio sample before it finishes naturally.

Scene changes also trigger a random selection of chords and ranges, which are predetermined, organized and grouped using collection (coll) objects. As I was using the Sensitive Female Chord progression, each coll is assigned a chord, and contains only the notes within that chord. Each coll is then separated into different options for ranges found on the viola.

Out of the four octaves recorded, I determined the low range as being the bottom two octaves. The mid range consists of the middle two octaves, excluding the bottom and top octaves. The high range consists of the top two octaves. One coll for each chord also exists with all ranges available. Four chords, with options for low, mid, high, or all ranges, totals to sixteen possible options of note groupings for each voice in each scene, each group consisting of six notes for limited ranges, and twelve notes for full ranges.

Video

Once the photos of the buildings were taken, I imported them into Photoshop, laying each one on top of the others at varying opacities, to get a feel for common architectural elements and divisions, and aligning them accordingly. The intent was to create an ‘exquisite corpse,’ in which one segment could seemingly be a continuation of another: a mix-and-match of architectural elements.

To further blend the images, and to soften the edges of the projections, I cropped each quarter of each image to eliminate excess negative space, retaining only architectural elements. To these segments, I applied a vignette to blend the foreground with the black background. I chose to desaturate the images, as they blend more naturally without the distraction of contrasting colors.

Each quarter is tied to the same metronome speed and interval determination process as the corresponding viola voice. On every scene change, an urn object generates a random number from zero to three, inclusive.

The generation of the number zero leaves all four of the segments completely tied to the same triggers as the audio. If a note is triggered, a video segment will fade in and out, the opacity directly linked to the volume of the audio clip.

The generation of the number one redirects the triggering process to a duplicate set of triggers, based on the same maximum duration and note to silence ratio as the original, but running as an independent triggering process. This keeps the clip on the same rhythm as the corresponding audio, but breaks the direct link between audio and video. The generation of two or three randomizes an independent choice on each quarter of whether it is tied to the audio or to the parallel triggering process.

The urn object ensures that all numbers must be generated before one could be repeated. Therefore, the direct linking of the audio and video will always occur within four scene changes of the last.

Every time a note-on trigger is sent to the video, by whatever means determined, a counter object scrolls through the four available image options for each quarter. Every time a

note is triggered, a different image will appear. As all of the images are being triggered at different speeds and at different rhythms, occasionally the images phase in a way where one could get a sense of what a building might look like as a whole. For the most part, the result is a random alignment of different segments of different buildings—an exquisite corpse of architecture.

Summary

Viola Quartet, as a whole, is a collage based on classical and contemporary popular music and the institutions that foster and support them.[3]

The programmed rhythms created are often at odds with one another, making it a piece that would be nearly impossible to be performed by myself, or by any live instrumentalists. The distribution of four voices to a quadrophonic system further fragments the musical aspect of the piece, making it so that the audience's position within the installation space plays a variable role in the composition as well, determining the volume of each voice in relation to the viewer's position within the room. The piece has no determined beginning or end: it begins when the listener enters the room, and ends when the listener leaves. In this way the audience's actions affect their experience with the piece. Each viewer will receive a different experience of the piece.

Viola Quartet is a marriage of classical acoustic and contemporary computer-based music making processes, generated through a programmed architecture of variable parameters. The piece plays visually with the physical architecture of buildings that house the

musical forms I attempt to deconstruct, while using the physical architecture of the installation itself to further its indeterminacy.

Conclusion

Through trial and error in the process of creating this piece, I have learned that lack of repetition results in a very chaotic composition. Excessive repetition and no repetition both seem to be recipes for predictable compositions, as music with no repetition can be predictably and monotonously chaotic.

Despite my misgivings I now acknowledge that repetition is a powerful tool in music composition, and that it can manifest in many forms. Within this piece, the note choice, singular instrumental voice, and limited range, in addition to the repetition of recorded samples, creates a sense of never ending repetition, despite my intentions to avoid this.

As in many of my pieces, this composition is an effort to find balance between structure and chaos. Viola Quartet, as it is, leans toward the chaotic side, for better or worse. Further versions of this program might include the generation of sequences to be repeated through the duration of a given scene. The repetition of longer phrases would serve to temporally segment the piece, which, in a way, would make it ‘feel’ more varied to the listener, while maintaining the initial intent that no two scenes within the piece would ever be identical.

Notes

1. See Hirsh, Marc.

2. On the accompanying USB drive, see Viola Quartet/Max_MSP_Jitter/include_voice1.maxpat and its use in the Viola Quartet/Max_MSP_Jitter/ViolaQuartet.maxpat file.

3. On the accompanying USB drive, see Viola Quartet/video/ViolaQuartet.mov for two channel video documentation. To listen to the piece within the program, open Viola Quartet/Max_MSP_Jitter/ViolaQuartet.maxpat, choose ‘2 channel’ or ‘4 channel’ from the menu depending on your current audio setup, and toggle on ‘Start Program,’ then ‘Start Audio,’ then ‘Start Video.’

IV WILLS

Introduction

Theories

IV WILLS is a multi-media, multi-disciplinary performance piece based on ideas of four classic critical theorists: Arthur Schopenhauer, Friedrich Nietzsche, Sigmund Freud, and Victor Frankl. The piece was written for violinist Hollas Longton and pianist and singer Claire O'Brien, and choreographed by two dancers, Inma Pavon and Maria Sinnecker. The concept of the piece came from a very personal search for meaning and purpose in a materialistic, highly capitalistic Western world. In business, academia, and art, a thought, concept, skill, or item seemingly has no worth other than its current or potential monetary return.

I believe that in order to live a satisfying, meaningful life, one must nurture one's intellectual and emotional needs as well as one's bank accounts. In the USA, one of the most materially well-off countries in the Western world, suicide is the leading cause of injury-related deaths, surpassing homicides and car crashes.[1] While some of these cases surely stem from very real personal dilemmas such as poverty, illness, or loss of loved ones, I believe many cases stem from what Frankl terms an existential vacuum, or a general, pervasive sense of meaninglessness,[2] despite having all basic physical needs met. As Frankl states, citing Nietzsche: even in the most dire of circumstances, those who have a why to live can bear almost any how.[3]

Historically, religion and community provided morality, spirituality, and human connection to individuals, giving them a sense of a higher purpose than the monotonous

obligations of their own daily routine.[4] Today, communities are more wide-spread. Through the use of modern technology, human communication involves less one-to-one contact, but covers a wider distance and a more expansive range of perspectives. We are just as, if not more, likely to ask advice from sources on the internet as we would from a family member or neighbor.

As one born outside of any strong religious tradition, in a highly populated, ethnically and culturally diverse area, with full access to information on a wide range of beliefs, religion has for me always been a thing freely and personally chosen or not chosen. Every religion is just one of many: all have good and bad tenets, and all are of seemingly equal standing. Therefore, religious zealotry seems absurdly self-righteous and stubbornly ignorant of the millions of other people on the planet and the thousands of other religions that they follow. From the outsider's perspective of an atheist, religious purism seems to do more harm than good, breeding and justifying xenophobia, homophobia, and sexism.

Like an increasing number of others,[5] I view organized religion with suspicion, yet still feel a need for a sense of spirituality that connects me to the world I live in and those I share it with. I seek to find a better morality and sense of community, free of residual oppressive dogma born in archaic societies based on the realities of today. Therefore, theorists such as Schopenhauer, Nietzsche, Freud and Frankl appeal to me, as they cover broad philosophical and moral standpoints from a more or less secular position, stemming from the field of individual psychology. Though each theorist is not without flaws, and some of these texts were written over a century ago, they cover universal human issues that are still relevant today. Unlike many modern texts, they seek to provide frameworks within which to

think, rather than to determine narrowly defined absolute truths. They read more like thought processes rather than scientific theories, and the theorists often turn back and contradict themselves later. I believe these dialectics and contradictions are important to intellectual pursuit: a debate often reveals more truth in the argument than in the conclusion.

Structure

I create works that employ multiple creative materials and methods unified via technology, as I believe this is the best means to represent the multifaceted world in which we live. It gives us access to the the forms of information and communication that we use in our daily lives, and it enables us to combine analog and digital forms; the physical and intangible; the old and the new. I seek to create networks between creative mediums: between dance and video, video and audio, live instrumentals and imagery, a collage in which each element acts upon, reacts to, and informs the other. I play with the instability of such networks in a live performance setting, intentionally programming indeterminacy into the behaviors of the digital media and exploring variable parameters through trial and error.[6]

My directing methods correspond with my media-making methods: I create structures via sound, image, space, topic, and time, and let the performers' agency serve as variable parameters within these structures. Working within additional randomized media parameters, the performers are unable to fully settle into routine, and become more indeterminate in their actions. Each performance is fresh and unique, with an energy and determination that can only be achieved through uncertainty. Through *IV WILLS*, I sought to create a balance between structure and chaos.

The main structural elements of *IV WILLS* are space and time. The piece is structured in fours, to lend stability and structure to a piece created on unstable theories, using unstable technology. Four provides architectural stability: four rectangular walls, four sides to a window, four sides to a door. Nature is divided by fours: there are four seasons, four classical elements, and four cardinal directions. Religions abound with the number four: the Buddhist four noble truths, four bases of power, and four stages of enlightenment; the Christian four gospels and four horsemen of the apocalypse; the four books of Islam.

IV WILLS is divided into four acts, based on Schopenhauer, Nietzsche, Freud, and Frankl, in chronological order of when they lived and worked. Each act is sixteen (four times four) minutes long.

For rehearsals, I secured four separate weeks of development time dispersed across six months in the Corcadorca Theatre Development Centre (TDC), in Cork, Ireland: the week of December 1st, 2014; and the weeks of February 23rd, April 6th, and May 11, 2015. We developed one act per development week, in sequential order. I developed the musical concepts, structure, and themes before meeting with the performers. We discussed these at length, and then I let the performers interpret these guidelines as they wished, interfering only if needed, during the development process for the sake of continuity and interaction design. The final show ran June 30th - July 4th, 2015 in the Granary Theatre in Cork.[7] We had a full week of tech in the performance space preceding the show.

Technical Devices

Four Wills was performed in a square space, with the audience positioned along all four walls, facing the performance space in the center. A projection screen was placed

covering the majority of each wall, above the audience, spanning 6 by 3 meters each. The audio system consisted of four speakers and two subwoofers. Each performer was assigned a corner of the room as their home base (see figure 5).

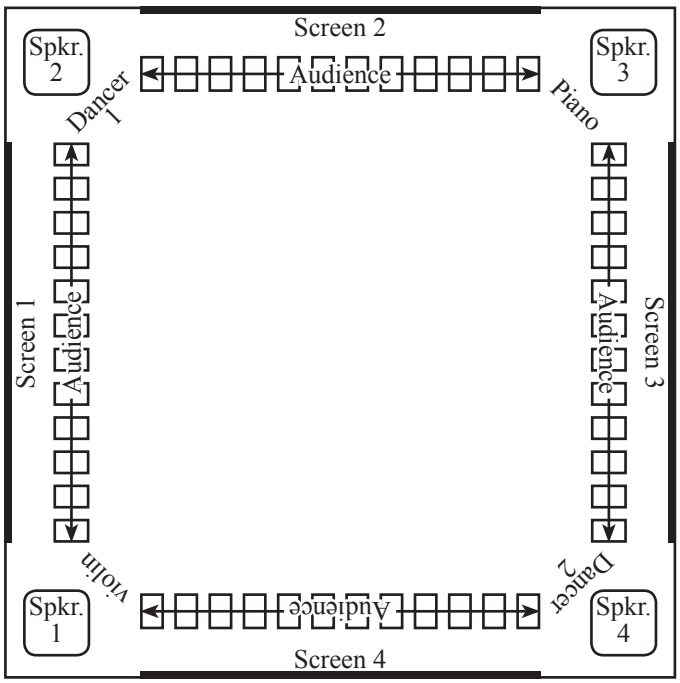


Figure 5

Hollas's violin was input to the central computer and amplified via a crude piezo pickup microphone secured on his instrument with tack and run through a pre-amp pedal. Claire was set up with an electric piano, set to silent and sending MIDI to a nearby computer via USB, and a Shure SM58 microphone. The dancers each had LilyPad Arduino boards embedded in their shirts. Accelerometers attached to their wrists picked up x, y, and z data from the dancers' arm motions, which was transmitted wirelessly to the central computer via XBee radio modules.[8]

ACT I: Arthur Schopenhauer - World as Will and Representation

Theories

The first act, Will to Live, is based mainly on Arthur Schopenhauer's texts *The World as Will and Representation*[9] and '*The Fourfold Root of the Principle of Sufficient Reason.*'[10] Schopenhauer's 'will to live' is a blind, animalistic desire to perpetuate oneself: to avoid pain and to procreate.[11] In *World as Will*, Schopenhauer maintains that the world is, for us, a lawless blind impulse, devoid of knowledge, absolutely free, entirely self determining endless striving: there is no God, and the world is inherently meaningless. The world is represented as being in a condition of eternal frustration. It endlessly strives for nothing in particular, goes essentially nowhere, and is beyond ascriptions of good or evil.[12]

Through *The Fourfold Root of the Principle of Sufficient Reason*, Schopenhauer defines four kinds of necessary connections that arise within the context of seeking explanations. Inspired by Aristotle's doctrine of the four basic kinds of explanatory reason, Schopenhauer correspondingly identifies four independent categories of objects in which explanations can be given: material things, abstract concepts, mathematical and geometrical constructions, and psychologically-motivating forces.[13]

Structure

Act I was temporally subdivided according to the aforementioned four themes defined by Schopenhauer.

0-4 minutes	4-8 minutes	8-12 minutes	12-16 minutes
Abstract Concepts	Psychologically Motivating Forces	Mathematical and Geometrical Constructions	Material Things

Table 2

The score I provided, for both dance and music, consisted of instructions within these guidelines. We discussed these topics at length, and collaboratively came up with ways to interpret these themes within the piece. The dancers worked on choreography independently after an initial discussion of each topic, before rejoining the full ensemble to work out ideas within the TDC space. The music for Act I was mostly devised through improvisation and trial and error between myself with the looping system and Hollas on violin during the residency.

I interpreted Abstract Concepts in relation to human experience to be the internal working of the mind. Relating the beginning to origin stories such as the Greek concept of chaos, I aimed for a trajectory of moving from stillness — a nothingness with the potential for all of existence — to an emergence into consciousness. For Inma and Maria this translated to moving from a deep, internal, meditative state, and slowly awaking into physical form. Hollas and Claire were instructed to remain silent for the first four minutes.

Linking Psychologically Motivating Forces with human will, in this section both the dancers and musicians become less passive, and start to interact and work with each other and the performance space. The dancers were instructed to gradually wake up from their previously meditative space, and begin to explore and interact with the space and with each other. Hollas was instructed to blend the violin with the white noise audio static, slowly evolving into light harmonics, over the course of the next four minutes. Claire was instructed to match Hollas on vocals, singing tones that were similar to or consonant with those that Hollas played. To create sounds which emulate static, Hollas bowed the violin body and bridge in various ways. Claire gently breathed and blew into the microphone to produce static-like sounds.

During Mathematical and Geometrical Constructions, I instructed the dancers to become more rigid and structural, playing with ideas of pattern and symmetry. I asked Hollas to move from the harmonics he had previously been playing to consonant tones, using a steady, firm bowing with a consistent pitch, mainly on open strings. Claire continued to consonantly harmonize with Hollas.

For Material Things, I instructed the dancers to consider materiality, particularly resources: topics discussed were wanting things but not being able to have them, and conflict over resources. Hollas was instructed to slowly move from strong, consonant tones to become more dissonant, within his own tones, and against the samples which played back over the speakers. Claire continued to harmonize with Hollas, less consonantly, matching the feel of the piece.

Technical Devices

During the first TDC development week, through trial and error, Hollas tried a few violin tunings based on Just Intonation. Hollas, as a joke, tuned the violin to harmonics of a 50 Hz buzz that was coming from the sub-woofer due to faulty wiring of the pickup microphone attached to his violin. The resulting tuning became the basis for the tuning of the entire show.

The violin tuning for Act I was:

string	Hz	note	Harmonic Partial
G	100	G+35C	2
D	300	D+37C	6
A	350	F+4C	7
E	400	G+35C	8

Table 3

The soundscape for the first four minutes, Abstract Concepts, was created entirely in Max for Live: a white noise generator was passed through a resonant bandpass filter with gain, center frequency, and Q variable parameters. The initial center frequency was set at 10000 Hz, and the Q at 100, the widest possible width.

The master volume controlling this noise generator was gradually raised from silent to full volume over the course of one minute. At two minutes, the control of the volume and Q parameters changed slowly from a fixed number to a variable range between slowly changing upper and lower parameters. The input from the accelerometers on the shirts determined

where within these upper and lower parameters each variable was at any given point in time. The up and down motions of Inma's two arms were averaged into one variable, as were the forward and back rotation of the arms. The up/down motion controlled the volume of the static, while the forward/back rotation controlled the Q.

From two to four minutes, the lower parameter of the volume lowered from full volume to a quarter of the maximum volume, and the lower parameter of the Q lowered from 100 to 10. The upper parameters remained the same until the 8 minute mark, where they, too, were lowered to .25 and 10 over the course of the next 8 minutes, once again closing the range to a fixed variable. Over the first four minutes, video static slowly fades in, uniformly, on all four projection screens.

One noise generator with the above parameters was assigned to each of the dancer's arms, making four noise generators in total between the two dancers. As the dancers began Act I facing opposite directions, each noise generator was assigned to the speaker in front of the dancer closest to the arm from which parameters were being received.[14]

A 50Hz sine tone faded in between 3.5 and 4 minutes, cuing Psychologically Motivating Forces, fading out again over the next four minutes. At four minutes, identical Max for Live looping devices are initiated on both violin and voice.[15] The device begins recording the incoming signal in 15 second intervals: four samples per minute. For each of the four audio channels, a random number is chosen from the number of available recorded clips, and the corresponding clip is chosen to be played. Parameters for playback duration and time between clips are also randomly generated, with the parameters becoming tighter as time progresses. At four minutes, clip duration is chosen between 0 and 15 seconds,

becoming 0 and 8 seconds over the course of four minutes. Similarly, the upper range for time between clips shortens from 15 to 0 seconds over the course of 8 minutes. In this way, the looping playback is more sparse in the beginning, and gradually becomes more dense. A light reverb is put on all four channels.

At four minutes to eight minutes, the previous video static fades out. Halfway through, at six minutes, a new video static begins to overlay the first. This static is not uniformly dispersed as is the previous static, but is generated via javascript acting on the jit.gl.sketch object.[16] It receives parameters for particle density (number of pieces of static per screen), as well as low and high range values for particle width, height, fill alpha, and stroke alpha. This static is designed to be white particles on a black background, and is mixed with the underlying video via the co.negate.jxs shader at maximum opacity. At six to eight minutes, as the other static continues to fade out, this new static emerges with particle density increase from 0 to 1000 over two minutes, with fixed width and height of one pixel, and a fill and stroke alpha range of 0-1, with 1 being fully opaque. At eight minutes, the static particles have become more individually defined and more sparsely dispersed.

Eight minutes marks the beginning of Mathematical and Geometrical Constructions. This is cued to the performers via sine tones, slowly fading in and out, as had the previous 50 Hz tone. These tones, however, are tuned to be consonant with the open strings of the violin: 1000Hz, 400Hz, 350Hz, 300Hz. Each tone fades in over thirty seconds and out over thirty seconds, making one complete circle around all four speakers per minute, each beginning from one speaker to the right of the previous tone. It takes four minutes for all four tones to complete.[17] The digital sine tones served as a reference for Hollas, and created some very

satisfying beating patterns and fluctuations with the rougher, more imperfect tones of the amplified violin. The looping mechanism continued to play back samples from both violin and voice.

At eight minutes, the width and height range of the static expanded to four pixels maximum diameter over the next four minutes. Underlying pre-recorded close-up imagery of the dancers' hands, feet, and shoulders began to fade in and out underneath the static, which had at this point evolved to be reminiscent of old film dust. Due to variances in Jitter shaders with which I combined videos during the week of the show, the underlying videos were sometimes more and sometimes less apparent in each show.

Twelve minutes marked the beginning of Material Things. At this point the height parameter of the 'film dust' is set to elongate from 4 to 400 pixels over the course of the next three minutes. The resulting particles begin to look like rain.

The overall sound became louder and more layered, as more samples are played back, and the tones become more discordant. At 14 minutes, one last sine tone slowly came in over the course of 30 seconds at 17000 Hz. This tone was held for 30 seconds, and then at 15 minutes, the tone slides from 17000 Hz to 0 Hz over the course of the remaining minute. This tone served as a cue to the musicians and dancers to wrap up what they were doing, and to finish with the glissando. From 15 to 16 minutes, the particle count of the rain was reduced from 100 to 0, fading it out, and the volume of the loop feedback was reduced from full volume to 0.

Summary

The overall trajectory of Act 1 was to move gradually from an inner world to an outer world, exploring human will and its manifestations on an individual level. Audio and visual static was used to portray chaos, the stillness from which everything emerged, interpreted physically through dance as the stasis of a meditative state. This static/stasis is gradually given form. The audio static is first given form through the motions of the dancer, then enhanced by pure sine tones and the timbre of violin and voice. The video static slowly morphs into film dust, overlaying images which could be read as past, present, or future imagery seen from the mind's eye. The film dust finally emerges into rain, a real-world, physical form, loaded with symbolism of cleansing and renewal, life and death, and the power of nature over human affairs. The increasingly textured and layered nature of the musical landscape, enhanced by digital looping, is meant to portray a journey from the inner mind and personal will to a more layered engagement with personal experience, memory, and the outside world.

ACT II: Friedrich Nietzsche—The Will to Power

Theories

Act II: Will to Power is mainly based on Friedrich Nietzsche's text of the same name.[18] Moving from Schopenhauer's individualistic approach to will—a primordial will to live and perpetuate oneself—Nietzsche's Will to Power moves to a more inter-social, societal level. Nietzsche posits that nothing has existence and meaning outside of the "game" of

power relations. Power, according to Nietzsche, exists only in relation to other powers, and is a dynamic striving to expand itself: a constant effort towards self actualization.[19]

Nietzsche emphasizes structure and the lack thereof, organization and chaos, as key principals in the Will to Power. Chaos is seen not just as a burden to be overcome, but a stimulant for our creative power.[20] Organization, in science and society,[21] makes the whole stronger than any individual element or person. Organization, which is never complete, is a process in which the most successful organization is shown to come out stronger, and the less successful organization becomes a function or functionary of the greater.[22]

Nietzsche was a vehement atheist, in a particularly anti-monotheistic sense, and spent his life in an effort to replace Christian morality with secular ideology revolving around philosophy, music, and art.[23] These concepts of religion, morality, and power struggles drive the themes of Act II.

Two further writings have played a large role in the structure of this movement: Douglas Rushkoff's descriptions in *Present Shock: When Everything Happens Now* of how time has evolved as a construct in the minds of humanity according to the methods with which it was measured,[24] and Karen Armstrong's descriptions in *A Short History of Myth* of how humans have historically viewed myth, and consequently, religion. Armstrong explains various myths and how they related to various ways of life, and how they were continually altered and changed once they had outlived their use.[25] Act II follows Armstrong's chronology and the idea of transformation that runs through the text.

Structure

Act II is broken down into sections according to historical periods discussed in *A Short History of Myth*:

Timing (minutes)	Period	Audio	Video
0-3	Paleolithic	Generative Bells	Constellations
3-5	Neolithic	Bell Phase	Constellations out
5-5.5	Axial	Chimes/Toll	None
5.5-8	Post Axial	Wood Sounds	Additive Architecture
8-16	Great Western Trans-formation	Morse Code Music	Additive Architecture

Table 4

As in Act I, the scores for the dancers were broken down into themes within time durations. We collectively discussed how these themes could be translated into dance, and then Inma and Maria worked on choreography together before we came back together in the TDC residency to streamline interactions within the media and as a group.

Musically, the first eight minutes were generative or pre-recorded electronics. The last eight minutes was a traditionally notated composition for instruments and electronics created from rhythms derived from Morse Code. These rhythms were derived from a quotation from Nietzsche's *The Will to Power*:

> If we affirm one single moment, we thus affirm not only ourselves but all existence. For nothing is self-sufficient, neither in us ourselves nor in things; and if our soul has trembled with happiness and sounded like a harp string just

> once, all eternity was needed to produce this one event—and in this single moment of affirmation all eternity was called good, redeemed, justified, and affirmed.[26]

This eight minute section is meant to portray a journey from smaller to larger societies, and the struggle between the wills and desires of opposing forces that drives, creates, dismantles, and rebuilds them.

Technical Devices

Act II utilizes accelerometers in the dancers' shirts to trigger audio and video events. During the first section, the dancer's shirts were programmed to send a trigger once an arm ascends to a given vertical threshold. Each arm triggers a note from a bank of notes consisting of Bb, A, G, and D, which gradually descends four octaves over the first three minutes, and are then randomly played on one of the four speakers.[27] When the bells are triggered, so is a video representation of a constellation in the night sky, also randomly on one of the four screens.

These dancer-triggered bells are replaced after three minutes by a bell phase generated in Max for Live. This bell phase works off of similar principles to the techniques Reich used in 'Piano Phase.'[28] The generator consists of three notes controlled by three metronomes, which change as each set of tempos resolve.[29]

For example, in phase one three metronomes are set to trigger a bell at a given interval in milliseconds. Phase one takes 24000 milliseconds (24 seconds). In that time, a tempo set at 1500ms would send a trigger 16 times. One set at 800 would trigger 30 times.

One set to 1000 would trigger 24 times. All metronomes would send a trigger, all at the same time, at 24 seconds, for the first time in that duration since the initial trigger. The last phase fades to silence over the course of 54 seconds, making the total time of the phase 120,000 millisecond, or two minutes.

Time in which all timings resolve (ms)	Phase 1 24000	Phase 2 28000	Phase 3 14000	Phase 4 54000
Note	**Bb3**	**Bb3**	**Bb2**	**Bb2**
Timing (ms)	1500	700	700	500
Note	**A3**	**A3**	**A3**	**G3**
Timing (ms)	800	800	400	400
Note	**G3**	**D3**	**D3**	**D3**
Timing (ms)	1000	1000	1000	1000

Table 5

During this process, all notes are given a small random delay, introducing a level of chaos to make them seem less mechanized. At the entry of the bell phasing the stars become animated, and begin to move and disperse, leaving blank screens at the end of the last phase.

After the last phase is faded out, a Just Intonation version of the Westminster Quarter chimes comes in, triggered at one note per second, Bb G A D, rest, D A Bb G, rest, repeated twice, followed by a D bell toll. Thirty seconds in, the toll begins to fade out over the next thirty seconds.

As the clock toll fades, the shirts are then set to send a trigger once the dancers' arms descend to a certain vertical threshold. When the shirts trigger, a woodblock hammering sound is set to play randomly from one of the four speakers. On each hit, a frame from a predetermined frame-by-frame animation is set to update on a randomly chosen screen.

From here, at the eight minute mark, we move into the precomposed score based on Morse Code. Text was input and converted to MIDI via Robert Ecker's web application.[30] Different rhythmic patterns were created throughout the piece using various ratios for dit, dash, and dot, keeping it in 4/4 at 120 bpm for the entire piece, with intermittent use of triplet and sextuplet subdivisions.

The resulting monotone rhythms were imported as MIDI files into Ableton Live, originally with three lines: piano hand 1, piano hand 2, and violin. Once the rhythms were satisfactorily arranged in Ableton, I assigned pitches to the notes, roughly based on G Major and g minor chord structures, though the final score remained without a defined key.

After a few months of practice, this arrangement proved to be too difficult for the musicians to play. Because of this, I wrote new lines for violin and piano, adding a metronome beat to some sections and extra harmony, and converted the previous violin and piano parts to MIDI synthesizers. I distributed these across speakers 2 and 4: piano hand 1 and 2 on separate speakers, and the original violin part on both. Hollas's amplified violin continued to be played through speaker 1, directly behind him, and Claire's piano was played through speaker 3, directly behind her. Claire's new part mainly served to delineate the otherwise obscure 4/4 rhythm of the piece, grounding the irregular rhythmic patterns of the Morse Code. Hollas's new part served as harmony to the electronic tones.

Even with drastically easier parts, Hollas and Claire still had trouble keeping time, as the rhythm of the electronics was erratic. To help with this, I added a click track, including spoken measure numbers with a one-bar lead-in to cue the musicians in after long rests.

For Act II, as I wanted to stay true to the previous tuning, but I also wanted to write for piano, I devised a 12-note tuning system based on Terry Riley's tuning for 'Cactus Rosary,' using the original 100 Hz G+35C as the root. In order to convert the piano to this tuning, I turned the piano's volume to silent, and sent its MIDI to a nearby computer. The MIDI was re-tuned through Scala,[31] and sent to Ableton Live using a polyphonic eight-voice setup. This was then output to the speaker behind the piano.

All electronic voices were similarly converted in this manner. For the purpose of Scala, I set 'middle C' to 400Hz, two octaves above Hollas's low G (see table 6).

Here is a sample octave:

Note	Ratio	Tuning	Standard	Cent Difference
G	1/1	400	392	+35
G#	49/48	408.33	415.3	-29
A	9/8	450	440	+39
A#	7/6	46.67	466.16	+2
B	5/4	500	493.88	+21
C	21/16	525	523.25	+6
C#	11/8	550	554.37	-14
D	3/2	600	587.33	+37
D#	49/32	612.5	622.25	-27
E	13/8	650	659.25	-24
F	7/4	700	698.46	+4
F#	15/8	750	739.99	+23

Table 6

Hollas's violin remained tuned in the same manner as the previous act. His part was written to be easily played in that tuning, mainly on open strings. The piano voice was set to match its electronic Morse Code counterpoint, using a simple Ableton Live sine-wave synthesizer reminiscent of early electronics. As the piece was meant to move forward through history, from ancient to modern, this choice of synthesizer was meant to bring the piece forward in time to an era to which the audience can relate, while not clashing with the 'ancient' sound of the bells.

Summary

Act II was designed to move thematically from smaller to larger civilizations, from ancient to modern times, portraying power struggles. It roughly follows Armstrong's phases of human existence, with references to Rushkoff's historical account of time, as first being non-existent, then cyclic, then linear, and then fragmented,[32] which matched Armstrong's accounts.

From Armstrong's categorization, the initial, human-triggered bells and constellations correspond with the the reliance on and interaction with nature in the Paleolithic hunter-gatherer period. The bell phasing corresponds to the Neolithic, farming communities, who began to organize and cultivate land, and the early civilizations who began to organize and cultivate cities. The Westminster Chimes, the first distinct melody introduced in the piece, corresponds with the Axial age, determined by Armstrong as the beginning of religion as we know it,[33] and by Rushkoff as the beginning of time as a linear rather than cyclical progression.[34] As these bells are usually rung in church towers and clocks, including that in Big Ben in London, as a timekeeping device, this melody elicits imagery of religion, government and time, and the orderliness that these instill.

The building scene, consisting of wooden sounds reminiscent of hammering, was meant to portray humanity's ability to construct and re-construct its surroundings. The composed Morse Code scene is meant to elicit the idea of larger and larger societies and power structures, and their communications: Morse Code itself has a strong military history, playing a vital role in World War II, which was a culmination of and the downfall of many of

the more problematic ideas of power that Nietzsche and many of his German counterparts held at the time of his writing.

In this act, Morse Code was used as a metaphor for the codes and signifiers humans construct for communications purposes, and how they can be restructured over time.

ACT III: Sigmund Freud—The Pleasure Principle

Theories

Act III was based on Sigmund Freud, collage, and the pleasure principle. As Act II was fairly active, Act III winds back from exertive force into the internal mind, to portray inner psychological struggles.

Freud's pleasure principle posits that humankind's main motivation is the seeking of pleasure and avoidance of pain.[35] Freud also spoke extensively on juxtaposition and the psychology thereof, which influenced the Dadaist and Surrealist arts of collage.[36] Act III is a collage of videos, compositional phrases, and movements based on common themes found among public domain films from the '40s and '50s.

I find collage to be highly representative of the often chaotic, non-linear thought process of the human mind. Thoughts appear, unsolicited, from apparently nowhere, are easily sidetracked, and are often repetitive.

Structure

The films chosen as source material for the video collage were *Of Human Bondage* (1934),[37] *My Favorite Brunette* (1947),[38] *My Dear Secretary* (1948),[39] *Tulsa* (1949),[40] *Beat*

the Devil (1953),[41] and *The Last Time I Saw Paris* (1954).[42] These films were chosen from a list of films that were in the Public Domain, to avoid potential copyright issues.

From these films, I selected scenes that depict four categories: celebration, gambling, finery, and excess. Each category accounted for four minutes of the act, and they were further divided into subcategories.

Celebration (4 min)	**Gambling (4 min)**	**Finery (4 min)**	**Excess (4 min)**
Fireworks	Horse Racing	Fancy Cars	Jealousy
Public Celebration	Car Racing	Fine Dining/Dancing	Tantrum
Bar Singing	Casino Signs	Fancy Parties	Violence
Drinking	Arm Wrestling	Parlor Singing	Car Trouble
	Dice Games	Limo Drinking	Sadness
		Fancy Drinking	Drunkenness
		Kissing/Romance	

Table 7

To create a musical score in accordance with the structure of the video, I took these same themes—celebration, gambling, finery, and excess—and asked local Cork composers to come up with musical phrases that portray the themes. The musical phrases were to be 1, 2, 4, 6, or 8 bars long, in 4/4 at 60 bpm, in the key of G Major or g minor, depending on the theme. Claire O'Brien, Hollas Longton, John O'Brien, Eamon Ivri and I each contributed phrases.

I then sorted through the compilation of musical phrases, grouping similar-sounding phrases into each category. Phrases meant for one category often fit better in another category, so the G Major/g minor separation dissolved. As the tuning was non-standard to

begin with, I made the decision to leave the phrases as they were and strip the entire piece of a key signature.

These phrases were then arranged in an 'In C'[43] style format, with each phrase marked to be repeated *ad libitum*. I instructed the performers to choose phrases at random, not necessarily in a linear fashion, and to play them 1, 2, 4, 6, or 8 times, at will.

I sent the instructions that I had sent to the composers to Inma, in order to keep her informed prior to our TDC week. Inma decided to treat the dance for that act as we had treated the video and music, and chose to take actions and motions from the videos and incorporate them into a dance collage. Rather than choosing from a selection at random each performance, as the music and video were structured to do, Inma and Maria used dice to determine what moves they would do, in what order, and how many times—1, 2, 4, or 8—they would repeat these moves. From this, they wrote down the results, and created choreography 'scores' for themselves.

Technical Devices

The selected film scenes for each category were broken down into 1, 2, 4, 6, or 8 second clips. These clips were chosen at random in Max/MSP/Jitter, independently on all four screens, according to the given timeframe of the subcategory. At times one scene from one movie is re-mixed across all four screens. Other times several scenes from several movies are juxtaposed. Layered on top of this randomly triggered video collage, the 'film' static from Act I is re-introduced to the screens.

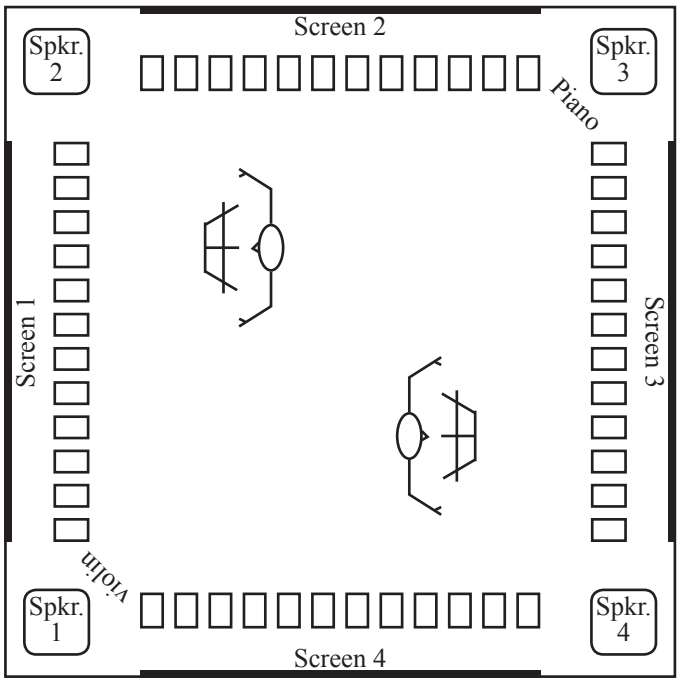


Figure 6

The timings of the videos and the music were specifically chosen to maintain the same rhythm. Since the melodies were all in 4/4 and at 60 bpm, most changes in audio and video would occur on a one-second beat. To reinforce this, and to keep the musicians in time, we introduced a click track to this act as well.

In the performance space, the dancers stood on opposing sides of the stage, facing opposing directions, with the scores on music stands in front of them for reference as they performed the predetermined moves. This was meant to further tie their actions in with those of the musicians, as both were performing repetitive gestures as notated through a score, and to emphasize the rooted, internal nature of the act (see figure 6).

For this piece, Hollas decided it would be easier to play in the Just tuning if he tuned his violin to the normal fifths, G D A E, only using the frequencies of the new tuning as

opposed to those of standard tuning. As re-tuning the instrument mid-show was not an option, we required a second violin, which remained un-amplified for this act. Claire's piano voice was changed to an acoustic-sounding piano instrument in Ableton Live.

Summary

Act III is a collage based on Freud's theories of psychoanalysis, illustrated via randomly juxtaposed themes derived from vintage movies. The un-amplified violin and acoustic piano, along with the black and white, vintage movies, is meant to give the piece a classic, retrospective feel. This, juxtaposed with the fragmented, repetitive imagery, creates a sometimes pleasant, sometimes stressful Freudian dreamscape of love, addiction, and tragedy.

ACT IV: Victor Frankl - Man's Search for Meaning

Theory

Act IV is based on Viktor Frankl's key text *Man's Search for Meaning*. Speaking from his experience both as a Holocaust survivor and a neurologist and psychologist, Frankl posits the search for meaning is our primary motivation in life: that a person needs 'something' for which to live.[44] Throughout his text, he reiterates a quotation originally written by Nietzsche: "He who has a *why* to live can bear with almost any *how*." In the concentration camps, those who knew there was a task waiting for them to fulfill were most apt to survive.[45]

Frankl describes what he terms an 'existential vacuum,' which he believed inflicted the Twentieth Century. According to him, at the beginning of human history, humankind lost

its animal instinct, through which an animal's behavior is embedded and secured. More recently, the traditions which previously buttressed human behavior rapidly diminished. Therefore, at present, no instinct tells us what to do, and no tradition tells us what we ought to do. We instead wish to do what other people do (conformism) or we do what other people wish us to do (totalitarianism). This existential vacuum manifests in a state of general boredom, or a kind of depression due to a lack of contentment in one's life. Frankl suggests that other wills, such as the will to pleasure, and the wills to power and money, are simply manifestations of a frustrated will to meaning.[46]

Frankl developed logotherapy as a means to help patients find meaning and purpose in their lives. He states that there is no one general meaning to life: the meaning of life differs from person to person, from day to day, and from hour to hour. Logotherapy therefore seeks to find the specific meaning of a person's life at a given moment.

Frankl describes three areas in which we can discover meaning in life: courage, or the attitude we take toward unavoidable suffering; love, which we can find by experiencing something (goodness, truth, beauty) or encountering someone; or purpose… creating a work or doing a deed. Adversely, Frankl defines that which causes people to fall into despair as the *tragic triad*: pain, guilt, and death.

Structure

Act III is structured by the tragic triad followed by the aforementioned areas where we can find meaning in spite of these. Each topic accounts for two minutes in duration,

bookended by a two-minute intro and a two-minute outro, resulting in eight sections totaling sixteen minutes.

2min	**2min**	**2min**	**2min**	**2min**	**2min**	**2min**	**2min**
intro	pain	death	guilt	courage	purpose	meaning	outro

Table 8

The musical aspect of the piece was partially improvised, and partially scored. Claire's vocal part consisted of quotations taken from Frankl's text meant to correspond with each section. Underlying the full duration of the piece is an electronic drone created with a Shepard-Risset glissando generator with variable parameters.

The first quotation, which enters at measure 55 (3:40), is "That which does not kill me makes me stronger,"[47] which Frankl quotes from Nietzsche. This coincides with and is meant to inform the 'pain' section.

For the beginning of 'pain,' Hollas was instructed to perform similarly to the beginning of Act I: making sounds like those he previously used to blend with the static.

The second quotation enters at measure 71 (4:44): "Set me like a seal upon thy heart, love is as strong as death."[48] Frankl quotes the Song of Solomon after explaining how the memory of his wife and his mental conversations with her helped him get through particularly dark times in the concentration camp. He tells of how love extends the physical person of the beloved, and finds its deepest meaning in his spiritual being, his inner self. He did not know if his wife was alive or dead, but she was still with him.

As in the first act, Hollas once again moves from chalky static-like sounds to harmonics, and then to more steady tones, mostly on open strings. At the eight minute mark, or the halfway point, to reinforce the idea of a mood shift, Hollas's part becomes notated. His part was meant to portray a feeling of forward momentum, of hope and progress, and to reinforce Claire's vocal melody.

The next quotation begins at measure 25 (8:20): "The angels are lost in perpetual contemplation of an infinite glory." Again, Frankl quotes this regarding his love for his wife, and how, in the most miserable conditions, when he had been stripped of everything, he could still find bliss in her memory.

The last quotation, "what you've experienced, no power on earth can take from you," comes at measure 181 (12:04). Frankl explains that in the concentration camp, despite having lost all worldly possessions, one's experiences, skills, education, memories, accomplishment, and mistakes, cannot be taken no matter what is done to your physical being: having been is also a kind of being, and perhaps the surest kind.[49] This ties in with his earlier explanation of regressing into memories, such as those of his wife, as a defense mechanism in unbearable circumstances, and is a reminder that despite having nothing, we are still ourselves, and can rebuild our lives with the experience and knowledge we have gained through our past.

Around the middle of 'meaning,' Hollas begins improvising light, quick harmonics, gradually playing quieter until the tones return to chalky static, and fading out with the end of the piece.

Section	Vocals: Quotation	Violin
Intro **00:00-02:00**	none	none
Pain **02:00-04:00**	That which does not kill me makes me stronger	quiet, static-like sounds
Death **04:00-06:00**	Set me like a seal upon thy heart, love is as strong as death	quiet, static-like sounds to lightly bowed harmonics
6-8 Guilt **06:00-08:00**		harmonics to steady tones on open strings
8-10 Courage **08:00-10:00**	The angels are lost in perpetual contemplation of an infinite glory	Notated score begins
10-12 Purpose **10:00-12:00**	none	Notated score
12-14 Meaning **12:00-14:00**	what you've experienced, no power on earth can take from you	Notated score to light, airy improvisation with harmonics
14-16 Outro **14:00-16:00**	none	fade out

Table 9

The dance instructions, for the first few sections of this piece, were more literal than in previous acts. For the first few minutes, I instructed the dancers to move slowly in circles, in the opposite direction of recorded video shadow versions of themselves moving similarly in a more vigorous fashion. I instructed Maria to lie down as if she had died around the four minute mark, and Inma to catch up to her, and mourn her loss. This was meant to coincide with Frankl's accounts of the concentration camps, giving an image of incarceration, suffering, and death. I suggested that the memory of Maria could revive Inma. The remaining

sections were again left largely to interpretation by Inma and Maria after a collective discussion about the theories and topics.

Technical devices

The two main technical devices used for Act IV were several variations of a specialized voice recording and playback Max for Live instrument,[50] and two instances of a Shepard-Risset glissando generator Max for Live instrument.[51] Hollas returned to the violin with the tuning used for acts I and II. Both vocals and violin were once again amplified in this piece.

To create a background soundscape, I created an instrument in Max for Live that synthesizes an adjustable Shepard-Risset glissando. A Shepard-Risset glissando is an auditory illusion in which a tone is perceived to continually ascend or descend eternally. This is achieved by fading in a new glissando exactly one octave above or below an existing one, while fading the previous tone out.

The Shepard-Risset glissando in my instrument consists of sixteen tones, each 1/16th of an octave apart. Of these, every fourth tone is allotted to one speaker: tones 1, 5, 9, and 13 to speaker one; 2, 6, 10, and 14 to speaker two; 3, 7, 11, and 15 to speaker three; and 4, 8, 12, and 16 to speaker four. The instrument receives parameters for base frequency and frequency range, the speed and direction of the glissando, as well as volumes for each overall speaker output, as well as an option to rotate the speaker location according to the glissando timing: one full rotation per gliss cycle. I then duplicated this instrument within the Ableton Live set, in order to create denser texture.

At the beginning of the fourth act, the primary instrument is initialized at a low frequency of MIDI value 31, or G0, with a range of 48, or four octaves, creating a high MIDI value of 79, or G4. The glissando is set to -250 seconds (a negative time value creates a downward glissando). The instrument is slowly faded in, first on speaker 2, over the course of one minute, then on speaker 4 over the course of the next minute, and then the remaining two speakers over the course of the third minute. At the start of the third minute, the speed of the glissando is set to slow down from -250 to -1000 seconds over the course of the next two minutes.

At the beginning of the third minute, a secondary Shepard-Risset glissando Ableton instrument is brought in to create a deep rumble underneath the primary instrument. It is initialized at a base frequency of MIDI 19, or G-1, also with a range of MIDI 48, or four octaves, making the upper range G3. The gliss cycle of the second instrument is set to -0.1. The resulting sonority is a low, undulating rumble, which is faded in under the initial tone over the course of one minute.

As the first half of the act is about the tragic triad, and the second half is about finding meaning, at the eight minute halfway point, the timing of the gliss changes from -1000 seconds to 1000 seconds, changing it from a downward to upward glissando. Also, beginning at eight minutes, over the course of the next six minutes, the range of the primary instrument's glissando expands from 4 to 6 octaves, and the underlying rumble of the secondary instrument fades out. At fifteen minutes, the main instrument fades out: channels 1 and 3 over the course of sixty seconds, and 2 and 4 over the course of 45 seconds.

Layered on top of this underlying drone, vocals help to delineate each section. The first quotation was recorded live, each word to a separate buffer. The words were then played back, in sequential order, with each word randomly assigned to one of the four speakers. After Claire finishes the second quotation, the first quotation is once again played back, this time randomly re-ordered, and diffused to a randomly chosen speaker.

These devices are not used again, until the last quotation: “what you’ve experienced, no power on earth can take from you.” This quotation is again recorded, each word into a separate buffer, and repeated twice; first in sequential order, randomly across all four speakers, and then again, more quietly, and randomly re-ordered.

A click track was vital for this piece in order to keep Claire and Hollas both in tune, in Just Intonation against the glissando drone, and in time. A note at the intended frequency was given slightly before the downbeat, to allow Claire to match the frequency with her voice. A high pitched tone was given at the beginning of each topical section, to help both Hollas and Claire keep time.

At the point at which Hollas’s part becomes notated, a metronome beat is introduced. However, to maintain a sense of fluidity — to match the sliding background drones — the click track is only given in rest beats. This cues him in and helps him to keep count when he is not playing, while allowing him to play more fluidly and naturally, off of the beat, during the notated parts.

The video for this piece was programmed similarly to that of Act III, in which videos were randomly chosen on all four screens from particular video banks according to a timeline. It begins with short clips of shadowy figures of Inma and Maria walking in circles,

then longer clips of struggling; first as a long shot perspective, then as a medium shot perspective. These videos were recorded by Enrique Carnicero in the Granary Studio under my direction. I then edited these to look like shadows on a white wall. This struggle then fades to a long video of clouds which I shot, taken from the perspective of an airplane window. These clouds then fade with the glissando at the end of the piece.

Summary

Act IV was meant to portray despair and the struggle to emerge from it. The Shepard-Risset glissando is meant to portray the sense of endlessness and futility that accompanies despair, with the downward glissando portraying sinking into despair, and the upward glissando portraying rising from despair. The quotations from the text serve to illustrate Frankl's ideas and to temporally segment the piece, providing relief from the Glissando drone.

The shadow figures walking in circles are meant to further portray a sense of despair and futility. This imagery was inspired by prison yards, in which prisoners walk in orderly circles. The shadow filter obscures the identities of the figures, and gives them an ethereal aesthetic. These figures could be shadow versions of the dancers, perhaps from another time, or they could portray the outside world, moving at odds with the characters on the stage. The struggling figures directly point to Act II, as the choreography is the same. This reinforces the idea that the shadow imagery might portray the memories or pasts of the dancers. The clouds are meant to illustrate freedom: Frankl mentions clouds frequently, representing the beautiful world out of reach from the concentration camp. Cloud imagery is also associated with religious notions of heaven and angels: these notions are very comforting to some.

IV WILLS: Reflections

As this project was my most ambitious to date, there were several things we partially developed but were unable to finish due to time restraints. One of the main things I had hoped to do, and almost successfully completed, was to track the two dancers from above, using a Kinect Camera. Using a modification of Zachary Seldess's KVL Kinect Tracker,[52] combined with basic distance formulas, I created a patch that was meant to track two dancers, and their distances from each screen and from each speaker. This data was to be used in act I, II, and IV to spatialize audio aspects in accordance to the dancer's locations, and in all acts to localize video elements in a similar fashion.

Due to limited available in-space tech time, my programming of the Kinect in regards to performance elements was completely hypothetical and conceptual until the time we mounted the camera on the ceiling in the Granary, a few days before the show opened. Once the camera was mounted, the two-dancer tracking system was working smoothly. However, I had mapped the input data to the wrong OpenGL video coordinates. Due to the rush of tech week and the complicated nature of the show, I decided it would be best to streamline what we already had, rather than spend time fixing the tracking and then reprogramming the show to accommodate the newly available data. This camera-tracking element is something that I intend to continue working with in future versions of this show, and in other future endeavors.

Additionally, I would like to continue to work with and refine the LilyPad Arduino sensor shirts worn by the dancers. The data input was unstable and fluctuated frequently. I

intend to continue experimenting with fabrication techniques, in order to stabilize the circuit connections and power sources. For the final rendition of the shirts, I used conductive thread insulated by lightweight iron-on interfacing fabric. The connections to the LilyPad were created with knots, secured by glue. The next version would include a mix of conductive thread and flexible conductive fabric. This would allow me to use thinner thread, which would have better grip and form more secure knots.

For a power source, I used a 9V battery, as recommended in various online sources.[53] I soldered these directly to the micro-controller. Despite this, as well as the addition of stitched reinforcements to secure the wires and prevent them from bending, this arrangement could not hold up to the dancers' movements, and frequently disconnected. The dancers found these batteries heavy, awkward, and difficult to work with. In the next fabrication I intend to use lithium-ion batteries, which are stronger and thinner.

I also intend to program better calibration methods into the software to be used before each performance. As it stands, the data input is crude, and the parameters triggering media elements are imprecise. Ideally I would add two more accelerometers to the arms, so that I would have independent data on both the upper arm and forearm. In Act II, I set the bells and constellations to trigger when the arms were fully raised, as if they were reaching for the sky. As I had no reference for the upper arm's relation to the rest of the body, the bells triggered even when the arms were bent and close to the body. This, in conjunction with the imprecise calibration, resulted in the motion-to-media relationship becoming lost to the audience.

Further developments would also include motion data and audio waveform pattern recognition. In this manner, I could not only trigger according to certain body positions, but

also according to certain predetermined dance patterns and choreographies. This ability would further enable me to create more meaningful motion-media relationships.

According to performer feedback, this was a productive and creatively satisfying collaboration for all involved. I wrote the piece specifically for the chosen performers and their specific interests and abilities, leaving much of it as an open work[54] to be further developed by the performers. While for the most part the performers liked working this way, one restriction we encountered was the time, space, and equipment to workshop various sections.

Due to the modified tuning of the piano and violin, in order for Claire and Hollas to practice together, good amplification was necessary in order to hear and work with the proper tuning. Logistics of piano and audio system availability and transport severely limited practice time, leaving just the TDC residencies and tech week in the Granary for available full set-up practice time. These tech weeks were further divided among lighting, dance, and programming, limiting practice time further.

Similarly, the dancers were unable to solidify the choreography until we were in the final performance space, due to drastic differences between practice environments to the Granary Theatre. The TDC space was half the size of the Granary, and had a cold cement floor which limited the dancer's capabilities. Inma and Maria additionally workshopped in Inma's studio, which, though the temperature and floor construction were better for dance, was also much smaller than the Granary stage. Regardless of these limitations, we worked with what we had to do what we could to the best of our abilities.

Following conversations with several advisors, the issue of extricating one's intellectual property from collaborations arose in relation to previous collaborations of mine, such as my media work with the company Eat My Noise Productions, which consists of two composers and a producer. Roles such as composer and director traditionally hold greater academic intellectual integrity than roles such as technician, engineer, or designer. However, the projects I tend to work on tend not to be directed or composed in the traditional sense. Eat My Noise is co-directed and co-composed, with equal standing between Peter and David in both roles. The two shows I worked on, *A:Volution* and *Moiety*, included large sections of un-notated improvisation by select musicians. In that collaboration, there is no one person with an overall control of the outcome.

Regardless, I had never assumed the role of director before *IV WILLS*, and I wanted to try my hand at it. For this show, I undertook the roles of Director, Composer, and Media Designer. Due to limited means, I also took up the role of Costume Designer, Set Designer, Producer, and Marketing.

This was a lot to take on. In retrospect, at minimum, I wish I had brought in a co-director. Even in the most loosely structured devised theater ensembles, in which all participants hold creative agency, the role of the director is to maintain an outside viewpoint and provide feedback to the performers and technicians, as they are unable to see the larger picture from within. I found it difficult to extricate myself from my own tasks in order to see the whole picture, and at times I was too preoccupied with my own endeavors to give the performers the attention and direction they needed.

I believe some of these issues could potentially be fixed by creating the majority of the music and media structure first, before bringing performers into the collaboration and the collaboration into a workshopping environment. However, this would make the work less open, and leave less room for the performers to contribute to the piece. I would find this unfortunate, as the performers' individual talents and creative input were great assets. If I were to pre-compose the next version of this show, I would still want to leave room for performer agency within whatever structures I create.

I view my choice of performers and collaborators as another aspect of the overall collage: I choose them because I admire their aesthetic and because I think their aesthetics and personalities would work well with each other's and with mine. By creating structures and then allowing the performers freedom to work within these, we are all more free to improvise and make adjustments to accommodate the input of others: Inma and Maria with dance, Hollas and Claire with music, and myself with programmed live audio-visual environments. When programming interaction design, I do not know the full scope and limitations of the technology I create until I put it to use in a live performance setting. As with any scientific or creative endeavor, trial and error is vital to the process. If I were to make the scores or instructions too rigid, I would stifle opportunities for this.

Overall I am content with the final outcome of the performance run. The show sold out one night and came close to selling out several other nights, and we received many positive responses from the audience. This is a piece that I could continue to work on with the previous performers if available, or, if not, that I could re-construct and re-devise under similar guidelines and structures with future collaborators. Regardless, I intend to continue

working on the technical and thematic aspects of the performance, as well as to streamline these collaborative methods of composition and devised multi-medium performance.

Notes

1. See Pappas: “Suicide: Statistics, Warning Signs, and Prevention.”

2. See Frankl, pages 128-130.

3. See Frankl, page 126.

4. See de Botton, *II. Community* (21-66).

5. See Neil Brown on the increase of Atheism (26-30).

6. See Olson, *Exploiting Chaos* (34-37)

7. See Wicks, under *4. The World as Will*.

8. On the accompanying USB drive, see IV WILLS/video/IVWILLS.mov for show documentation.

9. On the accompanying USB drive, see IV WILLS/showdocs/Audio/MASTER01 Project/ Presets/MIDI Effect/Max MIDI Effect/Lilypad_calibrate.amxd

10. See Wicks, under *2. The Fourfold Root of the Principle of Sufficient Reason.*

11. See Wicks, under *5.3 Asceticism and the Denial of the Will-to-Live.*

12. See Wicks, under *4. The World as Will*.

13. See Wicks, under *2. The Fourfold Root of the Principle of Sufficient Reason.*

14. On the accompanying USB drive, in IV WILLS/showdocs/Audio/MASTER01 Project/ Presets/Instruments/Max Instrument/ see rStatic1.amxd, rStatic2.amxd, rStatic3.amxd, rStatic4.amxd, for four voices of white noise generators corresponding with each of the two dancers’ arms.

15. On the accompanying USB drive, in IV WILLS/showdocs/Audio/MASTER01 Project/ Presets/Audio Effects/Max Audio Effect see looper_vioce.amxd and looper_violin.amxd.

16. On the accompanying USB drive, see IV WILLS/showdocs/video/IVWILLS/code/static04.js and its use within IV WILLS/showdocs/video/IVWILLS/IVWILLS.maxproj.

17. On the accompanying USB drive, see IV WILLS/showdocs/Audio/MASTER01 Project/Presets/MIDI Effect/Max MIDI Effect/ToneGen.amxd

18. See Nietzsche, *The Will to Power*

19. See Aydin, page 26.

20. See Aydin, page 27, in relation to *Thus Spoke Zarathustra.*

21. In Nietzsche's Will to Power, Third Book: in *I. The Will to Power in Science* (231); the most valuable knowledge consists of methods: in *III. The Will to Power as Exemplified in Society and the Individual* (341); a multitude will do what an individual will not; the State, or the *unmorality* organized, is the will to war, to power, to conquest and revenge.

22. See Aydin, page 31.

23. See de Botton, 283, ironically describing Nietzsche's stance in relation to his inability to gain the institutional backing of German academia, which was his downfall as an academic within his own lifetime, during which he was in 'nomadic exile.'

24. See Rushkoff, *Digiphrenia: Breaking up is Hard to Do* (69-129), particularly *Time is a Technology* (76-87).

25. See Karen Armstrong, *A Short History of Myth,* table of contents and *i. What is Myth?*

26. See Nietzsche, 532-533.

27. On the accompanying USB drive, see IV WILLS/showdocs/Audio/MASTER01 Project/Presets/MIDI Effect/Max MIDI Effect/W2P_Bells.amxd

28. See Reich for score. This phasing technique was explained earlier in the chapter *Paranoia,* pages 7-8.

29. On the accompanying USB drive, see IV WILLS/showdocs/Audio/MASTER01 Project/Presets/MIDI Effects/Max MIDI Effect/W2P_BellPhase.amxd for theoriginal Max for Live file used to create the sound file used in the show.

30. See Ecker's *Morse Code: MIDI & Text Generator* web application.

31. See Scala, and Curtis MacDonald, whose instructions were invaluable.

32. See Rushkoff (76-87).

33. See Armstrong (79).

34. See Rushkoff (77).

35. See Freud, page 7.

36. Stokes explains this through the works of Max Ernst (199-204).

37. See Of Human Bondage

38. See My Favorite Brunette

39. See My Dear Secretary

40. See Tulsa

41. See Beat the Devil

42. See The Last Time I Saw Paris

43. See Terry Riley, In C.

44. See Frankl (121-122).

45. See Frankl (126).

46. See Frankl (128-130).

47. See Frankl (103).`

48. See Frankl (58).

49. See Frankl (104).

50. On the accompanying USB drive, in IV WILLS/showdocs/Audio/MASTER01 Project/ Presets/Audio Effects/Max Audio Effect see voiceLoops.amxd and voiceLoops_random.amxd.

51. On the accompanying USB drive, in IV WILLS/showdocs/Audio/MASTER01 Project/Presets/Audio Effects/Max Audio Effect see shepardGliss1.amxd and shepardGliss2.amxd.

52. See Zachary Seldess.

53. See DIY: Audience Jacket. This tutorial was my main guideline in fabrication of the dancer's sensor shirts.

54. See Umberto Eco (169).

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Appendix

IV WILLS: Post-show questions for collaborators

After the show run in the Granary, I emailed the following questions to each of the performers, in order to gain insight into their individual working processes within the given guidelines, and to receive feedback from their experience with the show with an aim to improve future performances.

1) **What motivated you to join this project?**

2) **What was your role in the project? What did you contribute to the piece?**

3) **What is your background? Who are your influences?**
   Did these influence the piece? How so?

4) **Describe the working process. Was it creatively satisfying?**
   What would you change about it?

5) **What was your relationship to the technology? How did it augment/hinder what you were capable of doing?**

6) **If you could change anything the second time around (i.e. if we were to do it again), what would it be?**

Performer Responses

(all responses as submitted)

Inma Pavon

1. The entire idea of the project, the concept, the interdisciplinary work, the artists involved.

2. My role was as choreographer and dancer. My contribution was the choreography and my dancing involved too.

3. My background is Contemporary Dance/Choreographer/Teacher. My influences would be Pina Bausch, Sasha Waltz, Rosas dance company, DV8 Physical Theatre company, Maguy Maren dance company. I think they did influence my work indirectly. They would have influenced the work in the idea of using repetition in the choreography and in the process of creating the choreography through score-based improvisation sessions.

4. The working process involved 4 weeks in the TDC, Triskel, Cork and then rehearsals in my studio, where we would meet and work in the concept and structure which has been created by Sara and given to each artist. I particularly loved the way the process evolved from day one. I think having a week dedicated solely to each of the WILLS was very helpful and it helped a lot in creating a sort of a general shape for each WILL. When those 4 weeks ended we had a good idea of what it would look like and then it was time to pay attention to more details and mainly to set the choreography, to set movements within. I would only change the fact that the TDC does not have a proper dance floor for dancers to dance without getting hurt, I felt the floor limited my physicality but i then found other ways of creating new movements.

5. My relation with the technology was very direct, the simple fact that we had technology attached to our costumes, and that in certain points our movements would trigger/ change the sound and/or visuals also. I think technology allowed for the choreography to be significant and direct for an audience as they could see how in some parts the dancers' arms movements would trigger certain sounds for example bells or change the intensity of the static: both its sound and its visuals.

6. If we were to do it again, I would change the batteries that we had attached to our costumes, they were a bit bigger and it limited some of the movements, but I know Sara was thinking the same. I would be delighted to do it again.

Maria Sinnecker

1. This project was intriguing from the beginning. News of Sara's first residency and my glimpse of the sharing of experimental work of the first will, the will to live, made me curious. What really led me to commit to this project was this: Here was someone interested in exploring underlying themes of life, as a researcher, rather than as a director. Sara was interested in creating an audience experience through exploring the interplay of film, live music, and dance through/with technology based on the themes of four wills. In these crazy times, I feel, taking the time to look at what lives we actually lead, and what we would want our lives to be (in the Western world), maybe even going back to basics, is very meaningful and worthwhile.

I have a background in German expressive dance and tried my hand at researching some of the issues of documenting this type of dance for my second MA a few years ago. In my mind, this project was also delving into areas I am very interested in: the connection

between the dancer's inner world (imagery, thoughts and feelings) and outer world. - How meaning could be carried - How different art forms could influence each other, feed into each other, and also how we read performance, especially today, in this fast paced, digital age.

My first meetings with Sara really sparked my imagination. I left thinking about all the kinds of possibilities of linking, tracking, even influencing movement through technology. To me, this project also presented a rare opportunity to work with an amazing team by doing what I truly love - to dance. As this project was exploratory in nature, meaningful at heart, and posed an opportunity to dance and create a multimedia experience using current technology in an amazing team, I really wanted to be part of IV Wills.

2. I had the great opportunity to be the second dance performer in this project. My role was to be another dancer in Sara's exploration of the four basic human wills with Inma Moya Pavon as my choreographer and co-performer. I would say I contributed to this piece mainly by giving my heart and soul dancing in each performance of the final piece. The final piece was structured into sections of set choreography as well as sections of set improvisational frames.

In devising both types of sections, Inma worked closely together with me, allowing me to become very involved in exploring and creating movements. A lot of the choreography of the final piece stems from sessions exploring together with Inma. Sometimes she would set tasks for improvisations based on a drawn up structure closely connected to timing and theme and sub-themes for that particular will. Some of these tasks would later form the basis of the more choreographed movement sequences.

Joining the project after the first sharing of will I, I can say, I was more involved in the devising process of wills II-IV and in further developing the will I. By involvement I mean I helped develop some of the underlying dance story, motivation, and imagery and some of the movements based on these. In this way, my background, my understanding of the themes, my dance and performing experience as well as my range and style of movement contributed to this piece to an extent.

3. I believe there are many influences that would have had an impact on how I understood, worked and performed in this piece. I decided to list what I consider to be the main influences in dance. My dance background includes German expressive dance, dance theatre as well as contact improvisation and contemporary dance. With prior training in ballet from age 6, I began training and performing in ballet and German expressive dance with Kirsten Behm as member of the Tanzwerkstatt No Limit , Berlin, Germany in 1988 and danced with her for most of my childhood and youth (1988-92 / 94-2000). Her idea of no limits to the imagination, and that everyone can dance remain a great influence on me to date. They follow in the footsteps from the German founders of modern dance, such as Rudolf von Laban, Mary Wigman, Kurt Joos, Gret Palucca etc. Moreover, she began working with children and young people, making dances about what was moving them, in the then restricted society of East Germany. She still creates work in this spirit and recently featured in the popular project “Rhythm is it”. With her I learned to dance and perform an inner story, and express myself in movement.

Another of my main influences would be choreographer Peter Mann, whom I worked with as member of the Jlling company, Tanztheaterprojekt Rostock from 2001 to 2005. He

mixed modern dance with hip hop and break dance. His style would be quite lighthearted and humorous. He too involved his dancers greatly in the devising process. In developing the choreography for this piece, imagery and stories make up the thread we worked with. I am very much used to working in this way and devising together as a team.

In 1996/7 I took part in a performance workshop with Steve Batts and Ursula Läubli in Potsdam, Germany. I have these two to thank for introducing me to contact improvisation in the best way. I think my love of trying out new things, experimenting with known forms, my experience and ease performing in improvisation structures influenced this piece to a great extent.

From 2005/6 I began training and performing with Inma Moya Pavon in Cork. Her contemporary dance workshops and classes feature strong contact improvisation element and have been most influential in the past years. It was an ease developing work with Inma Pavon, as I've worked with her as choreographer before. I am accustomed to her style through dancing in her workshops and classes in the past. I think this understanding and connection is visible and played a great part in the making of this piece. I also have a background in many other things, from drama to graphic design but I would say the influences from these are more indirect and not easily pinpointed.

4. We worked very structured with 4 blocks of week long residencies. We also had meetings and rehearsals before and after these. There were rehearsals with all of us, as well as with dance performers only. Each residency ended in a sharing. Before the next residency, each part was recapped, developed further and edited. At the beginning of each residency I was mostly listening, asking questions, coming to grips with the themes for each will, in

order to understand them, and understand some of the thoughts, ideas that informed Sara's composition choices already in place. Inma would draw up a structure based on the themes and time frame, or structure in place already. Within this we would work on different parts – sometimes finding different movement qualities and movements in an improvised structure, sometimes in a set structure, sometimes a structure with chance elements in it.

Finding clear movements using certain parameters was the focus when working together with Inma in the studio, as was developing a sense of timing. We also explored movements with the sensors and with sensors triggering sounds and film. Later on we worked on transitions - always reworking and going back to the initial ideas and themes. I believe we worked very closely oriented on the time structure and composition of the piece. To me the process was creatively satisfying as I was given freedom to become involved in the devising process to an extent.

5. I wore a long-sleeved shirt with sensors placed at the top of my wrists. The shirts were reinforced and an elastic band helped keep the sensors in place. Wires from these fed into two main elements sewn onto the chest area. One of these had a red light to signal power. The shirt also had a pocket on the front left side for a battery. At times, we also worked with a sensor attached to a hair slide worn at the top of our heads.

In terms of the costume, I had to get used to dancing with the wrist a bit tighter at first, as well as with a shirt sewn with threads of connective wires. In the devising process, I felt a little restricted at first, as there were elements fixed at the chest and we were careful not to damage the equipment. In making the movement choices, we had to keep this technical costume in mind. However, towards the end, working with this so much, I became almost

unaware I was wearing this special shirt and being “connected”. I felt quite free to move and did not feel it hindered me.

In terms of the technology, I felt a little strange at first, being connected to a computer through movement sensors. In this case, the movements of my arms were tracked and could trigger other elements, such as sounds and film. The beginning saw us experiment with the distance the transmitter could work, as well as with the thresholds of what these sensors were set up to trigger. I believe this initial phase made me aware much more of the movements I made, especially with my arms. During the performance I had a heightened awareness in some sections. For example, I became aware of movement of my arms triggering film static at the very beginning of will I. As I had my eyes closed, I was very aware of the sound of static becoming louder, by both dancer's movements. This was also the case for the section of will II that triggered bell sounds. Apart from these, I was mostly unaware of triggering anything through my actions.

The red light glowing in the middle of Inma's and my chest became a strong point to focus on, for me, while working on the first will, which had us begin seated and facing each other during much of the rehearsals. Focusing on this light during performance really helped me with keeping in time with Inma.

I think overall, during the performance, the music, films, sounds and their interplay through technology, with changes and variables, made every performance fresh or slightly new. As there were so many elements making up this piece, it really required me to focus much more on my own actions and on my relationship to the other dancer. This focus felt

much stronger than in previous work. At the same time, the music and films did provide reference points for me as well.

6. Personally, I would have liked myself to have begun work on this project with a bigger range of movement to offer to the piece. I always feel I could have done more, been stronger, more versatile as a dancer. Working with sensors on more parts of the body a second time around would be a very exciting next step and bring the focus to the entire body.

I envisaged this piece to be set in a wider space, with the audience free to move about. This is what I would suggest, were we to do this project again. This might open up the piece and make the experience less intense for the audience and performers. Bringing down the screens to the same level as the dance performers and musicians might pull the piece together visually even more.

In terms of the working process, I think if I were to work on this project again, I would begin working less closely tied to the time structure and the composition. I really would have liked to understand more about the technology and have a deeper insight into the way Sara worked from the very beginning and been there when she was composing the music to the piece. Overall, I am very happy and thankful to have been part of this amazing project.

Hollas Longton

1. It seemed like an interesting (and possibly impossible) project. Especially the technical aspects of it (the shirts) appealed to me.

2. Violinist and improviser. I contributed my violin playing, advice about playing techniques with examples, and a couple of bits of material in act 3.

3. I was trained/groomed as a classical violinist from the age of 3. At 12 I was playing as soloist with an orchestra. At 19 I decided to become a composer. My influences now include La Monte Young, Alvin Lucier, James Tenney, Morton Feldman, and John Cage.

In general La Monte's expanded sense of time influenced my improvisations in this piece. La Monte's practice of tuning his sine tone installations to the natural (and in 1970, unavoidable) hum of the speakers so that the hum and the tones were in tune with one another was something we discussed together and then utilized in the tuning of the violin.

4. The process was very natural. Sara would come to me with an idea for a sound, which although seemed vague at the time, was actually very specific. I would show her some things on my instrument and she would either pick an option or try to synthesize an option with the options given, or one option given and a new idea.

It was creatively satisfying. Rarely have I been trusted as much as Sara trusted me in this project. Furthermore, the freedom to improvise as much as I did is a rare opportunity. In general, I wouldn't change anything about the process. Working with the composer closely is how I like to do things.

5. My relationship to the technology was pretty minimal. My violin was amplified greatly and looped some of the time. In university I was in a band so I was used to the sound and feel of the amplified violin. Some of the effects I did on the violin (e.g. the grating/ popping sounds, and bowing on the body of the instrument) would be completely impossible or inaudible without this level of amplification. The looping which occurred helped me to create a more harmonic space in the texture where doing so would have otherwise been impossible.

6. It's very hard to say, because I was generally very happy with it. The only thing I found frustrating are the kinds of things that can't really be fixed (the general capriciousness of computers and cables), and in doing it again it would likely be in another space so the problems will be different.

Claire O'Brien

1. I had seen the first act as a work in progress as an audience member in the TDC. I was impressed by the atmosphere the dance, music and visuals created together. It was a world I was drawn into. My love of performance means I am always open to new possibilities to perform and I knew Inma, Sara and Hollas already so I knew they were people I would be happy to work with. I was excited to perform music alongside dancers as I am interested in dance as well. Also the philosophies behind the work intrigued me.

2. I was a singer, a piano player, I reacted to the dancer's movements to create with them an atmosphere which in turn reflected what Sara had told us about her ideas and the ideas she had drawn on. I, as well as Hollas added a live aural element to the piece which used a lot of technology. I feel my role was strong in this aspect because of the nature of the voice as an instrument being an instrument of the human body. My vocal part also provided the only text in the piece, in act 4 I sang from quotes so in this instance my part gave some context to the listener and some reference points even if vague.

3. My background is in performance but not as a trained singer. I think this influenced the piece because my technique isn't as solid as a trained singer. Therefore, especially in act one, while improvising I was restricted in a certain sense because of my own limitations, with breath control and range and steadiness of phrasing but also I had certain freedoms to sing

from my gut reaction to the dancers and to my own thoughts without worrying about the quality of the technique or outcome too much. I have learned and sung a lot of religious music in my life and I think this influenced me as well. Again I focused more on my intention behind my singing rather than the result. During the piece I tried to focus more on being present and considering the weight of the concepts we were exploring rather than producing a perfect tone or line of singing. I was frustrated at points by my own shortcomings though especially when I ran out of breath when I felt the line should continue.

4. In one way I found it was a slow working progress for me, I felt it took a long time for the ideas to sink in and for the music to take on a certain character. In another way it was a very quick process in that I had my guidelines set out and it was a relatively short process between that and performance. However, I did feel that personally it took a lot of run throughs to feel like I was competently performing the material, even the improvised parts. It took a lot of time to feel I had some authorship over what I was performing. Actually I think I could have used more time working creatively with my own part within the piece to explore it more comprehensively and delve deeper into what I was doing. I'm not sure if I should have done that on my own. Perhaps, I could have spent more time with it on my own but also I think within the group rehearsal time it would have been good to spend more time exploring the individual parts, in a workshop kind of setting.

Certain elements were creatively satisfying; I found wherever I had a challenge I felt satisfied. For example: I was not too used to improvising so that was exciting, also I wasn't very used to performing piano without singing which was a good challenge for me. I found it good also working with such varied media such as dance and visuals and non- live music.

Again, I found I think it would have been more creatively satisfying if we had spent more time working on the live parts of the show. I think the dancers did this but I felt I didn't do enough of working on my own part.

The fact that the piece was based on different human motivations to live meant that I reflected especially on my own motivations for decisions I made throughout the piece. This was particularly evident to me because of the improvisatory nature of parts of the work. Because of this there was an introspective aspect to the performances which I found hugely beneficial.

5. The technology meant that things were on a strict "ish" timeline. I think, especially with improvising this is a little restrictive because I may have felt like going a certain direction but I knew I had to move on to the next part. It also gave me more scope for possibilities though, because my voice was part of a much larger soundscape than just me and a violin. I felt I could be dynamically free because the sound wasn't relying on me to provide a certain dynamic level, equally I could be very loud and sing with full voice because I knew I could never drown out the electronics.

6. As I said earlier I think I would like more time and focus on the live aspects of the piece. Not necessarily more guidelines or notation but more exploration of potential guidelines or things to try. I think Inma and Maria worked this out well because they worked together before and also they were both expressing themselves through dance whereas me and Hollas hadn't worked together before and also we had very different methods of working because I was voice and he violin. I felt in Act 3 when I was playing piano we were able to workshop things more but when I was singing, I still think we worked well together but it

was more difficult to workshop ideas. I think an external person working with us on our parts could have helped.