Poiesis and the performance practice of physically polyphonic notations

Fairbairn, K.T.

2. Poiesis in Practice

2.0 Preliminaries

> It matters which thoughts think thoughts. We must think!
> (Haraway 2016: 57)

The following chapter comprises three subchapters (2.1-3) devoted to borrowed ideas and cross-pollinations; they seek immersion in other disciplines, encouraging their concepts to diffract through the practice of learning music. First, though, it is perhaps useful to begin with a glance askance at a musical concept that has itself migrated elsewhere, in the hopes that as it circles back to its home discipline, it can bring with it all of the messy cross-pollinations and contaminations that have, through these peregrinations, woven themselves into its own conceptual fabric.

In attempting to describe a vision of ecological entanglement, Anna Löwenhaupt Tsing borrows the musical term "polyphony" to help elucidate the vast, interconnected, multi-scalar relationalities of ecological co-existence. In moving beyond the bounded concepts of "community," she describes a "polyphonic assemblage" rooted in the "patterns of unintentional coordination" that emerge from "the interplay of temporal rhythms and scales in the divergent lifeways that gather" (Tsing, 2015, p. 28). Tsing is fascinated by the simultaneous dis- and inter-connectedness of Renaissance polyphony, the consubstantiality of "separate, simultaneous melodies" and "the moments of harmony and dissonance they [create] together" (Tsing, 2015, p. 28) For Tsing, this vision of polyphonic assemblages offers a conceptual framework outside of teleologies; that is to say, she draws inspiration from polyphony that revels in the rub and the abrasion of voices' superposition, in contrast to what she describes as progress-driven music in which "unity was the goal … a unified coordination of time … music with a single perspective" (Tsing, 2015, p. 28). Her ruminations on ecological co-existence embrace the idea of polyphony as an entanglement of consonance and dissonance, neither taking precedence in resolution but intertwined and interdependent, journeying and well-travelled.

Tsing characterizes this as a "curiosity [that] follows such multiple temporalities, revitalizing description and imagination. This is not a simple empiricism, in which the world invents its own categories. Instead, agnostic about where we are going, we might look for what has been ignored because it never fit the time line of progress" (Tsing, 2015, p. 26). For Tsing, polyphony comes to represent a vision of multi-scalar coexistence that is not predicated on narratives of directional progress nor wedded to teleological points of arrival (historical, ecological, cultural). As with polyphony, where consonance and dissonance rub shoulders symbiotically, Tsing does not take this as an impetus to counter the myth of order with the myth of unbridled chaos. Rather, rejecting teleologies means accepting the consonances as much as and in order with the dissonances, refusing the siren call of resolution, as occurs also in ecological systems, where this ebb and flow emerges from the concept of "disturbance":

> Humanists, not used to thinking with disturbance, connect the term with damage. But disturbance as used by ecologists, is not always bad—and not always human. Human disturbance is not unique in its ability to stir up ecological relations. Furthermore, as a beginning, disturbance is always in the middle of things: the term does not refer us to a harmonious state before disturbance. Disturbances follow other disturbances. (Tsing, 2015, p. 126)

In the following subchapters, physically polyphonic notations provide exactly this disturbance. As a set of repertoire whose primary distinguishing quality is their variation, these pieces make visible the mutable nature of learning music, where new learning and technical strategies are embedded in a field of disturbances following disturbances. Through the next three subchapters, the nature of

these disturbances will be examined more closely through the aid of a variety of theoretical gratings. Throughout, these notions of superposition and symbiosis will recur, supporting a commitment to a musical methodology rooted in the relationality of polyphonic agencies. Haraway, channeling Marilyn Strathern, describes this commitment to following the grains of relations as "accepting the risk of relentless contingency, of putting relations at risk with other relations, from unexpected worlds" (Haraway, 2016, p. 34).

In attempting to verbalize this commitment to relationality, Haraway settles on the term sympoiesis, itself derived from poiesis by way of autopoiesis.[19] "*Sympoiesis* is a word proper to complex, dynamic, responsive, situated, historical systems. It is a word for worlding-with" (Haraway, 2016, p. 58). In the following subchapters, many different layers and scales of agencies are mined through their potential to world-with: the concepts themselves as they migrate from discipline to discipline, diffracting (cf. Haraway 1992b) and seeking "generative friction" (Haraway, 2016, p. 61); the interwoven agencies of composers, performers, and audiences—the music-writers and music-learners and music-listeners; and of course the complex ecosystem of the single performer's body, tasked with embodying the polyphonic consonances and dissonances of gesture that emerge in the notations under consideration.

Sympoiesis inhabits the lineage of poiesis as an act of creation and tool-building in an Arendtian sense, but imbues it additionally with the myriad of other poietic agencies that abound, intersect, coexist. In pursuing a poietic methodology for learning music, the embrace of these varieties of terms and concepts is intended to aid in a process of "material-semantic composting" (Haraway, 2016, p. 31). The diffraction of these terms and concepts through one another endeavors to cultivate a situation in which new disturbances can provoke new virtuosities of learning music. The particular concepts, pieces, and methodologies described hereafter are not prescriptive, but are stories that hopefully make possible a space in which new relations between notations and performers as well as between discrete actions within the performer's body can emerge. Physically polyphonic notations make this possible in part because they necessitate an initial disorientation from traditional interpretive strategies, a disturbance that allows us, as performers, to reevaluate which orientations and scales and relationalities we choose to embrace. I have chosen to house this commitment to ateleological relationality in the guise of poiesis. As Haraway writes, "Other words for this might be materialism, evolution, ecology, sympoiesis, history, situated knowledges, cosmological performance, science art worldings, or animism, complete with all the contaminations and infections conjured by each of these terms" (Haraway, 2016, p. 97).

Haraway combines the methodologies of these commingled concepts under the term speculative fabulation (one of many SF's that she continually circles back to—"science fiction, speculative fabulation, string figures, speculative feminism, science fact, so far" (Haraway, 2016, p. 2)). She uses fabulation as a form of storytelling, a weaving of superposed and consubstantial realities. Stories and storytelling recur as alternative methodologies, markedly in the work of Haraway and Tsing, but well beyond their purview as well, and as early as the work of Arendt, who introduced stories as a way of imagining the processual creativity of poiesis and human interactions. Stories are not facts, and they resist being recorded as data, and yet they contain information. They are the ripples that radiate from disturbances, traversing one even as the next is already superposed thereupon. They communicate and indicate, but also remain constantly vulnerable to the interpolation of fresh interjections and interpretations as their context shifts. They are not data points but trajectories, unravelings. Arendt considers stories the tools of action and speech (and therefore as an offshoot of poiesis):

> It is because of this already existing web of human relationships, with its innumerable, conflicting wills and intentions, that action almost never achieves its purpose; but it is also

19 For a closer discussion of autopoiesis, see 2.3 Autopoiesis and Sehyung Kim's *Sijo_241015*.

> because of this medium, in which action alone is real, that it 'produces' stories with or without intention as naturally as fabrication produces tangible things … They themselves, in their living reality, are of an altogether different nature than these reifications … [T]he stories, the results of action and speech, reveal an agent, but this agent is not an author or producer. Somebody began it and is its subject in the twofold sense of the word, namely, its actor and sufferer, but nobody is its author. (Arendt, 1958, p. 184)

As bodies of knowledge that embody the interstices of fluid relations, capable of drifting through temporal and spatial constraints with ease, stories form essential tools for developing the kind of methodologies that can accommodate and assimilate these insterstitial forms of knowledge and expression. Tsing writes, over half a century later:

> To listen to and tell a rush of stories is a method. And why not make the strong claim and call it a science, an addition to knowledge? Its research object is contaminated diversity; its unit of analysis is the indeterminate encounter. To learn anything we must revitalize arts of noticing and include ethnography and natural history. But we have a problem with scale. A rush of stories cannot be neatly summed up. Its scales do not nest neatly; they draw attention to interrupting geographies and tempos. These interruptions elicit more stories. This is the rush of stories' power as a science. (Tsing, 2015, p. 38)

Storytelling's power as a form of science and a research methodology is, as previously remarked, not new to Haraway and Tsing. Anthropologist Tim Ingold remarks on both the allure as well as the possible misuse of storytelling as a methodology in its application over time:

> Now of course, anthropologists have long recognised the educative functions of storytelling the world over. But they have been wrong to treat stories as vehicles for the intergenerational transmission of encoded messages which, once deciphered, would reveal an all-embracing system of mental representations. For stories do not, as a rule, come with their meanings already attached, nor do they mean the same for different people. What they mean is something that listeners have to discover for themselves, by placing them in the context of their own life histories. (Ingold, 2011, p. 4)

Ingold goes on to describe this form of storytelling as a type of emergent learning, or in his own terms, as guided rediscovery or even way-faring.[20] It is precisely this aspect of storytelling, though, which has made the concept a useful tool for Arendt, Haraway, and Tsing, among others; because it embraces forms of knowledge-making that unfurl dynamically (rather than being contained in a static informational vessel), storytelling makes disturbances and polyphonies necessary components of knowledge-making, rather than exceptions or interruptions. Marcel Cobussen describes how way-faring storytelling contributes to pluralistic knowledges:

> Therefore, it would be difficult to maintain that the quality of a theory depends on its ability to better (re)present reality than other theories. Instead, my claim is that the value of a theory depends on its capacity to convince. Theorizing is in fact telling a story, and its *auctor intellectualis* may hope that it offers some new insights, some new ways of experiencing the world. (Cobussen, 2017, p. 81)

20 For further discussion of Ingold and guided rediscovery, see 3.1 Introduction to Embodied Cognition; Enactive Learning; Enskilment.

A refusal to be reactive to other theories does not in itself negate them. A way-faring attitude of storytelling opens a space in which the importance or dispensability of other theories can evolve and develop over the course of a research story-journey; the "capacity to convince" includes as much this dialogue with other knowledge-producing activities as it does with a direct author-reader relationship. According to Jerome Bruner, "[I]t is not textual or referential ambiguity that compels interpretive activity in narrative comprehension, but narrative itself" (Bruner, 1991, p. 9). This is to say that the plurality of knowledge-making that storytelling offers as a methodology is not a result of the ambiguity of its subject, but rather of the distinctive way-faring, cross-contaminating qualities that it activates. As Ingold notes, "it may not be until long after a story is told that its meaning is revealed, when you find yourself retracing the very same path that the story relates. Then, and only then, does the story offer guidance on how to proceed" (Ingold, 2011, p. 4). A story can offer a new way of experiencing the world, but as with any experience, it must be lived in real space and time if it is to disclose any of its secrets. Stories offer a framework of viewing the learning and practice-building of various disciplines in this unfolding, emergent, experiential process. Bruner connects this idea of narrative as methodology to Roland Barthes' distinction between readerly (*lisible*) and writerly (*scriptible*) texts, and certainly Barthes' concept of writerly texts melds well with the notion of narrative as guided rediscovery: "The writerly text is a perpetual present, upon which no consequent language (which would inevitably make it past) can be superimposed; the writerly text is ourselves writing, before the infinite play of the world (the world as function) is traversed, intersected, stopped, plasticized by some singular system (Ideology, Genus, Criticism) which reduces the plurality of entrances, the opening of networks, the infinity of languages" (Barthes, 1973/2002, p. 5).

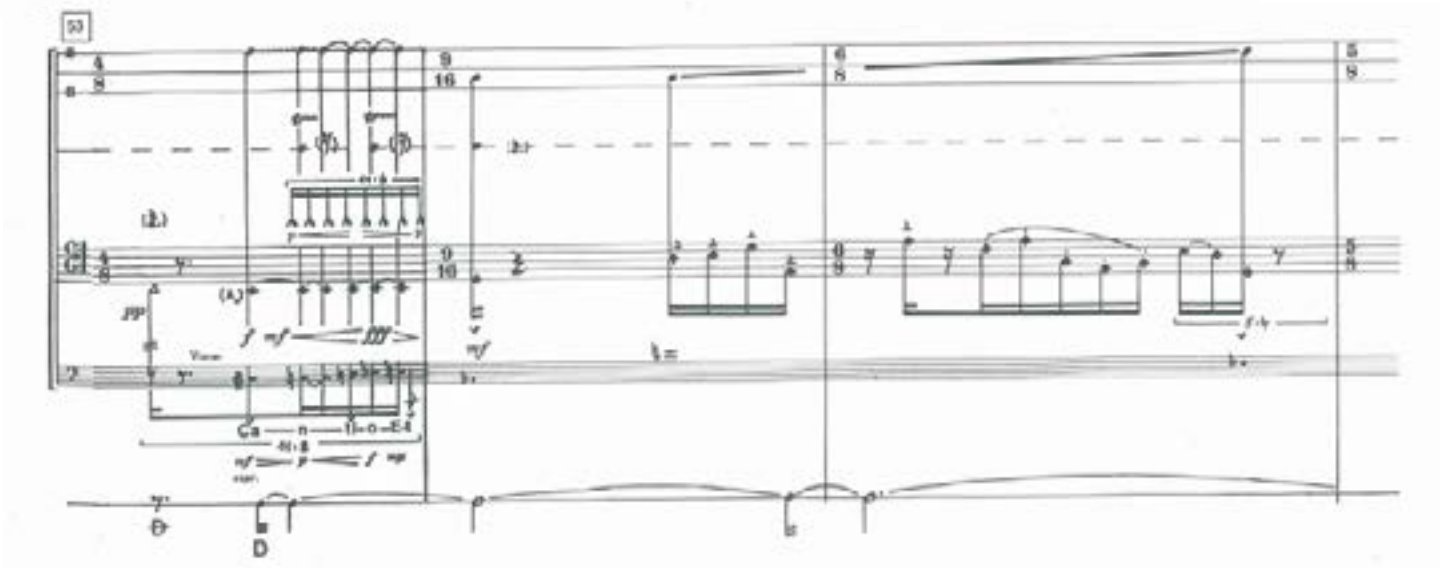
Stories offer a way to live the world emergently, traversing a topography, a "process … akin to that of following trails through a landscape: each story will take you so far, until you come across another that will take you further" (Ingold, 2011, p. 4). Barthes follows the topographical contours of narrative to an infinity of languages, Ingold to a (re)discovery of enactive enskilment, Arendt to tool-making as creativity, and Haraway to speculative fabulation as world-making. All of these approaches mine stories for their polyphonic cross-pollination, for their sympoiesis. It is precisely these cross-contaminations that I seek; they drive us and guide us not forwards, but merely elsewhere, and it is those elsewheres that allow new forms of musical expression to germinate. Following Tsing, we hope to be "contaminated by our encounters; they change who we are as we make way for others. As contamination changes world-making projects, mutual worlds—and new directions—may emerge" (Tsing 2015: 31). The following essays are not stories, per se, but do invoke the spirit of wayfaring and contamination. They allow non-musical theoretical gratings to diffract through specific pieces of physically polyphonic music, each proposing a certain pathway through the particular contours of each piece and its learning process. They are only propositions, the momentary pathways available to myself in the learning process, with the theoretical models that served as constellations to help me navigate these particular topographies. They are singular stories intimating the outline of how some other story might later emerge. To another performer in another situation, some other confluence of concepts, learning methods, and performance practices may take the place of those proposed in the following pages. As discrete theoretical gratings, the way in which these essays inform the development of physically polyphonic performance practice may or may not bleed into one another; they are neither continuous nor sequential, but do hopefully amplify and resonate with one another. Or at the very least, contaminate one another, as part of an evolving process of poietic learning and tool-building.

2.1 *Haecceitas* and Aaron Cassidy's *Because they mark the zone where the force is in the process of striking (or, Second Study for Figures at the Base of a Crucifixion)*

How might a performer steeped in the classical music tradition learn and perform a work like Aaron Cassidy's *Because they mark the zone where the force is in the process of striking*? The notation itself is immediately jarring: the rhythmic material looks familiar, albeit complex, but all note heads have evaporated leaving only lines traced along the empty staves. As if this were not disorienting enough, the performance instruction makes it explicit: "never projecting an air of control" (Cassidy, 2006, p. 1). A notation like this resists casual acquaintance. It demands a certain level of classical music acumen (with respect particularly to the rhythm) while simultaneously distancing itself from that tradition by replacing conventional noteheads with tablaturized instructions for the performer's body. Cassidy has notated three different layers of the physical action of playing the trombone, each on separate staves. The top staff indicates slide motion, notated with the slide all the way in at the top, and all the way out at the bottom. The middle system indicates lip tension from loose to tight, which consequently prescribes the relative placement within the harmonic series with a range from partial 2 to as high as possible. The third and lowest staff, which appears intermittently, indicates valve activation, with three positions indicated: undepressed, half-depressed, and completely depressed.

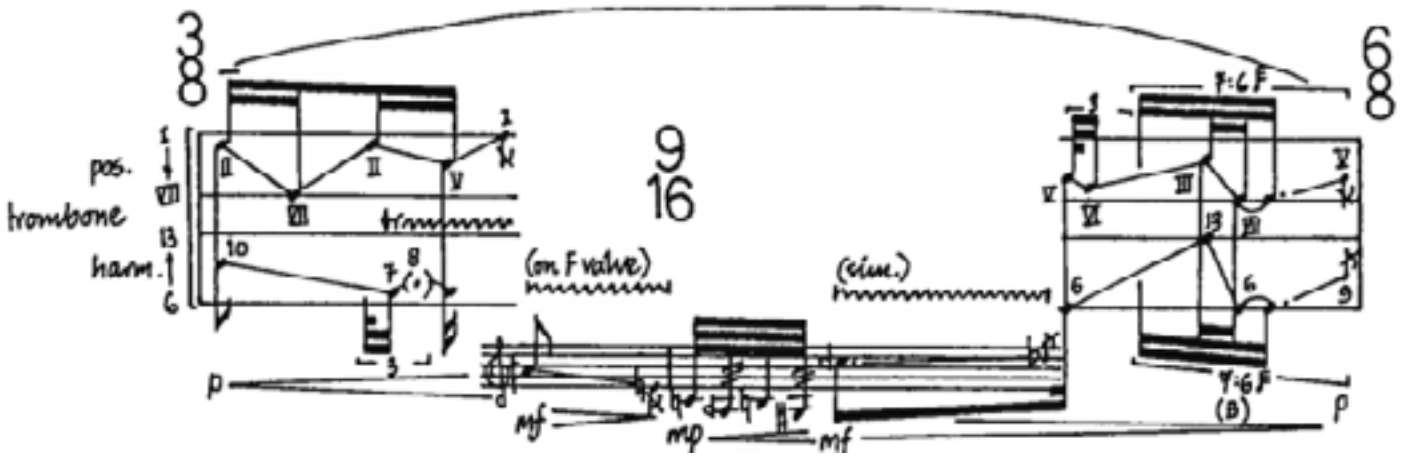
Any notational decision presents an opportunity to a performer. Whether it be traditional or experimental notation, each notational moment provides a means for the performer to parse a composer's interests, priorities, and preoccupations. What they choose to indicate, and equally what they choose not to indicate, become critical clues to the performer, not merely to satisfy the composer's wishes per se, but to understand the gestation of the notation so as to better nurture the practical techniques that can bring it to sound in the real world. In traditional classical music, this is equally true, even if the homogeny of notational strategies can at times obscure the critical differences between what a composer chooses to notate and not to notate. A composer who has a separate dynamic and articulation marking on each note has shown how much these details have preoccupied her, while a composer who has very little articulation markings but many fingerings has revealed another discrete preoccupation. Noticing which elements she chooses to foreground or

background is one of the first and most critical elements to consider when embarking upon a learning and interpretive journey. In notations such as Cassidy's, this is even more so the case. Because physically polyphonic notations vary so much from composer to composer and score to score, a huge volume of information is intimated by the choices the composer has made in each unique piece. By taking special care to notice which specific elements are chosen as parameters, the ways in which they are manipulated, and especially which are omitted, the performer can already begin to construct a new set of practice tools before even picking up the instrument. Cassidy's score provides a fantastic example of just such a set of both accentuated and omitted parameters, but to better appreciate this, I will first introduce three other notations that predate it: Klaus K. Hübler's *Cercar*, Richard Barrett's *EARTH*, and Aaron Cassidy's first trombone solo, *songs only as sad as their listener.*



Klaus K. Hübler: *Cercar* (1983): mm. 53-55

When compared to Hübler, it is interesting to see how much has been left out by Cassidy in *Because they mark the zone*: in *Cercar*, Hübler notates as many layers as possible and they are treated very equally as polyphonic voices.[21] Cassidy, though, has left out many of these layers (including mute, diaphragm accents, voice, and mouth shape) and has furthermore reduced the specificity in both the harmonic series and slide content, which are both relativized.



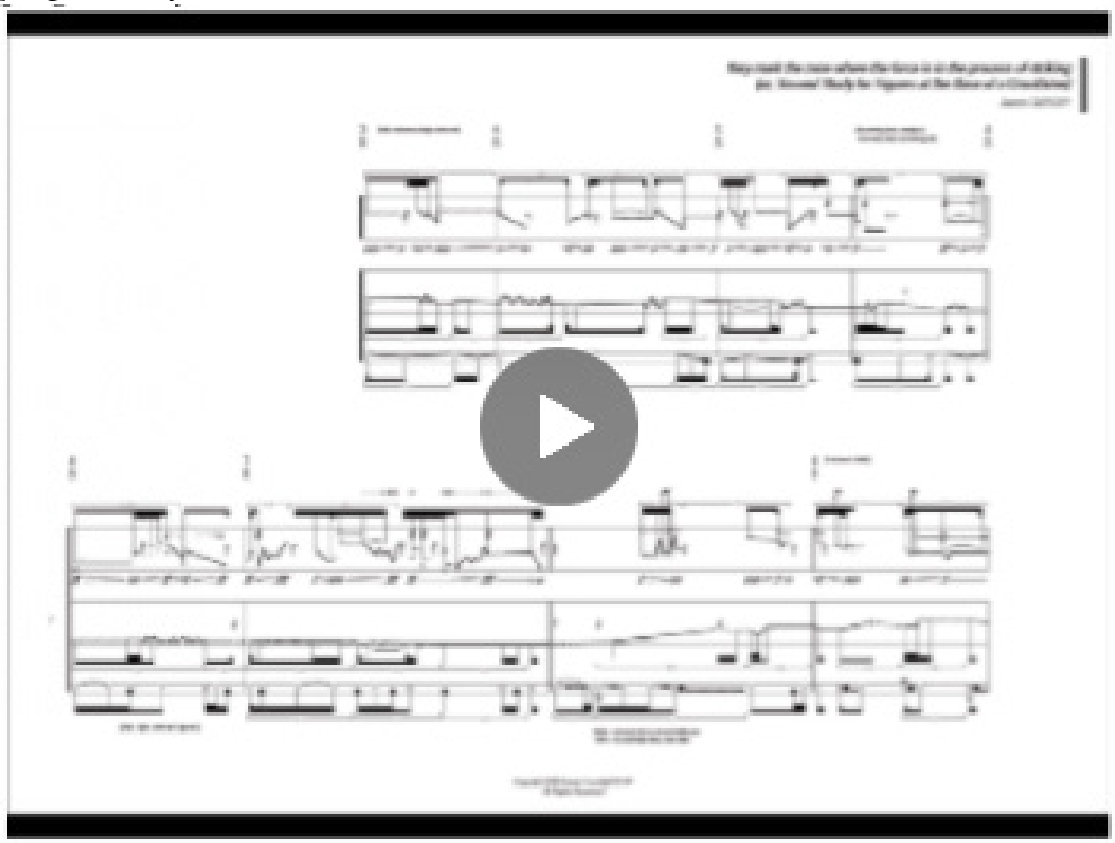
Richard Barrett: *EARTH* (1988): mm. 248-50

21 see also 3.2 Tablature, Shared Performance, and Klaus K. Hübler's *Cercar*

Unlike Hübler, Richard Barrett's notation treats almost exactly the same parameters as Cassidy's *Because they mark the zone*. However, in Cassidy's score, there is quite a bit *more* specificity and complexity of rhythm and the different strata of material are far more decoupled. This is in strong contrast to the decoupled passages in *EARTH*, in which the rhythms are more straightforward and the destinations of slide position and harmonic motion are largely homorhythmic.

Aaron Cassidy: *songs only as sad as their listener* (2006): m. 5

Cassidy's earlier trombone solo, *songs only as sad as their listener*, sets fewer and less complex parameters within a simultaneously more complex rhythmic framework. The rhythm is the only instance, though, in which *songs only as sad as their listener* is more complex, for despite the somewhat less extreme nested tuplets in *Because they mark the zone*, the overall density of activity in the latter is drastically more frenetic. Within these short examples of early decoupled notations for trombone—all precursors to *Because they mark the zone*—it becomes more clear precisely which parameters are foregrounded in *Because they mark the zone*, as well as which elements are backgrounded or omitted entirely. One can see how, for Cassidy, rhythmic specificity emerges as a more critical musical element than absolute pitch. One can also begin to see how the different physical actions are increasingly interwoven even as they are increasingly decoupled. Cassidy utilizes these foregrounded musical elements in his notation to explore the physicality of the instrumentalist as their primary physical actions are progressively stratified.



Cassidy writes that the physicality inherent in his tablature notations "are not means towards an aural result but instead are already musical materials in their own right" and refers to this concomitance of sound and gesture as part of the piece's "ontological identity—its haecceity, in Deleuzian terms" (Cassidy, 2008b, p. 22). Although Gilles Deleuze and Félix Guattari do introduce and make extensive use of the term "haecceity" in *A Thousand Plateaus*, its original provenance lies in the work of the 13th-century Scholastic philosopher John Duns Scotus.[22] *Haecceitas*, or the *individua differentia*, is one of Duns Scotus's primary contributions to scholastic philosophy, along with the real distinction (sometimes also called the formal distinction). Haecceity refers to the thisness of a thing or person, as opposed to its quiddity, or whatness. This is to say that in a traditional scholastic view of ontology, there are many different (one might almost say parameterized) properties that constitute a being: the form, the matter, etc. In the commingling of these elements emerges the essence of each entity. Scotus's haecceity, the individual difference, is a means to isolate the mystery of the individual within the ontological framework—in other words, what is it that makes Socrates Socrates, beyond being merely a man? Why exactly is he Socrates and not Plato? This problem was a major preoccupation for Scholastic philosophers, and for Scotus, it was intimately tied to the concept of indivisibility. According to Scotus, the humanness of Socrates is part of a common nature, what Scotus calls a non-numerical unity, which is to say that humanness is divisible, or rather, expressible in many different entities: Socrates, Plato, and so forth. The individual difference is tied to the indivisibility and individuality of Socrates. Like any property, a haecceity is an entity itself, and yet it is fundamentally indivisible, and so not separable from the larger particular itself. This, in turn, relies on Scotus's formal distinction. For my purposes, I can say that the formal distinction refers to a property or element that is both distinct in itself and yet necessary and requisite to the whole; it is conceptually discrete but cannot exist outside of its context. It is therefore inseparable at the same time that it is *formally* distinct. A haecceity is precisely such an entity, in that it is a property of while inseparable from the whole. The distinct individuality and indivisibility of this whole—the entity's thisness—resides in a haecceity. Implicit in any discussion of a haecceity is the idea that certain aspects of an entity are inextricable even if they are distinct, and that it is the relations between components (and not the components themselves, accounted individually) that comprise the identity of an entity.

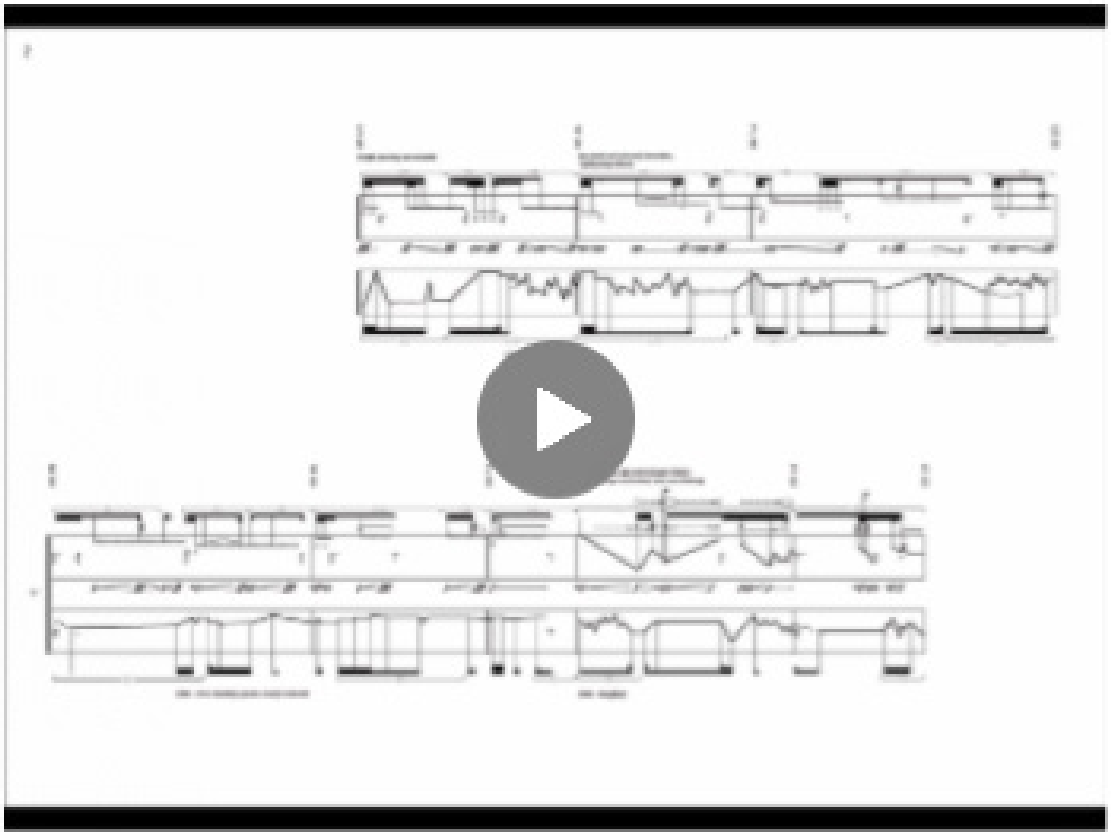
The notions of *haecceitas* and the real distinction were highly relevant to one of the most critical and controversial questions facing Scotus and his contemporaries: the Holy Trinity.[23] For many centuries, theologians and philosophers had tackled the problem of parsing the respective unity or discreteness of the three members of the Holy Trinity, leaving a long and troubled history as the problem remained stubbornly unresolved up until the time of the Scholastics. How can three different things coexist in separate forms and yet be one and the same? In his own attempts to successfully resolve this complicated issue of discrete but consubstantial entities, Scotus posits the divine essence as an immanent universal. In elucidating this idea, Scotus posited that the divine persons are expressions of this immanent universal, which (unlike some other universals) is expressible in its purest form in multiple instances. For Scotus, then, "the divine essence is communicable … however, the divine essence is indivisible. The divine persons, although they are exemplifications of divine nature, are not substances or individuals, since they are incommunicable. The only indivisible thing in God is the divine essence" (Cross, 2003, p. 188). These distinctions between divisibility and communicability cut to the heart of the formal distinction, revealing the thread of haecceity by which internal relations come to constitute identity and quiddity, leading also to communicability. The divine essence (the

22 "Cf. *Met.* VII q. 13 n. 61 (*Questions on Metaphysics*, II.208-209) and 176 (II.240-41)" (Ingham and Dreyer, 2004, p. 113).

23 In fact, the question of the Holy Trinity was the only instance in which William of Ockham fully accepted Scotus's formal distinction (Ingham and Dreyer, 2004, p. 34).

superposition of formally distinct entities in relation to one another) is communicable despite the more molecular entities' incommunicability. In orthodox Scholastic interpretation, the divine essence is not technically identical to a haecceity, since God is different from individuals such as Socrates and cannot be analyzed by the same philosophical principles. Nevertheless, the divine essence in this explication of the Holy Trinity operates very much like a haecceity, since Scotus identifies the divine essence (an individuating quality and identity) as the actual criterion of indivisibility. The most visible exemplifications of this divine essence, the three forms of the Catholic god, are not in themselves individuals; they are instantiations of the immanent universal linked by a shared identity inseparable from but formally distinct from their discrete identities—in other words, essentially a *haecceitas*. They are formally distinct but for all practical purposes indivisible—expressible only in the whole.

Applying this formal distinction to *Because they mark the zone*, we can see a similar relationship between the three layers of physical actions and the underlying individuality of the score and its resultant performances. The three physical actions are formally distinct in Scotus's sense, since they can be intellectually regarded separately. As discrete actions, they are visibly distinct in the notation; they are not, though, individually communicable. The thisness of the score and its resultant performances reside within the *interaction* of these three decoupled physical actions, which are inseparable as they are entangled in the single body of the holistic performer. They are conceptually independent and yet physically co-dependent, utterly contingent upon one another, each line both hindering and helping the other polyphonic actions. The valve action would simply not respond the same way, let alone sound the same way, without its interaction with the other two physical strands of material, which are likewise as affected themselves. Listen once more for this co-dependence within the independence of movement, for the haecceity that emerges from the performance of these actions.

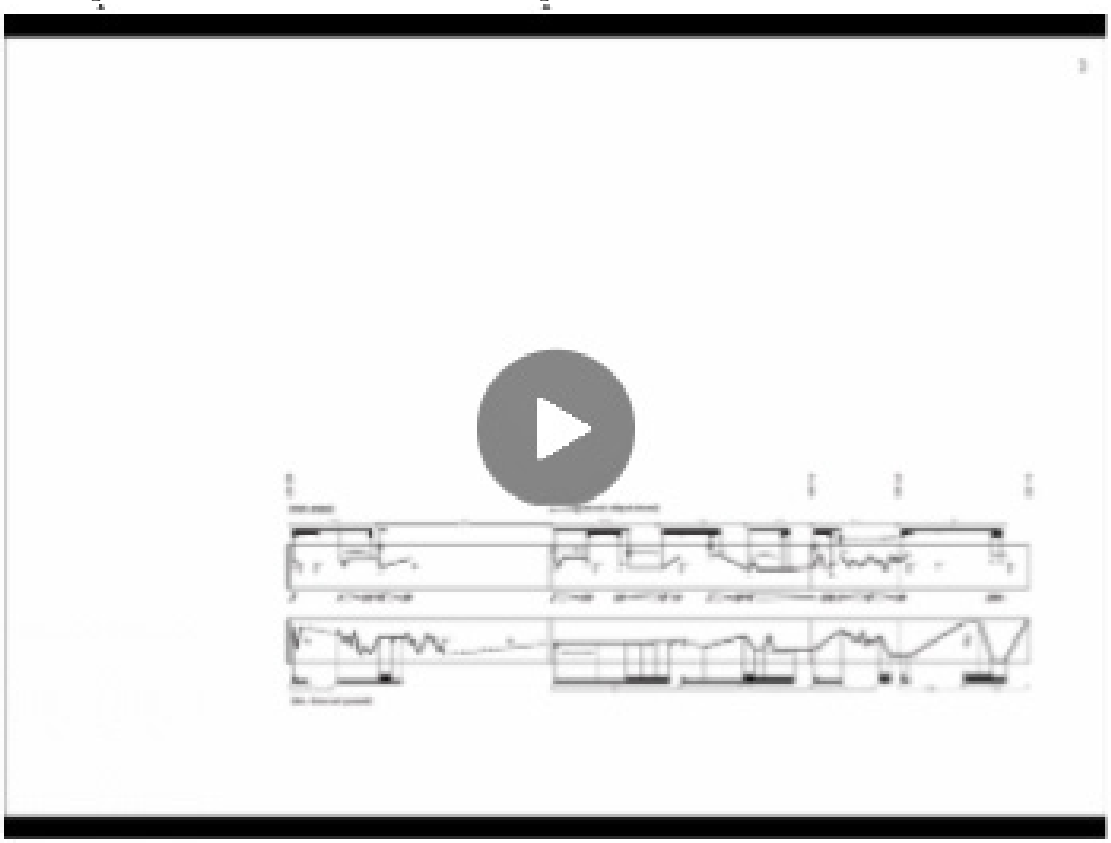


Haecceity is an access point, a way for the performer to understand the piece as something beyond a prescribed set of gestures. Each piece is, instead, a unique performative and physical system with a sense and identity all its own. Deleuze and Guattari write that, "it is a matter of surrendering to the wood, then following where it leads by connecting operations to a materiality, instead of imposing a form on matter" (Deleuze and Guattari, 1987, p. 408). As with a woodworker following the grain of the wood, allowing the wood's inherent form to aid and reinforce his craft, a performer's analysis of this piece must surrender to the physicality of the notation, learning more than just the *specific* motions of the piece (e.g., a rote-reflexive execution of one 13:12 rhythm), but also the *types* of motion within the piece (e.g. patterns of unaligned articulations and slide movement shapes). As with woodworking, these are always questions of actions in motion; cutting a piece of wood with the grain uses the wood's form to encourage a dynamic creative process, not a static object. Similarly, this performative analysis, rooted in the idea of poiesis as building tools for (a) practice, is concerned first and foremost with the *types* of interactions that occur at the intersection of the decoupled gestures. It seeks to find patterns and shapes within the body that enable polyphonic gestures to abut and superpose upon one another; it develops a practical feeling for these polyrhythms, subsequently allowing the germination of this physical/gestural vocabulary to inform the execution of specific polyrhythms that emerge in the piece as a consequence of the learning process.

This careful fertilization of a performative practice that allows systems of movement to inform more targeted musical learning is what it means to follow the operations where they lead to a materiality—as Deleuze and Guattari envisioned following the grain of wood—and in Scholastic terms, this materiality is the individual essence, a *haecceitas*. As in Scotus's view of the trinity, where the indivisibility was located in the divine essence and not in its exemplifications, the materiality is located in the haecceity and not in the distinct lines of motion that are constellated around it. It is these actions that we follow; these actions are the connective tissue that reveal to us the form in its materiality. In this sense, materiality is a performativity, something deeply rooted in the actual manipulation of the instrument in real time. It is a physicalization and temporalization that is indivisible within the act of realizing and performing it. This performance reifies the haecceity that is the individuating quality of the piece and its interwoven polyphonic physicalities.

A piece like *Because they mark the zone* does not exist on paper or theoretically: it exists only in the actual collision of physically dyssynchronous actions in real bodies and in real time. The consolidation of these elements is not merely a composite, it is a fundamentally idiomatic reading of the score. Such consolidation is the distinct identity and thisness of the piece. The different strands of decoupled physical material do not exist in a bubble, isolated from one another and reassembled in some way *ex post facto*. They exist alongside each other and in the same body, and thus are consequently inextricable and co-dependent. For example, the slide arm responds to the rest of the body, and to the fluctuations in air resistance, amplitude, and tension that change in relation to the other parameters. Cassidy refers to such collisions of physical actions as "polyphonic byproducts" (Cassidy, 2002, p. 151). The polyphonic byproducts are, in essence, the haecceity. They are the element that is inseparable from the piece, indivisible from the interweaving of the decoupled physical actions. Were the slide, valve, or lip motion to be isolated and performed solo, the extracted material would not be identical to the same action executed in the context of the piece—all of the resistances, interferences, and amplifications that result from the inter-relationality of these polyphonic gestures are indivisible from each individual strand of action. Were other parameters, say voice, to be layered on top of what we see here, the result would again be altered, irrespective of the precision of each independent parameter. The haecceity of the piece emerges from the entanglement of these particular actions. Finding the particular and distinctly individual dialogue of the physical actions in this piece is the performer's practical challenge, wherein they cultivate the haecceity of the piece in order to subsequently reap its emergent materiality.

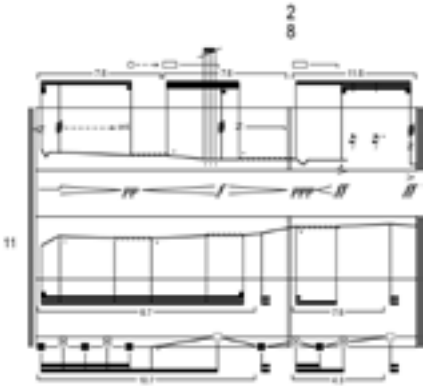
In addition to the slide, lip, and valve actions that constitute the bulk of the notation of *Because they mark the zone*, there are actually several further parameters notated, as well. They lurk slightly on the periphery because they are more obvious: namely, the dynamics and character indications, many of which are extremely descriptive. From the performer's perspective, after struggling with such precise and occasionally overwhelming control over so much of the physical performance of the instrument, how is there room then for interpretation? After relinquishing control over so many fundamental aspects of technique, how can they effect the difference between 'frail, embarrassingly awkward' and 'mangled, inelegant'; between 'increasingly focused, collapsed' and 'flabby'? (Cassidy, 2008a, p. 1) By focusing on the interaction of these physical components as a path towards the haecceity, the detailed notation is not an obstacle to interpretation, but rather a means to access the language of the piece that, in fact, allows for interpretation to emerge. Pursuing idiomaticism leads the performer to surrender to the motion within the piece, and to develop an intuitive sense for the types of motion and physicality it requires. The composer's control over such fine nuances of physical technique do not preclude character and interpretation, but rather necessitate it: the physicalization of the piece demands the interpretative collaboration of a live performer.



Orienting a learning method towards this concept of haecceity leads inevitably to redefining how one judges success or failure in interpretation. A performer naturally desires some barometer by which to track their progress, but with a learning method so dependent on polyphonic byproducts, which emerge from extra-notation collisions of physicality, how can we judge our progress? What is precision in this case? What is an idiomatic or successful performance?

To be able to play this piece precisely, or to even feel comfortable striving towards precision, requires intuiting or learning its haecceity: to come to terms with the individuality and thisness of the notation; to access the strata of physicalized actions and how they create a unique set of interactions; to embrace and embody the interdependency of all the interwoven physicalities of each piece. Cassidy's notation subtly moves beyond simple questions of pitch and rhythm, and precision begins to reside less in the destination points of an action than in the inter-relationalities it builds as action coincide. For example, the speed and shape of the slide arm in relation to the valve depression and

the lip tension demands a type of precision that is not so intimately connected to the question: was the resultant pitch on the downbeat of measure 11 exactly middle C? This can be counter-intuitive to a classically-trained performer (it certainly was to me, at first!), but ultimately, engaging with this idea of haecceity—the unique physical vocabulary of each piece—leads to an idiomatic rendering of a piece, as opposed to a purely denotative execution of gestures.



Aaron Cassidy: *Because they mark the zone where the force is in the process of striking*, m. 11

So what does that mean in reality? In this example, rather than aiming for middle C in measure 11, I am actually focusing instead on creating appropriate relations of velocity and directionality between the different physical strata. I am interpreting the notation as sets of relationships, not isolated points of arrival. Deleuze and Guattari describe this as relying "not on points or objects but rather on haecceities, on sets of relations" (Deleuze and Guattari, 1987, 382). The relations determine the motion, and the resultant pitches are exactly that: resultant. I could mark various reference points and strive to hit middle C as I approach measure 11, much like a telephone pole supporting a wire stretched across it. However, this kind of interpretation misses the piece's underlying haecceity, which rests in the relationships between the actions. It emerges from the way that they intersect with each other and thereby creates both the performative physical vocabulary but also the resultant sonic vocabulary of the piece. Deleuze and Guattari discuss haecceities as topologies, in opposition to geometries and geometrical rules: this is the difference between a pure circle, which is a geometrical rule, and round objects in the world, each of which is circular in its own individual and irreproducible way. A geometrical precision requires the plotting of individual points and the subsequent explication of their relationship functionally, graphically. The haecceity requires a topographical precision, which has less to do with the reproducible placement of a particular point, and more to do with the precision of its placement within a plane of motion, within a shape. This fundamental shift in what constitutes precision is essential to interpreting precision within the context of a piece that relies so heavily on a polyphony of physical motions. It is a precision that not only coheres within constant motion, but actually requires it. Deleuze and Guattari write, "it is not … a question of extracting constants from variables but of placing the variables themselves in a state of continuous variation"(Deleuze and Guattari, 1987, p. 369). Returning to my very first observation at the beginning of this section, a composer's notation is a hugely important window into a piece's haecceity. In this case, if the pitch is as relativized and the slide motion as intricately notated as they are in this case, it should be obvious that these elements of movement, momentum and interactivity are critical to the piece in a way that isolated pitches are not. The interrelationships of these continually shifting variables are the most fundamental and basic structure of *Because they mark the zone*. The continuity of motion and the polyphony of physicality are foregrounded, while the destination points of specific harmonic gestures are resultant. An idiomatic interpretation of the piece has to integrate this into both the learning method and the fundamental instrumental practice that the performer develops. One has to explore these motions until they become a self-sufficient vocabulary,

which can be achieved by following the lines of motion and learning broader vocabularies and inter-relationalities from them. Practicing this means not just capturing a specific moment, but learning how to create and interact with a type of moment. One follows between the lines in search of this performative materiality. Being precise means exactly this. It is the discovery of a haecceity.

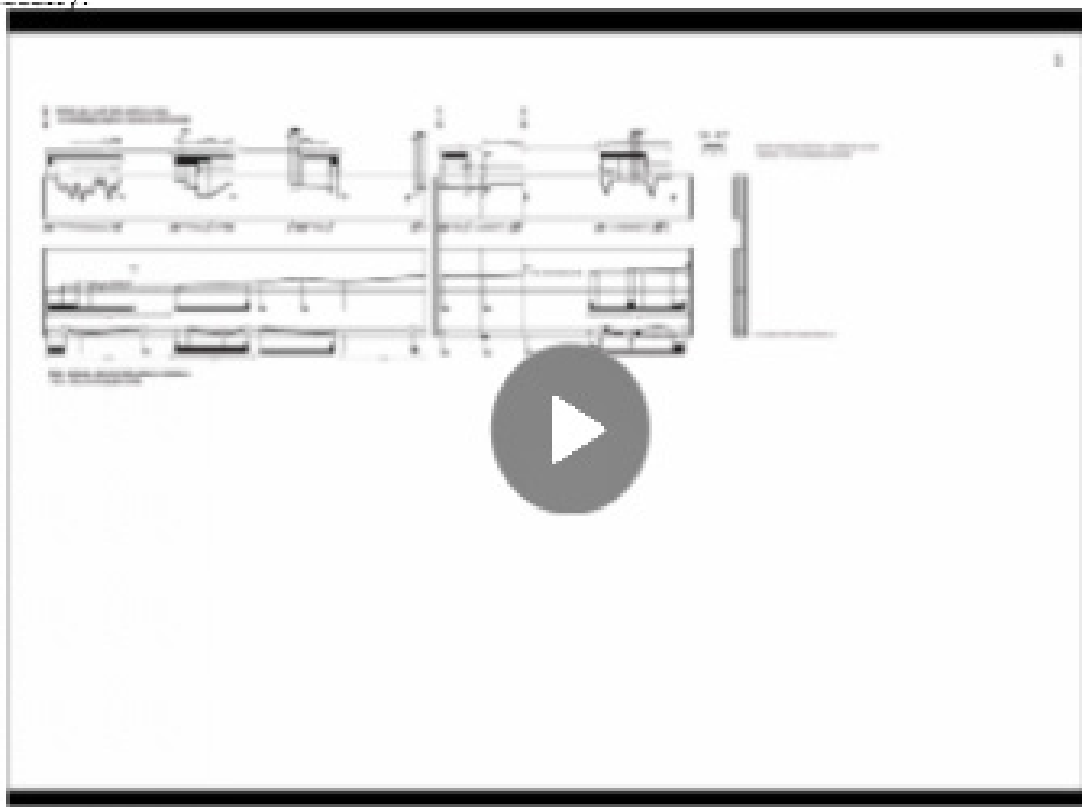
Of course, haecceities do not apply only to interpretation and notation. I have used the concept here as a means to develop specific learning strategies and interpretive priorities in physically polyphonic scores, but the concept itself is much richer than that. It can elucidate any manner of polyphonic assemblage, involving potentially not only a performer or a notation, but also locations, audiences, or even social contexts. In the case of Cassidy's score, these ideas can also help to examine some of the potential difficulties in presenting such pieces in performance. Its flurry of virtuosity can seem to prioritize the communication of effort over accuracy, especially to those performers or audience members who bridle at the fact that not all complex rhythms are immediately audible as such. In *Because they mark the zone*, the intermittent and prolonged freezes also add a layer of theatricality, further obscuring the purely harmonic and rhythmic complexity of the work for audiences. A performer may be confused by the seeming incompatibility of gestural theater and textual precision, especially when it comes to public performance situations. In the general discourse, too, it is unfortunately all too easy for discussions of interpretation and reception to center around the opposition of these elements: impossibility subverting notatational detail; theatricality undermining virtuosity; effort overriding control. Musicological analysis can at times be susceptible to exaggerating these fault lines, although in recent decades this has been increasingly accompanied by attempts to open up analytical tools to accommodate these disparate elements. Among other potential applications of haecceitas is its utility as a tool for assimilating these superposed elements rather than placing them in interference to one another. Effort and control are not contradictions, nor does theatricality preclude the foregrounding of rhythm or harmony. A performer unsure of how to embrace the seemingly conflicting logics of these coexisting musical elements can use these same learning strategies to guide broader interpretive questions, finding ways to present a piece like Cassidy's that seeks to enfold these rich contaminating musical possibilities into one another. Haecceitas provides tools to discuss these polyphonic interpretations analytically, as well as to open up the possibility to view the piece in even larger contexts beyond the concert stage. These sorts of scaled-up perspectives will be examined more closely through other concepts later in the chapter.

The questions of precision posed by physically polyphonic scores and their relationship to musicological analysis also open an old debate about prescriptive and descriptive notation, and how accuracy can be defined in each case.[24] I am proposing that there is a way to foreground the relations of prescriptive actions as a meaningful interpretation of accuracy. Although much historical music notation is in fact a hybrid of prescriptive and descriptive notation, most traditional notation tends to fall into the latter category, since it indicates intended harmonies and rhythms (hence, descriptive) more often than specific physical descriptions of how they should be articulated (prescriptive). As such, purely prescriptive notations such as Cassidy's appear as relative late-comers to the field (although, of course, early tablature notations would belie this oversimplification). In this context, a return to Scotus's philosophy can provide an alternative view of the relationship between prescription and description, and the role of choice in embarking upon action versus envisioning intent. He makes a distinction between two types of choice: "A choice$_1$ is any act of the will that follows the intellect's act of full apprehension, i.e. an act of the will that is carried out neither in a state of ignorance nor in a state of emotional perturbation. A choice$_2$ is a choice to *do* something, or, as Scotus says, an *efficacious* choice" (Pini, 2013, p. 75, emphasis in original). Scotus refers to the first class

24 Charles Seeger (1958) first introduced the words prescriptive and descriptive, and the opposition or balance between these two ideals of prescriptive or resultant notation have been a recurring theme in musicological discourse ever since.

of choice as a wish, which is analogous to a descriptive notation, marking an intended or wished-for result. The latter class of choice, efficacious choice, is instead a mere embarking-upon-an-action, prescriptive in its intention rather than predicated on teleologies. The wishful choice maps more accurately onto our normal conception of choice in everyday language, as well as onto traditional descriptive notation. And yet, Scotus finds that efficacious choice, in its reliance on instantiated action embedded in the world, avoids the pitfalls of teleological misapprehension.[25] By predicating an action on a predicted or intended outcome, there is in some way a greater chance of miscalculation or perversion, which Scotus sees as less possible in the more immanent nature of an efficacious choice. From a musical perspective, as criteria for judging precision are questioned by pieces like Cassidy's *Because they mark the zone*, it can be useful to return to Scotus's philosophy in order to embrace the simplicity of efficacious choice. The haecceities—the relations and entanglements of actions—produce precision, in contrast to a learning strategy that attempts to approximate or tend towards a limit of accuracy set out wishfully by a descriptive notation. And in particular, as inheritors of a Western tradition that has tended to prioritize descriptive notation (i.e. wishful choice), it can be valuable to embrace what Scotus views as the more immediate and simple value of efficacious choice—the efficient and straightforward embarking-upon-action.

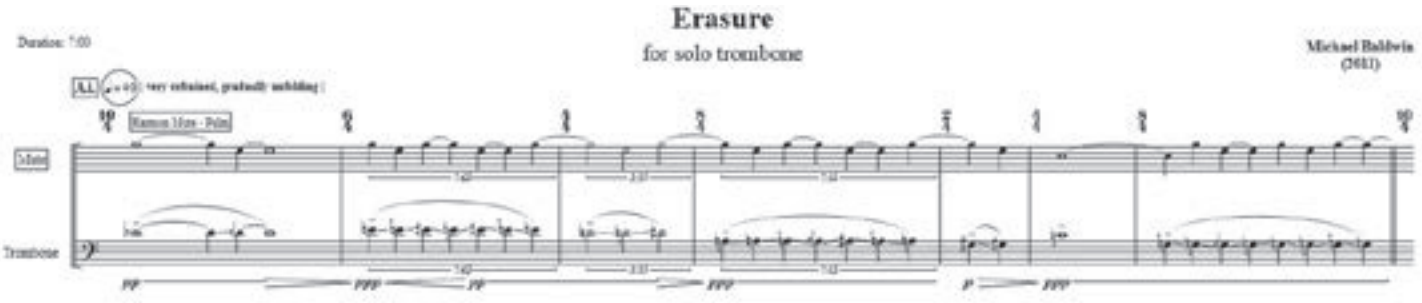
Eventually, prescriptive notations such as these become inviting, welcoming, even if many performers do not experience that in their first encounters. The haecceity of the piece is like a personality, in the end, and it is the key to a performer's ability to intuitively interact with the notation, to confront the often extreme performative demands and thereby collaborate on the realization of a unique and interesting phenomenological document: the eventual performance of the piece itself in real space and time. The piece demands that you learn not just its denotative gestures, but even more so its identity and individuality. The performance of the piece is a presentation of the history of learning the piece. It can become a document itself bearing the history of encountering—and embracing—a piece's haecceity.

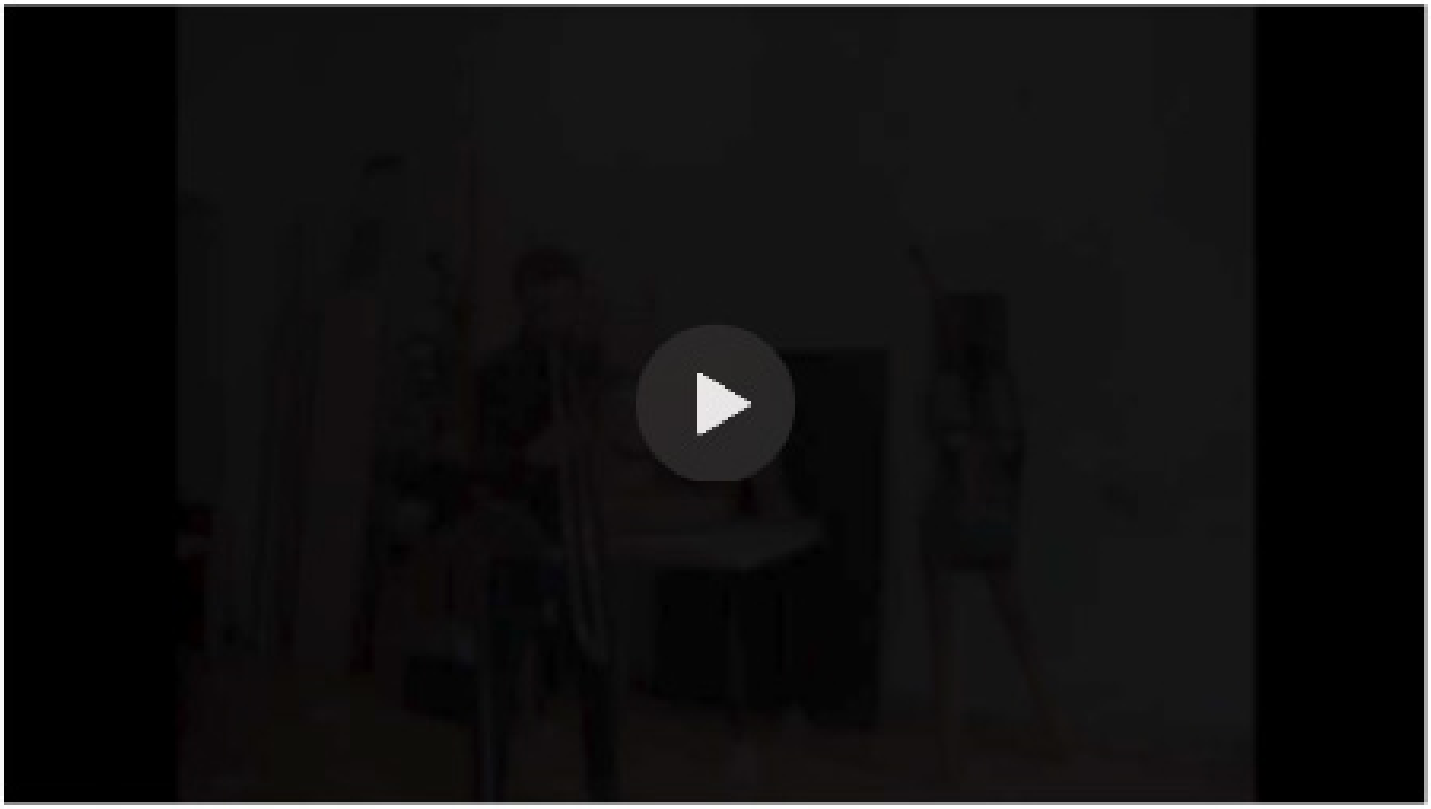


25 At the risk of belaboring the point, one can note that it is wishful choice that Scotus identifies as the source of the first evil choice, that of Lucifer to (attempt to) rival God. Were Lucifer to have attempted this as an efficacious choice, it would have been the result of a great misapprehension, of which a perfectly reasonable being (i.e. an angel in a Scholastic worldview) would be incapable (cf. Pini, 2013).

2.2 Agential Realism and Michael Baldwin's *Erasure*

I. Position 1





How does *Erasure* sound?

How does *Erasure* transform from a set of potential notations, motions, ideas, and intentions into the piece that is heard as *Erasure*? How is it that the sound—as a physical, actualized event—and the relationships between that sound and the litany of agents surrounding it spatially and temporally become a crucible for the coming-into-being of a piece of music? In *Erasure*, these webs of interaction are laid bare. Baldwin incorporates into the body of the work all of the fragility of the interconnected physical and mental processes that form the core elements of the production, or realization, of the piece.

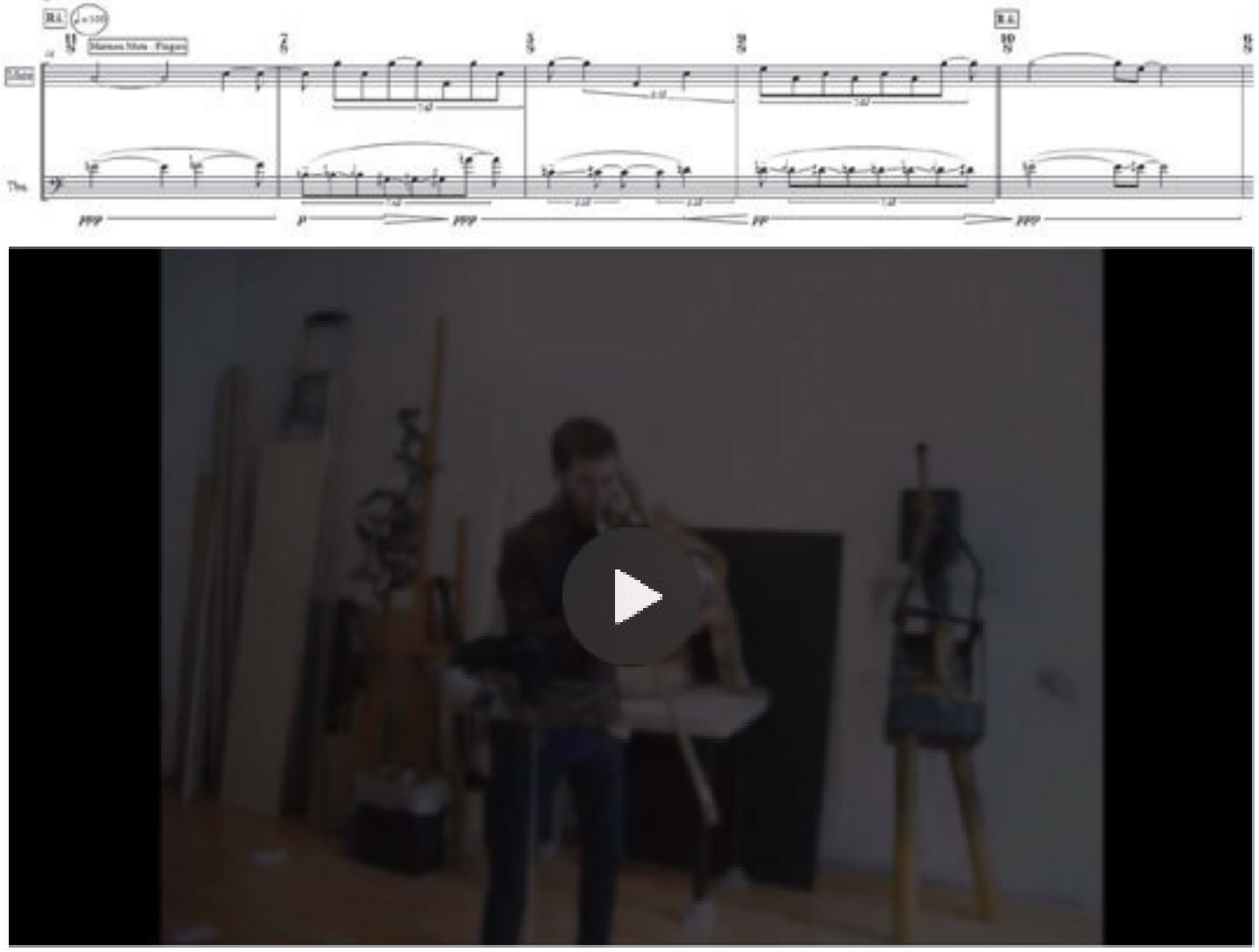
How, then, does *Erasure* sound? To begin: what does it sound like? The opening gesture: a thin note in the upper register of the trombone that creeps into audibility, slowly and subtly modulated by the performer's palm on the wawa mute. In the first position of the piece, these minor fluctuations of palm movement constantly modulate the formant content of the slow, microtonal glissandi effected by the performer's embouchure and slide arm. These subtle changes in overtone content are layered over the constantly shifting microtonal texture of pitches, obscuring and alienating the audible piece from the clear and complex metrical and rhythmic notation that guide the performer's

traversal of this sonic topography. The precise notation metamorphoses into a shimmering mirage of formant and microtonal waves superposed over each other, flickering in and out of each other's shadows, alternately reinforcing or obfuscating each other's gestures in constantly shifting balances of influence.

This interplay of influences, audibly appreciable, is an intrinsically physical phenomenon. The actions notated by Baldwin are physically dissociated, and theoretically removed from each other. Yet superposed and performed within the single body of the performer and their prosthetic instrument, these actions are in constant relation to each other. Static actions become immediately complex situations of constant fluctuation in the context of the holistic physicality of the performer: as noted, a single unaltered pitch constantly undergoes transformation by the superposition of the wawa mute-cum-filter. In later positions, as further parameters are introduced and more complex actions are prescribed in the score, these elements become ever more apparent. The air stream is constantly modulated by other actions, such as the mute (both wawa and cloth), valve, and slide motions, and the resultant interplay is increasingly foregrounded in the audible musical material as timbral, pitch, and dynamic changes. These qualities of transformation effected by air resistance and other concatenations of physical events are, of course, present in any similar trombone-playing situation, but what distinguishes *Erasure* is the extent to which these elements, conventionally minimized or overlooked, are allowed to command aural and theatrical presence as the loci of attention and centers of musical evolution. Indeed, the piece as conceived by Baldwin takes the resultant aural transformations inherent in these physical superpositions as its primary musical material. The web of dependencies and affects present in the overlaying of these physical gestures constitutes, through their notated dissociation and physicalized reencounter, the essential aural material of the piece. The extremely soft dynamics and relatively subtle visual gestures that characterize *Erasure* encourage the allocation of prominence to these otherwise easily overlooked (or overlistened) aural textures.

In this sense, then, *Erasure* sounds through the superposition of waves of activity, ostensibly quasi-independent though in constant interference with each other. *Erasure* begins to sound in the moment of intersection of these disparate but inseparable strands of physical material, interwoven into the constantly transforming aural material of the piece. This web of interference, referenced in the title as erasure, can also be constructively conceived through a variety of other theoretical tools. Donna Haraway's conception of diffraction, in particular, assists a productive reading of Baldwin's work, and Karen Barad's own diffractive reading of Haraway alongside her agential realist ethico-onto-epistemology provide profound and useful avenues for a performative analysis of *Erasure* and its materialization as a sounding phenomenon.

II. Position 2



Barad, following Haraway, proposes diffraction as a concept in direct opposition to reflection, and by extension, to an inherited Western tradition of binary oppositions. Scientifically, "Diffraction does not produce 'the same' displaced, as reflection and refraction do. Diffraction is a mapping of interference, not of replication, reflection, or reproduction. A diffraction pattern does not map where differences appear, but rather maps where the *effects* of differences appear" (Haraway, 1992a, p. 300). Theoretically, this also liberates objects or events from being analytically tied to one-to-one relations and simplistic semiotic representations, as is the case in much musical analysis. For example, rather than seeing the relationship of notation to a physical performance as a direct translation, that is, as a one-to-one reflection or representation of a set of denotatively prescribed actions, a diffractive reading allows for the possibility that the two events, notation and performance, are both related and in cooperation and interference with one another, with the performance "mapping" these interferences between the notated and physical aspects of a piece. The traditionally hierarchical relationship between notation and physicalization is problematized by Barad's proposal of performativity, which uses this concept of diffraction to liberate actions and things from a reflexively consequential reading:

> A *performative* understanding of discursive practices challenges the representationalist belief in the power of words to represent preexisting things. Performativity, properly construed, is not an invitation to turn everything (including material bodies) into words; on the contrary, performativity is precisely a contestation of the excessive power granted to language to determine what is real. Hence, in ironic contrast to the misconception that would equate

> performativity with a form of linguistic monism that takes language to be the stuff of reality, performativity is actually a contestation of the unexamined habits of mind that grant language and other forms of representation more power in determining our ontologies than they deserve. (Barad, 2003, p. 802, emphasis in original)

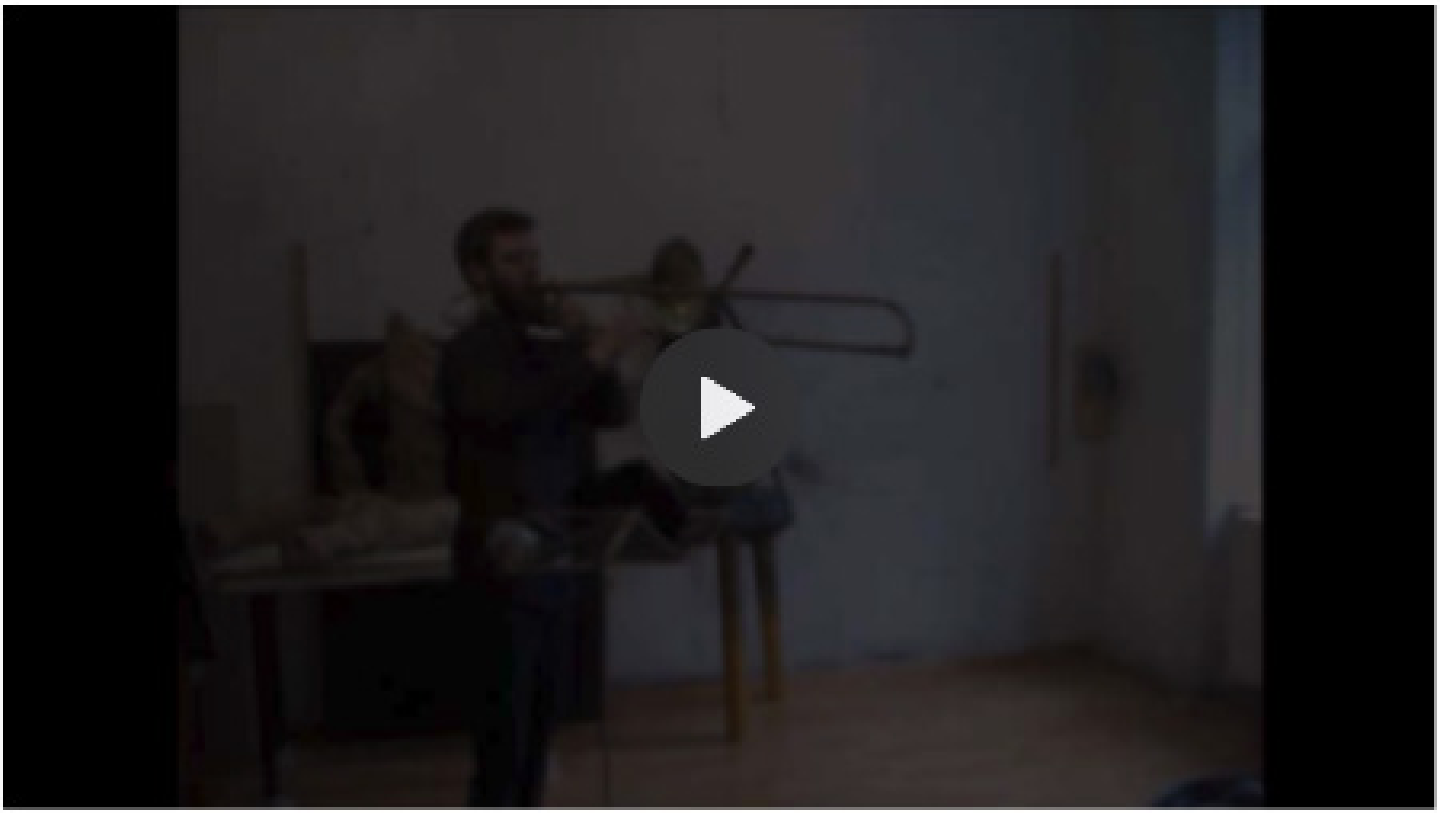
Ideally, wresting control from language (or in musical analysis from notation) does not constitute an attack on language or discount it from mattering as a potentially crucial element within a web of diffractive interferences. It does, however, constitute a deprivileging of the linguistic and notational habits that underlie a hierarchical relationship between composer and performer, instrument, listener, or other agents. All of these agents are involved performatively, i.e. actively within the spatio-temporal constraints of a particular version of a piece. This runs the obvious risk of exaggerating some minor agents' role in the piece, and yet is also a profoundly necessary corrective to more traditional, representationalist hermeneutic methodologies. As Barad emphasizes, "First and foremost, as Haraway suggests, a diffractive methodology is a critical practice for making a difference in the world. It is a commitment to understanding which differences matter, how they matter, and for whom. It is a critical practice of engagement, not a distance-learning practice of reflecting from afar" (Barad, 2007, p. 90). What is most crucial, then, is the heightened commitment from performatively engaging with a piece. The traditional composer-performer and score-performance dichotomies atrophy responsibility, allowing for a simplistic and reductive representationalist methodology that hinders the recognition of other agents that effect interferences and differences within a piece. Barad's "commitment to understanding which differences matter" is an invitation to use the theoretical model of diffraction to reveal and examine the complex set of relationships and interdependencies that contribute to the materialization of any phenomenon, musical or otherwise.

Barad's agential realism applies this diffractive methodology to understand how matter comes into being. It is a scientific account of quantum reality, the exposition of which leads her to coin the term *intra-action*, which highlights the interdependency of agencies within the localization of phenomena as critical aspects of the coming-into-being of things.

> The notion of *intra-action* (in contrast to the usual "interaction," which presumes the prior existence of independent entities/relata) represents a profound conceptual shift. It is through specific agential intra-actions that the boundaries and properties of the "components" of phenomena become determinate and that particular embodied concepts become meaningful. A specific intra-action (involving a specific material configuration of the "apparatus of observation") enacts an *agential cut* (in contrast to the Cartesian cut—an inherent distinction—between subject and object) effecting a separation between "subject" and "object." That is, the agential cut enacts a *local* resolution *within* the phenomenon of the inherent ontological indeterminacy. In other words, relata do not preexist relations; rather, relata-within-phenomena emerge through specific intra-actions. (Barad, 2003, p. 815, emphasis in original)

The implications for music are clear: entities do not preexist the relations by which a phenomenon (piece of music, performance) comes into being, or as Barad phrases it, comes to matter.

III. Position 3



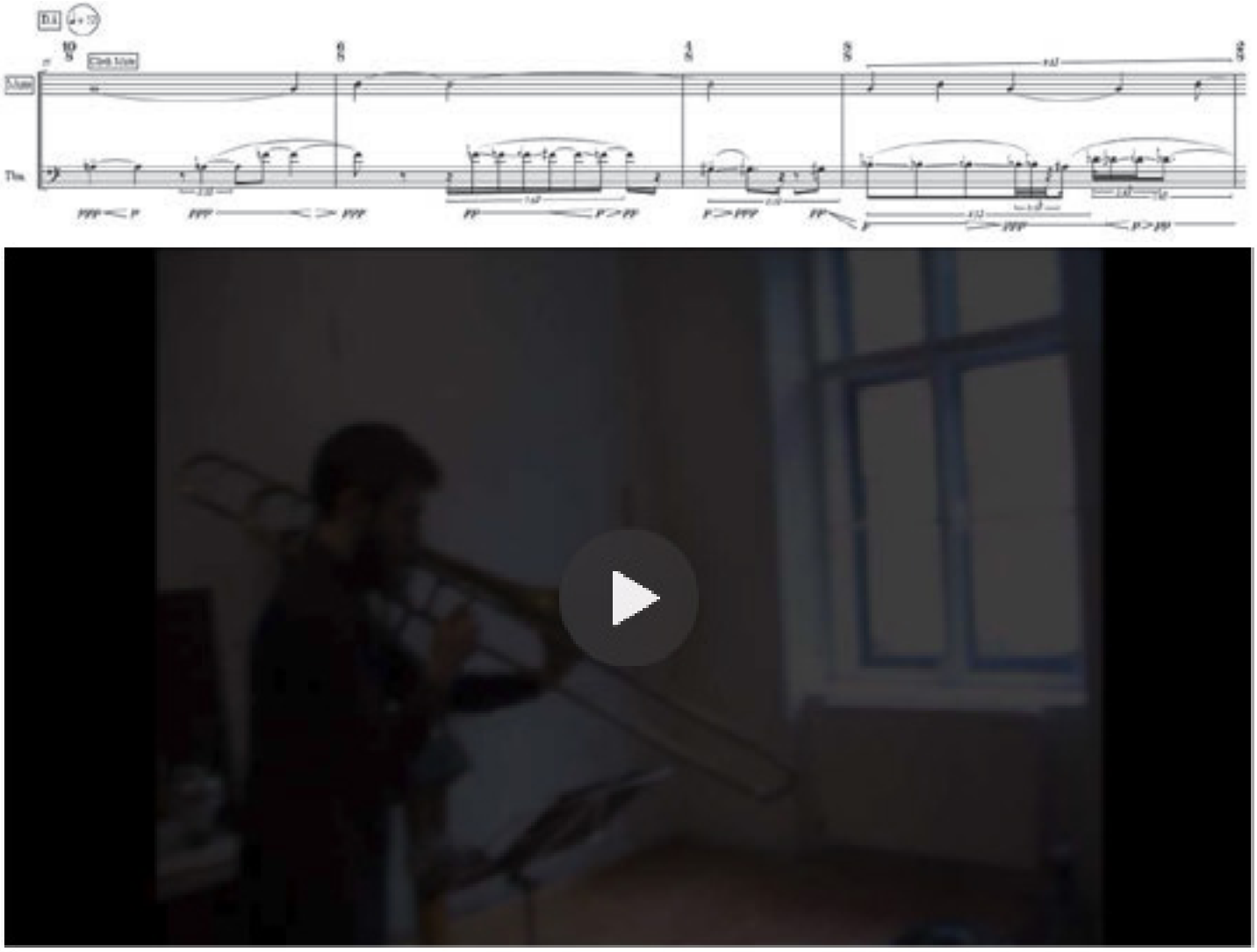
For Barad, the reappraisal of the world in terms of phenomena as opposed to independent objects is a *sine qua non* feature of agential realism. She posits that "[t]he primary ontological unit is not independent objects with inherent boundaries and properties but rather *phenomena* … phenomena do not merely mark the epistemological inseparability of observer and observed, or the results of measurements; rather, *phenomena are the ontological inseparability/entanglement of intra-acting 'agencies'*" (2007, p. 139, emphasis in original). Objects, then, are entangled, and they emerge from their intra-action within phenomena, rather than *vice versa*. Barad conceptualizes this as "exteriority-within-phenomena," (2003, p. 815) indicating the clear and obvious capability of the participant and observer to distinguish elements and agencies while still acknowledging that they are part of a reality created immanently in and through their intra-action. This immanence is a consequence of a quantum reality, first theorized decades ago in the work of Niels Bohr and slowly being confirmed experimentally. Transferring the implications of quantum reality to the dimensions of the observable, everyday world is a slippery task, but also a necessary one. As Barad notes, the old conception that Newtonian physics holds for the macrocosmic world and quantum physics for the microcosmic is not confirmed by experimentation and observation; rather, the implications of quantum physics are often miniscule enough in the macrocosmic world that Newtonian physics is merely an aptly accurate-enough model. How, then, do we examine a piece of music in the context of these quantum discoveries?

The sound of *Erasure* provides an avenue. The sound is the phenomenon that conventionally becomes understood as the communicative element of the piece. The sound, emanating from all of

the compositional, learning, productive, physical processes, is the physical phenomenon in which these agencies congeal and diffract through one another, intra-acting in the materialization of a recognizable piece of music. Examining the production of sound in the piece, the instrument and the space (as will be discussed at more length below) enlarges their respective realms of diffractive influence. Exaggerating the role of these elements often considered more ancillary or external to the act of musical production is risky, and yet *Erasure* foregrounds these elements consistently and purposefully. The instrument itself becomes a more active agent in the intra-active phenomenon of the piece largely through the dissociated actions of the mutes and valve, which are, as was previously demonstrated, constantly modulating and metamorphosing the sound waves produced by the performer in the instrument. In a normal piece of music written for the trombone, the instrument is essentially a megaphone, amplifying and reinforcing the pitch produced by the performer's lips buzzing. This function is, itself, an interesting intra-active process, but also relegates the instrument to a more obviously supporting role—it is very really a mere mouthpiece for the performer. In *Erasure*, though, these roles are subtly reversed. The lips produce a buzzed pitch, and Baldwin indicates in the performance notes that "[t]he pitch stave is to be performed 'ordinary', with the mute and trigger actions altering the pitch stave. The pitch stave can be seen as the main pivot stave by which all of the other parameters act upon (sic)" (Baldwin, 2011, p. 4). Therefore, the buzzed lips are being directly affected and physically changed, not merely amplified. In position 3, the wawa mute has been discarded and the valve is constantly shifting between states of open, closed, and half-valve, with abrupt, gradual, and trilled transitions between valve positions. These valve positions radically alter not only the pitch produced, in spite of the performer's physical input into the instrument, but also alter the timbre and air resistance, and thus the entire response of the instrument.

The resultant sound waves are dependent on the instrument in many crucial ways. For example, the difference in response and resistance of the half-valve playing varies, sometimes drastically, from instrument to instrument. The aural qualities of this movement will necessarily be different with each different trombone. In conventional classical music performance, these variations from instrument to instrument are usually minimized, even when remarked upon or admitted as a factor in the overall performance quality. In *Erasure*, Baldwin has constructed an environment in which the instrument's unique characteristics can exert an agency that in some instances rivals that of the performer. In position 3, the performer's input into the instrument is largely less complex than in the previous positions, and the role of the instrument is then further foregrounded, as the valve action, although enacted by the performer, takes precedence in the resultant sound. The sound waves, although not quite quantum in scale, are nonetheless an essential expression of the phenomenon that is agentially enacted in the performance of the piece. *Erasure* maximizes the possibility for agencies often consigned to ancillary roles to become intra-actively co-responsible and responsive in the production of sound.

IV. Position 4

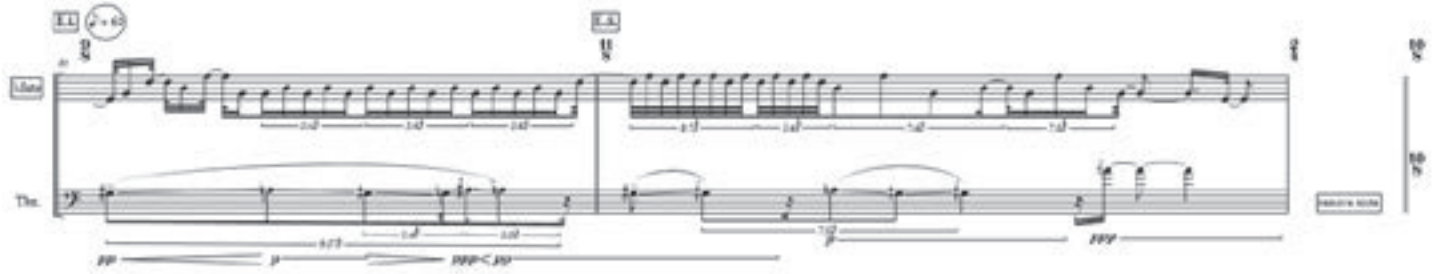


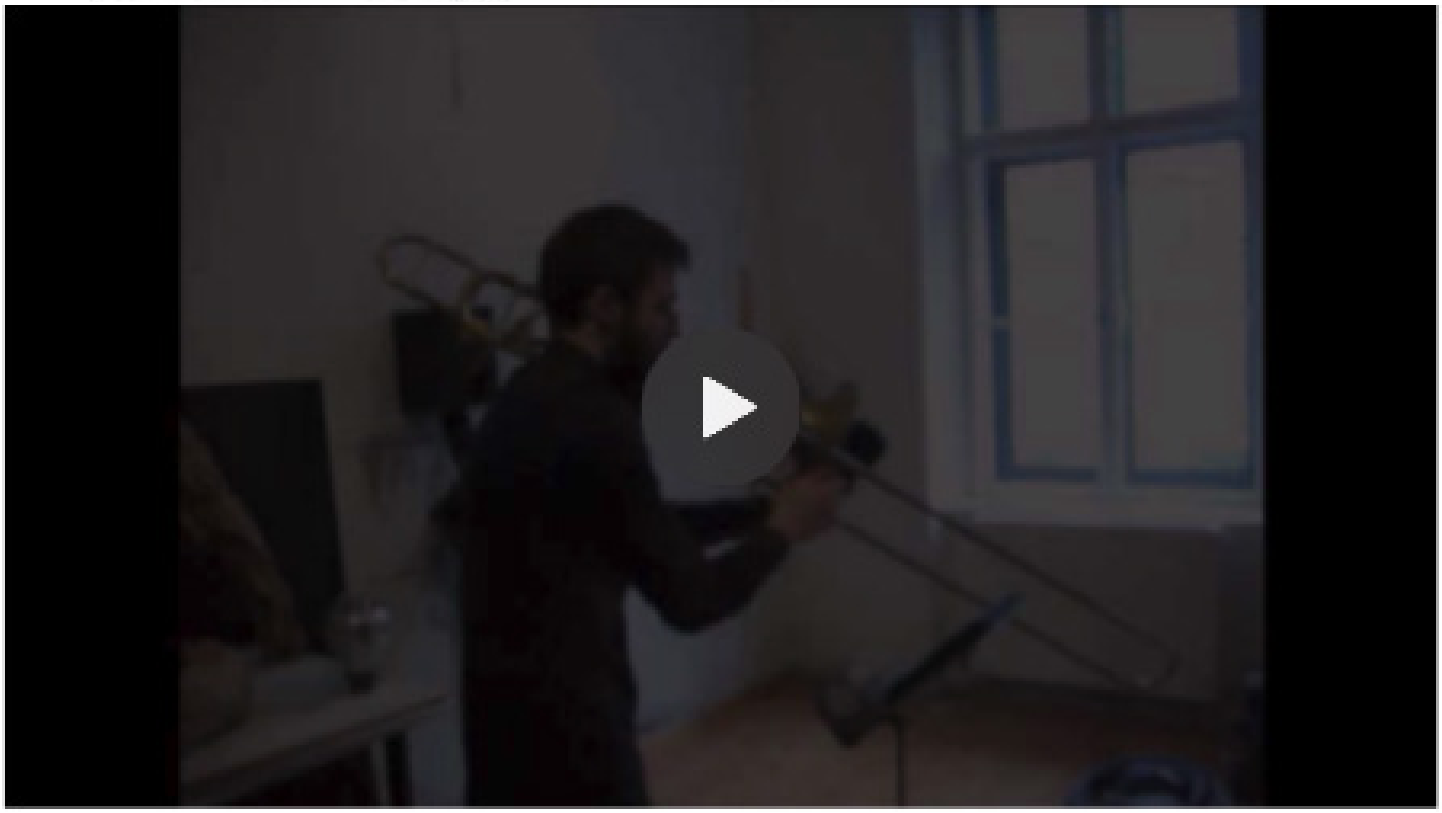
By opening up agential responsibility to all matter, Barad embraces a form of posthumanism, which for her entails "taking issue with human exceptionalism while being accountable for the role we play in the differential positioning of the human among other creatures (both living and nonliving)" (2007, p. 136). Accounting for the deprivileging of the human in assessing the coming-into-being of *Erasure* requires understanding the types of agency and intra-active responsibility that the nonhuman elements embody. Barad's description of the material-discursive practices that contribute to the constitution of reality allows us to understand the intricate and powerful role played by the nonhuman without unnecessarily siphoning agency or responsibility from the human actors within the process. Material-discursivity is an extension of concepts of discourse developed by previous philosophers—notably Michel Foucault, a major influence on Barad's work. Expanding this conception of discourse's role in shaping and controlling what it is possible to express or perform, Barad notes that matter itself embodies discursive properties. The material-discursive is the posthuman account of how matter shapes and transforms reality constantly and unceasingly. Every moment, every agential cut takes place intra-actively within the material-discursive: "[d]iscursive practices are not human-based activities but specific material (re)configurings of the world through which boundaries, properties, and meanings are differentially enacted. And matter is not a fixed essence; rather, matter is substance in its intra-active becoming—not a thing but a doing, a congealing of agency" (Barad, 2007, p. 183-4).

The previous discussion of the instrument already opened up my analysis of *Erasure* to the post- and nonhuman, but *Erasure* embraces and problematizes many further facets of the posthuman, as well. Position 4, with the introduction of the cloth mute, marks the agency of increasingly distant and nonhuman elements. Foremost, the cloth mute itself exerts an even greater force of change on aspects of pitch, air resistance, and response than either the wawa mute or the valve alone. The dynamic reshaping of the pitch material in the piece by the constant and occasionally quite drastic modulations effected by the cloth mute come ever more to the fore of the piece, displacing musical and aural attention away from the trombonist and reallocating it to the mute. Further, position 4 also marks the continuation of the gradual removal of the trombonist from the audience: in live performance, the stands are placed in a semicircle, with the trombonist moving from position to position along the curve until the final position, facing directly away from the audience. (In the video performance of *Erasure* presented in this chapter, this effect is replaced by the gradual displacement of the audience itself, as both the camera and microphone rove parallel to the trombonist's displacement in live performance.)

This displacement of the performer removes the traditional focal point of attention and reinforces the visual elements of the piece, as occurs at the end of position 4 when the mute motion is performed solo, without any other activated parameters (namely, pitch production). Similarly, the sound, continuously ephemeral and soft, also changes character as the bell of the instrument moves gradually away from the audience. The location also takes on a notably active role in the piece, as the music's aural fragility renders it exceptionally susceptible to changing acoustics and ambient noise; these effects, though foregrounded from the onset, encroach more and more on the receding imposition of the trombone sound as *Erasure* progresses. The role of the mute and especially of the receptive space of the location of performance slowly become more primary containers and agents of musical content and transformation. *Erasure* opens itself up, displaying a porousness and vulnerability that invites not just the prosthetic elements of the instrument and the mute but all of the human and non-human agents present to perforate the musical process and engage intra-actively in the performance of the piece. The material-discursive becomes far more than a mere tacit force exerting control on the productive process, but is actually elicited as an appreciable musical agent of the piece.

V. Position 5





The audience, the location, and the recording devices used (as in the video presented here) all embody part of the observational apparatus, a factor hugely relevant to the world of quantum physics (in which agential realism was developed) and a major preoccupation of the philosophy-physics of Niels Bohr (another primary influence of Barad's). The role of the apparatus (experimental, observational, etc.) is difficult to understate in this context: "*[a]pparatuses are the material conditions of possibility and impossibility of mattering*, they enact what matters and what is excluded from mattering" (Barad, 2007, p. 148, emphasis in original). There can scarcely be greater power than that accorded here to the apparatus, the very agency that enacts or excludes matter, or existence. This, though, distracts from the fact that the apparatus is merely one more element that is cooperative within the diffractive interference of superposed agencies that intra-act the agential cut. By examining and expanding on Bohr's own philosophy of the apparatus, Barad arrives at several key features that reveal the apparatus's unique role in constructing reality:

> (1) apparatuses are specific material-discursive practices (they are not merely laboratory setups that embody human concepts and take measurements); (2) apparatuses produce differences that matter—they are boundary-making practices that are formative of matter and meaning, productive of, and part of, the phenomena produced; (3) apparatuses are material configurations/dynamic reconfigurings of the world; (4) apparatuses are themselves phenomena (constituted and dynamically reconstituted as part of the ongoing intra-activity

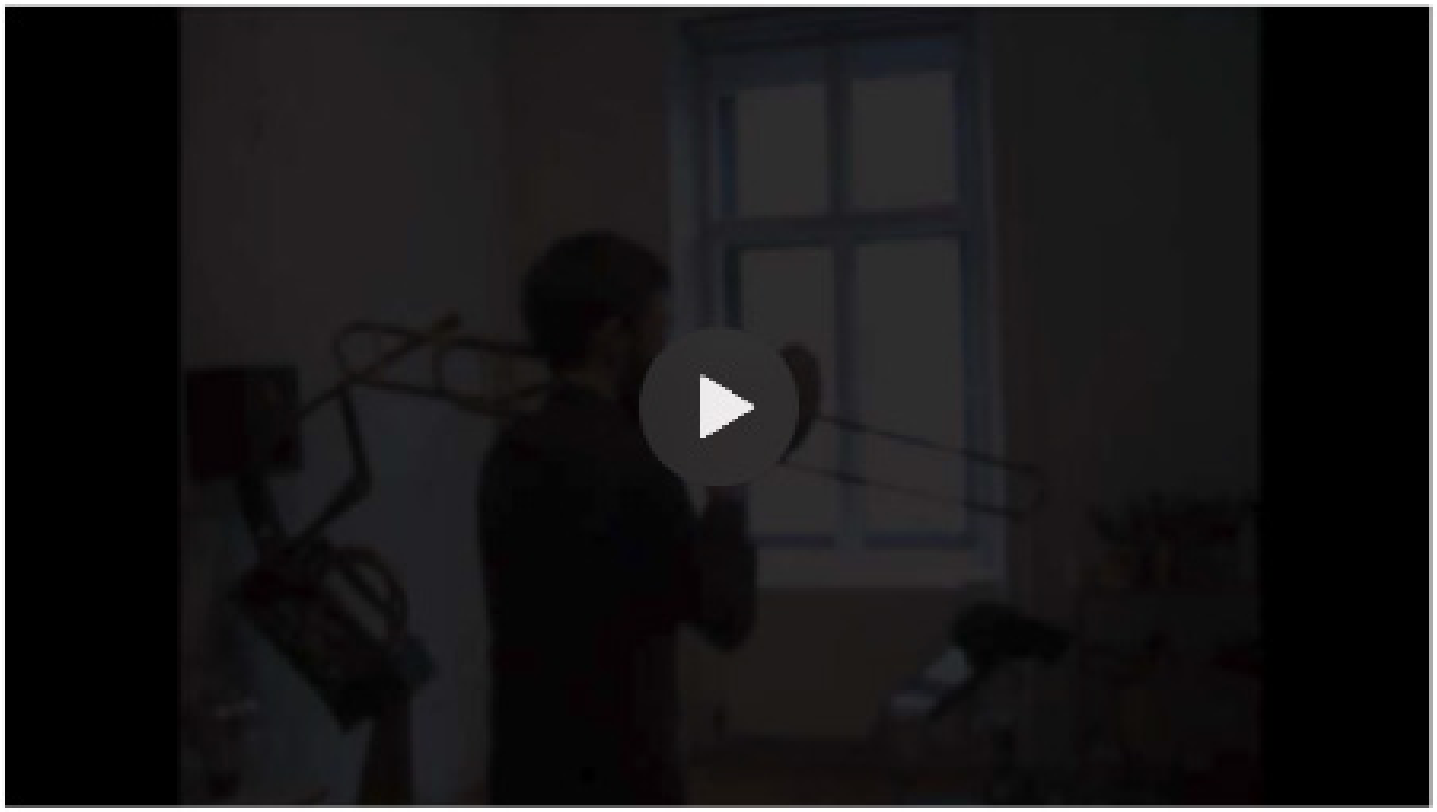
> of the world); (5) apparatuses have no intrinsic boundaries but are open-ended practices; and (6) apparatuses are not located in the world but are material configurations or reconfigurings of the world that re(con)figure spatiality and temporality as well as (the traditional notion of) dynamics (i.e. they do not exist as static structures, nor do they merely unfold or evolve in space and time). (Barad, 2007, p. 146)

The apparatus produces "differences that matter." The recording devices, and the observational capacities of the audience, are implicated in the boundary-making practices inherent in apparatuses. Baldwin's music often inhabits the ephemeral realms between audibility and inaudibility, replicability and unrepeatability, physicality and conceptualism (Baldwin, 2012). As *Erasure* progresses from position to position, these boundaries are increasingly blurred, and can only be enacted by the observational capacities of the audience and recording devices. Their agency becomes critical in the discursive act of creating what is and is not *Erasure*, in which process they become implicated even more fully in the piece itself, and not only in its reception or documentation. Barad writes,

> Apparatuses are not inscription devices … set in place before the action happens … They are neither neutral probes of the natural world nor structures that deterministically impose some particular outcome. In my further elaboration of Bohr's insights, apparatuses are not mere static arrangements *in* the world, but rather *apparatuses are dynamic (re)configurings of the world, specific agential practices/intra-actions/performances through which specific exclusionary boundaries are enacted*. Apparatuses have no inherent "outside" boundary. (Barad, 2003, p. 816, emphasis in original)

The observational agents in *Erasure* are intra-actively involved in the piece. The constant metamorphosis engendered by the superposition of physical actions leads to the ephemeral shimmering of encounter between performer, location, and observers, forcing the "external" agents to become active within the piece, a part of the agential cut and exterior only within the intra-active process of mattering in the time and space of the performance. Bohr notes precisely the spatial and temporal ramifications of the observer's activity within the materialization of phenomena. "Temporality and spatiality emerge in this processual historicity. Relations of exteriority, connectivity, and exclusion are reconfigured. The changing topologies of the world entail an ongoing reworking of the notion of dynamics itself" (Barad, 2007, p. 141).

VI. Position 6



The reconfiguring of space and time implicates not only the observational apparatuses of audiences and recording devices, but also reveals crucial aspects of the intra-active entanglement of the performer and composer. The hierarchical model of conventional composer-performer conceptions is temporally deterministic: the work of the composer exists first and, through the medium of the score, determines the role of the performer and dictates the terms of the performance. Bohr's indeterminacy undermines the very notion of determinism in this sense—the performance is a result not of temporally hierarchical relationships, but of complementary intra-active processes that encounter and interfere with one another in both temporal directions of the process, upstream as well as downstream. Baldwin, quite aware of this, writes:

> The work, and its authorial origin, is gradually evolving and re-contextualizing itself as a result of interacting with a growing number of performative forces, each of which further obscure and dematerialize the work's ontological identity. Additionally, there is an element of democratization … performers of this work play a significant role in shaping the work's trajectory and contribute to the performative baggage of each subsequent performance. Through this democratization and the ongoing dematerialization of the score's ontological identity, the work, in both a physical and aural sense, takes on a lifespan of its own. (Baldwin, 2012, p. 39-40)

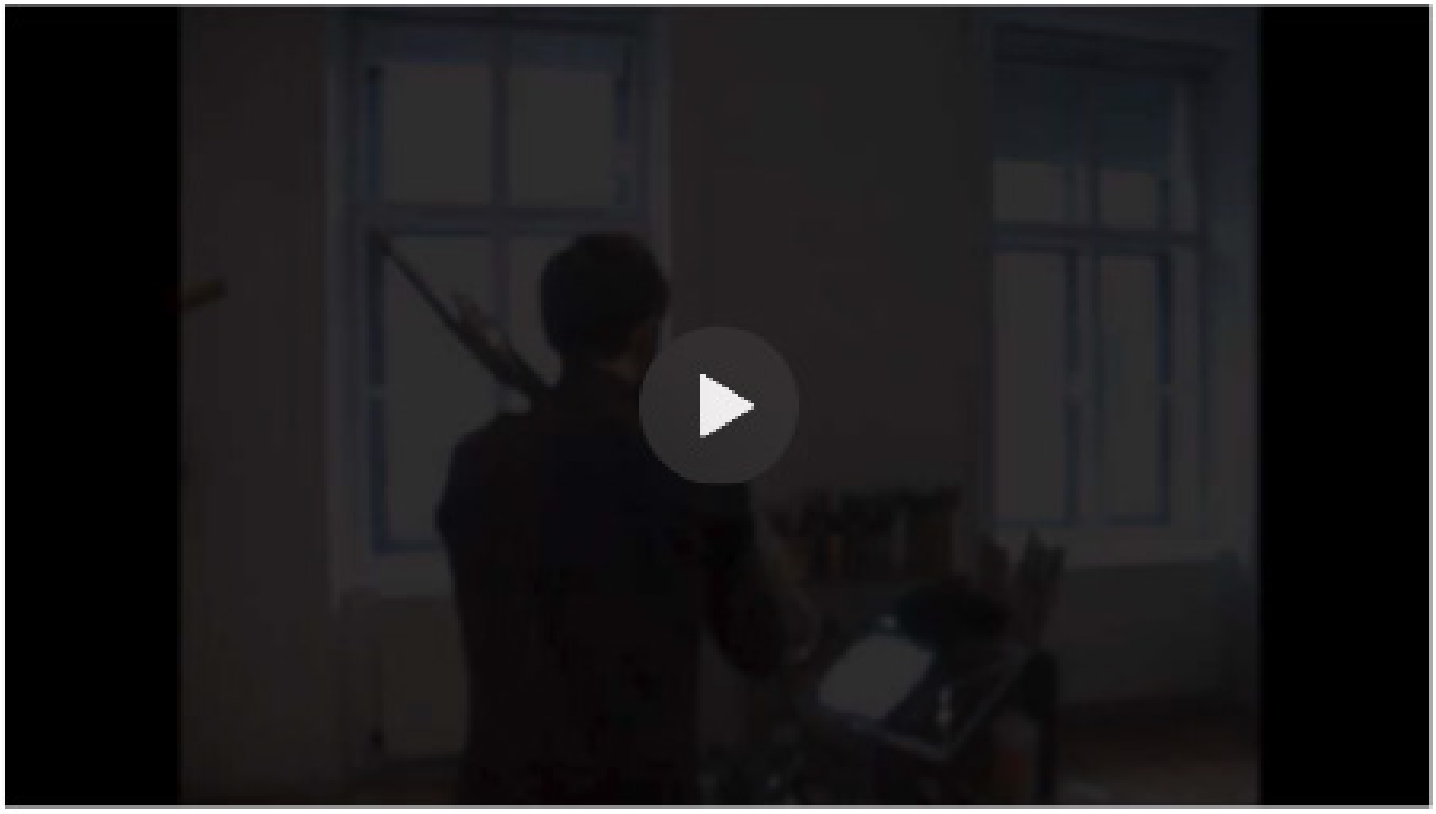
In *Erasure*, given the incorporation of the physical dimensions that transform the sound so drastically, the performer is present already in the act of conception and notation. In creating the score for

Erasure, Baldwin interacts with the physical demands of the dissociated and superposed strands of physical material even before they begin to be embodied by the performer. Baldwin recognizes that the "authorial origin" of the work is "evolving," that the role and work of the composer is altered retrospectively by its intra-action with the work or with the performer. His work is superficially a dense, complicated score of polyrhythmic, dissociated physical actions, but within that lies a more complex entanglement with the ephemeral metamorphoses that these superposed actions enact upon each other and the subtly rich role of external factors in contributing to any realization of the piece. As Barad notes, "knowing, thinking, measuring, theorizing, and observing are material practices of intra-acting within and as part of the world" (2007, p. 90). In examining *Erasure* we must add to this list composition, notation, and documentation.

The score becomes a crucial medium and agent in the intra-action of composer and performer. In grappling with the precise and challenging rhythmic and coordinational demands of *Erasure*, the performer must also engage with the composer directly. Just as Baldwin entangles himself with the physical constraints of performance as he composes the situations from which *Erasure* will emerge, performers must also entangle themselves with Baldwin's curation of that physicality. In coming to terms with the challenges of the piece, it becomes necessary not only to learn the denotative execution of its precisely-notated actions, but also to embody its vocabulary of physical activity and sonic metamorphosis. There is far more to *Erasure* than a set of gestures, something Baldwin refers to in later work as a "becoming-document:" "[b]y embracing a process of becoming-document … the human subject is increasingly capable of being composed, and thus manipulated and situated, along lines of musical thinking" (Baldwin, 2016, p. 120-1). The performer and composer are both imbricated directly in each other's work. The performer must learn to embody Baldwin's documentation beyond the level of mere execution if the resultant sonic language of the piece is to successfully emerge, and Baldwin must preemptively submerse himself in the performer and the performance if his demarcation of boundaries in the piece's realization are to emerge. "'[E]mergence,' in an agential realist account, is dependent not merely on the nonlinearity of relations but on their intra-active nature" (Barad, 2007, p. 393).

This, then, is how *Erasure* comes to sound. The subtle, ephemeral dynamics of the piece that emerge in unpredictable and ever-fluctuating sonic transformations are enacted intra-actively by the composer and performer in a complementary aspatial and atemporal discourse, inviting in a host of nonhuman elements in the process. The performer is situated within this web of agencies and is created herself within this agential cut. The work of the performer in preparing and realizing the piece is never solitary or external, but is consistently and palpably codependent on other agents in every facet of realization. "Intra-actions effect what's real and what's possible, as some things come to matter and others are excluded, as possibilities are opened up and others are foreclosed. And intra-actions effect the rich topology of connective causal relations that are iteratively performed and reconfigured" (Barad, 2007, p. 393). It is only within and through this entanglement of agencies that the sound of *Erasure* emerges. The sound is the phenomenon of diffraction enacted and intra-acted performatively and created audibly, perceptibly, and consequentially in the world.

VII. Position 7



Embracing this "rich topology" is the first step for a performer in approaching this piece. Recognizing the complex web of intra-actions that enable this piece to come into being entails recognizing the responsibility that comes with being a crucial and irreplaceable agent within that process. It means recognizing that these agents all bleed into one another, cooperating and interfering diffractively. Barad insists that

> edges or boundaries are not determinate either ontologically or visually. When it comes to the "interface" between a coffee mug and a hand, it is not that there are x number of atoms that belong to a hand and y number of atoms that belong to the coffee mug … what one sees is not a sharp boundary between light and dark but rather a series of light and dark bands—that is, a diffraction pattern. (Barad, 2007, p. 156)

Herein lies Barad's insistence that the ontological and epistemological ramifications of agential realism are also, necessarily, ethical. She reminds us that

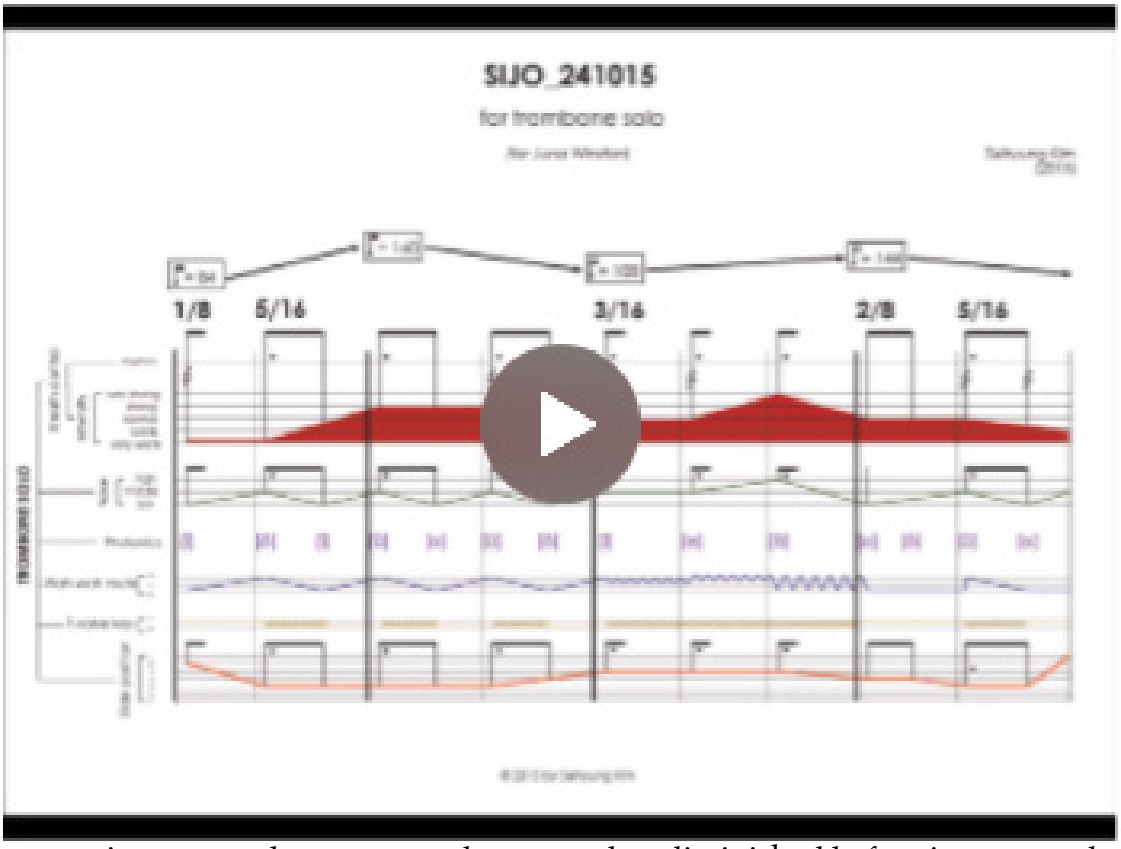
> consequentiality, responsibility, and accountability take on entirely new valences. There are no singular causes. And there are no individual agents of change. Responsibility is not ours alone. And yet our responsibility is greater than it would be if it were ours alone. Responsibility entails an ongoing responsiveness to the entanglement of self and other, here and there, now and then. (Barad, 2007, p. 394)

As performers, Barad considers our obligation to act responsively and response-ably to the agents that surround us as an ethical one. In approaching *Erasure*, a performer must engage with the whole system in which *Erasure* emerges, and that means that from the first moments of slowly embodying the complicated rhythmic motions of the piece, the performer must engage responsively with the entire network of composer and situation with which she is codependent. It is impossible to accurately or precisely embody the prescribed actions of the piece without first and foremost approaching and engaging this web of intra-actions.

Baldwin himself recognizes this, writing that "there is a certain degree of responsibility towards the subjectivity of musicking bodies that I consider when treating human persons as scores" (2016, p. 120-1). He acknowledges that in the process of creation, notation, and even conception, there are already complex implications for the other agents entangled in the work. The performer must meet Baldwin within and engage with the piece constructively. The responsibility of embodying the complex physical superpositions that create the unique and fascinating sonic world of *Erasure* requires that the performer engage principally with those gestures as a holistic system, as part of a larger web of intra-activity. At that point, the execution of the piece and its precisely layered actions become a fluid act, a dynamic entanglement in which the gestures and sounds of the piece emerge, rather than being merely executed. In this final movement of the piece, position 7, as the trombonist is turned fully away from the audience and playing with a practice mute, this fluidity is most concretely embodied. Layered over the fluttering valve motions, in a metrical grid that has underlaid the piece from its very first measures, the trombonist alternates singing and playing as seamlessly as possible. The varieties of sound production diffract through the valve, mute, and situation, melding one into the other and erasing distinctions. The erasure of aural identity and subsumption of superposed techniques in this passage embodies *Erasure*'s total entanglement of creative processes: compositional, performative, bodily, mental, theoretical, situated. In *Erasure*, the intra-active demands and responsibilities do not appear retrospectively in performance but are implicated in the very first as well as final moments of creation and coming-into-being. Performing *Erasure* means performing the entire material-discursive network within which it materializes in the world. Whether this awareness is interpreted metaphorically or, as is posited here, as a fundamental part of the reality of the piece is ultimately unimportant. What matters is that the embodiment of the piece emerges from the performer's entanglement with the piece rather than from an attempt to be an exterior or independent actor. Barad writes, "There is no such exterior position where the contemplation of this possibility makes any sense. We are of the universe—there is no inside, no outside. There is only intra-acting from within and as part of the world in its becoming" (2007, p. 396).

2.3 Autopoiesis and Sehyung Kim's *Sijo_241015*

I. *Dramatis personae*



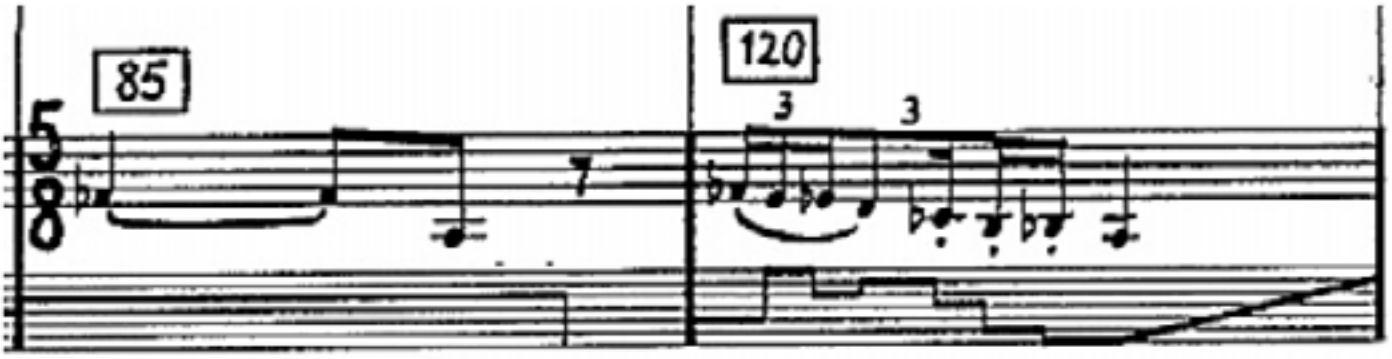
How much can an instrument be augmented, prepared or diminished before it ceases to be the same instrument? To what extent can a notation replace, exchange, and remove parameters before its internal consistency as a notation vanishes? To which extremes can a performer dissociate their physical and mental actions before their existence as a holistic performing body is threatened, perforated, disintegrated?

In a traditional performing practice, the barriers and boundaries to the edges of technique, notation, and instrumentation are sacrosanct. Even the common expression "extended techniques" states implicitly that there is a limit to normal, traditional, or proper technique, a limit that, once overstepped, is replaced or enhanced by a technique that is inherently and fundamentally other. Such characterizations of technique—bounded, delineated—plague the discussion of instrumental techniques and notations. Both technique and notation are subject to implicit assumptions about what may be normal, traditional, or proper, words which can all too easily become synonymous with the expectable and the predictable. But if standard instrumental technique or music notation is somehow bounded, and other techniques or notations exist somehow external to that standard, then where precisely are these boundaries? Attempting to accurately place these limits quickly becomes an exercise in Zeno's paradox: a limit ever more closely approached but never reached, never realized. Nonetheless, the difference between traditional and extended techniques can seem intuitively, if deceptively, clear from a casual perspective. Despite the lack of any rigorous definition in this boundary-drawing exercise, the realm of the "extended" technique and the "nonstandard" notation remain implicitly separate, quarantined, externalized.

In many cases, this externalization and these implicit demarcations can be navigated with a minimum of fuss. When a performer needs to engage with a single nonstandard notation, with an extra parameter here or a graphic, descriptive element there, the demands can be relatively

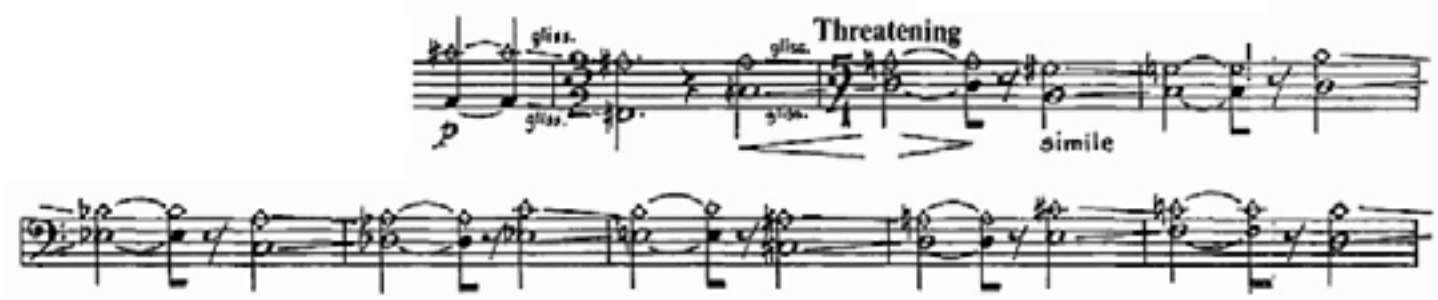
easily incorporated into a traditionalist approach. Often, the traditional practice facilitates the internalization of the more standard material in a more embodied, subconscious way, thus opening up the primary foci of the performer's attention and deliberation for the less standard material. Extended techniques are often treated similarly, which is to say, as extensions applied to the traditional technique and not as truly incorporated elements. They are additions, plastered to the outer shell of technique like a layer of make-up on an actress.

Fortunately or unfortunately as the case may be, such an approach is often extremely functional. In situations where a musical parameter is separated to allow a greater degree of complexity, but remains synchronous with other (more standard) actions, it is quite simple to, after a few minutes of practice, even easily divert attention to the isolated parameter and incorporate the extra information into the general performance action.



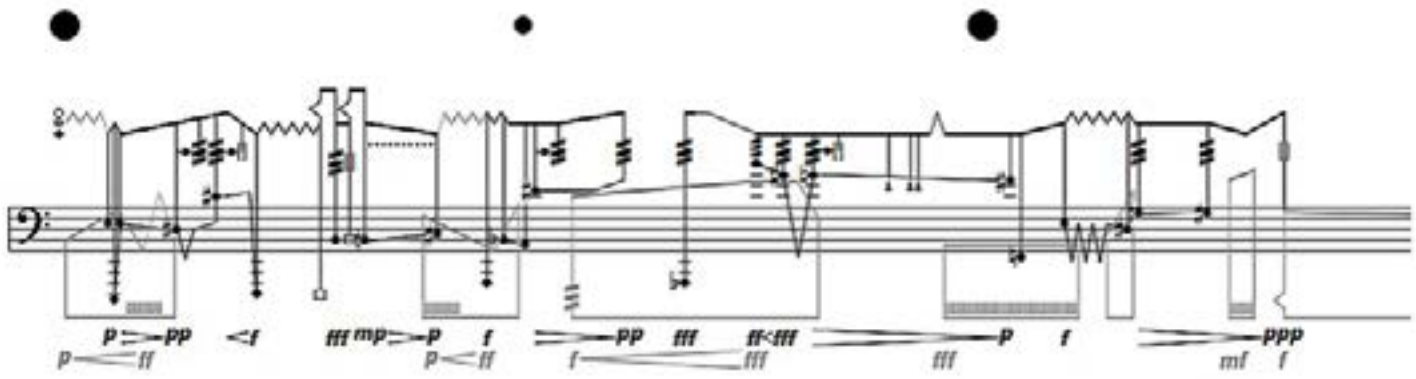
Karlheinz Stockhausen: *Michaels Reise*, Station 3, mm. 154-155
The dynamic indications (the lower staff) are given as a separate parameter in order to facilitate rapid changes from note to note or within a note. This allows Stockhausen to achieve a very high degree of specificity in both dynamic level and placement. Stockhausen uses this dynamic notation quite sparingly and the dynamic indications are always synchronous with the played notes.

Similarly, the addition of an extended technique can often be quite easily incorporated into the general performance fabric when it is synchronized with other more standard material and can be mentally treated as an ornament or addition thereto.



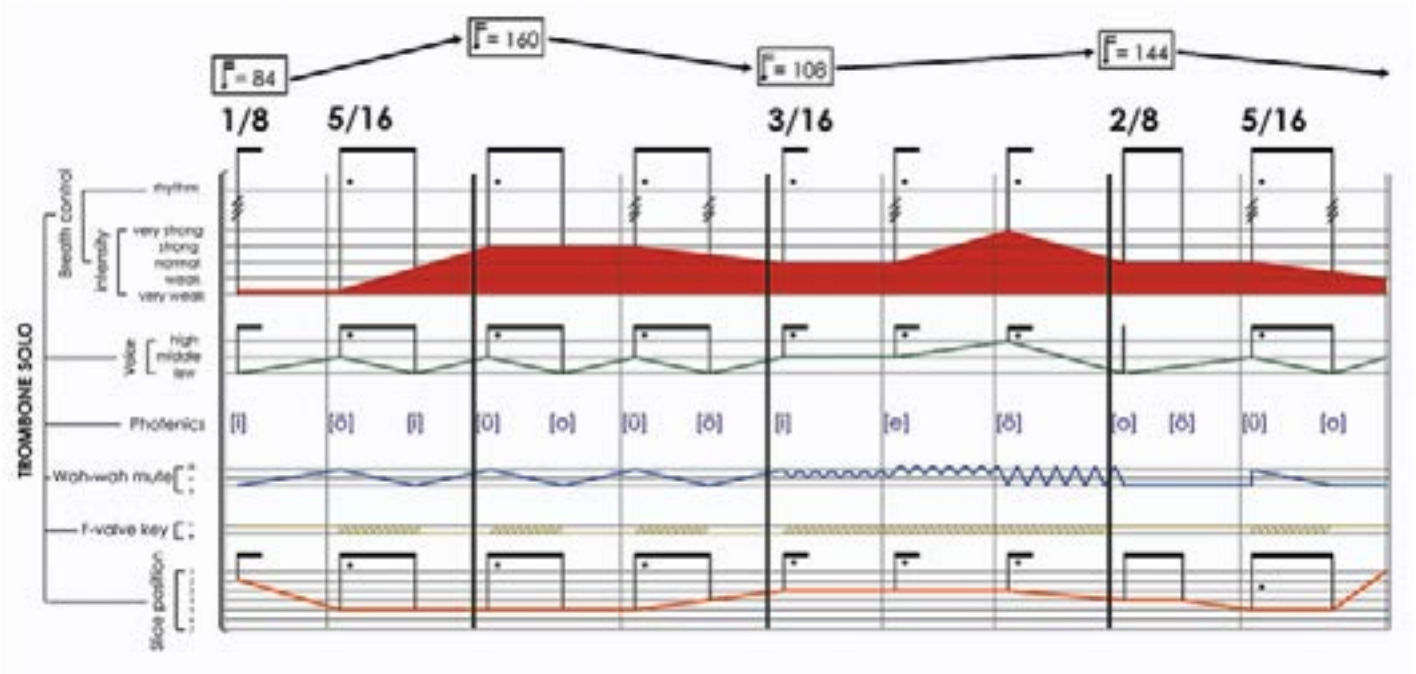
Folke Rabe: *Basta*, mm. 43-51
The upper, diamond note heads indicate pitches sung by the voice to produce a multiphonic with the lower, played pitch. The sung pitches occur always synchronously with the trombone and can be seen in that respect as fundamentally ornamental, particularly given the consonant intervallic structure of the multiphonics (excluding, of course, the transitions through glissandi).

However, in other cases, the borders between notatable parameters such as played and sung notes can be obscured, smudged, or even completely burnished out. As elements become dissociated and intertwined, the learning strategy of relying on a foundational, standard set of techniques upon which the less standard techniques are layered loses its utility.



Timothy McCormack: *HEAVY MATTER*, opening
The notation indicates both played and sung pitches executed alongside a variety of other techniques (mute actions, flutter-tongue, vocal fry, audible inhalation, ingressive singing). One can see that the overlapping actions are at times asynchronous, particularly between the played and sung pitches, rendering the transformations of effect far more blurred and interwoven than in the previous two examples.

The balance of elements that may or may not be considered standard varies from piece to piece, but in the evolution of experimental repertoire over the course of the late 20th and early 21st centuries, the deprivileging of any particular set of elements becomes increasingly clear. There is a constant flux of balance between various parameters, with particular notational strategies, extended techniques, instrument preparations, and physical gestures interchangeably foregrounded, minimized or altogether excised. Sehyung Kim's *Sijo_241015* presents a fascinating range of such notational, technical and instrumental demands, combining polyphonic treatment of physical actions, constant variation of information, augmentations, and preparations of the instrument, and essentially nothing but extended techniques (with traditional tone production potentially viable, but in virtually all cases practically and effectively excluded).



Sehyung Kim: *Sijo_241015*, opening
The notation indicates tempo, rhythm, breath control, voice, phonetics, mute action, valve action, and slide position. Given the physical limitations of the performer, not all actions can be performed simultaneously and are indicated to be interchanged over the course of a performance.

The trombonist performs the piece multiple times per performance, each time with a different type of mouthpiece: bassoon, oboe, saxophone, duck call, without mouthpiece, etc. (the composer suggests those listed, but does not limit valid interpretations to these few possibilities). Kim uses reiteration as a means to provoke new explorations of the score's topography, describing it as "a kind of labyrinth, where each time the performer, no matter which way [she] is choosing, is coming to the same place" (Kim in Fairbairn, 2016, p. 4). As stated above, the eight parameters of tempo, rhythm, voice, phoneme, dynamic, slide, valve and mute are impossible to simultaneously perform. That alone is a radical departure from traditional notational strategies, and the demand that the performer engage in selecting and curating which parameters are present at which times, and thus also how they intersect and relate to one another, is a gigantic departure from norms of the Western classical tradition. Rather than performing all sets of information simultaneously, the performer is instead instructed to select different parameters for each iteration of the score, and is in fact also expected to move back and forth between parameters during and within a single iteration. Each performance consists, as previously noted, of several iterations of the score, itself quite short, during which the various parameters shift and modulate each other kaleidoscopically; sometimes as many parameters as possible are executed, while at other times fewer are engaged, as the texture of the piece undergoes constant metamorphosis. Indeed, even when a subset of parameters is performed, omitting one or several at a time, many details seem to interfere with one another, such as the relative imperceptibility of the tempo fluctuations once several other parameters are overlaid (appreciable particularly in the slower tempo passages, wherein the persistent density of musical material counteracts the deceleration). Accentuating the details of each parameter while navigating these potential contradictions present the performer with one further technical and interpretive hurdle. An initial glance at *Sijo_241015* reveals its superficial dissimilarities to standard notational traditions, but upon closer inspection, the true departure lies in the dynamic role demanded of the performer in executing this tapestry of fluctuating actions.

The instrumental technique itself is similarly dynamic and experimental. Changing from mouthpiece to mouthpiece for each iteration of the score, each different one requires a new technique and a unique and individualized practice regimen. Such foreign mouthpieces are occasionally used in late 20th and early 21st-century pieces, and have even occurred in solo pieces, but were always used fleetingly, and were never isolated from other techniques to this degree. In the most extensive previous use of such foreign mouthpieces, Vinko Globokar's *Echanges*,[26] the performer frantically swaps and changes a wide assortment of mouthpieces and mutes. But even in this instance, it is the interchanging and dovetailing of the effects that constitutes the primary notational and technical content of the piece, and not the extended exploration of particular, discrete augmentations of the trombone. For Globokar, it is the activity surrounding these changes that is given primacy; in other pieces, these foreign mouthpieces are interpolated as fragmented phrases surrounded by more standard techniques, such as in Gerard Grisey's *Partiels* (1975). In contrast, Kim's *Sijo_241015* augments the trombone with a different foreign mouthpiece in each iteration, which succeed one another musically as short movements. Although each such quasi-movement is quite short (less than one minute), this still leaves each mouthpiece temporally and sonically isolated from the others, providing space for appreciable distinctions between them. Because the trombonist is not being asked to add a mouthpiece for an isolated or transitory effect within a longer passage, as had been done before, she must be prepared to practice and to perform on each mouthpiece as an isolated, distinguishable instrument.

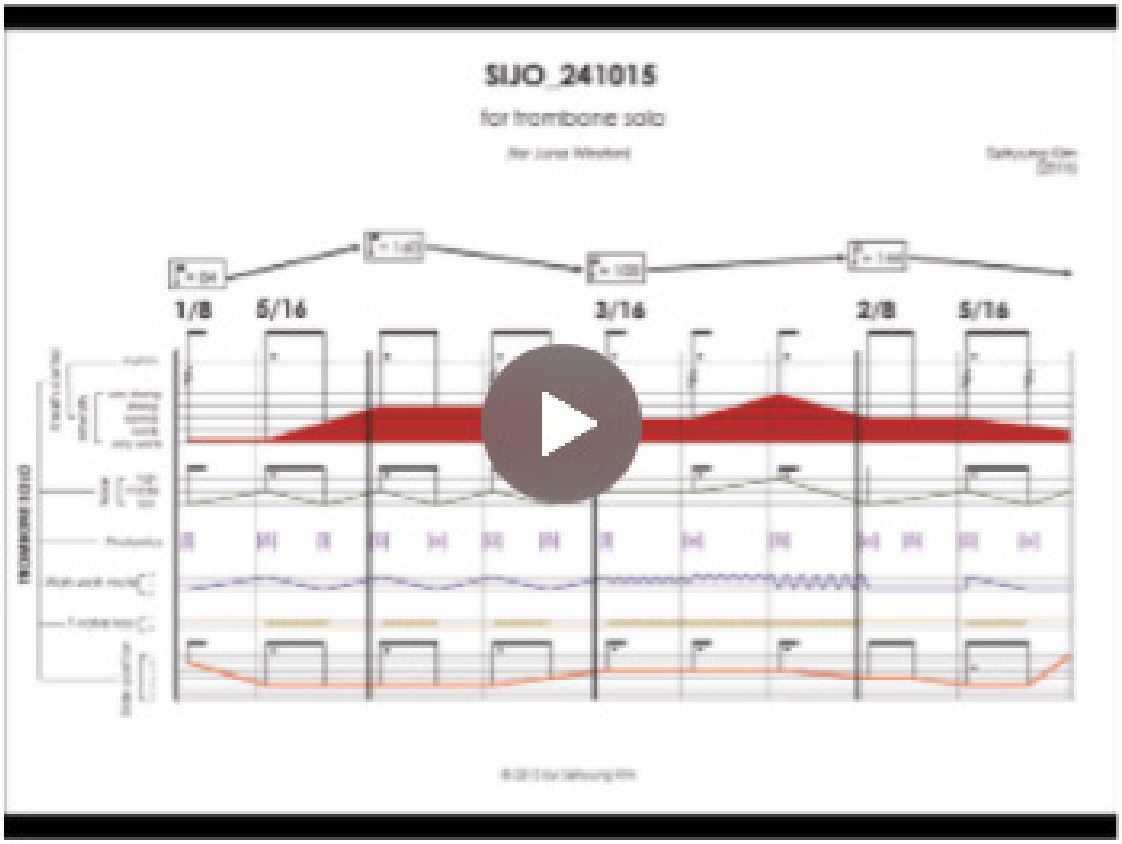
Sijo_241015 is, therefore, very much a series of solos to be performed on different instruments—trombone with bassoon reed, trombone with saxophone mouthpiece, trombone with oboe mouthpiece, and so on—each with a different technique, and each with a different preparation and

26 See 1.2 Poiesis as Musical Method.

learning strategy from the performer. Studying and learning other instrumental practices such as those of bassoon, saxophone, and oboe is already an extended technique by common definitions (see Dempster, 1979; Sluchin, 1995; Svoboda and Roth, 2018), but as these techniques' role in a piece is expanded and comes to envelope the majority or entirety of the instrumental technique required in the whole piece, the distinction between what is extended and what is not becomes increasingly meaningless. *Sijo_241015* essentially discards standard trombone technique entirely, forcing the performer to come to terms with conceptions of the instrument (and their own role in using it as a tool for sound production) that render traditional and normalized conceptions of the instrument not only useless but impertinent.

And yet, the piece is performed with a trombone, and it has a notation—a notation which is, in fact, quite Western in its presentation of rhythmic and polyphonic material. Far from being a complete and radical departure from Western classical art music, it actually satisfies many of the technical and notational expectations of that genre. Although it problematizes notation and instrumental technique, it is nonetheless still firmly placed within a field of contemporary classical music. And despite the disintegrations of traditional expectations of standard notation and technique, which force the performer to imagine and develop practice and performance strategies that answer to the specific demands of this piece, the departure is not so radical that it must be conceived and executed in an entirely new realm, by a new type of performer or a new type of artistic presentation. By no means is this the case: it can easily be executed by any trombonist willing to engage with the notational intricacies and the augmentations of the instrument. This is in itself also radical—a reimagination of the instrument and performer to an extreme that dissolves traditional expectations and techniques, and yet one that is still firmly housed within and open to performers of that same tradition. In confronting this paradox, *Sijo_241015* poses a series of questions that allow performers to reimagine their own body, practice, mind, instrument, and performance in a dynamically and radically altered context, not merely rejecting traditional strategies but rendering them locally incomprehensible.

II. Autopoiesis



Having unmoored the performer from traditional learning strategies and instrumental techniques, the question then arises, what will fill this void? Having witnessed a situation that absents or even annihilates standard interpretive strategies, is the performer then adrift in a sea of solutions in which anything and everything is valid? Or are there certain strategies that may prove more efficacious than others in assimilating the specialized demands of the situation? The responsibility lies ultimately with each individual performer to answer these questions independently—a responsibility that is equally and crucially also an opportunity—but herein I will demonstrate one such approach, one which uses a non-musical theoretical model to develop a learning strategy that can undergird a coherent approach to *Sijo_241015*, the rigors of its notation, and its varied technical demands. This theoretical model, autopoiesis, is an example of a different hermeneutic paradigm that may be incorporated into practice and performance, and as an example, is designed to show the nature of the search rather than an ideal (or single) solution.

The biologist, cognitive scientist, and cybernetician Humberto Maturana developed the concept of autopoiesis in the 1960s, first presented in *Biology of Cognition* (1970), and later with the psychologist and biologist Francisco J. Varela in *Autopoiesis* (1972) and *The Tree of Knowledge* (2008). Later publications and experiments have continued to elucidate and expand the principles and implications of autopoiesis, but the fundamentals of the concept are presented clearly and explicitly in these original works. Autopoiesis provides a means of conceiving systems of relationships that allow for the recognition and identification of unities (entities, organisms, etc.) dynamically. For Maturana and Varela, there is no established, Parmenidean truth or entity that is then engaged with the environment around it. Unities are established and maintained by the preservation of relationships, and any unity can be described by the organization of relationships that contributes to the maintenance of its homeostatic nature: such an entity is "organized (defined as a unity) as a network of processes of production, transformation and destruction of components that produces the components which … through their interactions and transformations regenerate and realize the network of processes (relations) that produced them" (1972, p. 135). The perforation or disintegration of homeostasis indicates the termination or limit of the autopoietic unity. Crucially, autopoiesis is a description of how reality and identity are continually and constantly enacted dynamically. For Maturana and Varela, autopoiesis is characterized by the construction and preservation of homeostasis within an internal set of relations. It is by examining how these sets of internal relations are preserved over time (both despite and because of changes and adaptations along the way) that one can identify an object, entity or system as an autopoietic unity.

One of the chief advantages of an autopoietic conception is its assimilation of change. "The domain of interactions of an autopoietic unity is the domain of all the deformations that it may undergo without loss of autopoiesis" (Maturana and Varela, 1972, 119). In the course of phylo- or epigenetic evolution,[27] conceivably every single aspect or feature of an entity may change over the course of time, but if the maintenance of homeostasis is never disturbed, then the unity remains intact and the autopoietic entity retains its identity and cohesion over this period of time.

Maturana and Varela's system of autopoiesis rejects static and fixed conceptions of what an entity may be, whether it be a member of a biological species, a single organism, a single cell, or a much larger system such as a social community. In redefining a concept of unity, autopoiesis thus also redefines all of these entities that may be determined as independent (i.e. internally unified). There is conceivably unlimited flexibility in the identification of entities so long as homeostasis and the

27 Phylogenesis refers to the evolutionary drift of a whole species, whereas epigenesis refers to the genetic changes that accrue within a single individual's lifetime. Maturana and Varela draw a distinction between phylogeny, encompassing the broader structural drift of generations, and ontogeny, which encompasses only the phenomenological experience of a single individual (however that may be defined). See, for example, Maturana and Varela, 1972, pp. 98-99.

consequent set of internal relations are preserved. This limit provides both possibilities to account for growth and evolution, but also constrains what may be considered unified based on the efficiency of integration of change and external stimuli. The balance between maintaining a set of internal relationships and processing stimuli from the environment is fragile and yet unfathomably rich in possibility, a fascinating combination that Maturana describes as "both bounded and infinite" (Maturana and Varela, 1972, p. 50). Autopoiesis provides a framework to navigate this distinction and a discourse with which to describe the consequent changes, adaptations, interactions, and dissolutions.

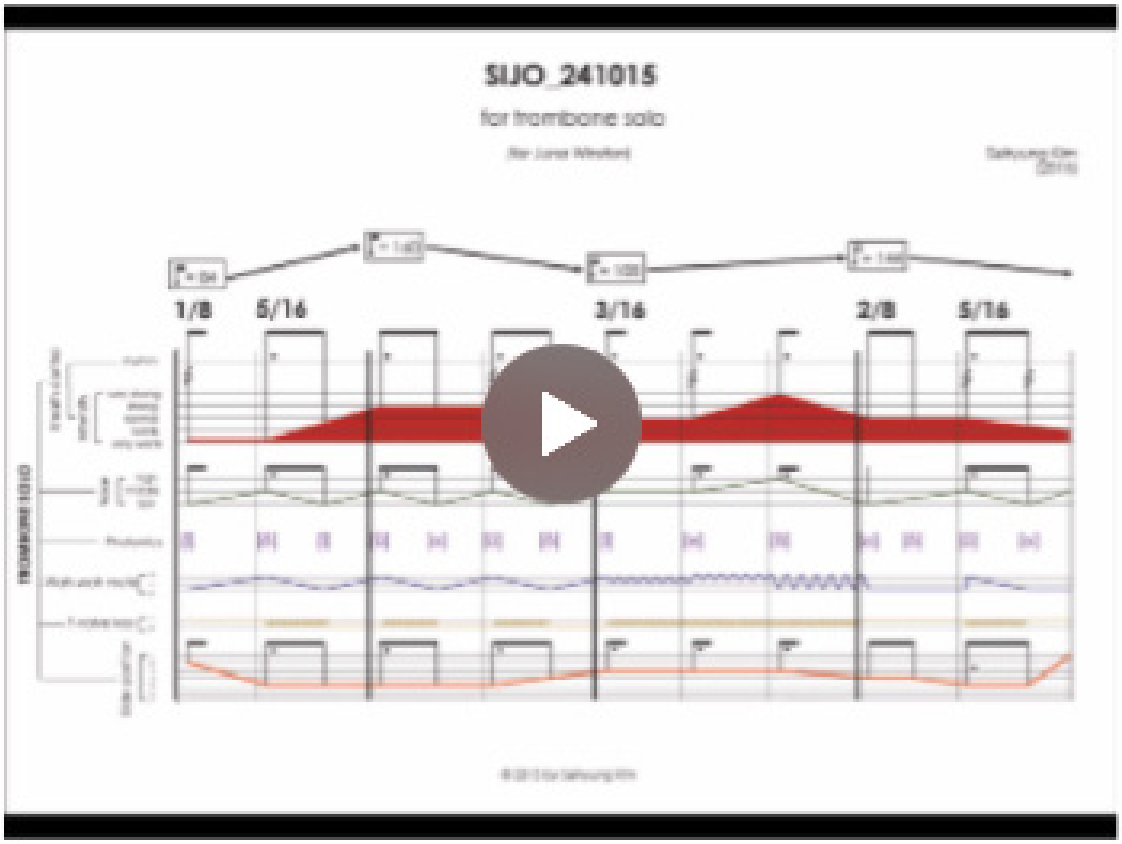
It is precisely this facility for describing variation and transformation within homeostatic systems that makes autopoiesis a useful theoretical grating through which to examine Kim's *Sijo_241015*. Beyond the complexity of the notation and the varied technical demands, the most apparent complications of the piece are the fluctuations and metamorphoses of these notational, technical, and ultimately sonic components. Before even attempting to execute a local passage of the piece, a global perspective of how these drastically different sets of information and technical demands can be assimilated into a single performance or performer must be in place (either by decision or through intuition). By viewing the performer and notation as autopoietic unities singly but also together as they collide during the learning process, this extreme variability manifests itself as part of a temporally dynamic system encompassing both fixed notation and fluid performative learning. In part because of the labyrinthine variability of the shifting parameters in the notation, both the score and the performance can, at times, be agents of either flux or stability. The player's engagement with this score, by building practice tools to variably incorporate all of the various interchangeable parameters, is autopoiesis in practice: the reaction to and assimilation of constantly shifting information while maintaining a holistic embodiment that preserves the relationships of each parallel component in a homeostatic unity.

This combination of both flux and stability can perhaps be most easily examined in the notation itself. It is in many ways a stable object, printed on a sheet of paper and unrevised since its first performance in 2016. This score also remains the same from iteration to iteration within a single performance. The parameters remain fixed. Nonetheless, as has been previously described, it is written such that all parameters can never align at once. The interchanging of parameters and fluctuation of content is built into the demands of the piece, yet even as the performer shifts from parameter to parameter within and between iterations, the boundaries of the notation remain undisturbed (no parameters are renotated or modified). Although the performer must shift between variable constellations of parameters, there is a strict limit within the notation and within the physical capabilities of the performer that determines which constellations may occur and which may not. In theory, other relationships between the parameters and actions of the piece can be imagined. That is, the prescribed actions and gestures of the piece could be recombined in other formations than those that actually occur on the page, which would inevitably lead to sounds beyond those implied by *Sijo_241015*, however similar or different they may be. But these other constellations are not, in fact, reachable through the interpretation of this notation; there is a limit to Kim's notation that precludes these other sounds and shapes. This is the "labyrinth" that he describes, where the performer can drift through any of a seemingly endless series of parametric permutations, but always arrive in the same place. It is the exploration of a map, but of a map as an object, in which the edges of the page circumscribe a set of possibilities that is, nonetheless, still infinite and open-ended. These limits help define what we can describe, in autopoietic terms, as the homeostatic unity of the notation.

The instrumental technique is similarly both open and bounded. For a performer unused to the augmentations and techniques stipulated, suggested, and allowed by Kim, the vast array of new actions, techniques, and sounds can be overwhelming. However, by working with the score, the

richness of these new terrains is also bounded by the types of actions and relationships of material that Kim builds. That is to say, the techniques, even with the many different mouthpieces, are bounded and therefore homeostatic within the context of the physical demands of this particular piece (both the polyphony of actions and the extensive use of non-traditional mouthpieces). In order to execute and embody *Sijo_241015*, the performer will have to explore both the possibilities and opportunities of the technique built and elaborated in the piece as well as the boundaries to this technique that inevitably result from both the notational constraints as well as the physical constraints of the instrument, the player, and the available combinations of parameters. By experimenting and feeling their way into the unique demands of the piece,—by exploring both the expanse and the edges of the map,—a performer can build a recursive intuition within the techniques of the piece. The resultant sonic world delineates the autopoietic unity that is the instrumental technique of *Sijo_241015*. It is not standard trombone technique, and is also not simply extended technique. An altogether different technique is instead present, one that is coherent, limitless yet bounded, and consequently both homeostatic and autopoietic.

III. Language and Communication



This thought experiment, exploring the autopoietic qualities of performers, notations, and techniques, is largely superficial if they are viewed in isolation. After all, it is little more than a slightly non-traditional way of defining a simple, organic unity, with an emphasis on homeostasis and the preservation of relations rather than on a formal structure. Heretofore, the choice of one or another of these theoretical lenses is purely a matter of taste or a hermeneutic sleight-of-hand. However, Maturana's and Varela's autopoiesis begins to take on especial significance precisely at this point, where autopoietic unities come into contact with one another. Autopoiesis is a description of how an entity creates its environment and existence through the preservation of its own internal relations as it responds and adapts to the environmental stimuli that surround and interact with it. Autopoiesis is by definition not a static set of structural relations, but a processual way of responding and interacting, and Maturana and Varela demonstrate how this leads also to a redefinition of language and communication.

For Maturana and Varela, there is no information as such. Language is not a vessel of content, nor is it a medium by which information is transmitted. In an autopoietic sense, language and communication are no different than any other stimulus from the environment. As a natural extension of that, they also see the role of cognition in ordering, processing, and parsing a linguistic stimulus as no different from the way in which any other environmental stimulus is processed.

> Linguistic interactions orient the listener within his cognitive domain, but do not specify the course of his ensuing conduct. The basic function of language as a system of orienting behavior is not the transmission of information or the description of an independent universe about which we can talk, but the creation of a consensual domain of behavior between linguistically interacting systems through the development of a cooperative domain of interactions. (Maturana and Varela, 1972, p. 50)

Language is essentially orientational, according to Maturana and Varela. One utterance directs the attention of another, who responds, and if this succession of interactions builds a mutual intelligibility, then they have built a "cooperative domain of interactions." Language as orientational rather than informational draws its impetus from the role information plays as part of a fluid system of mutual intelligibilities. And if language can be seen as orientational, then communication can similarly be viewed as an exercise in orientation, reaction, and the cultivation of mutually predictable or parsable sets of relations.

For Maturana and Varela, a communicative gesture engages in coordinating the interactions of distinct autopoietic unities. Stimulus, orientation, and the building of mutual intelligibility form the building blocks of interaction. In Kim's *Sijo_241015*, the shifting parametric relationships necessitated by the technical demands of the piece serve as similarly orientational stimuli. The map Kim provides, replete with its variable lacunae, builds fluid relations with the performer who learns to navigate its shifting contours. The performer, in turn, provides stimuli to the notation, by choosing a particular mouthpiece and a particular set of parameters, each of which in turn begins to open up or preclude the permutations than can or do ensue in the following bars and pages. The performer, the notation, the instrument and its technique all provoke each other, in a circle of stimuli and response, interactively creating a "cooperative domain of behavior."

One of the advantages of Maturana and Varela's concept of autopoietic unities is their ability to scale up and down as one examines different forms of interaction. Homeostasis can occur on an atomic, cellular, or organism level. When looking at musical elements of notation, technique, performer, performance, etc., this scalability is aided by the conception of orientational communication as the collaborative construction of mutual domains of behavior. In some ways the notation is an autopoietic unity, with clear boundaries and a replicable identity in spite of its embrace of variability. The same could be said of the performer, who has to assimilate new methods of playing the trombone and of reading music, but who remains, thereafter, a homeostatically stable entity. As has been detailed above, they can also be seen as forming an autopoietic unity together, because as they pose fluid questions to each other, they contribute to a mutually defined performance in each new iteration of the piece. The mutuality of this process results from the extreme variability of the notation, which builds a more radically foregrounded agency of notation into any performance, even as it remains—like a map—a seemingly static, stable object. This scalability can apply to any level at which orientational communication occurs, whether in performance as just described, or earlier in the learning process. In fact, this can be used to develop effective learning templates for the unique technical demands of the piece, as well. The assimilation of new and 'non-trombone' mouthpieces

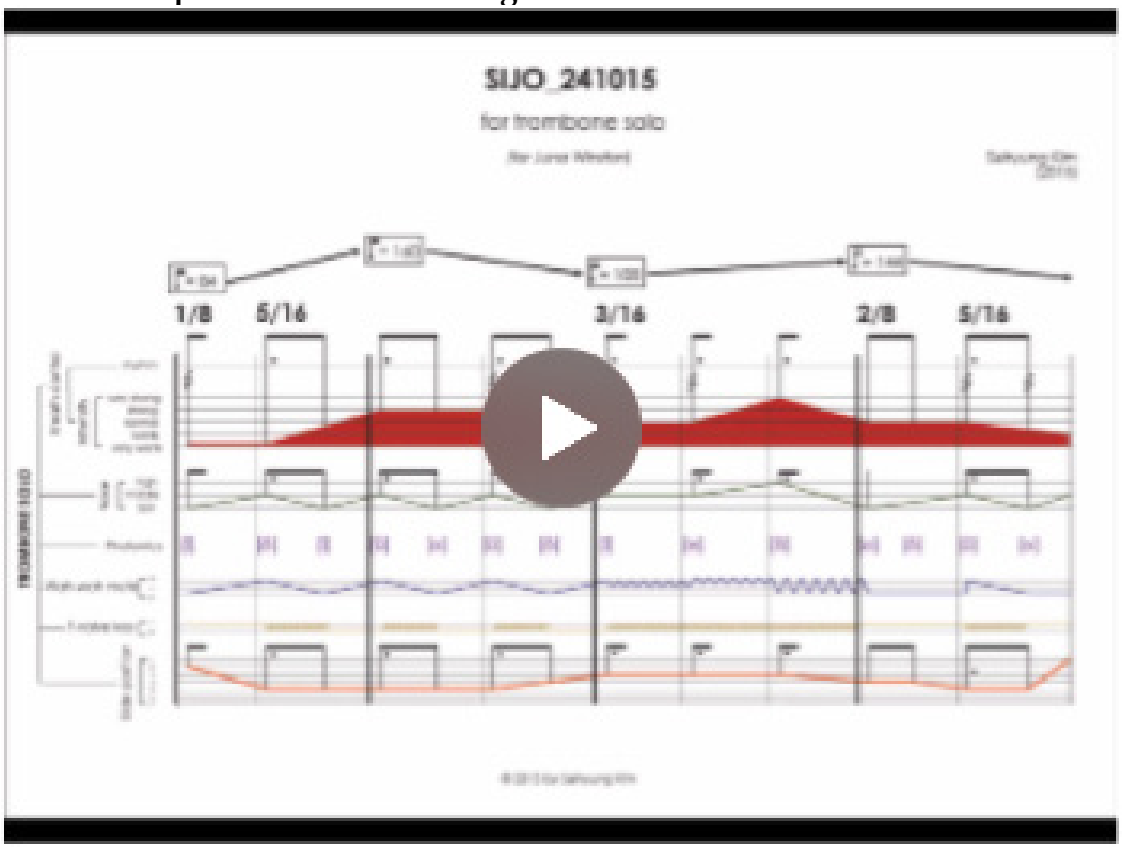
offers an opportunity to use this idea of orientation as a gateway to new forms of mutually intelligibility.

All three of these entities—notation, performer, and technique—are both discrete and united in a mutual dance of orientational communication. The notation and the performer are both posed certain problems by the technique of the instrument. Most obviously, every input from the notation and the performer is filtered through a giant megaphone (the trombone), and is thus subjected to amplification, timbre and pitch modulation, the reinforcing of particular overtones and harmonic structures, and varying degrees of air resistance, among other factors. The response of the instrument, in particular as it changes from mouthpiece to mouthpiece and with the interchanging of parameters, has a profound effect on both the performer, as is quite obvious, but also on the notation. The notation, after all, is extremely intimately tied to the response of the instrument in these variable circumstances. In the act of notating by the composer, before the piece has even begun to be practiced in its terminal state, these considerations are constantly informing the process and provoking alterations and evolutions within the notation, such as what levels of activity are too active or too inactive to be perceptible alongside other parameters or in the context of the piece. These underlying reactions and responses to technical considerations are perhaps quite obvious, and yet their overwhelming role in determining the nature of the piece and the eventual orientational stimuli given to the performer merits attention. These stimuli and responses (from technique to notation), are not easily definable temporally and spatially: they may occur very locally as Kim meets with a performer or experiments with the instrument personally, or they may cut across space and time because separate meetings, interactions, and imaginations can diffract through one another. These cross-pollinations of temporally and spatially isolated processes are part and parcel of the lengthy process of honing specific technical demands that will eventually be present in the piece (honed in this case by the composer and the performer, no less than by the instrument itself). The instrumental technique and the inherent and very physical constraints and potentialities that it embodies play a very crucial role in provoking actions and reactions from other autopoietic entities. The piece could not emerge purely intellectually, isolated from the embodied instrumental technique (or at the very least, could not emerge in the state that it does, which is precisely the point). The experimentation with and imagination of the instrument and its technique are not results of the notation, but are critical and irreplaceable stimuli and preconditions to the notation. These stimuli continue to orient one another even after the notation has been finished. The relationships between notation and physical technique (both constraining and expanding) have direct and appreciable impacts on the performer, and in particular on how the performer learns to process the notation. The internal logic that is built up between notation and physical technique builds a cooperative linguistic domain that allows for the growth of a recursivity within the language of the piece. The performer is responding to this, and the variably minute or drastic assumptions and decisions that accompany the process of learning the notation and combining it with the instrument are invariably a product of the orientational input of the physical dimensions of the instrument and its technique (again, both constraining and expanding). The precise potentialities and limitations imposed by these physical considerations are inseparable from the performer's act of responding to the input of the notation, and it is the set of relationships already built up between technique and notation that build the linguistic domain that will become stimulating, intelligible, and eventually responded to by the performer. It is precisely the analysis of these variably remote and juxtaposed interactions that is made possible by an autopoietic learning method.

Communication as orientation allows for the evolution of extremely varied linguistic domains. The relative complexity or simplicity of these domains depends on the range of potential interactions between different entities. These domains are continually enacted and reenacted in the course of contact between entities. In this case, each of these autopoietic unities identifiable within the context

of *Sijo_241015* is in contact with each of the others, and the linguistic domains that are thereby collaboratively constructed vary for each set of interactions. The communication between the performer and the composer is different from the communication between the performer and the notation, or that between the performer and the instrument. Nonetheless, each of those situations has very clear points of contact through which any two or more unities confront each other, engage in orientation and proposal of stimuli, and reach a homeostatic concurrence. They build an entangled interaction that allows their cooperative domain to survive from one moment to the next. This continually reenacted linguistic exchange could be described, in Maturana's words, as a "consensual domain of behavior" (Maturana and Varela, 1972, p. 50). Autopoiesis allows us to analyze how these linguistic domains differ from one another as we simultaneously see how they function similarly and how they are each in constant interplay with each other, engaged in interwoven webs of homeostatic exchange and discourse. The more intertwined these discrete entities become as they build ever wider realms of mutuality, the more refined becomes each of their respective homeostatic unities.

IV. Second-Order Autopoietic Unities and Cognitive Domains



As previously mentioned, one of the most fascinating implications of Maturana's and Varela's autopoiesis is its scalability. By taking the construction, enactment and preservation of a homeostatic system of relations as the fundamental definition of a unity, many different levels of organization can be viewed through the same criteria. Autopoietic unities can be identified at all levels of the human organism, from atoms to cells to organs, as well as to systems of organs, the whole body and even social bodies. Maturana and Varela refer to these higher scale interactions as "second and third order autopoietic unities" (1972, p. 107). This is to say that, as two or more autopoietic unities come into contact with one another, whether they be two or more cells or human beings, if they are able to engage in a cooperative exchange of stimuli and to build a consensual linguistic domain, then they can be viewed together as a second-order autopoietic unity. There is, theoretically, no real limit to how far this concept can scale up or down. Any level of micro- or macro-scopic entities can be analyzed as autopoietic unities, provided only that they demonstrate the necessary criteria of constructing and maintaining a homeostatic domain of interrelation.

In order to describe how such second-order autopoietic domains are created, it is helpful to first examine Maturana's and Varela's definition of cognitive domains, which is more or less an extension of what was previously examined as a linguistic domain. According to Maturana and Varela, cognitive domains encompass "all of the deformations that [the closed system] can undergo without loss of autopoiesis," (1972, p. 119), or "the domain of all interactions in which [it] can enter without loss of identity" (1972, p. 136). This is, of course, intricately related to the most basic characteristics of autopoiesis. The boundaries between linguistic domains and cognitive domains can become blurred as one begins to examine second- and third-order autopoietic unities; as orientational networks of mutual organization, language and cognition can begin to be seen as scaled-up or -down versions of each other. A linguistic domain describes "a consensual domain in which the coupled organisms orient each other … through interactions that have been specified during their coupled ontogenies" (1972, p. 136) These domains are so intimately related that, as Maturana and Varela describe the way in which a cognitive domain interacts with itself in a cycle of self-recursion (self-consciousness), they refer to it as a "closed linguistic domain" (1972, p. 121). That is to say, that an entity within its own cognitive domain is able to open up a consensual domain of linguistic interaction with its own states, thus developing a linguistic domain within its cognitive domain. As we look at autopoietic unities and begin to build second- and third-order autopoietic unities, it becomes clear that, from a purely functional, autopoietic frame of reference, the interactions built up between the various elements involved in a piece of music generate both a linguistic domain and, as a higher-order autopoietic unity, a cognitive domain as well.

The network of unities that we have been focusing on, from the composer through to the score, the performer and the instrument, reveal many ways in which overlapping and non-overlapping linguistic and cognitive domains are constructed. In fact, viewing this entire web of forces as a single autopoietic unity with its own cognitive domain allows a performer not only the freedom to become a true collaborator in the holistic process of producing the piece, but also highlights exactly how and why the preservation of their own, individual cognitive domain and homeostatic internal relations is simultaneously of critical importance. Scaling up and down through various levels of autopoietic unities reveals also the importance of preserving homeostasis on all of these different levels. The performer must preserve their own internal balance when confronting the augmented trombone (with all of its foreign mouthpieces) and the notation (with its diverse array of dissociated physical actions). The preservation of the self and its self-recursive domains of cognition is paramount to being able to then interact as a consensual member of a higher-order autopoietic unity.

Learning, then, and learning as epigenetic adaptation, becomes the crux of maintaining autopoiesis. Maturana and Varela describe the "dispensation of teleonomy" (1972, p. 85), noting rightly that in this context, there is no goal-oriented growth. Each cognitive domain is a product of a sequence of individual, localized, and relatively minor actions, each of which contributes to the assimilation of stimuli and the preservation of autopoiesis. They rightly point out that "[i]nstruments enlarge our cognitive domain" (1972, p. 38), because the incorporation of prosthetics is a natural extension of the cognitive domain when viewed in this way. As such, we can expand each autopoietic unity to include the others as linguistic partners and even prostheses, depending on their respective modes of interaction. Ultimately, even these distinctions are unimportant. After all, each of these individual actions is not determined by its linguistic content or prosthetic application alone, but when seen rather in a non-teleological framework, they are only responsive to very localized autopoietic demands, and the long-term ontogeny of the autopoietic unities is constructed out of this continuum of bounded actions. Maturana comments that the cognitive domain is "bounded and infinite" (1972, p. 50). It constructs a state of long-term adaptation that responds and evolves to stimuli while maintaining its own coherence. There is no goal and there is no destination, only the continuous

recursion of homeostasis. Autopoiesis provides a template for a process- and action-based system of organizing the learning process. This then allows one to examine both an individual's role within the system, the system's inter-agential collaborative process, and the long-term adaptive patterns that contribute to the eventual form that a piece of music takes as it enters the world of sound and action.

The interplay between these alternately independent and codependent unities allows us, as performers, to access a piece like *Sijo_241015* in a completely new way. The role of the performer becomes less rigid, and is no longer contained within a hierarchy bridging the inspired realm of compositional intent and the didactic role of interpretation in public performance. One can still choose to see compositional intent as rigorously definable, or respectively, to see the act of interpretation as didactic and content-oriented. But an autopoietic approach shifts the relative importances of those elements and makes them ultimately ancillary to more critical issues of communication and the mutually-constructed evolution of interactive systems. The performer abdicates the role of hermeneutic curator and becomes just one homeostatic element within a diverse environment of musical agencies. This is not a matter of claiming performance as a co-compositional act. Rather, an autopoietic method hopes to build the tools by which seemingly isolated components such as composers, scores, performers, and instruments both assume but also abrogate responsibilities in a mutual entanglement of agency.

As a performer, I work to construct a system by which the orientation and response to stimuli from all of these agencies can work fluidly. I attempt to help initiate varied linguistic domains with the instrument and the notation, so that we can evolve together towards a point of cooperative domains of interaction. This effort to build mutual intelligibility between composer(s), notation(s), instrument(s), etc., leaves the exact nature of these interactions and domains of intelligibility very open—and that is precisely the point. By working without a teleological hermeneutic oriented towards an approvable interpretive product, the performer is instead working in very localized situations and sets of stimuli, constantly building a conversation between different elements. This is a very natural and, in fact, simple way to approach what is a complex, complicated, and difficult score containing a huge amount of information and requiring a high degree of flexibility and response-ability. Learning to engage within autopoietic linguistic and cognitive domains and reacting to particular stimuli embodied by the notation and filtered through the instrument, I as a performer can foster an organic learning process that cooperatively creates and recreates the piece alongside the composer, the notation, and the instrument. The growth and development of the collaborative potential within this autopoietic learning process allows for a very simple and straightforward learning technique that blossoms into a rich and rewardingly complex network of musical and sonic co-creation.

More precisely, it allows for a contextualization of the performer's role that embraces her importance to the overall project of producing the piece while also avoiding the trap of exaggeration, in this case by acknowledging the production of this role in a continuum of specific, localized embodiments of the piece. It is a vision of the learning process that unfolds over time without succumbing to teleonomy, one that encourages agency but reacts to the bounds that confine the process. The performer's body and her bodily practice are incorporated into the production of the piece, utilizing both her general, foundational technique as well as her continual and ever-changing practice regimen. As a performer, I must approach each practice session with the knowledge that I can only react bodily and mentally with the particular parameters and technical issues that present themselves in each particular moment. I must remain aware of the over-arching process by which these actions engage with and co-create the work. Each different practice session, with each different mouthpiece, is an exercise in experimenting with the constraints of the instrument and the variable combinations of parameters. Only so can I continually learn and relearn how to interact with the score and the

sounds while maintaining my personal coherence as an autopoietic entity. Practically, this means working slowly and response-ably with all of the various parameters, constantly combining them in different ways, to slowly allow my body to internalize and entangle with the orientational stimuli that they propose. I learn to react to their constraints adaptively, in unexpected ways, rather than working to slowly approximate a predetermined, fixed concept of how the piece should sound based on my prior experience or assumptions.

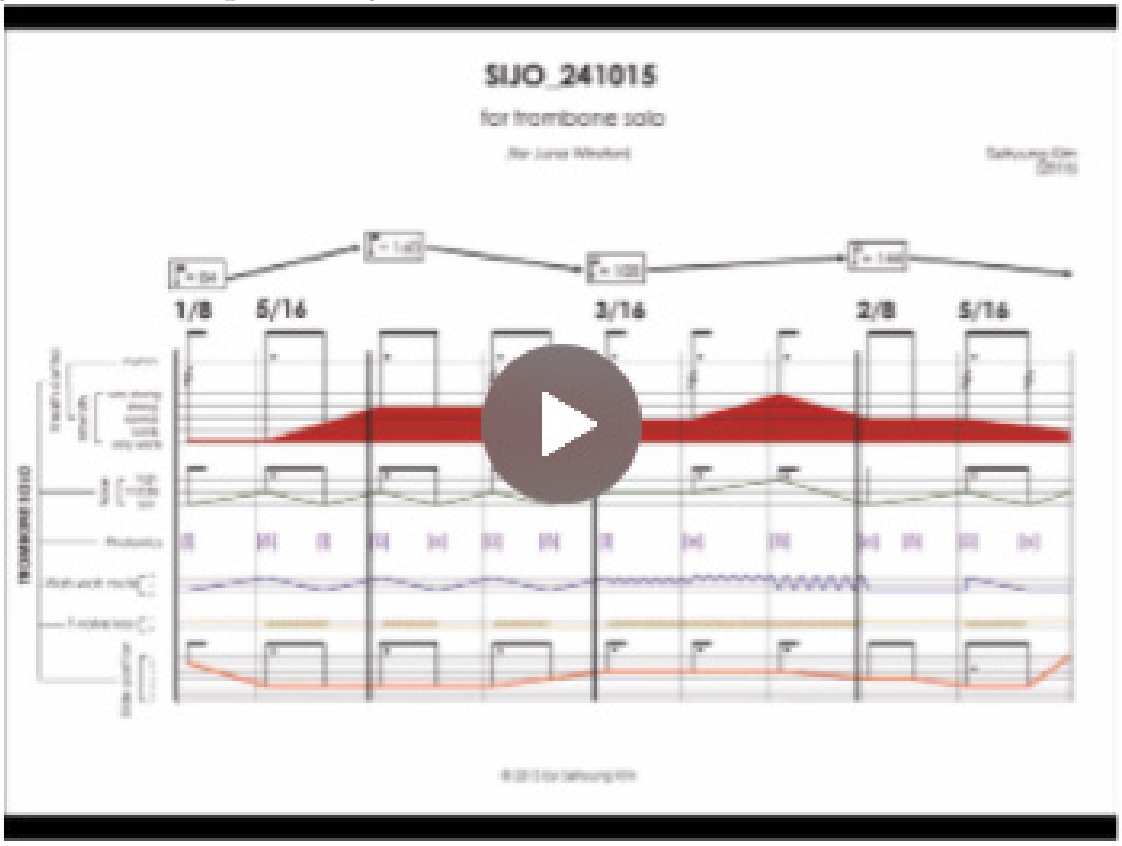
The notation and the body must communicate, and that can only happen by actually diffracting parameters through each other and through different mouthpieces to allow them to create and re-create the domains of interaction. The sound world of *Sijo_241015* is built from these interactions, and not from a preconceived ideal. I work slowly but holistically with the technical and notational constraints to build a practice that maintains my individual autopoiesis and contributes to the construction and preservation of a higher-order autopoietic unity that encompasses the other musical agents surrounding me. There can be no hierarchy of elements here, or there will be a discontinuity in autopoiesis as one element subordinates the others. This means adopting a practice strategy that does not, under any circumstances, isolate layers as separate elements. Rather, from the very outset I prioritize the entanglement of parameters, practicing them carefully but always together (although always in variable combinations). I find that I learn to slowly embody the particular physical conditions of the piece, exploring the "unlimited but bounded" domains of action that result from a working process that strives to maintain an internal set of structural relations throughout. The alternative, which presumes a hierarchy of parameters and techniques, subverts the process by which the linguistic domains of the piece emerge.

These concerns about learning slowly and holistically are not indulgent. An over-zealous rigidity of traditional trombone technique will inevitably fall apart in the face of the ever-changing mouthpieces, and the unity of the performer and the piece will suffer accordingly. Given the radical disorientations of technique that *Sijo_241015* proposes, it is simply not possible to begin with a rigid trombone technique and slowly introduce other elements thereupon. The accrual of parameters will promptly break the continuity of traditional technique; when I attempted to learn in this way, I found myself facing a blank slate every new morning, trying to relearn everything from the day before in an endless cycle. Only by shifting to a different learning method, what I have described here as autopoietic, was I able to invite the piece's technical demands into my own personal practice. Similarly, hierarchizing notated parameters will also lead to eventual problems in the piece. Because parameters shift in and out of focus and in and out of use so quickly and ephemerally, even the ever-present parameters, such as the tempo fluctuations, cannot be excessively prioritized. Learning autopoietically means building all of these parameters into a holistic linguistic domain, response-able to one another.

On one hand, the methods I am describing constitute only a few minor adjustments to practice regimens, and yet, in other ways, they are a radical departure from standardized norms of interpretation in the classical music world. A piece like *Sijo_241015* does not allow one to easily choose one or other. The extent of its disorientation demands a more collaborative participation from the performer. It is constructed in such a way that the extended techniques and the tablature notation must be handled as dynamic and organic elements within the piece, not as external attachments to be pasted on top of a pre-existing, static foundation. The interplay and mutual adaptation of all of these notational and technical elements together *is* the piece. *Sijo_21015* is realized in the adaptive process of learning it, not in the eventual performance. The performer's sensitivity to their role in this co-production of the piece will determine whether they are able to learn the piece without sacrificing themselves or the piece itself to some static teleonomy. A patient, collaborative commitment to

the preservation of homeostasis within the production of the cognitive and linguistic domains of the piece is necessary in order to eventually build a practice that stands any chance of holistically enacting its kaleidoscopic notational and technical texture.

V. Living Systems and Responsibility



> [A] physical system if autopoietic, is living. In other words, we claim that the notion of *autopoiesis is necessary and sufficient to characterize the organization of living systems*. (Maturana and Varela, 1972, p. 82, emphasis in original)

Maturana's and Varela's claim is about the essential nature of life from a biological standpoint. They argue that more traditional definitions rely on teleological structures, focusing on an organism's organization towards a purpose. They point out that even the individual in this context becomes subsumed in a larger, evolutionary phylogenetic drift. Apart from the glaring anthropomorphic fallacy lurking inside, this view fails to accurately accommodate epigenetic change and the nature of an individual's own localized organization of living. Similarly, definitions of living systems that rely on reproduction also fail to sufficiently account for the diversity of organization of living systems. Instead, Maturana and Varela propose that autopoiesis is the essential marker of a living system, that is, that a system, if capable of maintaining a set of homeostatic internal relations while interacting or responding to stimuli from the environment without loss of autopoiesis, thereby demonstrates the necessary and sufficient characteristics to be deemed a living system.

This interpretation is quite fertile, allowing one to observe very localized situations and use non-teleological markers to identify characteristics that indicate whether an individual system can be considered a living one or not. Furthermore, change and adaptation across long periods of time are also easily accountable for. Autopoiesis clarifies how a living system can conceivably change or replace every single internal element or set of relations over time without ever losing homeostasis and while maintaining, throughout, its own boundaries and identity—something we all do

throughout our lives as humans, as our cells die and new ones replace them. Autopoiesis allows for the reconciliation of these personal (epigenetic) and general (phylogenetic) adaptations within a non-teleological framework that avoids the pitfalls of the more traditional notions of living systems described above. By reconceiving the criteria by which we make these designations, autopoiesis expands the question of what is a living system in some surprising and even troubling ways. After all, if autopoietic unities can engage in consensual linguistic and cognitive domains to form larger-order autopoietic unities, as is the case with multicellular organisms like humans, does that then mean that all larger-order autopoietic unities are also living systems?

This consideration leads to one of the most fascinating passages in *Autopoiesis and Cognition*. In the Foreword, Humberto Maturana designates human societies as autopoietic unities and, thereby, living systems. In so doing, he further claims that this state of being, in which individual humans are components within a consensual interactive domain that comprises an autopoietic unity, implicates humans in a series of ethical considerations, which he proceeds to outline. He acknowledges, though, that this extrapolation of larger-order autopoietic systems to *ethical* implications is not shared by his colleague, Francisco J. Varela. In fact, that is why his thoughts on these implications appear in the Foreword and not in the text of *Autopoiesis* itself. At the point at which the biological considerations of their theory of autopoiesis suggest possible social implications, the two authors part ways, one unwilling to press this claim as part of their scientific work, and one considering it an inevitable and unavoidable consequence of proposing the theory in the first place.

Autopoiesis, though, also provides a framework by which these ethical considerations can be viewed in a totally different manner. As noted earlier, at a certain point, the distinctions between different orders of autopoietic unities and between certain elements of linguistic and cognitive (especially self-reflexive) domains become pedantic. What is truly at issue is just the continual (re)creation and preservation of autopoiesis. Maturana and Varela's "dispensability of teleonomy" demands that global issues, whether of evolution or of ethics, are not privileged *in any way* over localized interactions, in both of which a homeostatic set of internal relations can be preserved. This means that whatever broader claims can be pressed (for Maturana, ethical claims), they cannot assert a teleological constraint on the system, living or not.

These ethical issues also appear if we use autopoiesis as a lens for examining Kim's *Sijo_241015*. After all, if we are to extrapolate from the types and qualities of interactions between the various components of the productive act that there are larger-order autopoietic unities, the same issues of ethics and responsibility that troubled Maturana and Varela arise in this context as well. It is inevitable, as linguistic and cognitive domains are identified or postulated, that questions of responsibility and obligation emerge. If the interaction between a performer and the notation or the instrument involves the engagement in a consensual and mutually intelligible linguistic or cognitive domain, then what obligations are inherent in that process? If one chooses to see this larger-order autopoietic unity as a living system in itself, then what responsibilities fall accordingly to a component of that living system? And, more importantly, what are the consequences of failing to maintain autopoiesis in the process of learning or performing this piece? Is a poor performance literally the death of a living system?

It is a troubling thought. Moreover, it can be a truly paralyzing thought for a performer faced with these problems in real life, for not only would a poor performance be the death of a living system, but even a poor practice session could be. How ought one to approach a tricky passage, replete with layered parameters of complicated, polyphonic physical actions and unfamiliar apparatuses of sound production, if one is simultaneously obligated to the preservation of a healthy autopoietic unity? The response-ability demanded by an autopoietic method leads to a very slippery slope.

This is really only a mirage, though, generated by a teleological misconception of the autopoietic process, wherein the domain of relations becomes too asymmetrical and one entity exerts inflexible control over the whole. In musical terms, this would perhaps most readily be the power exerted by the notion of textual fidelity. This slippery slope only occurs if there is an ideal conception of the piece that demands a certain fidelity. The goal of opening up the performance process to ideas of cooperative orientational communication can provide a balance between response-ability to another and response-ability to oneself. Both the notation and, as described above, the performer's personal instrumental practice make demands. It is for this reason that I explored so extensively the way that performative, instrumental demands can reach backwards into the compositional process and provide stimuli well before they later respond to that selfsame notation. It is implicit in this that both will have to respond to the constraints of the other, but they can also allow other criteria to evolve around and within those constraints. The slippery slope is a product of what Maturana and Varela call a self-reflexive cognitive domain, a type of self-recursivity that can occur naturally as part of a system that is capable of interacting with its own internal states as both a participant and an observer. As noted, Varela does not co-sign these ethical concerns, and this may be why. Although the exact reasons for his reticence are not clearly stated, since he continued in his career to explore many forms of embodied and enactive cognition,[28] one imagines that it was not because he lost faith in the fundamental tenets of autopoiesis, but because he recognized that these somewhat simplistic fears of being trapped in an asymmetrical autopoietic unity were not the primary issue. It seems certain that any such asymmetry would perforate any semblance of autopoiesis, and that if such a power imbalance were to develop, it would occur in another way.

The same is true in the case of Kim's *Sijo_241015*. The risk of killing a living system is rather too exaggerated. When learning the piece, the real risk is not that one cannot learn to adapt to the needs of the score, but rather the opposite, that the performer will suborn the piece to an instrumental practice that cannot or prefers not to accommodate the uniqueness of the piece. The notation, the instrument, the technical demands and the composer's work and intentions all play roles in the production of the piece, and they all contribute to how the piece eventually comes to sound. The performer's role involves listening to these fellow collaborators. Just as the composer listens to and responds to the technical issues of the instrument and its various augmentations, thus implicating the performer directly in the compositional process, so must the performer also remain responsive to the implicit demands of all of these members of the system. When the performer applies pre-conceived notions of musicality and interpretation to a work, particularly to a work with such unique demands, then they allow for the possibility that the work itself is silenced in that act of bringing it to performance. There is no clearly-defined, correct way to interpret the score. The performer and all of these other elements collaboratively construct an environment in which a 'correct interpretation' (only one of many potential ones) results from their considered interaction, a state we have been calling a consensual linguistic domain here. The consensuality at play is one that allows for the preservation of each element's homeostasis, which is to say, for the preservation of each element's internal set of relations and internal balance. For the performer, that is their ability to make any sound on the instrument at all, however augmented or not. For the notation, that homeostasis resides in the balance and simultaneity of the parameters, during and as part of their interchanging. For the instrument, it is the relationship of the various augmentations to the trombone itself, and a technique that marries fundamental aspects of both the trombone's and the mouthpiece's techniques to produce a functional method of sound production. These are all very basic concerns, almost trivially so, and yet, the balance between them and the practice and performance methods that produce that balance over time require thought and energy to enact if they are to lead to a response-able learning process.

28 See 3.1 Introduction to Embodied Cognition; Enactive Learning; Enskilment.

The risk, as it were, is that a performer approaches the piece without being responsive to the balances inherent in these various components. In beginning this subchapter, I asked to what extent an instrument or a performer or a notation could be deformed before losing its identity. In the end, I find that I can be deformed almost limitlessly as a trombonist, so long as the notation and my own learning process allow me to approach those extremes in sensitive ways. I have attempted to describe how one such learning process has evolved with Kim's *Sijo*. The title comes, after all, from a Korean poetic form in which a predetermined number of syllables may be combined and recombined in a variety of ways to provoke a kaleidoscopic reimagining of the surrounding world. But just as the syllabic form remains in place, so does the same old world remain, and so does Kim's labyrinth lead me—the trombonist—always back to the same place. Even as the instrumental technique cuts across time and space to interact with the composer and the notation, it also expends itself in a performance of set duration, as a particular instantiation of finite sound erupting from a trombone bell. Maintaining the balance of these temporal and extra-temporal elements is part of the homeostasis sought by an autopoietic method. It is not only the discovery of new facets and entanglements of a learning process but also the *re*discovery of the sound as it is executed in time and space that this learning method attempts to enable.

Autopoiesis gives a clear idea of how these various components exist as entities or elements in their own right, and also how they become part of an interactive system that exists between and includes them all. It provides a framework for the ebb and flow or orientation that makes discovery and rediscovery coextensive. Initially, autopoiesis was presented merely as a response to the disruption of non-standard notations and techniques, but as has subsequently become apparent, it is not quite so simple. Just as the standard practices are themselves disrupted by a piece like *Sijo_241015*, they also, when used as a blanket guide to interpretation and learning, deform every other aspect of the piece and its productive process to meet their own, pre-conceived and teleological needs. Whether this has any ethical ramifications, whether it involves a living system or merely a complex one … these questions will invariably be answered differently by different people, just as Maturana and Varela both had different conceptions of comparable issues in their own collaboration. There can be no doubt, though, that the choices of practice and learning strategies do have the capability of deforming a piece, and that a notation or a piece have the capability to dissolve the efficacy of an instrumental practice. Autopoiesis provides an extremely flexible and functional theory through which to diffract a piece such as Kim's. It gives us the tools necessary to engage thoughtfully with these issues and plot an individual course of action receptive to a unique piece and situation. It allows us to develop learning and performance strategies that are open to the internal balance and evolving needs of all of the collaborative elements which contribute to the realization of a sounding piece of music. As a tool, it is one of many possible avenues through which to enter a piece, but as can be seen clearly in this study of Sehyung Kim's *Sijo_241015*, it can prove an extremely invaluable one in pursuit of this variety of challenges.

2.4 Interliminaries

> What if, as I'm suggesting, precarity *is* the condition of our time—or, to put it another way, what if our time is ripe for sensing precarity? What if precarity, indeterminacy, and what we imagine as trivial are the center of the systematicity we seek?
> (Tsing, 2015, p. 26)

Maturana and Varela couch their conception of autopoiesis in scalability, exposing the idea of the *auto-* to the kind of commingled multiplicity that Tsing and Haraway demand. This scalability allows for a localized sense of autonomous music learning to scale upwards into inter-agential relationships between composers and listeners, alongside performers, equally as it facilitates the scaling down into the interwoven strands of physical activity within the performative body. This more-or-less artificial construction of centrality to a particular situated knowledge gives it some advantages as a methodological tool, but nonetheless elides the messiness—the precarity—of the entangled agencies intra-acting in these processes of musical creativity. In an attempt to elucidate problems and potential solutions within learning and interpretation of physically polyphonic scores, the previous subchapters succumbed to an unfortunate focus on the singular entities of performer and composer as they collide through the mediation of notation. I have attempted to use the contextualization of ecological polyphonies and disturbances to underscore the potential of these theoretical aids—haecceitas, agential realism and intra-action, and autopoiesis—to situate these seemingly individualistic struggles in wider and less human-centric conceptions of the creative act of learning and performing music. Nevertheless, this artificial centrality persists.

For Haraway, sympoiesis signals a way beyond this impasse. As she writes, "Sympoiesis enfolds autopoiesis and generatively unfurls and extends it" (Haraway, 2016, p. 58). For M. Beth Dempster, who coined the term in 1998, "collectively-producing" (Dempster, 1998, p. 25) sympoiesis contrasts with a "centrally controlled, homeostatic, and predictable" autopoiesis (Dempster, 1998, p. v), and Maturana and Varela's insistence on bounded systems with "self-produced boundaries"—however scalable—are countered by unbounded sympoietic systems that are "organizationally ajar" (Demptser, 1998, p. 33-34). Dempster acknowledges that the exact nature of boundary-drawing in practice renders these distinctions between auto- and sympoiesis as a spectrum rather than a binary opposition. Certainly, for Maturana, the scalability of autopoiesis would seem to include many if not all sympoietic systems. The distinction that emerges from an emphasis on the "organizationally ajar," though, relies perhaps more on the precarity of these relations. Tsing envisages precarity itself as a systematicity. In proposing the various diffractions of the previous three sections (2.1-3), I have attempted to find ways for the precarious and the ajar to congeal into methodologies and localized performance practices. Tsing writes, "Precarity is the condition of being vulnerable to others. Unpredictable encounters transform us; we are not in control, even of ourselves. Unable to rely on a stable structure of community, we are thrown into shifting assemblages, which remake us as well as our others … A precarious world is a world without teleology" (Tsing, 2015, p. 6).

In mining precarity for systematicity, a lot can be learned from the messiness of overlapping, intra-acting sympoietic systems in the more-than-human world. Haraway in particular revels in the muddiness of this "material-semantic compost," proposing even that "[w]e are humus, not Homo, not anthropos; we are compost, not posthuman" (Haraway, 2016, p. 55).[29] Sympoiesis provides a framework for the balance between the constant, organic metabolisms that maintain homeostasis and the similarly unceasing assimilation of the ajar, the stimuli for new, poietic tools that create spaces for response-able intra-action. As with the notion of disturbance-upon-disturbance as a state of being,

29 In selecting this terminology, Haraway stretches the term compost from its simple connotations of organic renewal to also embrace the etymologies of both com (with) and post (temporally consequent).

Tsing also redefines this ecological balancing maneuver by contrasting proliferation, the pursuit of growth at all costs, such as agricultural monocrop plantations, with resurgent "assemblages of multispecies livability in the midst of disturbance" (Tsing, 2017, p. 52). By accepting the continual and inevitable role of many scales of disturbance, resurgence can operate as a hallmark of a sympoietic, open-ended, response-able engagement. In ecological terms, this response-ability entails the coalescing of multispecies networks on varied planes of time and space, coordinating long-term cycles of survival and evolution directly through the unfolding of their entangled intra-actions. Tsing points to the way that a forest may resurge after a fire, as "the cross-species relations that make forests possible are renewed in the regrowing forest" (Tsing, 2017, p. 52), although often in different constellations of multispecies assemblages as new symbiotic and sympoietic relationships are reinforced by the shifting ecological conditions. New patterns of growth and symbiosis develop across species in instances of resurgence, creating the diversity of biological life that enables further resurgence and balanced, sympoietic ecosystems. These patterns of growth resist easy predictability, but result in richer, more resilient tapestries of multispecies entanglement.

The resurgence that typifies these multispecies assemblages bears striking resemblance to what embodied cognition researchers describe as emergence. Emergent cognition occurs on a much smaller scale, within the body of an individual (however one chooses to define that, whether as a single-species entity with clearly defined boundaries or as a sympoietic holobiont). The following chapter will trace research on embodied cognition and situated learning to find avenues for emergent cognition to guide the learning and performance practice of physically polyphonic musical notations. As I leave the theoretical methodologies of this chapter behind and move into the realm of embodied cognition, it is worthwhile to retain the intellectual attitudes of Tsing's resurgence and Haraway's compost. The extreme variability between notations and their physical demands of the performer problematize the role of the music-learner as a confluence of agencies responding to the disturbance of a new situation. However a musical notation de- or re-constructs the traditional physical practices of instrumentalism, whether dramatically or subtly, as response-able agents attempting to learn music, we can couch the following forays into emergence as continuous with the rather more hopeful language of Tsing's resurgence.

When Tsing posits that precarity and indeterminacy might undergird a more productive systematicity, she indicates a systematicity that emerges from flexibility and adaptation, rather than from mechanistic predispositions. By opening up to precarity, the possibility for renewal presents itself, but that initial step towards precarity is no easy task. It is the nature of self-consciousness and self-reflection to respond conservatively, by relying on patterns and habits that have proven useful at some point in the past. Better safe than sorry. It is for this reason that we, as nominally individual agents in a circumscribed musical situation, can stand to learn from the examples of multispecies assemblages in sympoietic coordination, of forests regrowing in freshly emergent patchworks of interdependent growth. Because they lack an obvious centralized computing mechanism coordinating this behavior, these networks do not seem to choose precarity and resurgence so much as they simply unfold it in real time. As we face our own fears of the unknown in musical and instrumental practices, we can embrace precarity as the assumption that practices must evolve in real time, in contextual situations, no matter how new or old the techniques that might surface from an attempt at response-ability may be. The inherent conservatism of reflection is natural, given that the only available body of knowledge is the past. As regrowing forests demonstrate, there are certainly old patterns and symbioses that can emerge in new situations—they do not constantly reinvent evolution after every burn. Nonetheless, the elision of a centralized, reflective/reflexive choice means that the particular patterns that resurge in response to the perpetual ballet of disturbance are emergent behaviors responsive to a given situation, to both its constraints and its opportunities. As will be explored in the following chapter, much research into the direct action-

perception relations of embodied cognition mirror this systematic precarity, allowing for response-able behaviors to emerge contextually, drawing from previously learned lexica of behavior as well as evolving new ones. Sympoiesis, precarity, resurgence, and emergence: these concepts do not question the beingness of entities (whether multispecies assemblages or individual musicians); they question the constant unfolding of relations over time, shifting focus to the active entanglements and intra-actions that supersede static conceptions of agents, practices, behavioral lexica, and so on. It is these dynamic relations that define learning and growth, resurgence and emergence. As Haraway writes, "The question here is not how animals hold themselves together at all, but rather, how they craft developmental patternings that take them through time in astonishing morphogeneses" (Haraway, 2016, p. 66). That is, indeed, the question at hand! How do we accomplish the astonishing tasks of virtuosity in physically polyphonic scores, all while maintaining the homeostasis of an instrumental performance practice? After Haraway, I ask myself: how do we hold ourselves together at all in these circumstances? As with these multispecies sympoieses, I proceed in the hope that a response-able commitment to developing poietic learning tools can also enable constellations of emergent, resurgent music learning to blossom.