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Play-Sequence & Energy Models:

From Analysis through Improvisation to Composition

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BACHELOR THESIS

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1. Introduction

1.1 Unmasking Sound: Discovering Acousmatic Music

My journey into acousmatic music began with deep curiosity tempered by skepticism, particularly concerning musical expression and the tangible connection between composer and composition. This skepticism stemmed from my background as a vocalist and pianist, where expressiveness is intrinsically linked to the performer's physical presence—an element seemingly obscured by the technology prevalent in electroacoustic and acousmatic music. While there are many forms and definitions of expression in music, when I talk about expressiveness, I base it on my background in classical music training from an early age, where expressiveness forms the basis of interpretation—how a phrase is expressed on a given instrument, how it is interpreted. This type of expressiveness is what I relate to and seek in my own work. How can I compose electronic music that embodies this relationship? Is it even possible, or are there other forms of expressiveness in electroacoustic music?

The pioneering concept of "Objets Sonores" (Sound Objects) by Pierre Schaeffer, as well as insights from other key figures, introduced me to a new dimension of sound, a dimension in which sound is abstracted from its source. While these ideas offered innovative perspectives on listening and composition, they also seemed to widen the gap between the composer's intent and the music itself.

This perception began to shift when I discovered Annette Vande Gorne's concept of "Play Sequences," a pedagogical approach rooted in the practice of acousmatic music. Play Sequences enhance how we listen, create, and interact with sound-producing mediums, fundamentally enriching our expressive capabilities within any given system. Annette Vande Gorne's adaptation of Play Sequences builds on historical developments in acousmatic music and presents a comprehensive method that seamlessly integrates theory with practical application.

To effectively employ Play Sequences, one selects a sound-generating system—be it an electronic device, a traditional instrument, or another abstract sound source. The first step is to choose an "Energy Model," a conceptual framework categorizing sounds based on their dynamic and expressive qualities. Each model represents an archetype of energy evident in both natural and man-made contexts, this providing a unique perspective for exploring and manipulating sound properties.

Through improvisation, one explores as many sonic possibilities as the sound-generating system offers within the chosen Energy Model. This process not only trains our ears and enhances musical expressiveness on any given medium, but also inspires to push the boundaries of familiar systems and sounds.

The essence of Play Sequences involves analyzing the chosen medium, improvising upon it, and then composing with the results. While this approach is common to all forms of composition, what sets Play Sequences apart is the structured framework they provide. Their framework ensures a more effective and systematic exploration of sound that can guide the composer to fully integrate his or her physicality and emotions into the sound creation process. Vande Gorne's emphasis on this integration shifted my perspective of electroacoustic composition practice from focusing solely on sound to also including the composer's intentions and physical body.

Vande Gorne's teachings illustrate the potential of engaging with sound on a deeper, more intuitive level. They affirm that sound, even in its most abstract form, is imbued with human intent and cultural significance. This fosters a richer interaction with sound for both the composer and the listener.

Inspired by these teachings, I have been driven to explore the potential of Play Sequences and Energy Models in greater depth. This thesis aims at providing a comprehensive analysis of these concepts by examining both their theoretical foundations and practical applications. Moreover, by integrating and expanding these approaches into my own compositional practice, I am seeking to uncover new dimensions of expressiveness and engagement within my own music composition practice.

I hope this exploration will enhance my understanding and appreciation of sound, as well as of acousmatic music composition. Additionally, my aim in this thesis is to contribute to the broader discourse on how composers of all genres can be inspired to search for and use the full spectrum of sonic possibilities in their music. Especially in the realm of electronic music, where the editing process considerably reduces the necessity for instrument practice, this thesis also seeks to inspire composers to engage deeply with their craft, encouraging a practice-oriented approach to mastering and enhancing diverse compositional techniques.

1.2   Aims and Architecture of Inquiry

In this thesis I examine the capacity for Play Sequences and Energy Models to deepen musical articulation, examining this through the lens of musical intention. By bridging theoretical exploration with practical application, my inquiry showcases the transformative power of these concepts in shaping composition.

The structure of this thesis is designed to provide a comprehensive exploration of acousmatic music practice, beginning with a historical analysis that presents the theoretical foundations and traces the evolution from Pierre Schaeffer's Objets Sonores to the innovations of Annette Vande Gorne. The discussion then delves into the intricacies of "Play Sequences" and provides an in-depth analysis of "Energy Models." Subsequent sections examine the impact of these models on musical design, highlighting their potential. This is further illustrated through case studies and reflections on my personal composition processes that apply these models.

While this thesis focuses on the expressive potential of Anette Vande Gorne's ideas in acousmatic music, it is important to note that the contents are confined to this specific area. Discussions on broader aspects of acousmatic music, such as spatialization techniques or live performance practices, fall outside the scope of this work. The objective here is to deepen the understanding of how compositional frameworks can enhance depth and expressiveness in music composition practice, thus bridging the divide between theoretical concepts and creative application.

2. Historical Background

2.1 Theoretical Foundations

Annette Vande Gorne's methodology is deeply rooted in the history and development of acousmatic music. Her approach is based on a tradition shaped by pioneers such as Pierre Schaeffer, Francois Bayle, and Guy Reibel. Schaeffer's work, particularly his concept of Objets Sonores (Sound Objects) and his morphological analysis, laid the groundwork for understanding and classifying sounds in electroacoustic music. François Bayle has extended Schaeffer's foundational concepts by exploring psychoacoustic distinctions as well as the spatial attributes of sound. He advocates for a dynamic engagement with particular mediums in order to sculpt a musical aesthetic. The concept of Play Sequences was pioneered by Guy Reibel, who emphasizes dynamic interplay and exploration within sound sequences.

To fully grasp the significance and impact of Annette Vande Gorne's innovative take on Reibel's Play Sequences and the development of her Energy Models, it is crucial to consider them within the historical and theoretical evolution of acousmatic music. The following historical overview aims to offer deeper insights into the evolution of acousmatic music, emphasizing those aspects and innovations that have paved the way to Annette Vande Gorne's contributions, thereby illuminating her and her contemporaries' significant roles in the field.

2.1.1 Sound Objects and Acousmatic Listening

Pierre Schaeffer (1910–1995), widely recognized as a pioneer in electroacoustic music, transformed the musical engagement with sound through his influential volume *Traité des objets musicaux* (*Treatise on Musical Objects*). At the heart of Schaeffer's exploration lies the notion of "Objets Sonores" (Sound Objects), which posits an innovative perspective on sound by treating it as independent from its generating source and from traditional musical contexts. His "typo-morphology" tries to enable an analysis of sounds based on their inherent characteristics, such as pitch, volume, and timbre, facilitating a means for categorizing sonic phenomena.

Integral to Schaeffer's theoretical framework is the concept of acousmatic listening, an auditory experience that draws inspiration from the ancient teachings of Pythagoras. Schaeffer draws upon an age-old tradition described by Pythagoras in which disciples were described as listening to their master's teachings from behind a curtain, focusing solely on the auditory content without visual influence. This historical anecdote serves as a metaphor for Schaeffer's acousmatic approach, where the listener is immersed in a sound world devoid of visual cues, thus emphasizing the purity of the auditory experience. As Schaeffer elaborates, "in former times the device was a curtain; today, the radio and sound reproduction systems, using all forms of electroacoustic transformations, place us, modern listeners to an invisible voice, once more under the conditions of a similar experiment."[1]

This recontextualization of an ancient practice within contemporary electroacoustic music underscores the relevance of acousmatic listening in fostering a direct, unmediated connection with sound. Schaeffer delves deeper into acousmatic listening by drawing an analogy with the immersive nature of cinema:

> […] the sound recorder can make an original "take" of the sound object by adjusting the position and the setting of the microphones, just as the cinematographer or the "lighting" director in the cinema can choose the angle, the distance, the lighting for the object to be photographed. These apparent restrictions conceal immense potential.[2]

This analogy to the role of a cinematographer highlights the creative freedom of the sound artist in shaping an auditory landscape that transcends its origins. In advocating for this concept, Schaeffer calls for a move away from traditional instrumental practices and towards a more expansive exploration of musical possibilities:

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[1] Pierre Schaeffer, *Treatise on Musical Objects: An Essay Across Disciplines*, trans. John Dack and Christine North (Berkeley: University of California Press, 2017), 64. Originally published in French as *Traité des objets musicaux* (1966).

[2] Ibid., 328–29.

Our approach is therefore different from spontaneous instrumental practice [...]. What we are aiming for, in fact, is the most general musical situation possible. […] Deliberately ignoring any reference to instrumental causes or preexisting musical meanings, we seek to give ourselves over entirely and exclusively to listening, and so to come upon those instinctive pathways that lead from pure "sound" to pure "music."[3]

Schaeffer accentuates the originality of the acousmatic idea, whereby the emphasis is on the departure from the physicality of instruments towards an unmediated encounter with sound itself. His vision encourages a liberated engagement with sonic material to allow for an unprejudiced exploration of sound as a musical entity.

2.1.2 The Evolution of Sound Interaction

François Bayle (1932–) is one of the pioneers who expanded upon Pierre Schaeffer's foundational ideas, leading the way for the later development of Annette Vande Gorne's Play Sequences. While Bayle has been a key figure in the development of acousmatic music generally, this section will focus on those of his thoughts that have directly influenced the ideas of Vande Gorne.

Rather than viewing technology merely as a tool for implementing preconceived artistic visions, Bayle sees it as an integral participant in the creative process. He emphasizes the active role of technology in shaping musical aesthetics, whereby he articulates the dynamic interplay between the composer, the technology at hand, and the resulting soundscapes. Bayle focuses particularly on exploiting what he refers to as the "frayed edges of the technology."[4] This concept involves using the inherent limitations and imperfections of electronic processes to unearth unique sounds and effects.

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[3] Ibid., 69.
[4] François Bayle, "Acousmatic Morphology: An Interview with François Bayle," *Computer Music Journal* 21, no. 3 (Fall 1997): 18.

Bayle embraces these imperfections as valuable sources of creative inspiration rather than as obstacles. This approach not only promises to enrich the sonic palette available to composers, but also has the potential to deepen the listener's engagement with such music.

Furthermore, François Bayle elaborates on the notion of "acousmatic modalities," which refer to the ways sound is experienced and manipulated in acousmatic music. He, too, emphasizes a renewed focus on devices and the separation of sound from its visual source. His discourse investigates how physical and formal aspects are integrated with devices, and how they utilize archetypes and corporeal characteristics to evoke familiar sensations.

This exploration of archetypes—timeless, universal patterns that resonate across cultures—was pivotal in enhancing the understanding of music's fundamental aspects and its interaction with human operators.[5]

Bayle's contributions laid a pathway for extending the boundaries of acousmatic music. His approach toward "acousmatic modalities" and his use of archetypes laid the groundwork for future developments. Importantly, Bayle's idea of archetypes was the foundational stone for Annette Vande Gorne's Energy Models, which further systematize the interaction between human expressiveness and sound creation. These Energy Models will be discussed in greater detail below (section 4), where their potential in electroacoustic composition practice will be demonstrated.

2.1.3 Reibel's Play Sequence

Another key figure on the path from Pierre Schaeffer to Annette Vande Gorne is Guy Reibel (1936–). Reibel, not only a renowned composer but also a dedicated teacher and professor of composition, developed the concept of "Séquence-Jeu" or "Play-Sequence." Reibel's concept of "Séquence-Jeu" marked a significant shift in the teaching and practice of electroacoustic composition.

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[5] François Bayle, "Principles of Acousmatics," in *Composition and Musicology in Dialogue IV (2000-2003): L'image de son / Klangbilder. Technique de mon écoute / Technik meines Hörens,* ed. Imke Misch and Christoph von Blumröder (Münster: Signals from Cologne. Contributions to Contemporary Music 8, 2003), 17.

By highlighting the importance of musical gestures and their development over time, Reibel sought to recenter the compositional process on the dynamic engagement with sound bodies. His innovative approach emphasizes the physicality of sound production and the expressive potential of electronic music, thus bridging the gap between theoretical concepts and practical application in electroacoustic music education.

In the exploration of Play Sequences, it is crucial to clarify the distinction between a "sound *object*" and a "sound *body*," since these terms are foundational to understanding Reibel's approach. In contrast to the sound *object*, the sound *body* represents the physical or material entity that produces the sound, such as a musical instrument or an object in the environment. The sound *body* is the tangible source from which the sound emanates, yet through the process of acousmatic listening, it becomes secondary to the perceived sound *object*.[6]

As Michel Chion has explained: "The sound object is a unit of sound, a 'gestalt', which can be made up of several micro-events bound together by a form […] a harp arpeggio on the score is a series of notes; but, to the listener, it is a single sound object."[7]

Unlike methodologies of composing acousmatic music that rely heavily on the montage of sound objects and mixing tracks, Reibel's approach favors a more organic interaction. He advocates for a deep exploration of the sonic possibilities of a single sound body, determined by the optimal placement of the microphone and focused on a chosen energy model. The aim of this meticulous exploration is, through controlled gestures, to create a "writing" rich in variation, adhering to the principle of permanence–variation that is intrinsic to musical instruments.

Denis Dufour and Thomas Brando have described Reibel's Play Sequence as akin to "a very structured improvisation, not conceived as a composition but as a writing, where the detail of inflections, nuances, momentums, melodic, rhythmic and dynamic profiles, etc., forms a phrasing comparable to that of a

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[6] Michel Chion, *Guide to Sound Objects*, trans. John Dack and Christine North (2009), 32–33. Available at:
https://monoskop.org/images/0/01/Chion_Michel_Guide_To_Sound_Objects_Pierre_Schaeffer_and_Musical_Research.pdf (accessed June 12, 2024).
[7] Ibid.

school counterpoint line that no repetition, no stagnation, no arbitrary bias comes to slow down, break or deviate."[8]

Reibel's Play Sequences therefore provide a practice designed to develop a composer's listening and improvisation skills, whereby widening and training their musical ideas and concepts. A composer can train with any given medium. Once an energy model is found, the composer explores and expands both their own and the sound body's limitations through improvisation and gestural approaches, thus creating a musical sequence akin to a conversation between composer and medium.

Dufour and Brando elaborate: "In short, a Play Sequence is a musical phrase, lasting two to three minutes, obtained by a continuity of execution from a single playing mode on a single sound body, and whose constantly renewed flow respects the 'natural' characteristics of the device."[9]

Reibel's Play Sequences resonate with François Bayle's above-mentioned notions of leveraging technology's limitations and capabilities to carve new expressive paths within electroacoustic music. Both composers embrace the imperfections and challenges of their medium as catalysts for creativity. Yet Reibel's methodology extends this concept into the realm of performance, real-time sound manipulation, and the active and conscious practice and development of a composer's expressive capabilities.

The concept of Play Sequences therefore signifies an evolutionary step beyond the ideas of Pierre Schaeffer. It marks a transition from a fixed and categorically analytical approach to a dynamic, gestural interplay with sound. This shift brings the composer into an intimate encounter with the creation of sound, transforming the act of composition into an expressive dialogue. It is through this evolution that the composer redefines his or her role, a role no longer focusing on organizing and manipulating sound, but on actively participating in its organic unfolding. The creative process hence becomes a reflective performance,

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[8] Denis Dufour and Thomas Brando, Séquence-Jeu, accessed March 7, 2024, https://aecme.org/terminologie/#sequence-jeu (translation by the author).
[9] Ibid.

whereby each decision and distinction is a direct response to the sound body's behavior and inherent qualities.

Reibel's approach moves beyond the singular analysis of a sound object, as proposed by Schaeffer, to emphasize the combination of sound objects to create phrases. This perspective allows for an understanding of sequences of sound objects, leading the way to a more detailed and expressive compositional practice. Building on these ideas, Annette Vande Gorne has expanded the concept further with her innovative methodologies, as will be explored in the next section.

2.2   Vande Gorne's Innovations

The foundational work of Schaeffer, Bayle, and Reibel has been built upon by Annette Vande Gorne, whose contributions to acousmatic music represent a synthesis and evolution of those earlier composers' pioneering concepts.

In her volume *Treatise on Writing Acousmatic Music on Fixed Media*, Vande Gorne introduces the idea of "Energy Models," a concept that builds on Schaeffer's morphology and Bayle's idea of archetypes. By providing specific criteria for categorizing sound within a sequence, she effectively connects Schaeffer's detailed analysis of individual sound objects and Bayle's exploration of archetypal sound properties with Reibel's emphasis on the dynamic interplay and combination of sound objects in Play Sequences. This integration has created a comprehensive framework for understanding and organizing sound in a way that enhances both analysis and composition.

Vande Gorne's take on Play Sequences emphasizes the tangible connection between composer and sound, similar to Reibel's approach but further enriched by her incorporation of Energy Models. These models explore sound in relation to universal cultural archetypes, echoing Bayle's exploration of sound's archetypical properties and offering a deeper understanding of how sound can convey meaning and emotion across cultural boundaries.[10]

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[10] Annette Vande Gorne, *Treatise on Writing Acousmatic Music on Fixed Media* (Ohain: Musiques & Recherches, 2018), 10.

Her innovations seem to provide a more holistic view, where sounds are not isolated objects, but dynamic entities imbued with expressive potential and cultural resonance. This perspective bridges the gap between the theoretical foundations of Schaeffer's work and practical applications in composition and performance. Moreover, it reveals the evolving nature of acousmatic music as a field that is continually shaped by the interplay between technology, human expression, and cultural context.

In essence, I believe Vande Gorne's work marks a significant milestone in the acousmatic tradition, advancing the conversation started by her predecessors and opening new pathways for understanding and engaging with sound. Her emphasis on active listening and the creative potential inherent in sound manipulation challenges composers and listeners alike to explore the depths of sonic expression. She thus reaffirms the dynamic and progressive nature of electroacoustic music.[11]

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[11] Ibid.

3. Play Sequences

In section 2.1.3 of this thesis, we touched upon the foundational concept of Play Sequences as introduced by Guy Reibel, highlighting their role in redefining the compositional process within electroacoustic music through the active engagement with sound bodies. Building upon this, this section delves further into the intricacies of Play Sequences, expanding our exploration to encompass Annette Vande Gorne's contributions to this concept.

This deeper examination aims to shed light on the multifaceted nature of Play Sequences and their profound impact on the creative and expressive processes in acousmatic music. It will illustrate how Play Sequences support a more intimate and intuitive interaction between composer and sonic material.

3.1 Annette Vande Gorne's Play Sequences

Annette Vande Gorne's take on Play Sequences within the realm of acousmatic music teaching and composition goes beyond merely revisiting Guy Reibel's initial concept. She amplifies the idea, intertwining it with François Bayle's philosophy, namely, that "artists must exploit their medium's limitations as well as its capabilities. Eventually, an aesthetic vision emerges from practice, rather than being imposed from an idealistic philosophy".[12]

She takes this principle to heart, leveraging Play Sequences as a methodical means of exploration for uncovering the full spectrum of interactions possible with a particular sound body. This approach not only celebrates but also navigates the medium's inherent constraints and possibilities, thereby extending Bayle's ideas into new territories.

Vande Gorne herself describes Play Sequences as "a simple and effective means to immediately enter into the heart of musicality, through their expressive and personal relationship with sound, in the improvised continuity of a sequence charted by memory, using exploration and play, guided by musical constraints

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[12] François Bayle et al., "Acousmatic Morphology: An Interview with François Bayle," *Computer Music Journal* 21, no. 3 (Fall 1997): 14.

and limitations, using one or more sound bodies. […] In short, it's a very special relationship between the instrumentalist and their instrument."[13]

This perspective underscores the significance of Play Sequences in fostering an environment where the composer is analogous to an instrumentalist, not just playing with the sound but living through it, navigating its contours and textures with a sense of immediacy and presence.

Building on this concept, Vande Gorne also acknowledges the possibility of Play Sequences being created by a somewhat static medium—essentially by creating a temporal sound installation. In this scenario, the system is activated, performs its intended action, and then concludes.[14]

Steve Reich's "Pendulum Music" exemplifies this concept. The work involves microphones hanging on long wires and swinging like pendulums above loudspeakers, thus generating sound through feedback. The process of choosing the microphones, loudspeakers, room acoustics, and the duration and speed of the swinging is akin to actively performing and playing with a sound body. Creating a system and setting it in motion (in this case, by releasing the microphones to swing over the loudspeakers until they stop moving) can constitute a Play Sequence.

Though Steve Reich did not create his piece with the concept of Play Sequence in mind, analytically it can be seen as one or at least as an example of the process. The initial setup and activation are integral to this process, which employs an improvisational and gestural approach. If this kind of approach is involved in forming a Play Sequence, one doesn't have to actively play or interact with the medium during the sound creation.

The special case of the work "Pendulum Music" aligns with the mathematical energy model of oscillation, which will be elaborated and explained in detail in section 4.2.4 below.

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[13] Annette Vande Gorne, *Treatise on Writing Acousmatic Music on Fixed Media* (Ohain: Musiques & Recherches, 2018), 11.

[14] Personal notes of the author from Annette Vande Gorne's masterclass held in Vienna in October 2023.

Thus, Play Sequences can be created not only through direct interaction with sound bodies but also through algorithmic and generative means. This approach demonstrates that Play Sequences are more than just sequences of sound objects; they represent a versatile idea that allows for various forms of sound interaction. Particularly, setups in which the initial configuration and activation themselves form the Play Sequence exemplify how algorithmic and generative methods can be integrated. Whether through digital or analog processes, electric or traditional instruments, or even something as simple as a squeaking door being used as a sound body, all these methods have the potential of being explored to create a Play Sequence. This flexibility underscores the broad applicability of Play Sequences.[15]

Vande Gorne also explains that Play Sequences are not compositions in the traditional sense, but more like studies or explorations of sonic material through gesture. They serve as a form of ear training in acousmatic music, whereby one focuses on deep listening by closing one's eyes and wearing headphones, with the microphone acting as an extension of our ears and body. Play Sequences provide a fantastic way to create sonic material for further use in composition, processing, and montage. This methodical approach to exploring sound encourages an intimate understanding of the material, enhancing the composer's ability to manipulate and transform these sounds in more structured compositions.[16]

3.2   Gestural Dynamics

As envisioned by Annette Vande Gorne, gestures within Play Sequences adopt a pivotal role, transcending physical and psychoacoustic movements to become the essence through which a composer's intentions are communicated. These gestures give form to inner musical intentions and become a source of inspiration, connecting the composer's creative mind and the listener's experience.

Vande Gorne's philosophy reflects an immersive approach, as she states: "Insist on situating a musical idea, then vary and manipulate it for itself, bringing out the invention implicit in the gesture and memory." She emphasizes, "the

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[15] Ibid.
[16] Ibid., December 2023.

importance of gesture allied with musical inventiveness: sonic actions are not innocent; their most effective form is the sequence. Musical phenomena exist in a context moving from one state to another."[17]

This process affirms that the acoustic space is an active extension of the composer's expressive will, with the act of listening becoming an intimate exploration of the composer's artistic vision. This approach allows for an experimental exploration of sound in which the composer's interaction with the medium can yield a diverse array of sonic outcomes. By embracing the flexibility and potential of Play Sequences, Vande Gorne expands the acousmatic narrative to include both the structured analysis and the spontaneous, expressive creation of music.

The gestural language of Play Sequences is not premeditated but is rather an organic evolution that reflects a philosophy in which the composer is encouraged to fully inhabit the moment of creation. "Anticipate nothing—no pre-established plan [...] by intensely experiencing the present moment, make the sequence evolve towards an unknown future, through the memory of what has already been heard," Vande Gorne instructs.[18]

This ethos is embedded in the gestural interplay of Play Sequences, where each movement and modulation is a spontaneous response to the unfolding musical narrative, not constrained by a predetermined path but guided by the composer's intuition and memory of sounds that have preceded.

Her emphasis on the interplay of gestures used in Play Sequences breathes life into the quite static nature of sound objects, thus fusing technical execution with a rich gestural tapestry. This vitality is crucial to transforming the listening experience from an auditory process to an intimate journey, where every articulation serves as a testament to the composer's presence and intent.

This approach fosters a unique dynamic when composing acousmatic music, where the act of creation becomes similar to a conversation with sound. The composer listens and reacts, allowing the sequence to grow and transform

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[17] Annette Vande Gorne, *Treatise on Writing Acousmatic Music on Fixed Media* (Ohain: Musiques & Recherches, 2018), 12–13.
[18] Ibid., 13.

organically, propelled by the memory of past sounds and the anticipation of those yet to come. The result is a soundscape that is ever-evolving, unpredictable, and deeply connected to the immediacy of the composer's creative impulse.

Vande Gorne's emphasis on such immediacy in Play Sequences encourages composers to let go of rigid structures and instead embrace a fluid, exploratory process. This liberation of the creative process is mirrored in the listener's experience, as they too are taken on an unpredictable journey through the composer's gestural dynamics.

4. Energy Models

Building upon the foundational ideas of François Bayle, particularly his emphasis on archetypes, Annette Vande Gorne extends these concepts in her development of "Energy-Movement Models." These models enrich Vande Gorne's framework by embedding sounds within the context of universal cultural archetypes, based on the idea that sound possesses energy that moves. These models, manifested as either gestural or physical movement, are focused on the different types of movement found in nature, movement based on physical laws. This approach also draws from François Bayle's insight that our understanding and interaction with sound are deeply influenced by the ways in which sound is experienced and manipulated, rather than solely by the physical attributes of the sound source itself.

These models aim to align sound with deep-seated human experiences that transcend cultural boundaries, inspired by Edmund Husserl's phenomenological approach, which prioritizes the role of subjective experience and consciousness in interpreting phenomena. Phenomenology studies structures of consciousness as experienced from the first-person point of view. It focuses on intentionality, namely, the directedness of an experience toward an object by virtue of its content or meaning, together with appropriate enabling conditions.[19]

4.1 Sonic Archetypes

At the heart of the Energy Models lies the concept of the "Archetype," an instantly recognizable element that resonates with individuals regardless of their cultural heritage. Archetypes can be understood as fundamental sound patterns that evoke common experiences and phenomena found in nature. Examples include the sound of something falling, swinging, or bouncing—actions and events that are universally understood and can be vividly expressed through sound.

Vande Gorne identifies ten distinct Energy Models, each rooted in an archetypal idea. These models are not confined to specific sound sources, but can be expressed through various materials within the same behavior, ensuring

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[19] David W. Smith, "Phenomenology," in *The Stanford Encyclopedia of Philosophy*, ed. Edward N. Zalta (Summer 2018 edition), accessed May 17, 2024, https://plato.stanford.edu/archives/sum2018/entries/phenomenology/.

universal applicability and resonance. The "Law of Association" plays a pivotal role in this framework, guiding the categorization and interpretation of sounds based on their inherent qualities and how they relate to these archetypal movements.[20] This methodology incorporates a sense of organicism that reflects the patterns and systems found in the natural world. This organic framework is a counterpoint to the artificiality often associated with electronic music, grounding it in the principles of natural phenomena and processes.

By embracing this framework, composers are encouraged to draw parallels between the evolution of sound and the rhythmic cycles found in nature, leading to an approach that can be felt as alive and evolving. The result is music that not only exists in the realm of auditory perception, but also seems to engage with a broader, more universal context of existence and experience.

Understanding sound through Energy Models allows for a precise exploration of acousmatic music's expressive potential, offering composers a rich palette of sonic textures and dynamics to draw upon. By framing sounds within the context of these archetypes, Vande Gorne not only deepens the listener's engagement with the music, but also fosters a more intuitive and emotive compositional process.[21]

4.2   The Ten Energy Models

In the following sections, I will examine each of the ten "Energy Models" in more detail, exploring their characteristics, implications, and how they can be employed in the creation and analysis of Play Sequences and subsequently in music composition. This detailed examination will illuminate the vast expressive landscape opened up by Energy Models, further demonstrating their potential role in contemporary electroacoustic composition. Additionally, I will provide a personal approach as a practical example for experimenting with each of the ten models. These examples are suggestions based on my study and understanding of the concepts; they also offer practical insights into these concepts' application.

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[20] Personal notes of the author from Annette Vande Gorne's masterclass held in Vienna, November 2023.

[21] Annette Vande Gorne, *Treatise on Writing Acousmatic Music on Fixed Media* (Ohain: Musiques & Recherches, 2018), 13–24.

4.2.1 Percussion-Resonance

Percussion-Resonance is one of the most widely used methods of sound production, being commonly utilized in many types of musical instruments. This model involves three key components: the exciter, the resonator, and the diffuser. The exciter initiates the sound, the resonator amplifies and enriches it, and the diffuser disperses it. This model is closely related to the ADSR envelope (Attack, Decay, Sustain, Release), which describes the dynamic evolution of sound in instrumental contexts.[22]

Percussion-Resonance can be effectively employed in Play Sequences to explore the dynamic interplay between sound initiation and its subsequent resonance. The energy derived from the exciter needs to be examined carefully, including consideration of the resulting sound's characteristics influenced by gestural and rhythmic traditions.

Practical Example:

Create a Play Sequence using a grand piano and a variety of small drums. Lay the drums across the corpus and strings of the grand piano:

- Use different exciters, such as different types of mallets or your fingers, to strike the strings of the piano as well as the drums. Each will produce a sound with distinct attack and resonance characteristics.
- Use the resonant pedal of the piano to emulate a reverberation, thereby extending the *allure*, the sustaining of the sound.

Through improvisation and controlled gestures, the composer can explore a wide range of sonic possibilities given by the medium, from sharp, percussive attacks to rich, resonant tones. The composer practices thereby various means of exploiting the expressive potential of the chosen medium.

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[22] Ibid., 15.

4.2.2 Friction-Granulation

Friction-Granulation is the raw energy produced when two surfaces come into contact. Transitioning from a sliding state to a stop, it examines the unstable states and equilibria (grain) between these two poles. The model connects intention, gesture, and the resulting sounds, whereby it emphasizes the deep emotional meaning transmitted through physical gestures. This model is significant not only for musicians, but also for dancers, painters, and sculptors, since it illustrates how emotions and movements are expressed through gesture.

Friction-Granulation is ideally suited for creating Play Sequences that explore the tactile and dynamic qualities of sound production through direct physical interaction. The dynamic interplay in Friction-Granulation includes a transition from a continuous line to discrete points. The movement between these states captures the essence of frictional energy, showcasing how it can convey the idea of movement and dynamism. The factors of speed and material texture play significant roles in how friction is perceived. [23]

Practical Example:

Create a Play Sequence using your hands and a variety of surfaces, such as sandpaper, wood, metal, and glass:

- Use your hands to slide across these different surfaces, with each producing distinct frictional sounds.
- Experiment with different types of movements and gestures.
- Vary the pressure and speed of the gestural motion to transition from smooth to more granular sounds.

By employing Friction-Granulation in this manner, the Play Sequence will convey the physical intensity of the gestures, transforming the tactile interactions into auditory movement. This approach not only expands the expressive potential of the medium, but also deepens the composer's engagement with the sounds produced.

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[23] Ibid., 16.

4.2.3 Accumulation of Corpuscles

The Accumulation of Corpuscles model focuses on sound grains that exist near the threshold of auditory perception. It thus functions more globally than friction, which deals with individual or iterative grains and their transitions. In contrast to friction, the accumulation of corpuscles generates masses of grain, forming a perceptual focus on the overall sound mass rather than on individual granulations. This model emphasizes global movement and the process of accumulation over time, rather than being a static form.

The Accumulation of Corpuscles model can be effectively applied in Play Sequences to explore the dynamic interplay between individual sound particles and the resulting mass. Depending on the scale of perception, a single sound source can be perceived either as discrete corpuscular objects or as a continuous flux. This model allows composers to manipulate sound on a macro level, creating evolving patterns that highlight the accumulation process.[24]

The perception of a sound source varies with distance and context. For example, during a rainstorm, standing close to the rain allows one to hear the distinct impacts of individual raindrops, each creating its own unique sound (corpuscles). However, from a distance, these individual sounds merge into a continuous flux, the sound of a rainstorm.

Practical Example:

Create a Play Sequence using the sound of rain:

- Use a microphone and wear headphones to closely monitor the sound. Use the microphone as an extension of your body.
- Capture close drops: Move the microphone close to capture the distinct sounds of individual raindrops hitting various surfaces. These are the discrete corpuscles, each with its unique sound.
- Gradually move the microphone away to blend the raindrops into a more continuous soundscape, creating a flux where individual drops merge into a cohesive auditory pattern.
- Vary the movement and speed of the microphone to explore the transition between corpuscles and flux, emphasizing the accumulation process.

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[24] Ibid., 17.

By engaging in this exercise, the composer practices manipulating the perception of sound, highlighting the transition from individual particles to a unified mass. This method not only expands the expressive potential of the medium, but also enhances the listener's engagement with the evolving soundscape.

4.2.4 Oscillation

Oscillation is a mathematical model describing a physical phenomenon: the physical law of the pendulum. Oscillation involves two mechanisms of energy entering into a pendulum movement. A triggering gesture sets the physical law into force, creating an encounter between that gesture and the physical law, thus forming the model.

Oscillation in sound creation can be understood through its variables, such as speed, density, frequency, spectra, stereo field, and illusory depth. The key to effectively using this model lies in being within the sound, rather than superficially manipulating the sound body. This ensures a more immersive listening experience. The variability in models defined by the law of the pendulum does not depend upon the sound itself, but upon the different factors acting variably upon the physical law.

The oscillation's effectiveness depends on the number, weight, and positioning of exciters, the force applied, and the duration of the oscillation.[25]

As confirmed by Annette Vande Gorne, Steve Reich's composition "Pendulum Music," as discussed above in section 3.1, aligns with this Energy Model. The physical gesture is reduced to that of triggering, and its auditory perception, to that of minimal variations in predictable temporal behavior.[26]

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[25] Ibid., 18.
[26] Annette Vande Gorne, personal communication.

Practical Example:

Create a Play Sequence using a guitar and several small sticks like pencils or chopsticks:

- Insert the small sticks between the strings of the guitar so that if a stick is struck, it bounces back and forth between the strings, creating oscillations.
- Create variations by inserting the sticks at different locations between the strings of the guitar. Adding weight to the end of a stick may increase the duration of the bouncing.
- Ensure that the speed of bouncing doesn't decrease too noticeably. A constant oscillation is needed and the sound should extend over a good length of time.
- Position two microphones, one over the bridge and another over the body of the guitar, to create a stereo image.
- Excite each of the various sticks individually and listen, allowing each one to oscillate for a period of time before exciting another one.

This setup is an example that explores the Oscillation model in a practical context, emphasizing the dynamic interplay between the exciter and the resonator and the resulting Play Sequence.

4.2.5 Swaying/Swinging

Swinging/Swaying, or "Balancement," is a fundamental mechanism in which energy enters oscillation. This involves a deliberate, alternating gesture that creates various forms of swinging or swaying movements. Unlike the regular, mechanical motion of oscillation, swinging/swaying is characterized by slower, irregular, and gestural movements between two poles.

The continuous motion between these poles can be linked to Pierre Schaeffer's concept of "*allures*," which relates to the sustainment of sound. The factors influencing this model include speed, density, frequency, spectra, stereo field, and illusory depth.

Swinging/Swaying can be effectively incorporated into Play Sequences to explore the dynamics of sound movement and trajectory. The deliberate control of the gesture, along with the choice to either relaunch the swing or let the movement naturally come to a stop, introduces variations that capture and maintain the listener's attention.[27]

Practical Example:

Create a Play Sequence using a long, suspended metal plate and a soft mallet:

- Suspend a large metal plate so it can swing freely. Place two microphones on either side to capture the motion.
- Gently strike the metal plate with a soft mallet to start the swinging motion. The initial strike should be strong enough to set the plate into motion but not so hard as to create a harsh sound.
- Vary the gestures: Control the swing by gently pushing the plate at different intervals, changing the speed and intensity of the pushes. Observe how the sound changes with each variation.
- Adjust the microphones to capture the full stereo field and the illusory depth of the swinging motion, ensuring that the trajectory of the sound between the two poles is clearly audible.

Through this process, one can explore the delicate interplay of gesture and sound, creating a dynamic and engaging Play Sequence. The expressive potential of this Energy Model is underlined by the emphasis on the gestural control over the physical law of swinging.

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[27] Ibid., 19.

4.2.6 Rebound

Rebound is an Energy Model that describes the physical phenomenon of repeated impacts against a single pole, with predictable acceleration and diminishing intervals between impacts. This model follows the physical law of rebound, in which a triggering gesture sets a force into motion. The variability of the triggering gesture's force influences the resulting sounds, with the rebound's speed and harmonic halo creating perceptual variations. The iterative nature of the rebound involves regular, mechanical repetitions with accelerating speed and rising pitch as the rebounds increase.[28]

Rebound can be effectively employed in Play Sequences to explore rhythmic and melodic profiles created by repeated impacts. By manipulating one or more sound bodies against different surfaces, composers can vary the color and sound of the impacts. The mathematical unfolding of the rebound model, whether allowed to run its course or controlled through gestural intervention, provides a dynamic framework for creating expressive and engaging auditory experiences.

> Practical Example:
>
> Create a Play Sequence using a rubber ball, a tennis ball, and a ping pong ball, combined with a variety of surfaces such as metal, wood, and glass:
>
> - Place several surfaces (e.g., metal, wood, glass) on the floor or a table.
> - Initiate movement: Drop a ball onto the metal surface, observing the initial impact and subsequent rebounds. Note how the intervals between impacts diminish as the rebounds accelerate.
> - Vary the gestures: Introduce variability to the force of the drop by varying the types of balls and the height from which the balls are released. Experiment with dropping the balls onto different surfaces to observe changes in the color and sounds created.
> - Control the rebound: Allow the balls to follow the law of rebound until they naturally come to a stop, or retake control by catching a ball and releasing it again with a different force and angle to create a diverse range of sounds.

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[28] Ibid., 20.

Through this process, one can explore the rhythmic and melodic potential of the rebound model, creating a Play Sequence that highlights the dynamic interplay between gesture and sound. The emphasis on controlling or allowing the natural unfolding of the rebound motion underscores the expressive potential of this Energy Model, making it a valuable tool in acousmatic composition.

4.2.7 Flux

Flux refers to continuous and gradual variation, characterized by minimal energy and a homogeneous nature with a very low rate of change. It focuses on sustaining and directing attention despite a lack of distinct contours or frequent musical shifts. This model is particularly associated with the uninterrupted output of analogue synthesizers of the 1970s, which lacked pulsations and were constructed from interconnected modules. Flux stands in contrast to the scales or pulses of traditional instrumental music and emphasizes a state of constant change that is both subtle and enduring.

Flux can be utilized in Play Sequences to explore the idea of seamless, ongoing transformations. This model involves creating a sound environment in which change happens so gradually that the sound environment seems almost static although it is constantly evolving. The challenge lies in maintaining listener engagement despite the minimal degree of variation. Introducing slight, unexpected variations, or "accidents," can refresh and sustain interest.[29]

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[29] Ibid., 21.

Practical Example:

Create a Play Sequence with a synthesizer and a series of long, sustained tones:

- Use a synthesizer capable of producing continuous tones. Set the synthesizer to generate a long, sustained note.
- Begin with a single tone, gradually adding tones and changing them, adjusting parameters such as pitch, filter, and modulation. Ensure that the changes are slow and smooth to create an impression of constant but minimal variation.
- Vary the gestures: Introduce subtle changes into the sound by adjusting the synthesizer's settings. For example, slowly alter the cutoff frequency of a low-pass filter or gradually change the waveform shape. The key is to make these changes almost imperceptible, ensuring a fluid transition from one state to another.
- Introduce "accidents": Occasionally introduce small, unexpected variations to maintain listener interest. This could be a sudden, brief change in pitch, a slight modulation in amplitude, or an abrupt shift in the harmonic content. These "accidents" serve to re-engage the listener's attention without disrupting the overall continuity.

By employing the flux model in this manner, one can create a Play Sequence that embodies the principles of minimalism and continuous transformation. For this Play Sequence, a longer duration is needed than for the preceding ones, so that the sequence can develop over time. This approach highlights the subtle, evolving nature of sound and challenges the composer to maintain a delicate balance between constancy and change, making flux a powerful tool in the realm of composition.

4.2.8 Pressure-Deformation

Pressure-Deformation, or flexion, describes a continuous back-and-forth energy evolution and transformation, particularly in spectra during the application and release of force. This model involves two poles with an audible trajectory between them, reflecting continuous variation. An example of this concept is an upside-down glass plunged into and removed from water, which demonstrates the transformation of force and sound. The *allure* or sustained quality of an instrument like a jaw harp or musical saw can also represent this model if the motion is slow and varied.

Pressure-Deformation can be applied in Play Sequences to explore the dynamic interplay between continuous forces and the resulting transformations in sound. The model emphasizes the trajectory and evolution of sound as pressure is applied and released, allowing for rich variations in spectral profiles. This approach is particularly useful for creating an evolving Play Sequence that captures the gradual change in energy.[30]

Practical Example:

Create a Play Sequence using a metal bowl and water:

- Setup: Place a metal bowl on a stable surface and fill it with a small amount of water.
- Use a soft mallet to gently strike the metal bowl, or a violin or cello bow to excite the bowl, producing a resonant sound. This will initially generate a sound with a distinct pitch.
- Introduce flexion: Slowly tilt and move the bowl so that the water inside shifts. This movement will cause the pitch and resonance of the bowl to vary as the water level changes in different areas.
- Trajectory: Experiment with different tilting speeds and directions to explore the range of sounds produced by the flexion of the bowl and water combination.

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[30] Ibid., 22.

Through this process, one can create a Play Sequence that embodies the principles of Pressure-Deformation. By focusing on the audible trajectory and the gradual evolution of sound, the bowl's material and the water's movement creates a combination of gestures, resulting in a Play Sequence.

4.2.9 Rotation

Rotation is a model of a movement and method that can be applied to other modules such as friction. It is perceived as cyclic repetition, simulating rotation through sound. The model emphasizes spatial manipulation, using two or more loudspeakers to create a three-dimensional effect or real movement in multiphonic setups. Rotation is characterized by continuous periodic movement, which can become a figurative illusion of movement, a typical acousmatic effect. Criteria for varying rotation include speed, frequency, and spatial positioning.

Annette Vande Gorne emphasizes the significance of rotational movement in acousmatic music, stating, "if there is one archetype that is the most common, it is indeed movement in rotation and its geometrical shape of the circle. So much so today that positioning loudspeakers around and above the audience in concentric circles is considered self-evident for spatialising 8, 16, 24 or 32 channel multiphonic works."[31] This highlights how fundamental the concept of rotation has become in contemporary sound spatialization, where such arranging of loudspeakers in concentric circles has become a standard practice for creating immersive, multiphonic soundscapes.

The rotation model has also a repetitive attribute: By looping a short passage and imagining a circular movement, composers can create the illusion of rotation. The repetitive nature of rotation allows for intricate patterns and textures, making it a valuable tool in the acousmatic composer's arsenal.[32]

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[31] Ibid., 23.
[32] Ibid.

Practical Example:

Position 4 microphones in a square formation, pointing upwards near the floor, for a 4-channel recording setup.

Stereo Setup:

Mic 1: Hard pan left, -1.5 dB

Mic 2: Opposite of Mic 1, hard pan right, -1.5 dB

Mic 3: Front, center pan

Mic 4: Back, center pan, -6 dB, add reverberation to imitate distance

- Take an electric toothbrush or shaver and suspend it on a string above the microphone setup.
- Use both hands to initiate a circular movement of the toothbrush or shaver above the microphones.
- Vary the speed, direction, and distance of the toothbrush/shaver to create different impressions of movement.

This setup allows one to explore the rotational Energy Model, creating an immersive and dynamic soundscape that highlights the cyclical and repetitive nature of rotation.

4.2.10 Spiral

The spiral model builds on the concept of rotation but includes a gradual variation in speed, either accelerating towards a higher frequency or decelerating towards a lower one. This variation in speed creates a dynamic and evolving melodic profile that distinguishes the spiral from a simple rotation.

This model can be used to create evolving soundscapes that change over time, adding depth and complexity to the composition. By manipulating the speed and direction of the movement, composers can craft sounds that either intensify or relax, leading to a sense of progression.[33]

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[33] Ibid.

4.3 Classification of Forms of Energy

Material energies emphasize the importance of the matter and morphology of sound in perceiving energy. Examples of these energies include Percussion-Resonance and Friction, where there is global control of sound material. Accumulations of Corpuscles, representing mobile energy forms, and Flux, representing immobile energy forms, also fall under this category.

Gestural energies are characterized by a clear derivation of sound from a physical gesture. This category includes Friction, Swinging/Swaying, and Rebound, where the gesture is obvious and the sound is a direct result of the movement. These energies can be divided into trajectories (representing mobile forms of energy) and stasis (representing immobile forms of energy), as seen in Rotation, Spiral, Pressure-Deformation, and Flux.

Energies governed by physical laws provide a certain degree of predictability. These include Oscillation and Rebound, where the regularity of the movement or impact follows a specific pattern. Such energies are predictable due to the inherent physical laws that govern their behavior, ensuring a consistent and reliable response from the sound materials involved.[34]

4.4 Similar Concepts: Temporal Semiotic Units (TSUs)

Building upon the classification of forms of energy in Vande Gorne's Energy Models, it is important to note that similar concepts have been developed over the years by various researchers and composers. One notable example is the Temporal Semiotic Units (TSUs), developed by a team of researchers at the Laboratoire Musique et Informatique de Marseille (MIM) in 1991. TSUs are just one of many approaches to categorizing and analyzing sound in electroacoustic music, all offering distinct perspectives on sound segmentation and meaning. These units focus on the temporal meaning and kinetic effects of sound figures, closely aligning with Vande Gorne's conceptual approach.[35]

Comparing TSUs to Annette Vande Gorne's Energy Models reveals several interesting similarities as well as differences. The MIM researchers have

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[34] Ibid., 24.

[35] Xavier Hautbois, "Temporal Semiotic Units (TSUs): A Very Short Introduction," in *Laboratoire Musique et Informatique de Marseille*, accessed June 17, 2024, https://www.labo-mim.org/site/index.php?2013/03/29/225-temporal-semiotic-units-tsus-a-very-short-introduction.

identified 19 TSUs, including Braking, Chaotic, Divergent, Falling, Floating, and Waves, while Annette Vande Gorne's Energy Models have 10 distinct categories, such as Percussion-Resonance, Friction-Granulation, and Oscillation, as described above. There are similarities in the names and conceptual foundations of the models; for instance, the TSU Waves aligns conceptually with Vande Gorne's Swaying/Swinging model, both emphasizing rhythmic, repetitive motion. Additionally, the Compressing-Stretching Out TSU can be compared to Vande Gorne's Pressure-Deformation model, which also involves a continuous evolution between two states through the application and release of force. Both models focus on the dynamic and temporal progression of sound, highlighting changes in energy and morphology over time.

TSUs use morphological and kinetic characteristics to define sound segments, considering factors such as duration, reiteration, phases, sound matter, acceleration type, and temporal progression, making TSUs very similar to Annette Vande Gorne's categorization method. Both TSUs and Energy Models classify sounds based on their temporal and dynamic characteristics, focusing on how combined sound objects develop over time.

A significant distinction between the two methodologies is the emphasis on real-time practice. Annette Vande Gorne's methodology includes the real-time practice of creating Energy Models using Play Sequences, thereby connecting practice and theory. This hands-on approach allows composers to engage deeply with their materials, exploring and manipulating sounds in real time. In contrast, TSUs primarily focus on the analysis and categorization of pre-existing sound segments, without an emphasis on real-time interaction or improvisation.

In summary, TSUs and Energy Models represent different yet complementary approaches to analyzing and categorizing sound in electroacoustic music. While TSUs focus on the temporal and kinetic effects of sound figures, Play Sequences with Energy Models emphasize the dynamic and expressive qualities of sounds through real-time interaction and improvisation.

5. Impact on Composition Practice

The previous sections have laid a comprehensive foundation by exploring the theoretical underpinnings and practical applications of Annette Vande Gorne's Play Sequences and Energy Models. We have examined their historical development, the evolution of sound interaction, and the impact of these concepts on the understanding and manipulation of sound. This chapter builds on that foundation to examine how these ideas translate into concrete compositional practices, thereby enhancing the expressive potential and expanding the sonic palette of contemporary composers.

While Vande Gorne's focus in her *Treatise* is primarily on the pedagogical and exploratory aspects of Play Sequences with Energy Models, the implementation of these ideas into compositional practice is a crucial area of inquiry. Although Vande Gorne provides insights into montage techniques and various compositional approaches in other chapters of her *Treatise*, the Play Sequences themselves offer a plethora of composition applications. This chapter aims to explore these applications in detail, drawing from my personal experiences and observations.

The purpose of this chapter is to investigate how Play Sequences and Energy Models influence my personal compositional practices. By examining the methodologies, techniques, and outcomes associated with these concepts, I aim to point out their transformative impact on the creative process. Through practical examples, case studies, and personal reflections, I try to illustrate how integrating Play Sequences into compositional work can lead to new musical outcomes.

5.1 Understanding Vande Gorne's Approach

In this section, I will explore Annette Vande Gorne's approach to acousmatic music composition, as illustrated in the provided graphic. The graphic, which I have reconstructed based on a graphic found in Vande Gorne's *Treatise on Writing Acousmatic Music on Fixed Media* (p. 11), outlines her comprehensive workflow for creating a piece of acousmatic music. While the graphic may suggest a linear progression, it is essential to understand that Vande Gorne's approach is inherently interoperable, with no fixed path or pre-established plan. This flexibility

aligns with the concrete approach she emphasizes, distinguishing it from instrumental composition.[36]
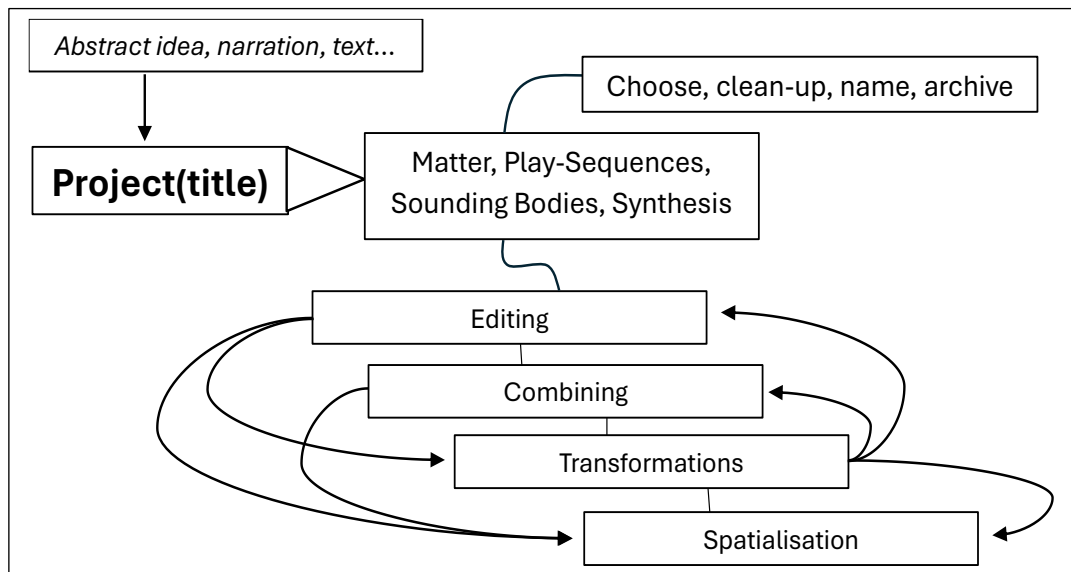
The process involves an abstract idea, narration, or text that serves as the conceptual foundation of the project. This initial concept is formalized into a project with a specific title, giving a defined scope and direction to the work. Vande Gorne emphasizes the importance of "matter," which includes Play Sequences, sound bodies, and synthesis techniques. These elements form the core materials for the composition.

The sound materials are chosen, cleaned up, named, and archived to ensure they are well-organized and ready for use. These sound materials can undergo editing to refine and shape them according to the project's needs.

These steps—conceptualizing, categorizing, choosing, cleaning up, naming, archiving, and editing sound materials—can occur in any order and are revisited as necessary. The materials are combined, integrating various sound elements into a cohesive whole. Transformations of the sounds achieve the desired artistic effects, adding depth and complexity to the composition. These combined and transformed sounds can be edited and combined further. Spatialization, that is, placing the sounds within a three-dimensional auditory

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[36] I would like to thank Annette Vande Gorne for her remarks and suggestions regarding this section 5.1, and for her direct clarification on several points.

space, can also occur at any stage, enhancing the listener's experience from the beginning of the process.

Crucially, Vande Gorne's approach is characterized by the interoperability of these stages. There is no fixed path in advance; this flexibility is a fundamental aspect of the concrete approach, distinguishing it from instrumental composition. This approach allows for a fluid and dynamic workflow in which stages can be revisited and reworked as needed.

Annette Vande Gorne elaborates that the concrete approach to acousmatic music is fundamentally about the manipulation and transformation of recorded sounds to create new auditory experiences. She highlights the importance of the process being non-linear and iterative, whereby spatialization and sound transformations can occur at any point during the composition process.

Inspired by these insights, my composition method has changed significantly. I now place a substantial emphasis on the aspects of improvisation and real-time sound manipulation, not only for the creation of Play Sequences but also and especially for the composition process. This fosters a spontaneous and dynamic interaction with the sound materials. Play Sequences are not just a part of the initial "matter," but are continuously revisited and reworked throughout my composition process. They serve as both a creative foundation and a dynamic element that evolves with the composition.

Additionally, my approach prioritizes the flow of the Play Sequence, ensuring that the piece tells a coherent story through its evolving soundscapes. This focus is particularly important in my work across different genres, where storytelling through sound plays a central role.

5.2   Enhancing Expressiveness

In my experience, the use of Play Sequences has significantly enhanced my expressive capabilities as a composer, as it has encouraged experimenting with and exploring the vast potential of sound bodies. One of the fundamental ways this is achieved is through the deliberate imposition of limitations, a step that surprisingly fosters creativity and innovation. When I restrict myself to working with a single sound or a minimal set of resources, I am compelled to explore every

possible nuance and variation of that sound. This approach not only deepens my engagement with the material, but it also leads to unexpected discoveries and creative breakthroughs, enriching my compositional process.

Additionally, this method has transformed my teaching approach, particularly in teaching musical phrasing. By explaining Energy Models and Play Sequences to my piano and vocal students, we explore how these methodologies can be used to analyze and interpret music from any epoch and style. This not only enriches their understanding of music, but also provides a practical framework for interpretation, allowing them to approach pieces with a refreshed idea of musical expressiveness.

By using Energy Models and Play Sequences, composers and performers alike can reintroduce the notions of phrasing and breath, notions central to traditional music, particularly vocal music. Historically, musical phrasing has been intimately connected to the act of singing, where breath naturally dictates the flow and structure of phrases. As a composer with a background as singer, I have always found phrasing to be a crucial aspect of musical expression. However, the development of electronic music and its associated devices liberated music from the constraints of natural phrasing, allowing for continuous, uninterrupted sound production.[37]

Initially, this disconnect due to my personal experience made my electroacoustic compositions quite static and quite boring, although I tried to overcome that by using a maximalist approach, ensuring that no part of the sonic canvas was left unpainted. However, that approach didn't help. Introducing the concept of Sound Objects along with the use of Play Sequences into my workflow has revitalized my compositions by reintroducing the idea of musical phrasing. The practice of creating Sound Objects within a musical sequence naturally lends itself to phrasing, allowing for pauses, breaths, and a more organic flow of sound.

Moreover, specific Energy Models, such as Flux, extend the concept of phrasing over longer periods. In Flux, the continuous and gradual variation of sound can still guide the listener's ear toward moments of rest or breath, even

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[37] Personal notes of the author from Annette Vande Gorne's masterclass held in Vienna in April 2024.

within an extended timeframe. This approach ensures that the music maintains a sense of direction and purpose, as well as a more expressive and dynamic range.

In my work, I have always sought to make electronic music expressive, finding ways to imbue it with a sense of "breath" and natural phrasing. The concept of Sound Objects and the use of Play Sequences have been instrumental in this pursuit. I have gained a deeper understanding of musical expression and expanded my possibilities for creating what I believe to be more dynamic and engaging compositions.

5.3   Methodological Shifts

Integrating Play Sequences into my compositional practice has also brought about significant methodological changes. One of the most profound shifts is an increased emphasis on improvisation and real-time sound manipulation through practice. This approach has allowed me to engage more deeply with the sound material, exploring all its possibilities in the moment.

Since Play Sequences emphasize training and practice, their improvisational and exploratory nature results in the creation of a wealth of material, offering a wide variety of sounds. When I need a specific sound, like a "swoosh", I turn to my friction studies, select a Play Sequence, and search within it for the perfect "swoosh" sound for my composition. This selective process enables me to explore and categorize the musical material previously created as Play Sequences with Energy Models, thereby making my workflow smoother. While creating Play Sequences initially seems time-consuming, it ultimately saves time during the montage and composition phases. The detailed exploration and categorization of sound objects has streamlined my creative process, enabling me to craft my works with greater ease and precision.

5.4   Development of Listening

As mentioned above, using Play Sequences and Energy Models has introduced me to a new form of ear training for sound objects and musical phrasing in the acousmatic context. By closing my eyes, using headphones, and employing a microphone as an extension of my body, I practice focused listening. Just as we have distinctive intervals between notes with a limited number, I can now use

Play Sequences and Energy Models to understand and create sounds and relationships between them.

In her classes, Annette Vande Gorne engages in a deep analysis of Play Sequences, challenging the participants to discern the subtleties within: "Is it too long, or too short? Does it speak to you? Do you hear the gestures? Is there a dynamic flow that feels musical?" Such questions have not only honed my listening skills but have also deeply influenced my approach to composing electroacoustic and acousmatic music. Vande Gorne encourages immersing oneself fully in the interaction with the sound body, often advising one to "close your eyes when creating a Play Sequence, if possible. With your eyes open, your hearing is reduced; if you close them, your hearing is used 100%."[38]

Incorporating Annette Vande Gorne's ideas into compositional practice trains both the ear and the inner ear, enhancing one's overall listening skills. Play Sequences develop the inner ear by encouraging one to imagine what will ensue and remember what has preceded, fostering the imagination and courage needed to engage with the right input at the right moment. This improvisational skill is trained and established through engagement with Play Sequences, which enhances one's ability to respond creatively and effectively in real time by listening closely to one's own musical actions as well as one's inner ear.

By integrating these focused listening practices into my compositional process, I've found that my enhanced listening skills lead to more detailed compositions. The act of actively engaging with listening while creating sound through Play Sequences allows for a richer understanding of a composition's potential.

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[38] Personal notes of the author from Annette Vande Gorne's masterclass held in Vienna in October 2023

5.5   Implementation into Composition

Play Sequences provide a multitude of possible use cases. Indeed, I am continually discovering new ones each time I engage with this concept. While Play Sequences are undoubtedly a great way of sound creation and training in improvisation and listening, I have found that they provide even more possibilities in my composition process. I have identified three key types of use cases, which I call Active, Passive, and Merged Use Cases.

By integrating these various use cases of Play Sequences into my compositional process, I have expanded my creative toolkit, allowing for a more versatile approach to music creation. Each method offers unique possibilities, contributing to the richness and depth of the final composition. In the following sections, I provide examples of the above three types of use cases.

5.5.1   Active Use Cases

Active use cases involve direct, real-time manipulation of sound. I consider creating a Play Sequence itself also an active use case, since it requires hands-on engagement and improvisation. Additionally, there are other active use cases in which the sound is already created but needs further manipulation, such as filtering, panning, or other modifications. In these scenarios, I apply the principles of Play Sequences to enhance and refine the sound in real time.

Active use case example:

Using a controller for active and real-time modulation

- Instead of drawing a modulation, I improvise using a controller with knobs or faders to manipulate sound over time.
- This method relies on the training of improvisation and expression developed through working with Play Sequences.
  The hands-on approach allows for more intuitive and expressive sound manipulation, enhancing the dynamic qualities of the composition.

5.5.2 Passive Use Cases

The basic form of passive use cases involves looking for a sound object in a Play Sequence by actively imagining the composition and finding the sounds needed.

In this way, the Play Sequence serves as a provider of sound material. However, passive use cases can extend beyond this simple function.

I have found I can use Play Sequences as foundational elements within a composition, leveraging their inherent structure, dynamics, and form without active real-time manipulation. Such passive use cases focus on integrating whole Play Sequences or parts of them to provide a temporal, dynamical, and formal framework for the composition.

By utilizing the established qualities of Play Sequences, composers can maintain coherence and structure while exploring creative possibilities within the defined parameters.

Passive use case example:

Using multiple Play Sequences for polyphony

- Layering Play Sequences to create a specific polyphony of sound.
- If each Energy Model remains distinct, this approach results in a multilayered experience, with the motion and expression of two or more Play Sequences intertwining polyphonically.
- This method can enrich the texture and depth of the composition by adding complexity and interest.

Another example of a passive use case:

Using Play Sequences as a temporal, dynamic and formal template

- Construct a composition around a Play Sequence to maintain its rhythm, pace, and phrasing.
- This framework ensures that the piece retains a cohesive structure while allowing for creative exploration within that structure.
- Additionally, this method involves using the temporal dynamics and form of the Play Sequence and applying montage techniques with sound objects to enhance and characterize the sequence.
- By carefully selecting and positioning sound objects, one can accentuate the inherent temporal flow of the Play Sequence and bring out its unique qualities.

5.5.3 Merged Use Cases

Merged use cases involve integrating both active and passive approaches to create more complex and dynamic compositions. These methods leverage the strengths of both real-time manipulation and pre-existing material.

By merging these techniques, it is possible to create compositions that are rich in texture and depth, benefiting from both the structure provided by the Play Sequences and the freedom of real-time improvisation. This hybrid approach enables a more fluid and responsive and interactive compositional process.

Merged use case example:

Improvising onto another Play Sequence

- Combining active and passive approaches, improvise onto an existing Play Sequence.
- This method involves using a Play Sequence as a foundational layer and then performing and recording a new Play Sequence on top of it.
- This approach not only enhances the existing material, but also allows for spontaneous creativity and dynamic interaction between the layers.

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6. Reflection on a Personal Project

In this section, I will elaborate on a specific composition of mine in which I have utilized Play Sequences to explore their possibilities in my compositional practice. The piece, titled "*Anima Dei Per Machina*," exemplifies the integration of Play Sequences and Energy Models into my music.

By examining this work in detail, I aim to showcase the practical application of the theoretical concepts discussed above, highlighting how they enhance expressiveness, structure, and depth in my music.

6.1   The Initial Concept

In my composition series "*Anima Dei per Machina*," I aim to depict the intricate and evolving relationship between nature and technology, with "God's soul" representing humans, nature, and all living things, and the "machine" symbolizing technology. The title, translating to "God's Soul Through the Machine," reflects

the transformation and merging of these two realms. Each composition in this series is dedicated to one of the elements: water, earth, wind, and fire.

The piece I will discuss here is "*Anima Dei per Machina, I. Aqua.*" This composition uses the different states of water to illustrate the above transformative process between nature and technology. The journey begins with a small creek, which then grows, transforms, freezes, and ultimately is polluted by humans. The creek represents the serene state of water. Using Play Sequences and Energy Models, in the first part I have tried to evoke the various natural phenomena inherent in water, symbolizing the purity and primal beauty of God's soul—humanity and nature.

As the composition progresses into the second part, machine-like and technological elements are gradually introduced. These sounds begin to fuse with the natural phenomena using montage techniques, reflecting the growing influence of technology. This phase represents the tension and interplay between nature and machine, as technological advancements reshape the natural environment. Here, the water becomes affected by human activity, symbolized by pollution, and the transformation begins.

In the third part, the composition reaches a pivotal point in which the machinal elements become normalized, representing the new natural order. Using the Energy Model Flux, I tried to fuse these realms with the aim of making the machinal world the new normal, illustrating the path in which technology becomes an intrinsic part of the natural world. The journey of water continues as it is released into a wild white-water river, with its energy directed toward the vastness of the ocean, where it ultimately succumbs to the ocean's immensity.

In "*Anima Dei per Machina, I. Aqua*," I explore the dynamic interplay between the organic and the synthetic, portraying a vision of unity and co-existence in which technology transforms and integrates with the essence of life itself.

6.2   Reflection on the creative process

The initial recording that set off this journey and formed the foundation of the dynamic structure and form of the first part of my composition is a Play Sequence I created in Marseille, France, in April 2024. As I sat by the ocean making field

recordings, I listened to the water breaking and cracking on the rocky shoreline. Inspired by the motion, I perceived it as a Play Sequence, aligning with the Energy Model Friction. Enchanted by the inherent motion of the ocean, I decided to interact playfully: observing the waves closely, I moved the microphone through the air, mimicking the waves' motion. This resulted in phase shifting and L/R panning. Additionally, by moving the microphone into different cracks and holes in the rocks, I discovered various resonant bodies that represented the waves anew. While I did not know it at the time, this Play Sequence would become the foundation of the first composition in my *Anima Dei per Machina* series.

It was during this initial recording session that the concept for "*Anima Dei per Machina*" began to take shape. I imagined using Play Sequences to create a soundscape that becomes increasingly distorted through the application of montage techniques. I planned to use very specific sounds, such as kick drums, snares, and hi-hats, combined with a vast arsenal of sounds created using FM and AM synthesis—to represent machines created by humans.

This process was challenging, since it involved creating a soundscape that is generally associated with specific other genres, but I believed to have found a means for merging these worlds into a new hybrid one—always relying on the progressive nature and unpredictability of the rhythm of a Percussion-Resonance Play Sequence.

This approach seems to have the potential for seamlessly blending natural and synthetic elements to create a dynamic interplay that evolves throughout the composition I have envisioned.

6.3   Technical Executions

The composition process began by importing the Play Sequence I created at the ocean in Marseille into a DAW project and building upon it. Initially, I applied the passive use case as described above in section 5.4.2: using a Play Sequence as a temporal, dynamic, and formal template.

At the zenith of the first wave, I briefly interrupted the wave with a Sound Object from a Percussion-Resonance Play Sequence I created while studying this Energy Model, as explored with the setup described in section 4.2.1 Percussion-Resonance. Additionally, I incorporated an FM bass synthesizer to

emphasize the dynamics and expressive motions of the waves. This approach allowed me to change the energy and expression of the unfolding waves and dynamics of the initial Play Sequence over time.

I then incorporated a recording of a creek I made while hiking in the Austrian Alps. Using granulation and tap delay, I applied the active use case described in section 5.4.1, where I manipulate and improvise using a knob to map a Play Sequence onto the modulation and mix of the desired effect. By employing tap delay and granulation, I extended a single drop of water into a prolonged, lasting sound object, culminating in a Friction Model-like state. Through delicate mixing of these two states in an active approach using the knob, I aimed to incorporate the Accumulation of Corpuscles Energy Model. This allowed me to enhance the expression of each wave while maintaining the dynamics of the initial recording.

The composition process continued with the delicate montage of additional Play Sequences. I incorporated a variety of field recordings, including a study of the Rotation Model, a study of the Swaying/Swinging Model, and a delicate-sounding study of the Percussion-Resonance Model, in which I used a leaf stuck between the twigs of a tree as the sound body for the Play Sequence. These elements were carefully integrated to bring a sense of dimension into the initial setting of the composition.

Applying the passive use case described in section 5.4.2, I used a polyphonic approach, employing multiple Play Sequences to create a vast tapestry of sounds that continuously culminate in the next big wave of the initial Play Sequence. Despite many different sound objects being included to form the accumulation, making it not strictly an Accumulation of Corpuscles as described by Vande Gorne, the desired effect of depth, dimension, and dynamic expression as described and studied with this Energy Model was achieved to my satisfaction.

Throughout part one of this composition, I continued this process, enhancing and growing in energy while always focusing on the dynamics of the initial Play Sequence. It is important to note that by the end of the composition process, the initial Play Sequence from Marseille was no longer in its original form. I used montage techniques to adjust dynamic points necessary for the

progressive development of my composition. However, the fundamental Play Sequence and its dynamics remained the central focus throughout the work's first part.

Within the first three minutes of the composition, I managed to transition from a natural feeling to a more synthetic and mechanical character, thus moving towards the second part of the composition. In the second part, I introduced the mechanical human aspect into the composition by using sounds such as Kick, Snares, and High Hats. While such sounds have been used excessively in certain genres, as mentioned above, mapping them onto a Percussion-Resonance Play Sequence focused on unpredictable rhythms enabled me to provide them a different perceptual perspective. This process was done primarily through montage. Throughout the second part, I continued focusing on the dynamics of the waves of the initial Play Sequence. The resulting waves of sound are always long and rising in energy, but are continuously interrupted by the heavily montaged Percussion-Resonance Play Sequence.

Finally, in the third and last part, I focused on creating a Play Sequence with the Energy Model of Flux. The state is constantly changing but in a slow pace, always rising in dynamics, speed, and expression, resulting in a final impact of a wave, bringing the composition to an end.

6.4   Creative Results

In the above description of my composition "*Anima Dei per Machina, I. Aqua*" I have attempted to show its integration of the theoretical concepts and practical techniques explored in this thesis. By leveraging Play Sequences and Energy Models, I have aimed to craft a dynamic and expressive soundscape illustrating the transformative relationship between nature and technology.

Starting with the initial recording from Marseille, the dynamic structure of the piece evolved organically. The Play Sequence of the waves provided a natural yet structured template for the composition. This foundation allowed for a coherent progression from natural soundscapes to more synthetic, machine-like elements. Integrating various Energy Models, such as Percussion-Resonance, Friction and Accumulation of Corpuscles, enabled not only the deliberate manipulation of sound objects, but cohesive narratives in unfolding soundscapes.

Active improvisation with a knob for real-time sound manipulation added an intuitive layer of expressiveness.

A personal creative breakthrough occurred in the second and third parts of the composition, in which I utilized a Percussion-Resonance Play Sequence. Typically, sounds like drums and pulsing rhythms are a central feature in common electronic genres. However, by following the concept of a Play Sequence, I found a way to use these percussive elements in an a-rhythmic manner, allowing the narrative to depart from the normal use of these sounds, making them feel fresh and less tied to specific genres. This a-rhythmic percussive element also allowed me to maintain the dynamic flow and expressiveness established by the initial Play Sequence with the ocean waves.

Through the montage and editing of Play Sequences, it was possible to effectively convey the thematic journey from serene water sounds to the complex interplay of human and technological influences. I aimed for gradual transitions and the fusion of elements to reflect the narrative of my composition, illustrating how technology can transform and become part of nature. The deliberate layering of different Play Sequences, including both field recordings and synthesized sounds, aimed at creating a rich tapestry of textures. By using the Flux model in the final part, I attempted to add continuous evolution, leading to a climactic resolution that I hope is an apt symbol of the merging of natural and synthetic realms. I am generally quite happy with the result. Nonetheless, as I will comment upon below, I find myself questioning whether I fully achieved the desired effect and whether the narrative comes across as intended.

6.5   Reflections and Questions

To conclude this section, I will reflect on the challenges and limitations I encountered while integrating Play Sequences and Energy Models into my compositional practice. Throughout the above-described creative process, I often questioned whether the intended narrative was being effectively communicated. The complexity of balancing natural and synthetic elements poses significant challenges, particularly in maintaining coherence and avoiding genre-specific clichés. I found myself continuously striving to ensure that the sounds were not

merely decorative, but essential to the evolving structure and dramaturgical journey of the piece.

One of the main difficulties was ensuring the seamless integration of Play Sequences without losing the spontaneity and fluidity that they inherently possess. The risk of over-editing and stripping away the organic quality of the initial recordings was a constant concern. Additionally, finding the right balance between active improvisation and structured montage required meticulous attention to detail and a deep understanding of the dynamics at play.

These reflections lead me to consider several questions for future explorations: How can I further refine the use of Play Sequences to enhance the narrative clarity of my compositions? What additional techniques could be employed to maintain the balance between natural and synthetic elements more effectively? And how might I better address the challenges of integrating diverse sound objects to create a cohesive and expressive soundscape?

By continuing to engage with these questions, I hope to deepen my understanding and application of Play Sequences and Energy Models, further enriching my compositional practice and expanding the expressive possibilities of my work.

7. Conclusions

7.1 Summary of the key findings and ideas of the thesis

In this thesis, I have aimed to explore the potential of Annette Vande Gorne's Play Sequences and Energy Models to enhance musical articulation through a comprehensive analysis of their theoretical foundations and practical applications. The journey began with an exploration of the historical background of acousmatic music, tracing the evolution from Pierre Schaeffer's pioneering concepts of Sound Objects and acousmatic listening, through François Bayle's expansions on psychoacoustic distinctions and archetypes, to Guy Reibel's development of Play Sequences. This historical context provided a foundation for understanding Vande Gorne's innovations and their significance in the field.

Annette Vande Gorne's approach to Play Sequences and Energy Models represents a synthesis and evolution of these earlier concepts, with an emphasis on the dynamic interplay between sound and gesture. Her methodology advocates for a hands-on, improvisational exploration of sound bodies in order to allow composers to engage deeply with their materials and uncover the full expressive potential of their medium. By categorizing sounds into distinct Energy Models, Vande Gorne offers a structured framework that enhances both the analysis and composition of acousmatic music, making it possible to create rich soundscapes that resonate with human and cultural experiences.

I have aimed to illustrate the practical applications of these concepts through detailed examinations of Play Sequences and their impact on my own compositional practice. Through personal reflections and case studies, I have aimed to demonstrate how integrating Play Sequences and Energy Models can lead to innovative and expressive compositions.

In my composition "*Anima Dei per Machina, I. Aqua*" I tried to depict the intricate relationship between nature and technology using Play Sequences and Energy Models as my main tools to evoke natural phenomena and their interaction with human and technological influences. This project aimed to present the practical application of the theoretical concepts discussed, highlighting their potential to enhance expressiveness, structure, and depth in music composition.

7.2   Finishing Words

The exploration of Annette Vande Gorne's Play Sequences and Energy Models has been both challenging and rewarding, and has offered new insights into the possibilities of acousmatic music composition. I have aimed to integrate these concepts into my practice not only to expand my creative toolkit, but also to deepen my understanding of sound and its expressive potential. By focusing on the dynamic interplay between sound and gesture, I hope to create compositions that are both innovative and deeply connected to human experiences.

However, the journey is far from over. The reflections and questions raised in the previous section highlight the ongoing challenges and opportunities for further exploration. How can I refine the use of Play Sequences to enhance narrative clarity? What additional techniques can be employed to maintain the balance between natural and synthetic elements more effectively? How can I better integrate diverse sound objects to create cohesive and expressive soundscapes? These questions will guide my future research and practice, driving me to push the boundaries of what is possible in acousmatic music composition.

In conclusion, this thesis has provided a comprehensive exploration of Play Sequences and Energy Models, demonstrating their transformative potential in music composition. By embracing these concepts, I hope to unlock new dimensions of expressiveness and engagement, enriching my work and contributing to the broader discourse on electroacoustic and acousmatic music. As I continue to develop my practice, I am excited to discover new ways to harness the power of sound and gesture.

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