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UNIVERSITY OF CALIFORNIA, SAN DIEGO

Double, Sync, Constellate
Realization Specific Works for More Than One Cello

A dissertation submitted in partial satisfaction of the requirements for the degree Doctor of
Musical Arts

in

Contemporary Music Performance

by

Judith Eleanor Hamann

Committee in charge:

Professor Charles Curtis
Professor Anthony Burr
Professor Amy Cimini
Professor Amelia Glaser
Professor Shahrokh Yadegari

2018

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Chair

University of California, San Diego

2018

EPIGRAPH

*For I have seen love
and his face is choice Heart of Hearts,
a flesh of pure fire, fusing from the center
where all motion is one.*

John Wieners, from “Cocaine”
from the concert flyer for the premiere of Tashi Wada’s duets

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Major Field: Contemporary Cello Performance
Professor Charles Curtis

ABSTRACT OF THE DISSERTATION

Double, Sync, Constellate
Realization Specific Works for More Than One Cello

by

Judith Eleanor Hamann

Doctor of Musical Arts in Contemporary Music Performance

University of California, San Diego 2018

Professor Charles Curtis, Chair

This dissertation will examine four works for multiple cellos prepared over the course of my doctoral studies. The works are: Tashi Wada *Duets: September 2006, March 2007, April 2007, February 2008* (2006-08), La Monte Young *The Melodic Version of the The Second Dream of the High-Tension Line Stepdown Transformer* from *The Four Dreams of China* (1984), Alvin Lucier *One Arm Bandits* (2016), and Anthea Caddy and Judith Hamann *Untitled* (2015-18).

An explication and discussion of four key characteristics - the dialectic of material and action, the works' unfolding in time, multiplication of bodies, and unison - will guide

and illustrate how these works become cast as pieces which are realization specific, that is, works that only reveal their form in performance, informed by dialectical material, present moment responsiveness, and secondary material generated through the relationships between each characteristic. This paper will suggest that these key properties are crucial in repositioning the pieces in a particular space within the composition and performance paradigm.

INTRODUCTION

This dissertation will examine four works prepared and performed over the course of my doctoral studies, each of which is composed for two or more cellos. These works have formed a thread, or through-line, from the very first project undertaken in my studies with Professor Charles Curtis, to my final doctoral recital. A recurring instrumentation of two or four cellos has formed an architecture of sorts for my doctoral work, one that frames several key areas of my performance research, unfolded here through an overview of the working methods employed to realize these pieces in performance.

The experience of working on these pieces over the last five years has altered the way I listen, the way I navigate my instrument, but most importantly, illuminated alternative ways of thinking and making music as a performer. In situating the performer in a specific role, that of an actant¹ who brings the works into being through a particular kind of navigation of compositional material, these pieces can be seen as a recasting of the relationship between composition and performance, creating an unusual space within it. This space is where the work lives, (or comes into being), through its realization in real time, arguably informed by an assemblage of interconnected properties. It is in all these interwoven relationships that the work could be seen to reside, and as a result, there is a

¹ Actant in this paper is used in the sense of a *source of action*. This term, (as opposed to actor for instance) was chosen specifically for its ability to refer to a source of action that is not necessarily driven by the motivation of individual human actors, or even necessarily humans. The word is drawn from Jane Bennett's use of it in her book *Vibrant Matter* (2010), but originates in Bruno Latour's work. This definition seems important in reference to later discussion of the cellos as responsive bodies, as a means to move away from more subject centered terminology.

sense of reframing of material here: one that shifts away from its being necessarily equivalent to composition, one blurred by a set of relationships enacted in performance.

The four pieces are: Tashi Wada *Duets: September 2006, March 2007, April 2007, February 2008* (2006-08), La Monte Young *The Melodic Version of the The Second Dream of the High-Tension Line Stepdown Transformer* from *The Four Dreams of China* (1984), Alvin Lucier *One Arm Bandits* (2016), and Anthea Caddy and Judith Hamann *Untitled* (2015-18).

This dissertation will examine each of these works with an emphasis on discussion of the following characteristics or properties, which, if not *shared* precisely, overlap and inform each other. They are, arguably, indicative of a larger frame within which I will attempt to position these compositions. These characteristics will be referenced throughout this dissertation, and have been chosen for their ability to magnify the interconnectedness of properties, the relationships which I believe are key to the generation and creation of the works. While each piece engages with these properties in its own way, it is by examining them through the ‘prism’ of these areas of exploration that this paper aims to create a specific space for these works, a larger shared idea at play: works which are determined by, and only emerge in, their navigation in performance.

I am, of course, writing from the epistemic stance of a performer in this context, and as a result certain understandings of process and execution may only be clearly seen from this perspective. However, it is my hope that through highlighting these ideas, for the non-

performer, some of these properties and their relationships will be rendered sensible, audible in a new way.²

The linked areas of exploration are:

1. The dialectical relationship of material and action

This topic will involve an examination of how the material of composition and the action of performance form a dialectic which, in a sense, *reveals* the work. These two elements form an axis which each work moves through in a definitive way. While each piece passes through it at a different rate, or with different ultimate aims musically or conceptually, the two are inextricably linked in a generative sense: in that each informs the other.

Material in this sense refers to the task given to performers, which includes tuning, maintaining or destabilizing a unison, and pitch movement and/or fluctuation, in order to realize a musical, or phenomenal aim. This term can also be viewed as referring to a musical or philosophical concept.

Action here refers to the physical, technical, and performative relationships required to achieve an objective or execute the instructions of the score. It encompasses bowing, bow pressure, approach to tuning, and a navigation of registering and responding to phenomena in time.

While the relationship here postulated is implicit in many other kinds of composition, in these pieces it specifically materializes, or produces the substance of the work. The relationship *between* material and action is key here. Rather than an instruction for action

² This approach could be seen as working within a kind of materialist musicology, the focus here less on how the works sound, or how they are notated, but on how they are *made*, practiced, produced.

without a clear concept of auditory embodiment,³ or its inverse, (a musical aim that is fixed as an external object in the score),⁴ here, action and material (or concept) together manifest the piece. It is only in the *performed* navigation of this dialectic that one locates or uncovers the work.

2. The works' unfolding in time

The discussion will address time and its distinctive function in these works. For the performer, these works enact a unique 'straddling' of the present moment: a magnification of present, while constantly referring to memory (past), and projection (future) in order to maintain the performed objective in question. The performer is then cast into a dual role, that of both observer and actant, with the work itself emerging out of this specific sense of time and its relationship to action.

This topic will also examine the idea that properties such as duration and slowness have a particular function in these works, manifesting not for an aesthetic reason, but for a human one. Slowness or length are not an end in themselves, but a necessary result of

³ For example, action-instruction based works such as Christian Wolff's *Prose Collection* (1968-71) or John Cage's *Variations* (1958-67). Here the concept, and the action to be performed is indicated in the score, but the audible outcome is not correlated with a specific musical sounding, in this instance, a casting of action over material.

⁴ This idea is refers to a particular attitude towards the score as where the work resides. To provide an example, Theodor Adorno wrote, "the performance is the x-ray photograph of the work," an implication that the act of performance should be at its best, transparent, and that "scores are not only almost always better than performances, they are more than simply instructions for them; they are indeed the thing itself." This creates a lineage of performance practice that is constructed in some way to serve the 'work,' and excludes the performer as a creative agent, positioning performance as a necessarily imperfect realization of the work in question. As seen in: Theodor W. Adorno, *Towards a Theory of Musical Reproduction: Notes, a Draft and Two Schemata*, ed. Henri Lonitz, trans. Wieland Hoban (Cambridge: Polity Press, 2006), pp. 100,160.

navigating the relationship of material and action, dictated, for example, by the demands of tuning, or maintaining a unison relationship. The function of time also extends to the works' hearing, both for performer and audience, with the kind of treatment of time here shaped by the navigation of the material and action dialectic, crucial in creating a temporal space for the experience of specific acoustic phenomena.

3. The multiplication of bodies (instruments, performers, speakers)

This discussion will involve an exploration of the results of doubling, and multiplication, in these works of groups of two and four cellos: what its role is in specific works, what it complicates and problematizes, but also what it reveals. Bodies here center on the dyad of performer and instrument, and should be viewed as referring primarily to the duplication or multiplication of the resonant body of the instrument as joined with the physical body of the performer. In the cases where this refers specifically to the body of the instrument, or performer alone, I will attempt to make the distinction clear within the context of the discussion at hand. The dyad definition of bodies is extended in the final chapter to refer to a multiplication of disembodied (acousmatic) producers of sound, speakers becoming an extension or abstraction of physical or sonorous bodies.

Multiplication of bodies can function as both as a form of magnification of a relationship of difference, and one of masking or covering it. The aim in these works is generally not one of enlarging forces towards a conglomerate sameness but, predominantly, exploring the inherent complexity in the notion of *likeness*, revealing the detail and tension therein. Multiplication makes audible the aims of the material, and in some cases, forms the central concept of the work.

Central to the discussion will be looking at what doubling or multiplication upholds in terms of a unified relationship and the kind of action it sets in motion: a sharing of difficulty, an exertion of listening, a constant navigation of compensation and compromise, and a necessary reliance on trust between performers.

While this property clearly refers to instrumentation, that of multiple cellos, it is also intrinsically linked to the next characteristic, that of unison, which necessarily requires more than one actant or sound object to be registered in time. Although these two characteristics coexist in a dialogue similar to that of material and action, they are separated here in order to speak with greater clarity of what *each* property enacts, rather than specifically situating them in terms of their relationship.

4. Unison (or the illusory quality of what is generally thought of as unison)

Unison will be framed as a recurring construct in each of these works, yet each piece destabilizes the concept in a specific way. Rather than regarding unison as an interval with a harmonic function, these works in turn examine, explore, explode, and reveal the paradoxical nature of the concept, redefining it as a *state* rather than an interval, as a relationship rather than a fixed parameter. Using the lens of unison also acts as a form of magnification: of difference, contradiction, and a richness that lies beyond the given of sameness of frequency or pitch. It also references something specific in this context: its being expressed by multiple cellos, multiples of the same *kind* of body.

The four focal characteristics listed above will be explored within a chapter narrative centered on the preparation and performance of each piece. While not explicitly outlined in

terms of a compartmentalized analysis of the works, these ideas will attempt to lift out and illuminate how each work engages with what becomes recognizable as a further shared characteristic of these pieces, marking out a space for a specific kind of interconnected compositional and performance practice, to which I will refer in the context of this dissertation as *realization specific works*.

These works belong to, and stake out, a space not often clearly defined: a kind of composition which reveals its form only in the lived experience of its performance. This should not be viewed as at all related to either improvisation or aleatoric composition; there is nothing improvised, or chance-based in their realization. At the same time, they are also distinctively different from most European classical music lineage composition, which uses notation, temporal indication, or other systems to bind the work in some sense to the score. The score here is not a stand-in for, equivalent to, or synonymous with the piece itself. Rather, the work, and what the work attempts to reveal musically, acoustically, and gesturally, emerges only in the navigation of its performance. This could be read as somewhat nominalistic: the claim that the works are not held within their scores (or their names), but that each iteration is unique and only exists as lived.⁵

This dissertation presents a somewhat atypical casting of material in relation to a composition and performance relationship. It would be misleading to take it that the dialectic

⁵ This casting of nominalism refers to the rejection of universals: to the idea that each iteration of a work is its own specific instantiation, rather than belonging to a larger, universal idea of the work held within a score. Drawn from Gonzalo Rodriguez-Pereya, "Nominalism in Metaphysics," ed. Edward N. Zalta, *The Stanford Encyclopedia of Philosophy* (Metaphysics Research Lab, Stanford University, 2016), <<https://plato.stanford.edu/archives/win2016/entries/nominalism-metaphysics/>>.

of composition and performance is necessarily equivalent here to that of material and action. While there are similarities, over the course of this paper it will become clear that this is not a simple one to one relationship. Therefore, through working towards larger ideas of realization specificity, the key characteristics will themselves blur and be changed by each other, generating new concepts which are shared, or constructed from the relationships between them. These secondary ideas articulate a further kind of casting of what it might mean to be realization specific: one that manifests as a particular kind of responsiveness, which will sometimes be characterized as *care*. Additional secondary concepts include the relocation of anomalies, byproducts, or flaws as focal material of the works, provoking an additional form of responsiveness. These ideas will emerge over the course of the paper in relation to each work, and be reviewed in the conclusion.

The four pieces are, of course, by no means intended to serve as some sort of singular example of a new kind of interrelated composition-performance practice. It is also beyond the scope of my doctoral research based in contemporary cello performance practice, to outline a holistic view of the broader idea of realization specific works, or how they might be situated historically. In approaching this dissertation from the epistemic position of a performer, this paper will focus on the process of preparing and performing these works, and, through this, my own arrival at a subjective sense that they *function* in a distinctive way (despite historical, ideological, practical, or conceptual differences in approach): as realization specific works.

Synopsis of content

Each chapter will focus on a specific work, presented in chronological order of performance presentation. Chapter One will be on Tashi Wada's *Duets: September 2006, March 2007, April 2007, February 2008* (2006-08), Chapter Two on La Monte Young's *The Melodic Version of the The Second Dream of the High-Tension Line Stepdown Transformer* from *The Four Dreams of China* (1984), Chapter Three on *One Arm Bandits* (2016), and Chapter Four on an untitled work by Anthea Caddy and Judith Hamann (the author) (2015-17). The four focal properties listed above will be explored in relation to the primary chapter narrative which revolves around the preparation and performance of each piece.

CHAPTER ONE

Tashi Wada

Duets: September 2006, March 2007, April 2007, February 2008

Tashi Wada's full series of string duets formed the first major performance project undertaken in my studies with Professor Charles Curtis. The cello duo version of the pieces was prepared in the fall of 2012, with the premiere performance in Los Angeles at 'the wulf' on November 17th. They were later recorded at UC San Diego in January 2013 for a vinyl release on Saltern. The pieces are represented in the score by a diagonal line spanning two octaves across a stave. Originally for violin duo, this appears as two Gs. However, the pitches themselves are less important than the trajectory of ultimately reaching the lowest possible open string in standard tuning. Thus, for the cello version, the duets begin on middle C and end with the open C string.

The first duet, *September 2006*, presents the fundamental premise of the duets, bearing the instruction that "The players descend in unison very slowly," while the second, *March 2007*, is essentially the same material with the additional direction of pizzicato, "plucking tones together at regular intervals in time."⁶ The third, *April 2007*, looks deceptively similar on paper, except, as a harmonic glissando, produces radically different material, with the instruction "The players descend in unison very slowly, matching the harmonics as they sound."⁷ The fourth and final duet, *February 2008*, somewhat resembles

⁶ Tashi Wada, *Duets: September 2006, March 2007, April 2007, February 2008* (United States of America, 2006) pp. 1-2.

⁷ Ibid., 3.

the first, with the addition of the curious direction: “always upholding the present relationship which varies each moment.”⁸ This last set of instructions will be explored in more depth later in this chapter. Each of these duets poses a unique set of questions in terms of unison, slowness, and descent which I will address through my process in preparing them and from my perspective as a performer.

Duet

for two violinists



The players descend in unison very slowly. (The piece may be transposed for other pairs of bowed strings.)

Tashi Wada
September 2006

Figure 1.1 Tashi Wada, *September 2006*

The players descend in unison very slowly

This instruction from Wada creates in its simplicity a space for approaching the duets in a way that is determined by the performers’ navigation of the material. The work must then unfold in a manner driven by the players’ negotiation of unison, slowness, and descent, as opposed to an external idea of musical outcome, or fixed temporal or spatial parameters

⁸ Ibid., 4.

(for example, any notated markers of time). How we move the unison over the course of the piece determines the limits of its duration, its method, its musical/aural outcome. This enacts a mutual searching, or as Charles Curtis puts it, “a personal dimension, even a drama.”⁹ This “drama,” is, from the perspective of a performer, perhaps the crux of these works, their tension, their performance.

Central to all this is *doubling*. Alone, a slow glissando on a string instrument generates its own sets of acoustic phenomena: sympathetic resonance with open strings, marking out the gradations of frequency response of the instrument and the room. This kind of exploration can be heard in pieces such as Alvin Lucier’s *Glacier* (for solo cello), and in certain of James Tenney’s works, *Cellogram* (1971) and *Koan* (1971). In such works, the glissando occurs within the frame of a single resonant body (or a single bowed string instrument), meaning that even in the double stops of the Tenney works, the movement towards and away from unison is contained within the intention and movements of a single system (player and instrument), comparatively limiting the phenomena produced and the difficulty of the pieces’ negotiation. Doubling, with two players, dramatically complicates a glissando, but also creates a richness of acoustic phenomena in its navigation.

It is within the act of doubling that the idea of unison is held, problematized, and explored. A single pitch or rhythmic gesture cannot be described as unison; it can only be so in relation to something else. To unify then implies a division reconciled, or the possibility of dividing again. Thus, unison is a concept which must contain within it some form of

⁹ Charles Curtis, Liner Notes, *Duets*, Vinyl LP, SLT-001 (US: Saltern, 2014).

multiplicity, a singular construct formed through its own division, carrying the implication of separation, past or future. Wada's duets further complicate all these elements by setting a unison relationship in motion.

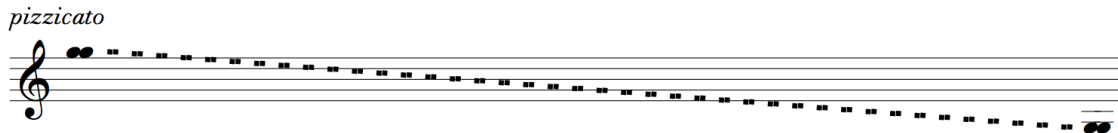
The instructions of the score, the technical execution, the aural outcome, and the manifestation of present are all in constant flux and dialogue in these duets. There is something generative that occurs in their performance, with each parameter feeding and shaping each other. The search for unison, the disorientation of individual voice/instrument, the heightened awareness of present, and the difficulty in navigating the slowness of movement outside time and rhythm makes the performance of these works extremely complex. Each performance feels like a new route through familiar topography, as if walking the same path through sand or snow. The placement of footprints will differ each time, leaving a kind of 'thickening' in memory of a path with many variables whose trajectory and destination nonetheless, remain the same.

How does one determine slowness? For Charles Curtis and I, the criterion for forming our pacing (which seems altogether the wrong word, but how does one determine duration without rhythm?) was a compromise between what fell within the realm of technical and physical possibility, and what teetered at the very edge of not moving at all. The movement needed to be constant, without stasis or resting 'points,' (points here being the operative word in terms of resistance, to that of markers which could indicate a stopping in the unyielding momentum created by the diagonal line of descent on the page).

Even in the second duet, *March 2007*, which can indeed be read as a dissection of the glissando by plucked points, our perspective as performers was that the movement of the

descent should still be constant. Each pizzicato then is understood less as a fixed point than as a pulsing light illuminating a continuous movement in darkness, each pluck a kind of aural strobe, with the inexorable left hand movement obscured or hidden, its momentum sustained through practice and trust between the players.

Duet
for two violinists



The players descend in unison very slowly, plucking tones together at a regular interval of time.

Tashi Wada
March 2007

Figure 1.2 Tashi Wada, *March 2007*

In the arco, or non-pizzicatos pieces, the only marker of time, or rhythm, are bow changes. The finite reach of a single bow means that with a steady regularity, there are the slight interruptions, or disruptions of the bow changing direction. These works, then, have an inbuilt reminder of the physicality and human-ness of the players, and the limits of the instrument as opposed to, say, a sine tone or electronically generated tone which could be truly continuous. These ideas of limitation seem key to hearing and understanding these works: just as two cellos cannot be truly continuous, neither can they be perfectly or precisely in unison, but only perceptually so, with the listener theoretically smoothing over

bow changes, imperfections in the descending pitches' unification, in order to register a unison relationship.

Bow changes in sustained music demand a consistency of approach and concept. This requirement necessitated some decision making in the performance preparation stage of learning the works. One such aim was to disguise the bow changes as much as possible without compromising on intonation and sound. This involved a slight decrescendo in and out of the bow changes, staggered with the other player, who would compensate slightly by increasing their volume to mask the shift in direction. Another decision was to coordinate changes in a regular rhythmic grid. The intention was to set in motion a regularity of movement to make the constant tracking and multitasking occurring in performance slightly less taxing through providing some predictability, or regularity for the players. This approach also arguably has the result of a kind of camouflage through repetition. With the regularity of changes between the doubled instruments, the bow changes lose the sense of being an event, and become instead a characteristic of the overall motion, just as rocking of a train blurs into one phenomenon, rather than discrete rhythmic pulses.

For the first, second, and fourth duets, a particular left hand technique was devised in order to slide as consistently and constantly as possible, a sort of *turning* of the finger stopping the string. To slide with the finger in one contact position and angle is not only increasingly uncomfortable, but the relationship of friction between finger, string, and fingerboard mean that *very* slow movement cannot be completely smooth, with the release of the contact position resulting in a ridging of pitch rather than sliding, albeit on a micro-level. In contrast, a turning motion, a swiveling of angles and the surface of the finger on the

string, allows the possibility of a rate of pitch movement which treads the edge of the slowest possible without becoming static. It becomes a kind of tangible tracking of continuity of the diagonal line, a thread of constant action in its twisting of finger and pressure, with the subtlest of aural results. This serves as an illustration of the difference of experience in performance between player and audience (be it live or mediated through recording). The aural or musical outcome of the slow glissando is necessarily created through an intensity of activity, alertness, and technical demands which are hidden from hearing, yet dictate how the players proceed through the trajectory of the descent.

A glissando over two octaves is not as simple as navigating the gesture on a single string (except in the case of the third duet *April 2007* due to its lighter, harmonic finger pressure). In order to move at the very slow rate required, the string tension and physical demands on the left hand to traverse two octaves on one string only would render performing the pieces at best painful, and at worst impossible in terms of smoothness of the glissando. As a result, string crossings are necessary, thereby in effect dissecting the diagonal line, moving it across several strings.

To approach the string crossing is to veer dangerously close to the territory of a cessation of movement, almost as if approaching an object or singularity whose gravitational proximity slows rather than hastens movement towards it. This moment, which occurs twice in duets one, two, and four, must be approached and emerged from carefully and delicately (in order to maintain a continuous line), which establishes a particular *kind* of slowness. The material and the difficulty of the negotiation of the string crossing dictate the speed at which it can be executed. As each player approaches the open string, they must very carefully

release the pressure of the left hand without any leaps or any disturbance to the constant pitch movement, and then, match the open string's pitch to that of a stopped note on the next string to the right, then cross with the bow and attempt to continue the glissando at the same rate.

I see the relationship of material and action enacted by the string crossing as one that creates a particular manifestation of slowness, dictated not by tempo, but by compositional material and bodies (of both performers and cellos). This kind of slowness I feel has a resonance with the idea of 'care.' Care in this sense refers to a particular focused approach to physical movement, whereby the *care* of an object induces slowness. This sense can be likened to carrying a vessel of liquid on the brink of spilling, lowering an uncooked egg into a pot of boiling water, balancing the highest in a house of cards. In these examples the task instructs the body. Careful movement is a specific form of slowness sympathetic to the action and the fragility of the objects or outcomes at play. This then suggests that upholding a unison relationship, in its movement across the strings, is inherently fragile, a bucket of water with a dangerously convex meniscus being carried by two differing physicalities (the players) in an act of constant negotiation.

However, fragility, while perhaps having some validity, seems the wrong way to characterize the overall function of unison in these pieces. The word fragile, which implies a kind of brittleness or breakability, fails to encompass the way that these pieces (in particular the first and fourth duets), embody and demand a kind of elasticity of thinking the concept of unison.

To set a unison in motion seems to destabilize its meaning and function. If we take definitions of unison as a *point*, for resting, departure, or arrival, we imply a melodic or harmonic function, a leading to, or away from, more complex activity. Or, if we think of unison as its ratio, 1:1, a whole number integer realized as an interval, there is historically an implication of building, the idea that we use unison as a cubit or unit of measurement in order to multiply or divide. These pieces call into question this casting of unison as mere functionality by making it the focal material of the work, and also by detaching it from a role of ground or reference, in fact making it registerable only in the present moment between two players as they move. As Curtis writes in the liner notes for the duets, that in the context of these works, “Unison is the doubling of constant change... With moment-to-moment shifting as the given, unison is not the stable reference point to change, but the ongoing attempt to fuse two independent operations.”¹⁰

This conception of unison as something unfixed and unstable creates a space for a different way of hearing and thinking unison in the context of these works: as doubling in a state of flux. There is no landmark or resting point here, only a focus on tracking the unison in the present moment. The experience of time for the players is a juggling of registration of what one has just heard, where one is now, and what adjustments need to be made in order to maintain the unison. A duality of perspective is established: performer and observer attempt to become simultaneous states in a magnification of present. Unison requires an act of comparison in *time*, yet in these works the ability to register comparatively is rendered

¹⁰ Charles Curtis, Liner Notes, *Duets*, Vinyl LP, SLT-001 (US: Saltern, 2014).

paradoxical by its motion. The relationship is constantly 0, but also consistently changing, thus the comparative registration of unison contains within it a limit of being ‘true.’ Unison, here, can be viewed as something that manifests conceptually and mathematically, but is temporally problematized. The implicit paradox of these works is linked inextricably to performative action, to the players’ navigation of a kind of impossibility in time.

For the first and second duets, one makes tiny adjustments, slightly slowing or speeding up the left hand to correct drift from each other, to shepherd the unison back onto its course as the searching for each other widens from a perfect fusion, stretching the ‘molasses’ of unison. This of course is complicated by the fact that there is nothing fixed to adjust *to*, only a sense that the pacing is no longer synchronized.

For the performers there is an inbuilt paradox in execution, for when the unison is most ‘true,’ (to the extent that it can be), it becomes incredibly difficult to discern which player is which. The fusing of sound through unison doubling at its most perfect creates a particular thickening of pitch and timbre, with bell-like overtones moving slowly like sirens through different resonances of the cello. In these moments, I cannot hear myself as a discrete identity and the word ‘fuse’ seems entirely apt for what is occurring acoustically. These moments make it impossible for us as players to track each other within the relationship of unison, and as a result we fall back on trust and practice, to the technique of turning and the proximity to a string crossing to attempt to sustain this fusion as long as possible. The inevitable fallibility of two performers on two cellos to move this two octave unison creates a specific drama, the diagonal line as a kind of tightrope, our slow motion fraught with the possibility of losing balance. Yet the concept of unison here provides a kind

of elasticity: even slight pitch deviations register in a general sense as unison through their *intention* to be so. In achieving a true unison for a registerable period of time, the whole technical apparatus of maintaining the relationship doubled, uncannily seems to flicker and temporarily disappear.

Duet

for two violinists

harmonic glissando



The players descend in unison very slowly, matching the harmonics as they sound.

Tashi Wada

April 2007

Figure 1.3 Tashi Wada, *April 2007*

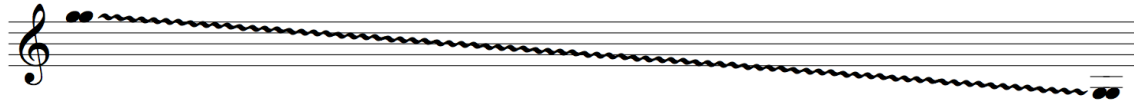
The third duet, seen in figure 1.3, as it traverses natural harmonics is perhaps the most volatile, in the sense of being uncontrolled, of all the pieces. A two octave natural harmonic glissando on one string, results in the opposite aural result to the diagonal line we see on the page. Harmonics emerge as sometimes close steps moving up or down, sometimes immense leaps, often white noise, sometimes complex multiphonics, in an Escher-like landscape where the audible result surprises and contradicts the uniformity of movement with its own morphology. This duet's unison is one of action, or gesture, divorced from a parallel musical result. The harmonic node or multiphonic which emerges is not dictated

only by the left hand, but by bow changes, pressure, speed, or even perhaps the whims of the cello and its sympathetic resonances. An unexpected partial might emerge earlier than expected, and it sometimes feels to me as if the cellos speak to each other as if the instrument wants to speak the same note as its double. At the risk of anthropomorphism, I propose that a kind of ‘ear’ of the cello seems at play here, even if it is in reality the ear of the cellist directing the hand via physical intuition.

This speaking between the bodies of the cellos, could be viewed as an extension of the idea of responsiveness, to not only the demands of a material and action dialectic, but to the relationship between bodies: cello to cello, but also the dyad of instrument and performer. Here, the cello can be seen as an actant, a *source of action*, that participates in the realization of the work through its own sounding. The responses of the cellos to each other, directs a further sympathetic responsiveness for the performers, who in a sense, must respond to the cellos’ needs, setting in motion a, perhaps, more extreme reciprocal dyad relationship between the multiplied bodies of performers and instruments.

Duet

for two violinists



The players descend in unison very slowly, always upholding the present relationship which varies each moment.

Tashi Wada

February 2008

Figure 1.4 Tashi Wada, *February 2008*

The fourth duet, seen above, represents the most difficult and paradoxical piece in the set. Here, the direction from Wada is extended: “The players descend in unison very slowly, always upholding the present relationship which varies every moment.”¹¹ There is now a shift in focus towards *difference* in the unison relationship, rather than an attempt at likeness. The intention of unison no longer manifests as the end-in-itself. Unison, as an implicitly temporary state, now reveals its inherent tendency to divide, and that very tendency becomes the musical material. The registration of difference in each drift in the relationship becomes the new focal point to be upheld. The implicit impossibility of this registration in real time gives a malleability to the material which is destabilized, altered, maintained, and moved by the actions of the players in the navigation of the work.

¹¹ Tashi Wada, *Duets: September 2006, March 2007, April 2007, February 2008* (United States of America, 2006), 4.

The question arises why have two cellos and not two sine tones and a patch which could in fact execute the instructions perfectly? Here we find an exploration of the richness of difference; humans and instruments fail to produce a unison, but instead generate a wealth of artifacts: intense acoustical beating when the cellos diverge slightly, strange flanging effects, the thickening of the doubled pitch. The fourth duet shifts the focus to these phenomena by instructing the players to uphold deviation rather than to correct it, exploding the illusion of unison or its attempt. This direction repositions material more commonly cast as flaws, mistakes, or byproducts as, instead, the central material, generating a resulting shift in priorities in performance, from what one might (in other compositional approaches) attempt to eliminate or hide, to becoming something to uphold. The fourth duet then, proposes a recasting of anomalies as material: a theme which will reoccur throughout this dissertation as a key idea in constructing a sense of realization specificity for these works.

The difficulty, or paradox contained within the instruction to uphold drift or difference, is in the conglomerate aporias of the directions. On face value, one could decipher the directions as simply suggesting that differences should be noted and maintained, yet how does one uphold a registered deviation from unison of the present while it “varies every moment”? What precisely here is to be upheld? Which moment should it be? How does one track constant change? Or, even more problematic, maintain it? This sets in motion a new kind of attempt, not to maintain a unison but to uphold its *drift* within an environment of constant flux.

In practice, this must be to some extent strategized. While the precariousness of the unison in the first and second duets could be nudged and tended, the fourth asks that we

resist correction, but somehow note it and then continue with this difference at the new ‘unison’, or rather, the new value to be upheld. How to determine what the difference *is* that we are upholding became a crucial point of discussion in performance preparation: are we maintaining the interval between the drifting fundamentals or the resultant phenomena? A decision was made based on the notion that the only verifiable information when dealing with such close intervals was the acoustical beating generated. This means that in effect we were attempting to track and move a new ratio based on the rate of its beating, we were dealing with a tempo, a pulse. When this would, (as it inevitably did), change, we would again register, and attempt to track, the new pulse, resulting in the fundamentals themselves no longer being key. Instead, the phenomena created by these intervals on the *edge* of unison became not only the feature, but the method with which to uphold difference.¹²

This speaks to the concept of realization specific works. Wada’s duets, through the relationship of instruction, material and performer generate a certain morphology realized only in performance. That is, there is a symbiotic relationship between material and action determining the lived performance of the work that cannot be reductively notated, nor can it be said to be subject to chance. Beyond their two octave frame and instrumentation, this nexus is perhaps the true unifying property of these four pieces. It also foreshadows a relationship to the other works under discussion in this dissertation. If we view elements such as slowness in the light of ‘care,’ we can discern an enactment of a temporal frame

¹² There is a further complication to this approach, in that in order to maintain a beating relationship when the pitch is continuously becoming lower, the fundamental relationship must drift. This adds another layer of paradox to the duet, in that even an attempt to register, verify, and uphold difference through maintaining a clear temporal, or even a rhythmic component such as acoustical beating, one element is always explicating a relationship of difference.

generated only in the navigation of performance, duration emerging as a kind of unintended result of a specific physical approach to action. In these duets we see multiplication generating action and material, we see unison become a relationship rather than an interval, we see the unfolding of the work generated in its performance. In Wada's duets the process of navigating material *through* the performers is, in essence, not just the site of the lived sound of the works, but something crucial to their creation in real time.

Descent

The idea of descent in these duets is another layer of potential paradox, or curiosity, based on the relatively recently established association, particularly in European classical music, of pitch relating to “high” and “low.”¹³ Etymologically speaking, to descend is “to be carried down,” or can describe a “tendency [for heavy bodies] towards the Centre of the Earth.”¹⁴ There is an implication here of the force of gravity, that descent involves being pulled towards something firm, towards the ‘ground,’ or even below it to more mysterious, deeper realms, (we might think here of Orpheus ‘descending’ to the underworld to rescue Eurydice).

To descend in pitch implies a journey from high frequency (higher number), to low. The idea of pitch and altitude having a relationship is an interesting one, something that is arguably learned, rather than intuitive, originating in the particular conceptual musical

¹³ Carroll C. Pratt, “The Spatial Character of High and Low Tones,” *Journal of Experimental Psychology* 13 (n.d.): 278.

¹⁴ N. Bailey, *An Universal Etymological English Dictionary: Comprehending the Derivations of the Generality of Words in the English Tongue* (R. Ware, W. Innys and J. Richardson, J. and P. Knapton ... [and 12 others], 1770), <https://books.google.com/books?id=pn0SAAAAIAAJ>.

lineage to which these pieces (and my own background) belong. However, there is some debate over why this association may have developed: that is, rather than any kind of absolute relationship, there is something perceptual at play. Study of subjects attempting to position heard pitch on a vertical axis has posited the idea that “High tones are phenomenologically higher in space than low ones.”¹⁵ This is not to assert any kind of association of pitch with altitude per se, but suggests that perceptually higher frequency is intuited as high in a phenomenological space.¹⁶ This may result, consciously or not, from being *taught* to associate frequency with high and low. The key idea under examination in the context of these duets is not about establishing an objective truth around the association, (which would comprise a different dissertation altogether), but, rather, that subjectively this learned spatial implication for understanding descent is built into the work.

Such conceptualization perhaps does indeed take place in a phenomenological space, and it is one aptly constructed to house the association of pitch with height or altitude. However, when viewing a performance of these pieces, one does not *see* a descent. The cello, specifically in its structure, means that descent in frequency results in a physical movement ‘upwards,’ or away from the Earth. Charles Curtis writes: “Why this motion should be perceived as descent is unclear to me. Given the posture of the cellist and the angle of the cello, the motion of the hand called for is in fact an ascending motion, relative to the floor and ceiling of the room one is in, or to the body of the player.”¹⁷ And yet, perhaps it is the body of the cellist that is the center of gravity, to which we move towards and away from,

¹⁵ Carroll C. Pratt, “The Spatial Character of High and Low Tones,” *Journal of Experimental Psychology* 13 (n.d.): 278.

¹⁶ Ibid., 279.

¹⁷ Charles Curtis, Liner Notes, *Duets*, Vinyl LP, SLT-001 (US: Saltern, 2014).

rather than the floor. An ascent then, moves away from the body, a descent, towards it. The inexorable glissando of these pieces then, could be viewed as descent in these terms: not just in their mapping of frequency, but in their movement towards a gravitational core, an earth constructed from the body of the player. Or it could be the open C string which becomes the ground, the moment one can go no further: a return, a coming to rest.

CHAPTER TWO

La Monte Young

The Melodic Version of the The Second Dream of the High-Tension Line Stepdown

Transformer from The Four Dreams of China

The Melodic Version of the The Second Dream of the High-Tension Line Stepdown Transformer from The Four Dreams of China, henceforth referred to in text as *The Second Dream*[...], belongs to a larger set of works, the *Four Dreams of China*. Each ‘*Dream*’ presents a different permutation of a set of four pitches, expressed as a whole number ratio, and must be performed by instruments in sets of four. This is in order to ensure that the harmonic, melodic, and timbral rules can be followed, but also sets in motion the form of the piece, which moves towards a realization of each pitch sounded simultaneously by the same instrument when the full chord is eventually presented.

I learned this piece in an aural/oral tradition from Charles Curtis over several months, without a text-based score. In 2015, I performed in an incomplete realization for three cellos in San Diego, and a complete version for four cellos and eight trumpets in New York City for the Dia Foundation’s celebrations of La Monte Young’s 80th year of birth.

The piece can be expressed most simply as a performance of the whole number ratios 18:17:16:12 in a specific melodic order, which unfolds over a period of time that can vary in duration, from anywhere between ninety minutes to over two hours. These intervals form La Monte Young’s *Dream Chord*, which, over the course of his life, whether on a conscious or unconscious level, is a recurring sonority, a reference to the rich harmonic material heard

in the humming of power lines in his childhood. This aural memory serves to direct Young's choice of intervals: a remembered chord that on careful examination is found in his work even prior to his use of whole number ratios in composition. It is present as the implied perfect fifth in *Composition 1960 #7* (1960),¹⁸ which can also be expressed as the 18:12, (rationalized as 3:2 in just intonation), the outer frame of the *Second Dream's* voicing of the *Dream Chord*. It is also the implied foundation of the harmony of *Trio for Strings* (1958), which similarly predates Young's work with just intonation ratios, and is in its first iteration a piece based on equal tempered twelve-tone composition structures. *Four Dreams of China* represents a realization of several points of intersection in Young's work: a full expression of the *Dream Chord* in each permutation of whole number ratio relationships,¹⁹ a piece that eliminates traditional notation, and demands an oral/aural tradition of transmission. *Four Dreams of China* forms a mapping of process, material and sonority that intrinsically belongs to Young's compositional framework.

The work's composition and transformation over time, from the first performance of the harmonic version in 1963,²⁰ to the generation of the melodic version in 1984, to its iteration in more recent performances, reflect a compositional process that is not itself fixed in a traditional sense, but is expressed through its realization in real time. This is not to suggest that the work does not have a clear identity, form, intention, and structure, but rather that the method of performance is tied not to notation, but instead, to the material, form, and

¹⁸ *Composition 1960 #7* presents a perfect fifth (the B just below middle C and the F# above) with the text instruction: "To be held for a very long time."

¹⁹ Each of the *Four Dreams of China* presents the same pitches expressed as different permutations of whole number ratio relationships. For instance: 18:17:16:12 can be inverted to place the 17 as the highest sounding pitch in the chord, expressed as 17:9:8:6.

²⁰ This first performance was for eight bowed instruments, including violin, viola, and bowed mandolin.

process of the work's unfolding. This treatment of material as inseparable from the composition points to resonances with Wada's duets, and also a distinctive relationship between composer, performer, and material, one that can be read as possessing a kind of unification of process within a compositional frame.

The function of memory in this context is distanced from the notion of fixed score as object. This is not to imply that there is not a great deal of complexity, rigor, and logic in the construction of the piece and the rules that dictate its form. Rather, the idea here is that the function of memory is fundamentally different from usual conceptions in repertoire performance; it does not refer to the reproduction of a fixed pattern of pitch within time based on notation in a text. The work was taught to me without a score at all: from Charles Curtis' memory, to my memory. This means that the idea of the work as an object, one contained within the score, is, in fact, is a misnomer. The empirical, measurable, qualities of the score as an object distinct from performance, are here completely destabilized, and as a result, the work is instead located in a lived space, with its transmission requiring an alternative approach to pedagogy and transmission. The shape of the work is cultivated through time, process, and a deep understanding of the musical and formal material involved.

The performer in *The Second Dream of the High-Tension Line Stepdown Transformer* has memorized a set of rules as contained within a text version of the score.²¹ This allows for the development of a slow, grounded understanding of the work, one whose 'accuracy' is verified not through measure against a notated object, but through listening and through its physical effect on the performer's body in space. This is a form of slowness

²¹ It is worth noting that I did not see the text score until the week of the performance, but learned it from Charles over many months leading up to the July 2015 realization of the work.

grounded in the pedagogy of the work itself, an unfolding in time which necessarily occurs not only in performance, but in its preparation.

Formal temporal elements, in terms of time and structure, are dictated not by arbitrary notated time divisions, but by the manner in which the piece itself demands to unfold based on what the material requires. Material here is not simply the intervals represented by a whole number ratio, but also refers to the act of tuning itself. Tuning as a *task* becomes material shaped by action: the process required to measure, register, verify and decide on the next action to be undertaken unfolds temporal structures, spatial relationships, and in a sense, the morphology of the work. There is a clear relationship between form and tuning here, which hearkens back to the notion of slowness, albeit expressed and experienced in a different way than in the Wada duets. Young writes: “Tuning is a function of time. Since tuning an interval establishes the relationship of two frequencies in time, the degree of precision is proportional to the duration of the analysis, i.e. to the duration of tuning. Therefore, it is necessary to sustain the frequencies for longer periods if higher standards of precision are to be achieved.”²² Time then, is dictated by material, and the duration of the piece’s unfolding is shaped by the act of tuning itself.

An understanding, a *feeling* of the piece, in terms of duration and when to introduce specific interval relationships is encoded in the performer’s memory, but this is malleable, responsive rather than fixed. This process of learning generates a particular body of memory that is constructed and is based specifically in the lived experience of the piece. Feeling in

²² Young, La Monte and Zazeela, Marian, *Selected Writings*, Ubuclassics (Munich: ubuclassics, 2004), p 7.

this context refers to something beyond the subjective; it is formed and based upon the demands of the tuning, of the central construct of the piece itself. I will attempt to provide a small illustration of here. The first pitch in the piece, the 12, may be played for a significant duration (twenty to thirty minutes). It may vanish from hearing into silence for several minutes before reemerging, or it may allow (or be pushed to allow) for the second pitch to be introduced within a relatively short time-frame. These decisions, made collectively in performance are a *response* to both tuning as material, and the action that takes place to manifest it. It is a response that is felt or intuited based on the amount of acoustical beating in the room, on how stable the bowing system is, on how much and in what way the tone has been passed between all instruments, on the bell-like clarity of high partials when they no longer waver but ring out once truly aligned, revealing a different timbral sonority altogether than what we usually hear. The performance of this first unison lays the foundation stone for the unfolding of the piece. The decision to introduce the subsequent second pitch feels, in performance, monumental. As if there is an increase of gravity in the room, the decision to introduce the 16 becomes a thickening texture of expectation the longer one inhabits the 12 and explores its sonority, its difference, the difficulty in sustaining it as a unison.

At any given moment, there is some kind of unison activity in play, even within the full expression of the *Dream Chord*. This may not necessarily be in a constant sounding as heard in the opening, but in a pitch's passing from one performer to another. When introducing a pitch, each individual player takes it from the player currently holding that same pitch. Softly introducing it against an already sounding pitch, one adjusts and merges into an existing sound until the doubling becomes sure enough that the past performer of the

pitch peels off from the present and prepares to take their next pitch, a slow motion handing over of a sounding object. Motion, then, the movement of pitch around the space from one musician to another, is grounded in registering and maintaining unison. Even within much more complex constellations of intervals, such as the full registration of the *Dream Chord* the transmission of unison passed between players remains a vital thread.

It is important here to mention the physical grounding of La Monte Young's work. The tuning of certain intervals is very much 'real', in the sense that they can be registered and verified by what they do to the body in space. Not wishing to delve too deeply into acoustics and psychoacoustics here, I would suggest that the intervals themselves have a particular feeling of their own: in the ear, on the body. The most difficult interval to verify and establish in the piece, that of 18:17, is one that Charles Curtis taught me to identify, not through the relationship between fundamentals, but through the interference that it generates, a very particular *whirring* set in motion that can then (hopefully) be verified by the gradual introduction of the full chord as governed by the melodic and harmonic rules laid out by Young.

A sensitivity and deeply learned understanding of these rules is crucial to the collective feeling that determines any compelling realization of the piece, or any performance that I feel *is* the piece. These rules imply the form and structure of the work, as Young builds intervals and relationships in an order that is based on a somewhat intuitive, yet fundamentally logical and practical, system, one where the melodic and harmonic rules make possible the accurate realization of the intervals. For example: 18:16, (or 9:8), is a difficult interval to tune and verify. However, the rules governing the introduction and

placement of this interval ensure that this verification is built into the performance by requiring its introduction within the context of the *Dream Chord* as 18:16:12, or 9:8:6. If 9:8 is perfectly in tune, it can be verified by adding the 6, and the three pitches together should, ideally, be able to be played without beats. The harmonic and melodic rules require that this verification occurs as the pitches unfold over time, thus stabilizing the interval, and allowing the 9:8 sonority the time and listening required to ensure it is the true interval.

Arguably, the entire framework of both the melodic and harmonic rules prescribed by Young provide this scaffolding, this structure, to support the intonation of the performers as they navigate the piece. My own experience based on Charles Curtis' teaching would suggest that the act of tuning is the central element of the piece, and the architecture of the work would seem designed to cultivate an ongoing process of attempting to play these ratios as in tune as possible in order to reveal its form.

The melodic and harmonic rules crafted by Young form the larger architecture of the work, a scaffolding, that the tuning necessarily hangs upon, fills, renders into an audible and physically sensible form. This structural frame is explicated by the navigation in tuning and interval in performance, but that is not to say that it is without an implication of narrative in terms of the order in which the rules unfold. In building the *Dream Chord*, the rules enact what could be perceived as a narrative structure to the work, adding pitches slowly, moving through the rules, from the 18 into a full expression of the chord, and then a folding back: a retrograde journey back towards the 12 over the course of two or so hours. It is as if it were a voyage to open sea and then a return, or as if we are hearing a vespertine flower very slowly open and close over the course of an evening. In some sense, the conceptual material of the

work coexists as both a narrative and as an abstract exercise in tuning, these two facets revealed in the emergence of form in time. Linear time cohabits with the conjuring of an eternal present manifested by material and duration.

In terms of situating this attention to the present moment as *action*, the practice of generating and eliminating beats is the central process and concern for a performer of Charles Curtis' transmission of the *Second Dream*[...]. It is how the tuning as material manifests as a performed action. However, the question of how one plays just tuned intervals perfectly in tune might compel an attempt at explanation. By this I do not mean explaining the scientific reasoning behind the phenomenon of beats, but the individual experience and navigation of them. My own path of instruction in realizing just tuned intervals places an emphasis on the need to create beats first, and the process of eliminating them indicates the adjustments necessary to keep the pitch in tune. This approach requires constant adjustment and attention on the part of the performer throughout the duration of the work.

The constant tending of the intonation is central to the experience of the piece, arguably for both audience and performer. The process of tuning, the human-ness of the act of making and eliminating beats, becomes an extraordinary feature of the work, one that raises questions as to the role of the performer and observer in this music in interesting ways. The continual attention to tuning by the performer in many respects points towards a sense of observation. The performer is observing, not only their own entrance, (through listening and adjusting to get rid of beats and then attempting to correct for beating triggered by bow changes), but the beats audible from their position in the room created by the group as a whole. Combined with the observation of the rules, bow changes, and the decision-making

process, a ‘fullness’ of attention is created, one that shifts between observation and creation, or bridges the two in some way. By creating beats, we make the act of tuning observable, and in turn, observe our contribution to audible beating. The kind of attention required here brings the performer into an *active* state of observation, one that involves a form of spectatorship, but retains the concept of agency and the ability to respond, change, and direct the sound.

This whole exercise is further complicated on the cello with bow changes, which create ripples of pitch disturbances as the bow changes pressure and direction on the string. With two cellists, as in the Wada duets, there is a proportionally longer length of bow time which will be relatively undisturbed by the bow changes; with four, this rate of activity doubles again. At one stage in the rehearsal process, we attempted to change bow simultaneously, but this hugely destabilized the intonation. Without something to listen for and adjust to, such attempts at tuning lacked a clear reference point. Ultimately the approach to bowing is similar to that of performing that Wada duets, again with a focus on attempting to maintain a regularity of changes between all four players, staggered across all four cellists. This creates a form of rhythmic grid, a clockwise movement between each cello, with the intention, (again similar to that discussed in the first chapter), a kind of diminution, or fading through regularity.

In *The Second Dream* [...] there is an interesting complexity to the multiplication of bodies, a result of a plurality of intentions, conceptually and practically. It is also of interest for what it effects in terms of placing performers in multiple subject positions, oscillating between a collective experience, smaller groups, and individual subjects. In performance,

my position is that of an individual, while simultaneously responding and working in a group of four, listening, registering, acting individually and collectively. Just as the tuning creates multiple positions in terms of temporal observation and the experience of present, multiplication of bodies in this context results in multiple frames of relational experience, a constant perceptual shift in ‘aperture’ between individual actor, and collective. This ongoing process is set in motion by the harmonic and melodic rules, and the act of tuning within it, a multi-tasking between tracking which pitches have been recently played and in what order, alongside the individual work of tuning and being attentive to bow changes.

The multiple subject positions create, but also problematize, what could be viewed as another kind of body here, a collective body as conceptualized in the sound mass generated by the overall ensemble. The performer as an individual, or a single sound source, is also a component of a larger assemblage: a conglomerate aural phenomenon. In recognizing this, the performers must respond to the material of tuning, to bow changes, to the rules of pitch orders and simultaneous sounding, in order to generate and sustain this collective body through a constant shifting of subject position. This larger conglomerate sound body, could be viewed in some way as de-emphasizing, even effacing, the individual performer: a form of disembodiment. However, this disappearance is produced only through individual focus. A lapse in attention, an impulse to make something additional occur through directing the responsiveness to material, destabilizes this larger apparatus. By moving as an individual outside of the immediate material and action dialectic of the work, rather than contributing to the sound mass, one will weaken it. The tension here between

embodiment and disembodiment becomes another kind of real time perceptual shifting for the performer.

In a purely practical sense, the piece must be arranged for multiples of four in order to realize the four notes of the *Dream Chord*. This is also necessary for the cellists to physically endure the duration of the work by allowing for small breaks to rest the left hand, or for the eight trumpet players in order to contend with the finite nature of each breath impulse. For the harmonic and melodic rules to function, governing the order in which notes can be played, and which ratios may sound simultaneously at various points in the overall form of the piece, players must also be in multiples of four. However, there is something beyond mere pragmatism at play in this piece which manifests differently dependent on instrumentation.

In the cello quartet version, the multiplication of bodies sets in motion several aspects of the piece: it establishes the tuning, the motion of frequency within the space, and it also renders these things legible, or audible. The transparency of each entry, as it generates and eliminates beats, demonstrates an active performance process, and places the act of tuning at the foreground of the work. I would suggest that this reading of multiplication is possible only because of the shared understanding between players of the work's material and concept, as well as a consensus on how to realize this in performance.

With the introduction of eight trumpets, a different kind of multiplication occurs. Here, multiplication refers more to a massing, an enlarging of forces, suggesting a potential threshold of how many of the same instrument there can be before the multiplication no longer magnifies, but *masks* process and action. This idea of a 'critical mass' means that the

kind of communication, the shared sensibility, and multiple subject positions crucial to the realization of the piece in performance may become overwhelmed. Additionally, differences in approach to the work from the two instrument groups can mean that the particular burden of care required (in terms of tuning, tracking the rules), for the unfolding of the work becomes diffuse, even contradictory.

When combining instrumental groups, as I experienced in the Dia Foundation presentation of *The Second Dream* [...], it became clear that each ensemble took vastly different approaches to the work. The trumpets approached the work with an emphasis on imposed strategy, rather than a responsive relationship to the material itself. The living quality of the experience of tuning, which for me signaled a compelling fluidity of the role of observer and performer inside the material in the act of performance, was now replaced by looking outwards, to measurement for its verifiability. Externalizing the experience of performing the work, through referring to a tuner for the placement of pitches rather than listening for beats, and the introduction of signs in the form of hand signals, moved the performance away from a navigation of a material and action dialectic, from collective sensibility, towards a closer relationship with the text and character-based structures that *The Second Dream* [...] had, until this moment in my understanding, resisted.

The use of hand signals in particular presents issues with the work's realization that could be seen as a distortion of the piece. The hand signals could be read as creating a sort of interference, similar to that of having a score or conductor. The specific gestures chosen to convey musical strategy here can also be read as a form of notation, something that immediately, and fundamentally, alters the engagement of the performers (and arguably the

audience) to the piece. By shifting the focus of attention from listening and adjusting, from the realm of the aural and physical, the use of hand signals moves to a textual domain, one of signs and language, reading and decoding.

There is a change in the performer's relationship to a work when they are engaged with this mode of thinking. The use of hand signals enacted a version of the *The Second Dream*[...] which could be viewed as a different work altogether than the incomplete realization for cellos alone presented in San Diego. In the Dia Foundation performances, certain relationships (arguably crucial to the unfolding of the work), were obscured, or lost: the relationships between material and action, between performer and material, between individual and collective subject positions. Instead, in this realization, the morphology of the work was often dictated by an individual's choices and their impulse towards narrative, control, or movement. These were also choices originating outside of the interconnectedness of subject positions, in some respects indicating a sense that the material itself, was regarded by some performers as by itself not enough to hold the attention of the performers. However, in imposing these textual structures, the integrity of the work's navigation of material, action, time, and multiplication, is in fact obscured, rather than made clearer. Hand signals, as a kind of conducting or notation, operate as a shortcut, yet one that results in what can be viewed as a problematic realization of the work.

In this amalgam of approaches, something integral to the piece's identity vanishes, namely, the care that is demanded by a deeper engagement with its realization. This is a conception of depth seen as residing in a kind of present moment compassionate responsiveness: to the tuning, to the rules, to each performer. We are thus lead to the notion

that care, or responsiveness, could be viewed as itself a characteristic of realization specificity: one must *re-pond*,²³ or pledge oneself, to engage fully in being guided by material and its sounding.

²³ From the Latin *spondere*: to engage oneself, to promise.

CHAPTER THREE

Alvin Lucier

One Arm Bandits

Alvin Lucier's *One Arm Bandits* for four cellos was written for, and in consultation with, Charles Curtis, and commissioned by Christian Scheib for the Steirischer Herbst Festival of Music for their 2016 festival (Musikprotocol) in Graz, Austria. It received its premiere performance in October 2016, with a second performance in Zurich shortly afterwards for Alvin Lucier's 85th Birthday Festival for ZHDK.

One Arm Bandits' compositional material arose from a curiosity shared by Alvin Lucier and Charles Curtis concerning acoustic phenomena generated by bowed string instruments when the bow changes direction, particularly when playing a unison pitch. With Charles Curtis, I attended a meeting with Alvin Lucier in New York City in July 2015 while preparing La Monte Young's *The Second Dream*[...]. Charles Curtis had previously mentioned to Lucier that he had noted something of interest regarding bow changes while navigating the Young piece: how they destabilize the tuning between cellos, sparking a momentary flare, a resultant flurry of beating and acoustic phenomena. While at the time uncertain as to how much this was due to the phase of the string changing between up and down bows, and how much related to speed and pressure, this preliminary discussion provided the fuel for *One Arm Bandits'* composition the following year, humorously named thus largely because the cellists use only one arm, the right, in its performance.

The piece builds a unique frame around some of the ideas discussed in the Wada and Young works above, establishing an environment in which the ‘impossibility’ of a stable, verifiable unison between four cellos using varying bow speed, is heard as the primary musical material. This chapter will discuss the preparation of the work, and through this account explore in more detail how the piece deals with multiplication of bodies, the problematization of the concept of unison, the unique function of temporal parameters in contrast to other works, and action in terms of bow speed and pressure.

The basic premise of *One Arm Bandits* is four cellos playing the same open string with a sine tone of the same equal tempered pitch, divided into four sections of equal length (one for each string of the cello). The total duration of the musical material of the work is one hour, with each string allotted fifteen minutes, moving from highest to the lowest. Small breaks in between each movement allow for the ensemble to reset, and for the sine tone to be triggered. On the surface, the piece presents an illusory image of homogeneity: four of the same instrument playing the same pitch. However, within this frame, Lucier crafts an intricate grid of bow speed and pressure in order to explode the illusion, the ‘given’ of unison.

The left arms being hidden creates a kind of demonstrative statement: that in its disappearance it draws attention performatively to its redundancy. The central premise of the work is that it is only the right arm which causes pitch variation through gradation in pressure and bow speed. The symbolism of the absent left arm becomes an important part of the presentation of the work, a physical signifier for what to listen for and to.

Time in *One Arm Bandits*, in contrast to the works previously discussed, is at the forefront of the realization of the work. The material here is dictated by increments of minutes and seconds which indicate not only the changes to bow pressure and speed, but the overall architecture of form. The clock is the conductor. However, this seems in many senses contradictory to Lucier's approach to his broader body of work, which predominantly prioritizes listening and has a focus on acoustic phenomena over other parameters.²⁴

When one is following a clock, one does not listen in the same way as when guided by listening in order to determine the unfolding of material. This begs the question whether this piece would be possible in another form, where the temporal grid is not necessarily dictated by an external mechanism meting out seconds, but, perhaps through a structure that could be intuited by the players in a grid of their own making. An example is a rule-based system like *The Second Dream*[...], where memorization of relationships becomes the foreground. What if, when player one is playing seven temporal units, another plays eight? While this hypothetical situation would present its own set of difficulties, I am curious as to what a potential liberation of the piece from the clock might enact, what it might allow in terms of deepening the material to action relationship of bow pressure and time. This undertaking would of course require a long, consistent, and intense working process for the quartet, in some way similar to that required in preparing La Monte Young's *The Second Dream*[...]. This is a species of preparatory process which necessarily falls outside the limits

²⁴ In a panel discussion by Charles Curtis and Anthony Burr just prior to the Zurich performance, Charles notes, "Alvin and I have discussed this and he said 'I'm not happy about the clock, it takes you out of the listening process.'" It takes you out of that process of steering the experience through feedback." Bernhard Rietbrock (Ed.), *Alvin Lucier: Illuminated by the Moon* (Switzerland: Zurich University of the Arts, 2017), 61.

of the typically compressed periods of preparation in the ‘new music festival economy.’²⁵ Rather than propose something definitive here in abandoning clock time, I merely intend to posit the question, whether in this current form, the piece has perhaps not yet exhausted the possibilities of its realization?

The length of the piece is also worth noting. Lucier’s oeuvre historically is rarely very long, but, in recent periods, has been getting noticeably longer. Lucier states in relation to his 2014 work *Palimpsest*²⁶ in a panel discussion in 2016 that “The length of the piece is determined by the point when the speech is unintelligible and you get a beautiful musical response.”²⁷ The potential issue in the implicit subjectivity of this statement is addressed when Lucier is questioned further by Anthony Burr as to how long the performer should remain in this final state, to which Lucier responds: “There is often a point where the piece does not change much anymore, and quickly gets boring.”²⁸ This concern about boredom, and its relationship to change and acoustic phenomena is an interesting one, something that could also be tied to the tuning decisions to be discussed later in this chapter.

In terms of length, however, *One Arm Bandits*’ duration could be viewed as reflective of the time *needed* to explore and listen to the phenomena in question. The unfolding of the grid takes time, as does the listener’s ability to begin to focus on and hear beating, the detail

²⁵ By this, I mean to refer to the compressed time frames for rehearsal and practice commonly available in the context of a festival. For the first performance of this work for example, the ensemble and composer only had a matter of a couple of days to prepare the work together, based on economic and geographical necessity.

²⁶ Written for Joan La Barbara, *Palimpsest* functions somewhat similarly to the iconic *I Am Sitting in a Room* (1969). However, with each iteration of recording and playback, the performer reads over the tape, creating a blurring of the ‘original’ or first iteration, which blurs and changes with the emergence of the room tone as in *I am Sitting in a Room*, but with the palimpsest of variations of reading the same passage over and over.

²⁷ Bernhard Rietbrock (Ed.), *Alvin Lucier: Illuminated by the Moon* (Switzerland: Zurich University of the Arts, 2017), 64.

²⁸ Ibid., 64

within the relationships of difference. Lucier said in reference to time and unfolding of material in his work, “Sometimes it takes time even for me to begin to hear the phenomenon... I’ll say ‘This is not working.’ After two, three minutes, then I start to hear it. It’s almost as if that’s a new little form. You have to focus.”²⁹ Thus the time allowed for each string in the work is a measure of the time taken to hear the focal phenomena which form the basis of the piece. The rate of activity in some way determines our ability to engage with the material basis of the work.³⁰

No Alteration of Pitch is to be Accomplished by any Other Means

Bow pressure being tied implicitly to pitch is a fundamental to the work. The result of this is that a faster bow with more pressure will necessarily result in an increase in volume, however this is not an intended outcome, but a *byproduct*. Dynamics in the context of *One Arm Bandits* should be understood as an artifact and not a deliberately correlated aspect of musical material; they are not ‘composed.’ The heaviest pressure on the string, while demonstrably louder, should not be read as loaded in any expressive sense, its intensity in volume is merely an outcome of the central aim, to bend pitch. It is crucial, however, that this increase in pressure does not push the pitch into any form of distortion or noise. In order to maintain the tension between cellos and sine tone, the bending of string through weight and speed must keep the integrity of pitch audible, recognizable.

²⁹ Ibid., 83.

³⁰ The length could also be indicative of the ongoing performer-composer relationship between Charles Curtis and Alvin Lucier, where the composer’s nervousness about works being too long is tempered by the performer’s wish for them to be longer.

Lucier writes in his performance notes: “All pitch change is done by pressure.”³¹ This could have potentially framed the piece in dialogue with more systems-based microtonal works,³² a result of its incremental, yet codified through notation, approach to pitch. However, such a reading is complicated by the cellists’ actions (bowing an open string), and also by the piece resisting any formalization of precisely how *far* the frequency will be altered: how stable or volatile the alterations will be, unmeasured in cents or ratios, forefronting a subjective notion of ‘accuracy.’ Here, the work finds a resonance with the discussion of the works in previous chapters: that material and action, through multiplication of bodies, generate their own terms of performance and audible outcome, positioning the composition material as belonging to the broader notion of being realization specific.

While corralled in some way by the time grid, the work’s navigation of the elasticity of unison must in some way be dictated by the bodies of the cellists. How far pressure bends the pitch from its ‘true’ frequency is a complex assemblage of instrument, bow speed and pressure, arm weight, string and instrument. In the version performed in 2016, this (irreducibly bodily) facet of the work became an important field within which the idea of realization specificity played out. In a hypothetical iteration without a clock, where the bowing-pressure grid becomes something woven by the performers, this space may expand exponentially and creates intriguing possibilities as to how the interconnected elements of time, bow speed and pressure, could establish a relationship where the material itself asserts a performative logic.

³¹ Alvin Lucier, *One Arm Bandits* (Frankfurt: Material Press, 2016), 2.

³² By this phrasing, I mean to point to works whose notation is drawn from particular systems (for example extended just intonation), or highly calibrated approached to tuning based on an exterior, notated, or more theoretical approach to producing and registering closely related pitch activity.

In constructing the bowing grid, Lucier assigns bow length in seconds to gradations in pressure, effectively marrying a fixed entity (time) to a more subjective one (bow pressure). The relationships can be seen in the following figure:

Each pressure level requires bow lengths as follow:

0 = 9 seconds per bow

1 = 8

2 = 7

3 = 6

4 = 5

5 = 4

6 = 3

Figure 3.1 Bow Pressure in One Arm Bandits Performance Notes

Labeled from 0 – 6, the only absolutely defined parameter of pressure is that of the 0 value which, “indicates a soft bow pressure that produces unison (no beating) with the oscillator tone with which it is associated.”³³ The 0 pressure is then a sort of ground level, an entry point, into hearing a unison ever so slightly disturbed on each bow change, an étude in listening.

The 0 pressure opens the piece with the first movement at 220 cps³⁴ (or the A string) yet this moment of hearing a ‘true’ unison against the sine tone occurs only twice in the piece, both in the first movement, and even then for relatively short periods of less than two minutes and between two cellos only. In order to sustain the bow for nine seconds at a

³³ Alvin Lucier, *One Arm Bandits* (Frankfurt: Material Press, 2016).

³⁴ Cps here stands for cycles for second.

volume that satisfies the requirement of unison with the sine tone, the 0 pressure must be very soft. Yet this must not edge too close to a fragility of tone, or potential breakability of the note in order to maintain the unison relationship.

The navigation of speed and pressure here is difficult, but dictates a position from which the gradations of the rest of the bowing must derive. The unfolding of the pressure and bow length grid from the opening is easily visually understood from the page as seen below in figure 3.2: a lattice of pressure slowly emerges with constant staggering between all four cellos. A slow wave arises and subsides with subtly changing pressures and speeds, all, for this section, remaining within a relatively restrained bandwidth of pressure, from 0 to 3.

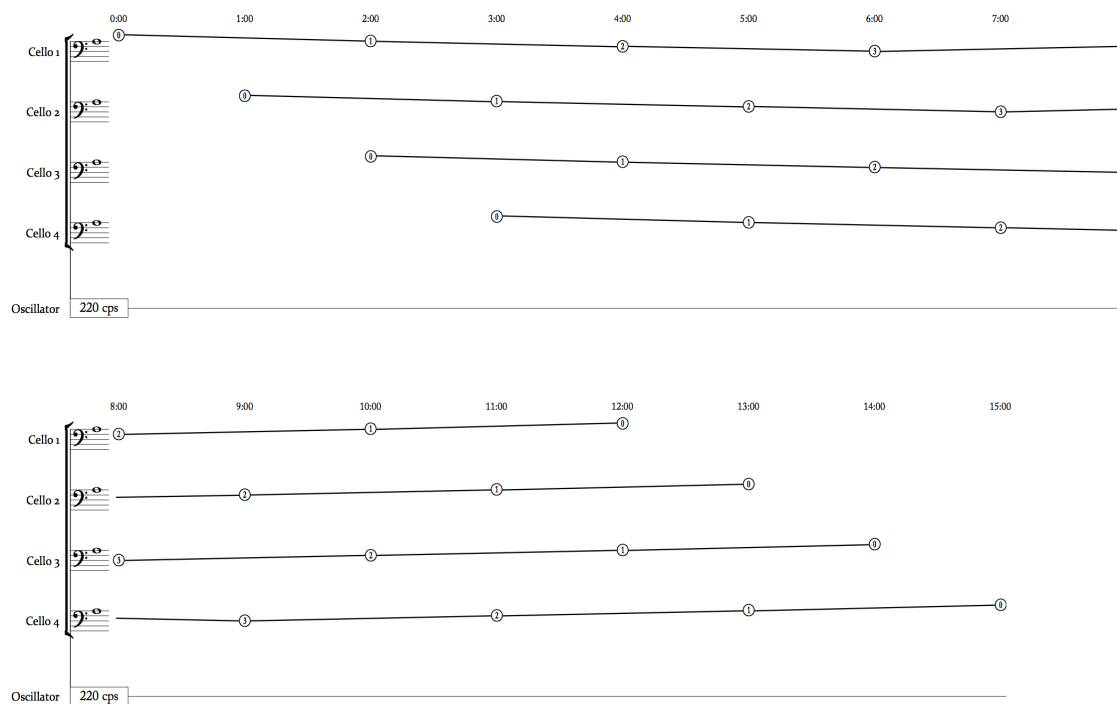


Figure 3.2 *One Arm Bandits* Movement 1 (full score)

The second movement moves to 146.6 cps (D string) and begins with cellos two and three in unison. Both play the 1 = 8 bowing, only marginally heavier than 0 = 9. This peels

apart over the course of two minutes as cello two moves gradually towards a 4 = 5 relationship. The scored representation of this divergence can be seen in figure 3.3, as each cello maps a different gradient, necessitating different rates of change.

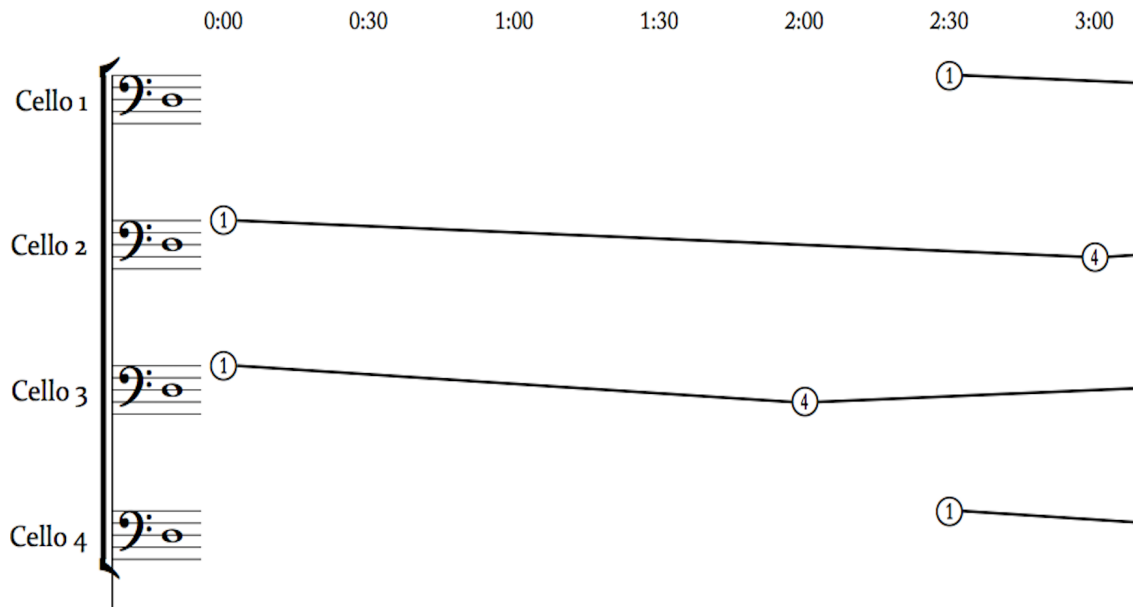


Figure 3.3 *One Arm Bandits* Movement 2 (excerpt)

This moment becomes clearly demonstrative in terms of the results of change to speed and pressure, with cello two's pitch bending further away from the sine tone, and a clear fracturing on unified gesture when the bowing begins to shift from being together to something staggered and non-aligned. It was collectively decided in rehearsal that this moment (which returns in retrograde at the end of the movement) must *show* in the bow changes, marking that something significant has occurred; the cellos have fallen out of step. This demonstration took the form of a very light increase in emphasis on the changes, the smallest lift beforehand and a slight stress on the beginning of each bow.

Now we see that the pattern of bow changes developed for stability, or invisibility through regularity, that is a key part of the overall apparatus of the Wada and Young works,

is here instead highlighted, made a subject. As the movements fracture into more latticed speeds, with each change, and its resultant impact on pitch stability, bow changes become a feature rather than an arbitrary element in sustain.

The third movement at 98 cps (G string) is comprised of shorter gestures that shift gradations in bow comparatively quickly, over three minutes. This section's material becomes increasingly complex and dense as each cellist enters. The architecture of the grid is more fluid and difficult to hear as each cellist negotiates grading the pressure change within the strict tempos of seconds to shift between the heaviest bow pressure and fastest speeds in the piece as seen in figure 3.4 in cello four: $6 = 3$.

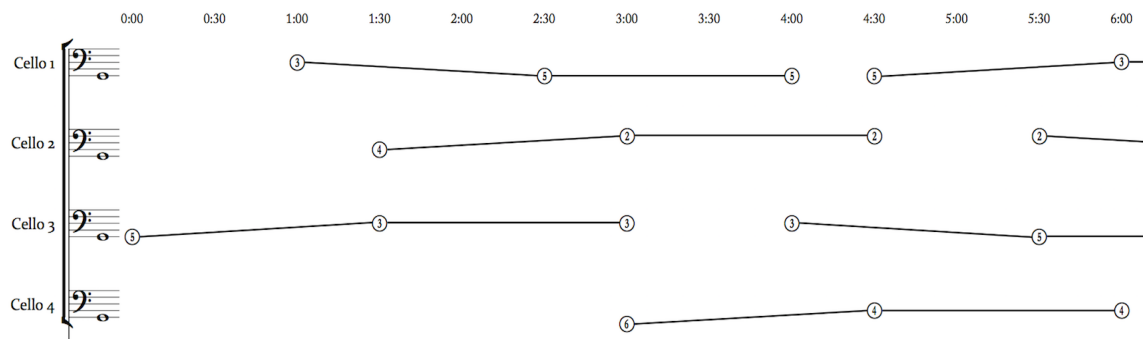


Figure 3.4 *One Arm Bandits* Movement 3 (excerpt)

The variation in amplitude resulting from the use of $6 = 3$ and $5 = 4$ in this movement results in other voices being masked or buried. This creates an interesting situation, where the fundamental is at times pushed right to the front of the ensemble sound, at its furthest deviation from the sine tone center pitch, while other less extreme variations in the fundamental which are at a lower pressure (and as a result, volume), are only registered through their contribution to phenomena such as acoustical beating, their fundamentals largely hidden.

The fourth and final movement at 65.1 cps (C string), dispenses with the, perhaps more lyrical, gesture of gradual morphing change, and presents a harder grid of block-like material. Each cellist enters for short periods of two minutes, inhabiting only one pressure and speed before abruptly stopping at the indicated time. This movement demands a consistency and attention to pressure and speed that is exposed through its singularity in focus. While a similar kind of masking to that of the previous movement occurs, rather than a constant morphing, each block presents as a fixed object, a single track to traverse. These blocks feel like large concrete objects, landing and vanishing, their hard edges revealing or masking a kind of aural depth of field. This sensation of closeness and distance, foreground and background, appears to me important here in that this it is generated not only through physical proximity but by its perspective position within a field of sound.

There is an additional curious element to this work, which is the tuning of the open strings of the cellos themselves. After some discussion between Lucier and the cello ensemble, it was decided that rather than aim for precision in tuning (which could mean using an external tuner, tuning all strings very precisely to one cellist's open strings, or to the sine tone), each performer would tune their open strings independently, deliberately furnishing room for error. This creates an interesting space for subjectivity in tuning, something which develops as one moves from highest to lowest string into sometimes relatively large differences in pitch. The interpretation of a fifth, whether just tuned, equal temperament, or some other more nebulous personal variation, thus proves to be something malleable and subjective. The results of this approach to tuning are to create a gradation of pitch which fans into a kind of greyscale, a Marcia Hafif-like rendering of variations possible

within the monochrome of an open string, superimposed on top of one another in real time. By the time the last movement is reached, the lowest string, a 'C' has fractured into multiple explications.

Lucier's rationale behind this choice reflects his concern as to whether, or not, the piece will 'work' in terms of activating phenomena, whether or not anything will *happen*. Like the sine tone, the fracturing of tuning is intended in some way to magnify difference, or the audibility of difference, within multiplication. It would be interesting then to perform the work without this extra parameter. What would happen if the cellos were more accurately tuned to the cycles per second prescribed in the score? Perhaps this would serve to provide further magnification, as if the closer the cellos are to unison the more they function as a microscope, or the more difference, in fact, reveals itself.

Lucier's tuning decision, which knowingly generates more complex phenomena in terms of acoustical beating, also frames the unusual multiplication of instruments in a compelling way. The thickening and complexification of sound and pitch which occurs does so at a disconnect from the performance spectacle: of the same instrument, engaged in the same activity, on the 'same' pitch. In this final movement, a loss of the sense of where the 'real' pitch is, is most marked, with the sine tone subsumed by the increased pressure and resulting amplitude of the cellos.

The planting of a marker, a theoretically impartial actor, in the form of the sine tone, creates a situation where it is the only element not susceptible to the variation and fluctuation of bow, string, performer. It becomes a thread, a line that the cellos weave around, providing a sort of relief, a surface to push against. It exposes and highlights the subtle pressure and

pitch distinctions of the cellos, as well as pushing ‘closer’ to the ear the higher partial activity as it ripples and beats. It is an actant which, ideally, shifts the focus from the increasingly muddy waters of the fundamental into a hearing of the phenomena generated, the focal material of the piece.

The multiplication of bodies, of cello and cellist as duplicates, has a unique function in *One Arm Bandits*. In contrast to the Wada duets, which attempts to fuse discrete bodies through doubling, or the *The Second Dream*[...] which employs multiples of four for the practical outcomes of expressing the full dream chord and moving it around a space, here the multiplying of bodies exposes difference and variability (rather than reinforcing a notion of sameness or aiming for fusion). There are a select few moments of unison in the piece, each transitory, always fanning out and away from a central point. Lucier in this work uses the duplication of instrument and bodies in a manner that pushes outward, stretching and expanding the possibilities of the open string, of the difference in quasi-identical physical materials, as mediated through the actions of the players in relation to the temporal grid. This draws attention to, and exposes, the resultant differences that we as listeners iron out and gloss over, that our hearing usually reconciles and forgives. The same phenomena that we decipher as unison in the previously discussed works are here exposed, highlighted.

One Arm Bandits also at times (the third and fourth movements) approaches the opposite outcome of multiplication, that of *masking* difference, or of blurring it beyond readability/legibility. Perhaps, at times, four is in fact too many cellos to register clearly what is happening in detail, particularly when the bow pressure creates a dramatic difference in amplitude between the cellos. Where is the line between multiplication exposing, and

rendering visible difference, and hiding it? Here, consider what happens when multi-tracking the same instrument, or in large orchestral forces: the variations of individual voice blend and form a sound comprising an aggregate, a massed homogeneity of pitch, timbre, and tone which becomes something more than a single instrument multiplied, a ‘section.’ *One Armed Bandits* navigates both territories of multiplication, yet I feel the focus on relationships of difference is closer to its central aims as a piece. To speak hypothetically again, I am curious as to how a working method different than clock time might impact the ability of the quartet to listen and adjust in order to maintain a focus on explications of difference, and the activating of acoustic phenomena.

CHAPTER FOUR

Anthea Caddy and Judith Hamann

Untitled

This chapter concerns what might be considered a *project*, and not necessarily a piece', with the work in question something more malleable, adaptable, and less fixed than a work tied to a score. Despite this more fluid status, I feel it important to situate the project as a *piece* within the context of this dissertation. This work, devised in collaboration with Anthea Caddy, for two cellos and amplification is relevant not only due to its instrumentation (two cellos), but also because its genesis has been informed and shaped by the work developed with Charles Curtis over the course of my doctoral studies. I feel it is also important to situate this as a realization specific work, due to its use of a material and action dialectic to navigate its unfolding, its use of unison and difference, and its extension of the multiplication of bodies into speakers via amplification: its disembodiment, layering, and masking of tiers of performed multiplication through acousmatic practices. This project was my third and final doctoral recital in April 2017, performed in Studio A at UC San Diego, and in August 2017 for the Inland Concert Series in Melbourne, Australia.

The work is co-composed, and is not held within the frame of a notated score; rather, its form is held within the memory of both composer/performers, and changes, bends, and stretches in performance. It is not, however, improvised, possessing an internal logic of structure and material which means that its intrinsic identity remains, I believe, recognizable, even in different iterations.

The compositional and conceptual material of the piece was created through listening to and gathering material that generates subjectively intriguing acoustic and electro-acoustic phenomena, more specifically, material that is situated in a dialectic with the actions of the performers (bowing, tuning, and collective decision making). Our choices within performance shape the material, even as it determines our actions to negotiate it within a larger narrative structure of form. This chapter will discuss the most recent work performed, a long-form piece for two cellos and 6 speakers, exploring its relationship to, and how it has been influenced by, the previously discussed works, its intentions artistically and experientially, and its rationale as an electro-acoustic project (supported by certain extra-musical parameters).

Two cellists

In July 2014, Anthea Caddy and I were invited to collaborate for a concert at an independent Melbourne art gallery, Conduit Arts, curated by musician and sound artist Rosalind Hall. In this chance moment of paths crossing by two cellists whose orbits rarely coincide geographically, we saw an opportunity to attempt to develop something more concrete than improvising. Coming from a background focused on media arts and sound art, Anthea Caddy's approach to the instrument arrives from another direction altogether than my own. She thinks predominantly in terms of frequency, rather than through the notion of 'pitch' which belongs to a European derived art music tradition, and has a rich practice in microphone placement and specific amplification methods for live performance. Even though our individual journeys to that point had been somewhat divergent, when we first met to discuss our impending performance, we found ourselves interested in similar acoustic

phenomena and noted a shared approach to sound making at that moment. There was an emphasis on listening to partial activity and artifacts of the doubling, on allowing duration to unfold slowly so as to hear the phenomena more clearly, an interest in amplification, and an interest in developing a shared performance sensibility, one that allows for a closeness of connection in live performance.

The basic formal structure of the work as presented in 2017 is an explication of a fundamental which is the lowest string on the cello detuned. This pitch itself varies according to the space, and the temperaments of the cellos. All the material in the work is derived from information which emerges from this pitch (partial activity, vibratory material). The piece focuses primarily on the low fundamental, slowly adding the pitch at four times that frequency (or two octaves above), then complicating it with narrower intervals in a smudged cloud of activity, ending with a gradual descent from high harmonic partials and returning ultimately to the open string. This harmonic glissando is distinct from that of the third Wada duet, in that the unison breaks into a cascade of multiplications here, with four discrete lines (or voices) at a time created through double stops (stopping two strings at once).

A graphic realization of this form can be seen below:

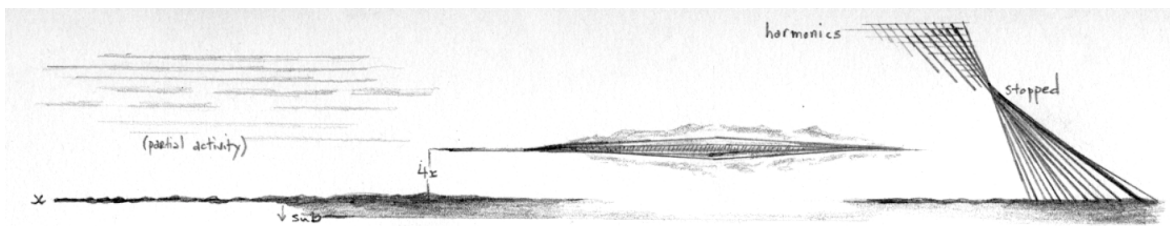


Figure 4.1 Graphic Representation of the Work (Caddy/Hamann)

The detuned open string has been a long term figure, even a permanent presence, in the life of this evolving work, from its first realization in 2014. With an approach to the

tuning that perhaps echoes that of the Lucier, the two cellos are deliberately very close to unison, but not *precisely* in tune. Through this proximity, the doubling of the string generates a wealth of overtone activity which shimmer, beat, and flare above the fundamental. Detuning the string creates a situation where the usual tension of the material, calibrated for 'regular' cello performance is loosened to a point of slackness that produces a certain instability, a volatility. By shifting the tension, the sort of malleability of pitch effected in the Lucier work by pressure is magnified: each bow change, with subtle shifts in arm weight, warps and bends the pitch of the string, creating an effect where the 'true' fundamental becomes blurry, out of focus.³⁵ The lowering of the string also causes partials and overtones to become clearer, moving the dominant activity into a lower frequency range than usual. The voices of the seventh, and even the ninth, partial emerge, interact, and subside within a certain wooliness to the overall sound, like felt-covered bells singing melodic material over the fundamental.

The detuned string also allows, indeed requires, the bow pressure to be extremely light and the amplitude of the acoustic cellos very soft, so as to not bend the string too far or in too dynamic a form over the course of a single bow. This engenders a timbral world shaped in part by the surface noise of hair on string and the almost audible rate of vibration of the string itself. There is an element of breath and breathing built into the overall sound arising from the increased noise activity in the slackened string. Amplified, this becomes a clear pitch presence as well: a rasping hiss, a prickly thread of high frequency noise content

³⁵ I was interested in Charles Curtis' comment that beyond the F on the C string of the cello, the body of the instrument can no longer contain a full sound wave cycle. In this case, I'm curious as to what happens when the string is lowered so far as to no longer sound clearly, if in fact its wave form is beyond the resonant capacities of the body of the cello, and how this may affect the sound and phenomena generated.

that becomes, like lateral string movement and bow changes, a distinct characteristic of the overall sound.

Amplification can be viewed as another instrument, and in the case of this project, one that (ideally) becomes integrated into the larger apparatus within which the work resides. It is not an extraneous addition or extension to the sound of the cellos, but is intended to diffuse and highlight phenomena in a specific way. The amplification chain comprises one DPA 4099C microphone, one Schertler DYN-C transducer pickup, and, usually, an accelerometer modified to be used on cello for each cellist. After EQ and balancing has been established in the rehearsal process, this is then sent to four speakers facing outwards into the corners of the room in mono, and two subwoofer speakers.

A cursory signal flow diagram can be seen in figure 4.2 below:

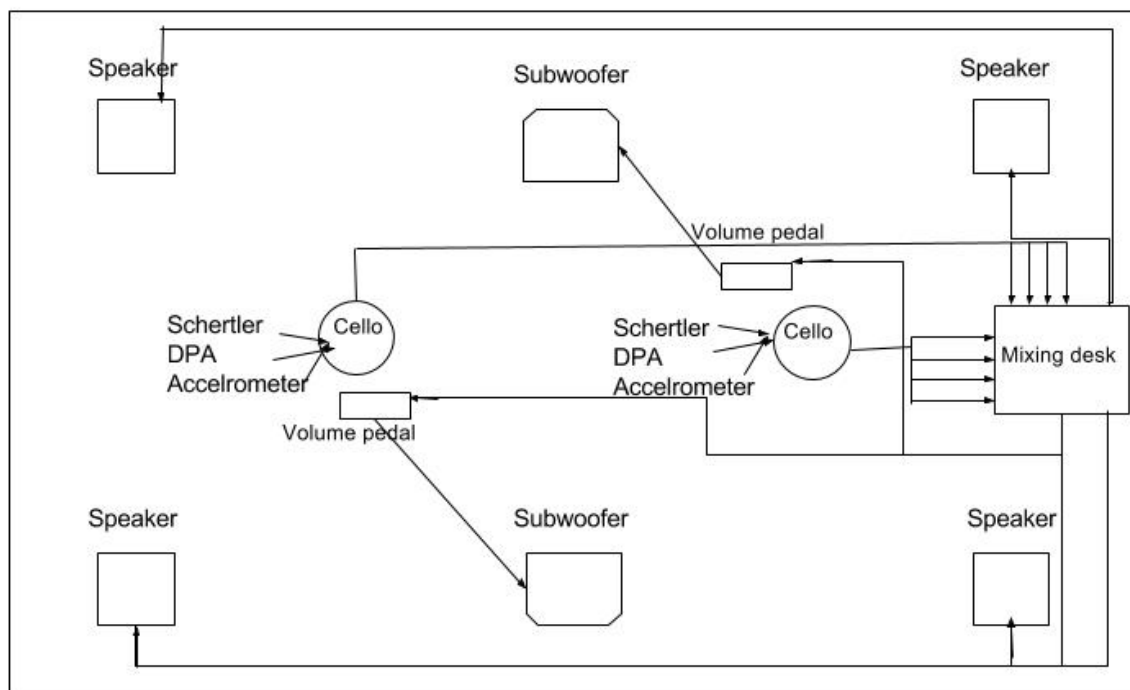


Figure 4.2 Signal Flow Chart

The mono send is not spatialization through amplification in its most common or usual sense of the idea.³⁶ There is no intent to create an amplified sound field with an artificial (non-acoustic origin) field of orientation where sounds emit from a speaker to create a field of directionality, constructed auditory space, or movement within amplified space. Rather, the intention is the opposite: to remove directionality altogether, to obliterate and subsume difference. While the material is generated by two cellos, the result is a kind of meta-instrument, where the two instruments combine into one sound field through amplification. This also intentionally covers, masks, the sound of the cellos themselves; their acoustic directionality is blanketed by the amplitude and thickness of the single send to four speakers.

The subwoofers are controlled independently by each performer and are used to activate and draw attention to detailed material in lower frequencies activated primarily by accelerometers. By using the accelerometers as a means of capturing a multi-axis reading of velocity-based activity on the bodies of the instruments, the translation of this information into an audio signal renders audible vibratory action that does not necessarily correspond directly with information that is heard acoustically. This phenomenon become clearer on the introduction of the frequency at four times that of the fundamental, where a pitch, usually around 305-315 Hz, generates a wealth of low frequency activity heard through the

³⁶ This statement is made in the context of a working definition of spatialization to refer to the harnessing of either sound's directional or spatial localization (perceptually or physically), or the creation of virtual sound fields for aesthetic ends, as can be seen in the following text: Georgina Born, "Introduction - Music, Sound and Space: Transformations of Public and Private Experience," in *Music, Sound and Space*, ed. Georgina Born (Cambridge: Cambridge University Press, 2013), p 11.

subwoofers, complexifying and revealing a sub strata of vibration, rendered audible through amplifying its velocity, its acting on the body of the instrument.

All activity thus occurs within the mediated field of the chain of amplification, the speakers, but primarily in the space of the *room*. The interaction of psycho-acoustic phenomena, generated by acoustic doubling and then amplified multiplication, takes place in an electro-acoustic field. Ideally this creates a blend, a sort of cello bath in dark water, a soup of thick liquid or dense smoke, sound you feel, corporeally.

The multiplication of bodies here extends beyond the cello/performer dyad into the multiplication of speakers: sound sources that are in essence disembodied. The layering of forms of multiplication creates a distinctive sound field, with the sound source, (two cellos doubled), operating in a different sense than in the works previously discussed. A result of the disembodiment of doubling, through its multiplication into diffused sound sources or speakers, is a shift in movement, fracturing and dissolving the unison relationship being upheld, into massed amplification. The dialectic of material and action is moved outside the relationship between bodies as actants, and extended into a larger field where the amplification and room become enfolded into the material/action axis. The complexity and rates of activity of the phenomena generated in real time now informs a collective decision-making process occurring in the present moment: what to uphold, duration of material, bow pressure and placement. The dialectic then, and the conception of bodies, is extended, hybridized and moved into a new relationship through amplification. These key properties, I feel, are still determinants of the piece. Its realization and unfolding emerges through a complex set of relationships between all these facet.

This notion of extension is somewhat idealistic, in that, by moving the parameters of multiplication beyond the bodies of cello/performer, the performance realization of the work becomes vulnerable to factors beyond the control of the players: reliant in part with an audio engineer, in part with equipment, in part with the room. While consistency in the speakers across each performance used would be ideal in terms of replicating the work in different spaces, in fact we have generally been at the mercy of whatever equipment was available on site for a performance and the limited time frame in which to shape the work to each space's characteristics.

The most successful setup achieved was while in artists in residence at q-02 in Brussels in December 2015, working with engineer Ludo Engels. There, we had a two-week period to work with the room, amplification system, and had the support of a sympathetic technician to carefully construct a sound field within a space which contained all the acoustic phenomena and partial information intended to be heard and experienced. This was achieved through detailed EQ, careful negotiation of optimal speaker placement, and through working on sound material created specifically to activate and be sympathetic to the space. Subsequent iterations, including my final doctoral recital, have served to emphasize that, outside the duration of the performance itself, preparing for it requires a certain investment of time, resources and support in order to fully realize the project. A more difficult room, with few reflections, a lack of detail and quality in speakers, and technical support with little affinity for the aim of the work risks rendering it something else entirely, a work more akin to a minimalist aesthetic, a 'drone' piece perhaps. Neither of the latter readings are the intention of the work, which, within a larger narrative formal structure, is really intended to

frame the phenomena that form the true material of the piece. The detail and activity (which one ideally hears), become legible and active over the work's unfolding, through durational listening to phenomena generated by the care taken in setting the amplification.

It could be asked here, whether there is a lack of empathy for the amplification that reads as contradictory to the compassionate responsiveness which, until this moment, has been a defining property of these works. The answer to this question leads us look at a what has been regarded as something of a given, that the instruments are in fact playable, and in reasonable condition. Taking this idea to its furthest conclusion, one could contend that the idea of realization specificity is in fact contingent on a predetermined aural outcome after all, that is: what a cello sounds like and is capable of. Would these works still be themselves if they were attempted on untuned, non-responsive instruments? Arguably, yes, but in a manner that may compromise certain elements' ability to engage in a responsive realization (such as the production of acoustic phenomena, unison, bowing, navigation of the topography of instrument). Perhaps then, rather than view this work's approach to amplification as overly particular, or implying that there is a predetermined aural outcome required for this work, the idea of extension here instead becomes integral: that the expansion of what we might mean by bodies into speakers (to disembodiment) requires some given level of responsiveness from the speakers themselves as actants. The point of difference here is, what this function must be able to achieve is perhaps less clear with amplification than with cellos. I would suggest that rather than proposing an end limit to the casting of realization specificity in the Caddy/Hamann work, perhaps instead, it in fact opens a space for extension.

The use of darkness in this project comes in large part from a strong preference by Anthea Caddy to perform in, as close to as possible, complete black-out.³⁷ For her own work, this parameter derives from not wishing to be a visual focus, to blanket over or disembody performer and cello as sound source. For Anthea Caddy, this approach arises from her feeling that the cello is an interface for sound production, and its iconographic or historical resonance is something to be resisted. The work should be somehow a live performance of acousmatic music, the source itself is ‘unseen.’ For me, I feel the cello and the body of the performer are inseparable from the performance space, and the very fact of there being two cellos producing the sound field is important. The qualities of string, bowing, the topography of the instrument, form the material, compositionally, and sonically. So, while we arrived at a consensus in terms of darkness, what I believe is interesting about it points to the idea of a shared sensibility, of a particular quality of a kind of extended proprioception, resulting in a fusion of intention rather than discrete gesture or musical outcome. The same kind of faith, or trust in the relationship between the performers as in the Wada duets is enacted, albeit here for different motivations.

Moving in unison, (referring here to the navigation of material and form), in darkness demands something from the duo. The disorientation of the sound field created by the multi-speaker diffusion creates a situation where it is indistinguishable whose sound belongs to whom. The decision to move, to propel the form forward through an increase in amplitude, the introduction of new material, must be felt, it cannot be ‘read,’ either visually or aurally. In a sense, once a sound is registered, it is too late, the connection, has been lost. Rather, the

³⁷ This is rarely allowed due to safety concerns in most performance spaces, thus performances will commonly just use as dark a lighting state as is permitted in the space.

movement of the duo must somehow navigate a group decision-making process, informed by a sense of when to change. This registers for me as a kind of inevitable burgeoning, a fullness of material, voluminous, which overflows from one section into the next.

This feeling manifests in the unfolding in time of the work, something which is not dictated by a fixed duration or an aesthetic aim, but echoes the rationale of the earlier works under discussion, that is, allowing phenomena and their hearing to determine time via material. This approach allows the material and action dialectic to inform the length of sections, the form, and overall duration of the work. My notion of overflow between sections is something that never occurs suddenly, as in a bursting, but is more a seeping, a bleeding through. The introduction of new material emerges from phenomena which outline and ghost what is to be heard: the eighth partial's flickering in and out of the first section's harmonic activity gradually emerges as a stopped pitch relative on the adjacent string; the final section should be heard as a hearkening back to the partial activity of the opening but set in motion; the smudging of pitch in the central section heard as emerging from the additional information generated by the accelerometer. The material, the musical concept here, should derive from different readings and explications of what the fundamental's unfolding might reveal. The time taken to do this can only be determined in performance, in the interwoven relationships between the key characteristics of material and action, time, unison, and multiplication. Their conversation with the performers in real time, reveal the work.

What occurs when an instrument is doubled, multiplied, and in this case specifically, mirrored, is again, the central material of this project. The emphases, or priorities shift slightly however, establishing a particular approach, a language of sound and physicality,

that belongs specifically to this work, nurtured by its relationship to existing practice. The intention here is not necessarily to focus on a unison fusing, but one of pacing and slow motion gesture, to intuit and experience rates of change in a different kind of unison than one defined by pitch content or musical outcomes. A shared sensibility then, becomes paramount, one developed over time and through listening. We have developed a keen sense of temporal space and shared fascination with the observing of acoustic phenomena which inform the collective choices of when to change, develop, complexify, the material. The rate as which this occurs is dependent in large part on the room, the partial activity generated, and the success of the amplification: the material and its lived experience in the performance space dictates the shape and unfolding of the work. The project has a similar malleability in performance to other works, yet it continues to evolve its form and internal logic through collaboration rather than being guided by fixed instructions or parameters. This creates a space for exploration, but it also has the consequence of making it difficult to define a performance's success or failure by any clear rubric, allowing for the life of the work to be somewhat open ended: its evolution a constant work in progress, with each realization like a photographic still captured of bodies, space, and time in the present moment of performance.

CONCLUSION

Over the course of this dissertation we have seen each work carving out its own identity in relation to the four key characteristics, or umbrella topics, while also instantiating and articulating more nuanced aspects of them, which in turn, have prompted the generation of new conceptual material. Through an exploration of the material and action dialectic, the works' unfolding in time, multiplication of bodies, and unison relationships, other ideas have emerged which provide further illumination as to how realization specific works in this set of pieces might be conceived. The casting of material in a particular way moves towards a conception which focuses on relationships (rather than categories of authorship or making), in dialogue with performers, viewed as something responsive and malleable. The kind of responsiveness in performance generated by these works has been seen in terms of certain threads, of qualities noted and lifted out throughout this paper: for instance, care, shepherding, and the responsiveness of bodies. This suggests that, beyond the key prismatic characteristics employed to examine the function of these works, the 'stickier,' interconnected spaces between them point to a deeper sense of what this kind of casting of realization specificity might entail.

In each of the four works, there is an emphasis on shifting attention towards a material and action dialectic that has the sense of recasting artifacts and byproducts, material more commonly glossed over. The upholding of difference in Tashi Wada's duets, the highlighting of tuning as material in Young's *The Second Dream* [...], the foregrounding of pitch fluctuations in bow changes in Lucier's *One Arm Bandits*, the doubling and the re-

voicing of partial activity in the Caddy/Hamann work: these can all be seen as a reframing of generally extraneous, or non-focal material into the core musical concept of each work. Another kind of inversion of priorities is seen in examples such as dynamics or shifts in amplitude being cast not as an expressive gesture, but in itself an artifact emerging incidentally as a result of the focus on the core material in question.

The exploring and masking of difference, the highlighting of what we hear and don't hear, is deeply woven into these works. The smoothing over and registering a unison relationship in Tashi Wada's first duet, is later exploded in the fourth by becoming instead a relationship of difference, upheld. Alvin Lucier's deceptively simple premise, over time, dismantles the ability to hear an open string as one stable pitch or the cellos as being unified even in their performance on the same pitch object (the same string, the same 'note'). This also speaks to the relationship between regularity and invisibility in relation to bow changes seen in both *Duets*, and *The Second Dream*[...]. From each of these works, there emerge interesting treatments of exposure and erasure, visibility and invisibility, embodiment and disembodiment. Perhaps, in some respect, there is a connection here between byproduct-driven material, the way absence and presence are explored in these works, and how we hear and identify likeness and difference. These works complicate each of these relationships, rendering a more binary reading increasingly irrelevant, driven primarily by what occurs in between them, generating a particular kind of responsiveness, and care.

The idea of care, as explored in the first chapter on Tashi Wada's duets, seems to find a natural resonance with other threads touched upon in later sections: care can be seen to relate to shepherding, and to tending. This recurring language lends a particular coloring

of the interconnected material and action dialectic: one resulting from a kind of *compassionate* response in real time, a responsiveness directed by how the material, or musical concept, asks to be shaped.³⁸ This kind of responsiveness relies upon a certain amount of flexibility in action, in technical response in the present moment, but never a complete *freedom*. Rather, the interconnectedness of this dialectic axis resides in its empathetic connection, its malleability in reciprocal shaping in the act of performance.

This casting of a caring interaction, in terms of a compassionate responsiveness, has also been extended to the bodies of the cellos themselves, in terms not only of sympathetic resonance, but in relation to the phenomenon of their ‘speaking’ to each other. My sense of the cellos as actants in the dyad of the instrument/performer is predicated on the postulation of a form of empathetic physical response in real time. This sense could be similarly applied to the relationship between the performers, whose navigation of material relies so heavily on trust, and a deep understanding of how their connection in performance brings the piece into being. The kind of empathetic resonance suggested here, moves beyond that of the collaborative relationships usually developed in chamber music, towards something so interwoven that the work’s very being arises within it. The material and action dialectic can then be seen as not merely integrating musical concepts and material into a reciprocal relationship in the action of execution, but as establishing something far more complex on a physical and personal scale.

³⁸ To me, this resonates somewhat with Iris Murdoch’s casting of compassion as a natural response to the “good by-proxy” inherent in art, in *The Sovereignty of Good*. Iris Murdoch, *The Sovereignty of Good* (New York: Routledge, 1971), 85.

The resonances above position these works in their realization specificity as something *felt* and shared, between bodies (of both cellos and performers), and this idea has shaped and deepened a view of the function and results of multiplication. The act of doubling, or multiplying, sets this kind of shared sensibility in motion; indeed, perhaps it demands it. Multiplication of bodies can also, as we have seen, perform specific functions, depending on how the material of the work deploys it. In Tashi Wada's duets, and particularly the first two movements of *One Arm Bandits*, multiplication highlights difference, magnifying and revealing the complexities of attempting a unified gesture. In the last movements of the Lucier, amplitude begins to mask this, and instead creates a depth of field in terms of difference. In La Monte Young's *The Second Dream*[...], different permutations of instruments inform how multiplication manifests, from the base level of four of the same instrument, to potentially massing large forces. Here, the amount of multiplication at play generates radically different versions of the piece. In the Caddy/Hamann work, multiplication operates on several levels, some masked and others extended. Here, we begin to move outside the instrument/performer body and diffuse into other systems: amplification and disembodiment in space. For all of these variations, the multiplications of cellos form a key component of the work, setting particular kinds of material, action, and temporality in motion in performance.

The works' unfolding in time, as a key parameter of what it means to be realization specific, moves in multiple directions in terms of concept in these works. Most significantly, perhaps the defining approach to time is that of being responsive to the material and action dialectic, to the complications of doubling, rather than being informed by fixed temporal

parameters, tempo, or the imposition of rhythm. Time in these works is not driven by aesthetic aims, but by the needs of material and performer, and by the length required to register phenomena.

Of course, *One Arm Bandits* stands in contrast to this conception of time, but a hypothetical reconfiguration (which could realize the work without clock time), allows us to consider another possibility. This idea is not intended to be read as an attempt to shoehorn Lucier's work into a fixed category, but to use this frame of characterizing works as a way to propose that the material of this piece might be realized in a way more sympathetic to the material in *action*. The use of hypotheticals here, could be seen as a possibility for broader applications of this research. This suggestion I mean to position more specifically in the construction of collaborative work like that of the Caddy/Hamann project rather than as a retroactive rubric for the analysis of other works. However, this strategy could also be applied to other pieces that may resonate with the aims of these works: not to corral them in terms of definition per se, but to open up alternative readings and approaches, to consider more generally what the work asks of us and how we might respond to this asking.

Time also operates in a pluralistic sense in these works, through the dual nature of performer and observer, and the constant shifting between registration of past, projection of future, and the creation of a present. Thus, musical concepts such as unison and tuning, in works such as La Monte Young's *The Second Dream*[...], manifest a kind of eternal present: one whose capacity for registration of time and difference creates an ongoing fusion of aims and activity in the present moment. Linear time, or narrative time, makes itself felt in a particular sense: as a navigation of material which is generative in nature. This creates a

specific kind of movement through time, one marked not by points, events, or a climactic phrasing, but through a journey which could take no other path. In examples such as the two octave path from one C to another, the unfolding and refolding of the *Dream Chord*, the return to the detuned fundamental in the Caddy/Hamann project, I intuit a kind of pull, a recurring sense of gravity manifested in time by these works. Perhaps this is what was intuited in the first chapter's framing of descent: an implication of gravity and return (rather than a push towards altitude).

Unison's role in these works is an interesting one, in that I feel it is not a necessary characteristic in order for a work to be cast as realization specific. However, in these works, aside from its interconnectedness to the concept of duplication, or multiplication, unison becomes a lens through which to view crucial approaches to material, and it enacts a highly specific approach on the part of performers to realize the pieces. The paradoxical qualities of unison, its inbuilt notion of unification through division, presents enough questions for a paper all its own. What these works do with the concept is particularly fascinating to me. Their exploration, reframing, and exposing of difference, their unusual vantage point for seeing anew something so 'simple,' or fundamental, as a unison relationship, are such vital aspects of what the works achieve. This more complex view of unison allows us to see more clearly the interconnectedness of material, the magnification of difference and artifact.

In terms of highlighting difference, the pieces' relationships to each other proves demonstrative of another a kind of dismantling. Taken individually, we could view a treatment of unison in more singular terms, for example the Wada duets' fusion of individual operations. However, once viewed as belonging to a larger set of explorations, it is possible

to intuit ideas such as unison in multifaceted ways, while still expressing a particular approach to the concept, one lifted out and away from classical music traditions of voice leading or harmony. For me, it is the construction of a pluralist approach to these concepts that forms the most interesting manifestation of the nexus of interlocked materials here, one that suggests an approach to examining works with shared realization specific properties that is situated not within a singular perspective, but in a multi-prismatic sense.

I do not intend here to argue for any grand claims in terms of a relationship between the works. Ultimately their connection to each other is formed through my epistemic perspective as a performing cellist, and it is within this context that an individual, pluralistic view of the key characteristics has been formed. Through viewing these works through the lens of my performance practice, this dissertation aims to propose a somewhat contained space for exploration of these concepts. While there may be potential for future applications of these theoretical and practical ideas in other contexts, this paper hopes to provide insight for future performances of these specific works by other performers.

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