EMBODYING SYSTEMS: AN INTERDISCIPLINARY APPROACH TO CHOREOGRAPHY

MA PERFORMANCE PRACTICES

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2025

HOME OF PERFORMANCE PRACTICES

ArtEZ University of the Arts

EMBODYING SYSTEMS: AN INTERDISCIPLINARY APPROACH TO CHOREOGRAPHY

A Thesis presented by Eleni Vasilonikolou to Master Performance Practices.

In partial fulfillment of the requirements for the award of Master of Arts in Performance Practices.

2025

SYNOPSIS

Embodying System: An Interdisciplinary Approach to Choreography is a practice-led, bottom-up, artistic inquiry into the nexus of choreography and systems theory. This research is guided by the central question: *How systems theory reimagines and redefines choreographic practices, structures, and experiences—and vice versa?* The research investigates how applying systems thinking in performance facilitates a shift away from execution-driven and linear approaches, creating opportunities for emergent, relational, and process-oriented modes of performance. By developing an embodied practice rooted in systemic principles —such as feedback, emergence, and self-organization— the research proposes an alternative choreographic logic grounded in complexity and lived experience. This logic inherently challenges hierarchical relationships by decentralizing authorship, redistributing agency among performers and systems, and emphasizing co-creation over top-down control. Ultimately, this work redefines the terminology and operational frameworks of systems theory through the lens of the embodied practice; positioning the body not only as a site of expression but also as an active agent in the generation and transformation of systemic knowledge.

The current artistic research foregrounds the idea that choreography and system theory are already structurally and conceptually embedded within one another. Rather than using system theory to interpret choreography or choreography to illustrate systems, the research frames both as already interwoven epistemologies. This ontological entanglement

supports that the previous co-constitutive parts can merge, dissolving disciplinary boundaries.

The ontological entanglement, alongside operational convergence, proposes that elements of the research function as a boundary object. It constructs a common ground on which notions like emergent properties, relational dynamics, or unclear agency can be discussed and enacted by various communities, without a unified and definite understanding. This particular function undercuts the question of where power and resistance are located in complex assemblages and contributes to a profound revaluation and enrichment of a sensitive politics of practice that is flexible and capable of recognizing the intrinsic heterogeneity and uncertainty of existence in the present times.

ACKNOWLEDGMENTS

DECLARATION

I, *Eleni Vasilonikolou,* hereby certify that I had personally carried out the work depicted in the thesis entitled, *'Embodying Systems: An Interdisciplinary Approach to Choreography'*.

No part of the thesis has been submitted for the award of any other degree or diploma prior to this date.

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INTRODUCTION

The current research draws on a personal and professional crossroads between two distinct, yet deeply interconnected fields: choreography and systems theory. With a background in choreography and engineering, I am inspired to explore the rich intersection of these disciplines. I aim to integrate intellectual exploration, grounded in scientific discourse – especially systems study– with both the tangible, sensory experience of the body and choreography as a mode of thinking and inquiry that shapes our understanding, engagement with, and embodiment of complex systems.

Systems permeate our lives, influencing our surroundings, social dynamics, relationships, and even our thought patterns. Yet, their effects often operate below our conscious perception (Arnold & Wade, 2015), remaining invisible, like hidden algorithms, unseen data flows, or insidious social norms that promote certain reconstructions of reality. This research confronts this invisibility by transforming systemic ideas into lived, tangible experiences through choreographic practices exploring the question*: How systems theory reimagines and redefines choreographic practices, structures, and experiences–and vice versa?* Rethinking systems through the lens of bodily experience proposes moving beyond detached analysis and actively engaging with systems. The study, situated in the ArtScience field, reveals the absence of a deeply embodied and articulated methodology for how these two disciplines (choreography and system theory) can interplay through vibrant, lived experimentation. The research is based on a clear line of inquiry, whose main components are the Observer's Practice, Practice as Research (through score-making and the

Trial-and-Error approach), Expositions, Workshops, and a thorough Documentation process with consistent reflections. Through the fostered methodology, it seeks to contribute to theories of practice and practice-based research on the potential of choreography as a systemic inquiry.

As a bottom-up and practice-led inquiry, it provides an opportunity to make an original contribution to both theoretical and artistic bodies of knowledge, cultivating and sharing a deeper understanding, as well as a more tangible connection, with the systemic forces that shape our shared existence.

The chapters of this thesis are organized as follows: Chapter 1 provides the context of the study, detailing the theoretical foundations of ArtScience and the principles of systems theory. Chapter 2 outlines the study's design, including the methodologies employed and the practical applications of systems thinking in choreography. Chapter 3 presents the research findings. The Discussion chapters address the implications and contributions of the research, along with its limitations and future directions. Finally, in the Summary and Conclusion Chapter, the thesis provides an overview of the artistic trajectory and its wider contribution to sociopolitical discourse.

CHAPTER 1: CONTEXT OF STUDY

1.1ARTSCIENCE

The Embodying Systems: An Interdisciplinary Approach to
Choreography research functions within the broader scope of the
ArtScience field. ArtScience is a vast transdisciplinary field and a hub for
intertwining methodologies and practices related to both science and art.
The origins of ArtScience trace back to the Renaissance, when figures such
as Leonardo da Vinci fused art with science (Taylor & Francis,1998).
However, the term and its contemporary concept began to gain popularity
in the late 20th century, influenced by diverse sources, including
cybernetics, systems theory, and conceptual art. Throughout the 1960s,
significant projects, such as Experiments in Art and Technology (E.A.T.),
fostered collaboration between artists and engineers (Burnham, 1968). In
the 1990s and early 2000s, institutions such as MIT's Center for Art, Science
& Technology and the ArtScience Interfaculty in The Hague, as well as
SymbioticA, a research laboratory at the University of Western Australia
(established in 2000), began to institutionalize these hybrid practices.
Theorists such as Stephen Wilson (2002) and Roger Malina (2006) have
played a crucial role in defining the field, presenting ArtScience as a
landscape of interdisciplinary cooperation and epistemological innovation.
Today, ArtScience is an acknowledged transdisciplinary field that views art
and science not as separate domains, but as co-constitutive modes of
exploration, encompassing speculative design, biotechnological

performance, and algorithmic aesthetics. Apart from being a transdisciplinary field, ArtScience proposes a "research methodology that combines artistic and scientific modes of investigation" (Heylighen & Petrović, 2020, 2).

This research explores critical epistemologies, challenging the relationship between analytical and experiential knowledge. It promotes the merging of intellectual rigor with somatic insight. In this way, it supports a core goal of ArtScience: fostering new ways of knowing that arise at the crossroads of logic, analysis, embodiment, and experimentation. By examining how systemic structures can be sensed, experienced, and enacted—not merely theorized—this work contributes to the expanding conversation on how artistic and scientific practices can enrich and transform one another.

The focus of this study is on the underlying metamodels of choreography, systems theory, experimental systems, and cybernetics. Based on the transdisciplinary dimensions of ArtScience, it combines concepts, critical references, and artworks from these fields to create a coherent methodological and conceptual structure.

1.1.1 DEFINITIONS AND THEIR EFFECTS

Systems are context-free in the sense that their mechanisms and effects are not limited to a specific field, medium, or device, manifesting across diverse domains —from the human body to ecological networks, from social structures to economic frameworks. "System is a complex whole, an entanglement of interconnections and multiple mechanisms working

together to meet a purpose" (Eisner, 2011). Systems can combine and support diverse components to coexist. They have the potential to act as a vessel for open-ended, complex, and transformative coexistence. This perspective aligns with the ideas of Erin Manning (Professor in the Faculty of Fine Arts at Concordia University) and Brian Massumi (Canadian philosopher and social theorist), who reconceptualize systems as affective, relational, and emergent, moving away from deterministic or mechanistic views. Manning introduces the concept of the "more-than-one" (Manning, 2009), suggesting that systems are dynamic assemblages that are always in the process of becoming, co-created through movement, sensation, and relationships. Massumi enhances this idea by highlighting affect and potentiality, redirecting the focus from static structures to the intensities and forces that influence experience before it is understood cognitively (Manning & Massumi, 2014; Massumi, 2002). Through their perspective, systems are not just comprehended but also experienced and embodied—shaped through action, perception, and adaptation.

The choreographer Michael Kliën, a scholar at Duke University (US), is one example of utilizing systems theory for choreographic purposes. Through his research on the intersection of choreography and systems, he defines choreography as "a dynamic constellation of any kind, consciously created or not, self-organising or superimposed," and as "an observed order that exchanges forces, a process that has an observable or observed embodied order."(Kliën, 2007) His definition closely aligns with the systems-oriented viewpoint proposed by Manning and Massumi, suggesting and repositioning choreography as a means of attunement and relational sense-making through observation. As a dynamic system –

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developing through interaction, adaptation, and co-creation— instead of merely a linear series of steps or a finite artistic product.

These perspectives are central to my understanding of systems and choreography, providing conceptual foundations for the progression of the research.

1.2 SCIENTIFIC CONTEXT

At the heart of this integration (choreography and systems) lies the purposeful use of systems theory as a conceptual framework, alongside a generative methodology. To effectively translate systems thinking into embodied methodologies, it is essential first to unpack the foundational principles and characteristics that define what a system is and how it operates. Insights from Donella Meadows, Peter Senge, and Hans-Jörg Rheinberger act as foundational pillars, each offering a unique viewpoint on how systems operate, adapt, and evolve. Presenting these core principles at the outset offers the essential information needed to understand the methodological choices explored in this research. Therefore, this review fulfills two objectives: it outlines the theoretical underpinnings of the research and foregrounds the concepts that were integrated, dissected, reframed, and embodied in the Practice as Research.

1.2.1 SYSTEM PRINCIPLES

Donella Meadows, a systems dynamics theorist, provided valuable insight into how systems function and generate materials. In her book *Thinking in Systems* (2008), I discovered essential principles of systems,

presented in a clear and accessible manner. The principles that identify a system as such are:

(a) The existence of concrete parts; (b) The parts affect each other; (c) The parts together produce an effect that is different from the effect of each part on its own; (d) The emergent behavior persists in a variety of circumstances over time. (Meadows, 2008, 52)

Although the book does not address artistic processes, it offers a solid understanding of the system's mechanisms that can serve as a diagnostic tool in identifying the system's principles in each performative experimentation. For example, detecting the "concrete parts" involves identifying performers, spatial constructs, or score elements. Observing how these parts influence one another requires tracking the shifts in movement or interaction dynamics over time. By studying emergent group behavior, such as formations and movements that occur without predetermined plans, the researcher can assess whether a system operates as a whole, rather than as multiple unconnected parts. Lastly, examining these patterns for persistence under various performative conditions provides evidence of the resilience and adaptability of the choreographic system. These criteria provide a concrete approach for translating abstract systemic ideas into tangible, observable phenomena, serving as the primary methodological foundation for this study.

1.2.2 SYSTEM CHARACTERISTICS

In his book, *The Fifth Discipline: The Art & Practice of The Learning Organization* (2006), Peter Senge, a systems theorist, identified the key

characteristics of an operating system: resilience, complexity, sustainability, vulnerability, and emergent behavior (Senge,2006). Senge developed these concepts within the context of organizational learning and corporate transformation, offering a theory-based framework that addresses management, education, and leadership development (Senge,2006) —a framework that this research proposes is equally applicable to artistic processes. The research addresses the practical application of Senge's work by connecting these abstract characteristics to embodied methodologies. The research traces and translates the principles and characteristics into choreographic scores that enact feedback, test thresholds of vulnerability, or facilitate self-organizing groups dynamics. This application not only illustrates Senge's ideas but also extends them into new terrains, positioning performance as a valid epistemological site where systems thinking can be practiced, tested, and transformed.

1.2.3 EXPERIMENTAL SYSTEMS

Meadows offers a foundational understanding of systems, while Senge expands upon this by providing their core characteristics. In continuation of the exploration of systems applications, historian of science Hans-Jörg Rheinberger supports this research through his extensive engagement with experimental systems. He argues that experimental systems are open-ended setups where researchers interact with epistemic things—inquiries whose properties are not fully understood. They are materially and conceptually embedded, relying on specific techniques and theoretical assumptions that shape research. Experimental systems often yield unexpected results, refining methods and advancing scientific

understanding. Quoting H. Rheinberger, "experimental systems give answers to questions that we are not able to formulate clearly" (Rheinberger, 2006, p. 238). This serves as a profound analogy for this artistic research, where choreographic processes center on emerging questions, the development of tools, and navigating uncertainty.

This research embraces the generative ambiguity of experimental systems, diverging from the quest for definitive conclusions. It prioritizes emergence, process, and relational dynamics. Artistically, this creates a space for experiencing the unknown, allowing for deviations and surprises during the process. In this context, the choreographic system transforms into a laboratory —where principles and characteristics of systems are enacted, tested, embodied, and challenged.

1.3 ARTISTIC CONTEXT

Recent explorations at the intersection of choreography and systems theory within the ArtScience field reveal an expanding repertoire of embodied examples for investigating emergent behavior, distributed cognition, and systemic complexity. Flock Logic (Leonard & Marshall, 2009) translates principles of agent-based modeling into the practice of choreography, involving agents (dancers) that follow a decentralized set of rules, much like the flocking behavior in a natural swarm, leading to unpredictable emergent group behavior. This illustrates how physical Trial-and-Error can be a metaphor for the study of self-organizing systems. Likewise, Ivar Hagendoorn's dual practice as a choreographer and neuroscientist highlights the possibilities of a choreographic framework

that surfaces the cognitive and affective webs that complex systems negotiate between order and improvisation (Hagendoorn, 2002, 2003).

Further technologically mediated positions, such as those of Marco Donnarumma (Donnarumma, 2012) and Johannes Birringer (Birringer, 1990), use bio-sensors and reactive-cybernetic systems to develop bio-media environments where performers and machines co-react. Positioned in dialogue with a long history of postmodernist practices that also question the autonomy of the artwork, such works unsettle conventional understandings of both authorship and agency, reimagining the body as a point within systemically distributed networks. The live coding work of Kate Sicchio (Sicchio, 2014) and the robotics practice of Amy LaViers (LaViers et al., 2017) expand choreography into computational terrains, allowing movement to be both a material and epistemic frame through which to articulate relations between humans and machines.

Working within such pedagogical hubs as the ArtScience Interfaculty (The Hague), these interdisciplinary exchanges are institutionalised in spaces that give room to experiments in the interplay of systems theory, exploration of the corpus, and creative methodology. Their practice frequently explores emergence, feedback loops, and nonlinear causality in a performative and installation-based approach. Similarly, TERC's Choreographing Science (TERC, 2018–present) project combines agent-based simulation with embodied learning to examine movement as a cognitive interface for working with complex scientific concepts.

Together, these ventures reconceptualize choreography not only as a form of expressive art but also as a cross-disciplinary instrument for

systemic modeling and embodied sense organization. They view choreography as a fundamental form of ArtScience inquiry and intervention in complex systems, control, emergence, and adaptation.

By directly engaging with existing artworks and artists, the research positions itself in conversation with a larger artistic community. This situational awareness is essential in artistic research, where knowledge creation is inherently performative and experiential. By incorporating artistic examples, I can acknowledge the diversity of voices and practices already navigating similar terrain. This showcases the artistic and conceptual lineage within which this research is situated, helping clarify the project's position, language, and contribution.

Theorists, philosophers, scientists, and artists have explored the intersection of choreography and systems theory, highlighting the affect, relation, and emergence that appear within it. However, these concepts often remain abstract and are insufficiently articulated in concrete methods for thinking and practicing. This gap is where my work fits in. In dialogue with these thinkers, I recognize the need to redefine systems and choreography not only as theoretical constructs but also as operational frameworks within my own practice –conceptual matrices that are enacted, tested, and evolved through embodied experimentation. The necessity of redefinition does not emerge from theoretical innovation, but from methodological needs. For example, how do choreographies themselves both model and become systems? This is the kind of question that calls for a reformulation of terminologies that takes into account not just epistemological lessons but also the material, affective, and performative

forces at work in the studio, in systems modeling, and in embodied cognition. This research enables the conceptualization of choreography as a way of thinking-in-action, as technology for exploring systemic complexity, and as a form of knowledge production that is affective, iterative, and bodily.

CHAPTER 2: DESIGN OF STUDY

In this chapter, I outline the applied methods, practices, and findings that informed the Practice as Research component of this artistic inquiry. The guiding question was to explore *how systems theory reimagines and redefines choreographic and performance practices, structures, and experiences –and vice versa*. To address this question, a series of aims and objectives were formulated. To tackle them, I employed a multifaceted approach that included various diverse methods and practices. Specifically, the proposed framework consists of the Observer's Practice (preparatory practice to initiate the research), the Trial-and-Error Approach based on three central pillars (Movement Exploration, Timing and Response, and Repetition and Variations), Documentation, Expositions, Workshops, Coding, and Feedback/Data Analysis. The research methodology was developed using a bottom-up approach by systematically collecting and analyzing data rather than starting with a pre-existing hypothesis.

2.1 THE OBSERVER'S PRACTICE

The theoretical frameworks developed by Meadows (2008) (system principles), Senge (2006) (systems characteristics), and Rheinberger (2006) (choreography as a generative laboratory) offered valuable insights for identifying and explaining system dynamics; however, they primarily focus on the systems' structure. They do not specifically consider the epistemological standpoint of the observer who perceives, defines, and ultimately engineers systems. This practice was developed to contextualize the observation and analysis of a system. Simultaneously, it examines how system theory impacts the choreographic and performance experience. The act of observing through a specific lens immediately alters the perception, thereby influencing the experience. The practice proposes a way of engaging with and being affected by a system through the process of observation.

Here, Heinz von Foerster's work becomes instrumental. As a foundational thinker in Second-Order Cybernetics—"the cybernetics of observing systems, where the observer is included in the system being observed" (von Foerster, 1981, p. 14)—von Foerster does not view the observer as neutral or outside the system, but rather as an integral, self-referential participant in the observation process. Von Foerster builds on the idea that "Anything said is said to an observer" (Foerster, 1981). This statement emphasizes that observation, communication, and meaning are inseparable from the observer, an entity who actively describes, interprets, and interacts with the system. Von Foerster identifies the observer as central to three interconnected concepts:

- The observer (the one who makes descriptions),
- Language (the medium of description and communication),
- Society (formed by observers through shared language).

  (Foerster, 1981)

All three elements mutually define one another and cannot operate in isolation. Within the scope of this research, von Foerster's theory provides essential insight into how systems –whether choreographic, social, or ecological– are not simply objective structures but are co-constituted through observation and embodied interaction. This viewpoint enhances the methodological aspect of the inquiry, aligning with the understanding that choreographic practice involves observing, describing, and co-creating dynamic systems. Language, perception, and social interactions play crucial roles in how systems are created, perceived, and evolved. Von Foerster proposes a set of principles–Descriptive Capacity, Participatory Role, Self-Referential Awareness, Blind Spots, Autonomy, Creator of Meaning, and Paradigm Dependency–that define the observer's role in providing an insightful analysis of a system (see Appendix A for details).

Based on the observer's principles, I formulated a series of methodical questions and instructions to practice observing and analyzing existing systems (ecological, structural, societal, and choreographic).

1. Situating- Descriptive Capacity: *What am I observing? How am I framing it?*
- Select a system to observe: a live performance, a social dynamic, a natural environment, a digital interface, or even the body in stillness.

- Document the initial assumptions and framing. What is emphasized? What is de-emphasized? What do I find relevant?

- From which paradigm am I approaching this? (e.g., choreographic, ecological, technological, somatic, socio-political)

- Where do I locate the system's boundaries, and how porous are they? What enters the system as input? What might act as an output?

2. <u>Immersing -Embodied Observation:</u> *How do I perceive what unfolds, and how do I affect it?*

- Observe the system without intervening. Engage with all the senses, not just vision.

- Track the emotional, sensory, and cognitive responses. What captivates my attention? What do I overlook?

- Practice non-directive attention: resist interpretation or labeling. Embrace ambiguity.

- Can I identify moments of feedback—when a response within the system loops back and alters behavior or flow?

3. <u>Reflecting -Self-Referential Awareness & Blind Spot Mapping: What is my role within the system I observe? What do I miss?</u>

- Reflect on my observational patterns. What were my blind spots?

- Include contradictions or breakdowns in understanding; consider these as valuable data.

- What did I fail to perceive? What became visible only later?

- Am I receiving feedback from the system that is reshaping how I perceive or act within it?

4. <u>Reframing -Meaning-Making & Possibilization:</u> *What shifted in the system – and in me – through this process?*

- Revisit the initial notes or observations. What has changed in your perspective?

- Identify a new possibility or configuration within the system – a pattern, a gesture, a rule, a feedback loop, a latent tension.

- What latent possibilities became activated, and how do they redefine the system and my place in it?

By training perception, cultivating self-awareness, and foregrounding the observer's role in meaning-making, this framework facilitates a shift from passive witnessing to active participation. It fosters a richer, more nuanced understanding of relational dynamics, making it relevant beyond performative contexts. It also emphasizes the preparatory practice necessary for learning and engaging with systemic notions through methodical steps. The same framework was used as a guideline for the feedback sessions.

2.2 PRACTICE AS RESEARCH: SYSTEM AT PLAY

The following subchapter presents the score-making method, along with a Trial-and-Error Approach, as key strategies for exploring how systems theory can inform and transform choreographic structures and practices. The focus was on actively constructing a system –designing, testing, and reflecting on its behavior over time. This methodological shift foregrounds how two common approaches (score-making and Trial-and-Error) can be reshaped by infusing them with system theory, thereby

altering the structural logic of choreography itself. These two methods form the Practice as Research component of the research.

One of the central aims of the research was to investigate and apply the fundamental system characteristics introduced by Peter Senge to embodied practices. To understand how system theory reimagines and redefines choreography, I first needed to create a system at play. Without a system at play, the theoretical concepts would remain unclear and abstract, and the choreographic applications speculative. Having a system at play within a performative context, the research was able to transition from metaphor to mechanism, turning the system into a generational model. The system itself became a testing ground, whose structure can actively explore the possibilities of choreographic thinking and doing. The initial idea was to create a system at play based on the system's characteristics:

- Resilience: A system's ability to recover or adapt after experiencing disruption or stress.
- Complexity: The intricate, often unpredictable nature of the system's structure and behavior.
- Sustainability: The system's capacity to function over time without relying on unsustainable or costly energy inputs.
- Vulnerability: How likely the system is to fail under extreme stress or pressure.
- Emergent Behavior: Unexpected patterns or actions that arise from within the system, especially under stress or extended operation. (Senge, 2006)

The first early finding was that these characteristics, if present, are detectable only through observation. They appear when a functional system is at play for a substantial amount of time through meticulous observation. Although the Observer's Practice provided the tools to trace the system's characteristics, the tools to create a system were not explored. Therefore, a shift was needed from exploring the system's characteristics to utilizing and incorporating its components. The constructive components of a system – inputs, outputs, feedback loops, stocks, flows, and clouds – formed the new core of the investigation.

2.2.1 SCORE-MAKING

The vehicle I employed to examine these components through the body was the process of score-making. Utilizing my background in choreography and score-making, I sought a format that reflects the way systems are structured. Choreographic scores reflect essential elements of system structure by employing rules and constraints that guide behavior, similar to the governing protocols in systems theory. Scores also establish temporal boundaries, forming a contextual frame that mirrors a system's environment, while the overall performance emerges from these interactions, revealing complex patterns and behaviors without centralized control.

It is essential to note that the decision was made to collaborate with a team of performers, including me. I am interested in exploring all the mentioned concepts with multiple complex bodies, such as human beings. To explore how performers can act as agents within the system, each with varying roles and degrees of autonomy, and their interactions –whether

reciprocal, hierarchical, or adaptive– create feedback loops that drive and shape the system's dynamics. This research approaches the "Body in Performance" as both an agent and an activator within a choreographic system, highlighting its entanglement with tangible and intangible bodies. Tangible bodies–such as performers, objects, and machines–interact with intangible ones–like concepts, operations, desires, and ethics–each influencing and transforming one another. Instead of operating independently, these bodies co-emerge through a dynamic, reciprocal activation process.

The first loose score revolved around the very simple rule, "When I move, you move, and when you move, I move." Reflecting on this rule, I identify that it embodies key system concepts such as emergence, interactivity, and system dynamics. Additionally, it marked the beginning of exploring the concept of causality within systems: IF A…THEN B. The notion of causality can manifest in either a linear or a networked/circular manner. Systems operate circularly, meaning that elements influence each other reciprocally or simultaneously. This circularity allows for the emergence of feedback loops, either positive (amplifying change) or negative (stabilizing change).

2.2.2 TRIAL-AND-ERROR APPROACH

The Trial-and-Error Approach represented the physical manifestation of the produced scores. Each iteration tested a proposed score and examined how the system components were integrating within the team.

The initial iterations of the "When I move, you move and When you move, I move" raised a range of questions among the team. How do I move? When do I move? Does the movement change over time? These questions frame the Trial and Error Approach around three main pillars: Movement Exploration, Timing and Response, and Repetition and Variations. This exploration actively addresses the research inquiry about how the system's concepts affect and influence the practice and experience of choreography and the body.

Positioning the body as a site of agency and affective responsiveness corresponds with Erin Manning's perspective that the body is "not what moves, but what is moved" (Manning, 2009) and resonates with Karen Barad's idea of intra-action, where agency arises from relational entanglement rather than from individual autonomy (Barad, 2007). Within this perspective, the body does more than just perform; it observes, disrupts, activates, and is influenced by the evolving conditions of the system. This approach transforms the choreographic landscape toward a relational and distributed model of authorship and agency, where the quality of movement emerges not just from intention but also from attunement to a web of both visible and invisible forces.

2.2.2.1 MOVEMENT EXPLORATION

In this research, the exploration of movement also served to explore von Foerster's perspectives on language. He emphasized that language transcends mere information transmission; it is a collaborative activity where meaning unfolds through interaction (Foerster,1981). This investigation was profoundly shaped by the principles of semiotic

multimodality, recognizing that meaning is constructed through various expressive forms, not just through linguistic signs. This idea significantly shaped my approach to developing what I term a kinetic language: a vocabulary of physical movements that act not as rigid steps or mere symbolic gestures, but as dynamic agents of interaction. I decided to work towards simple actions that are easily transmitted and present the notion of affect—actions like walking, running, talking, and laughing. It became crucial to employ simple patterns that, through revision and refinement, allow complexity to emerge from the process rather than from unclear rules. With these choices, the selected actions began to resonate deeply with the principles of the system, particularly those related to communication, transmission, and mutual influence. These actions are not merely movements; they serve as affective signals that convey energy, intent, and responsiveness, making them ideal agents within a system to provoke reciprocal or emergent behavior. Each action acts as both an input and an output—capable of prompting a response while also being shaped by the reactions of the surrounding system, thereby reflecting distributed causality and feedback dynamics. For instance, laughter may emerge spontaneously but can quickly ripple through a group, amplified by positive feedback, while walking can solidify into a rhythm shared among bodies—a negative feedback that aligns and regulates. These actions are fundamentally relational and adaptive, enabling the score to remain both open and structured, propelled by the evolving interaction between human agents and their environment. Through these embodied choices, the score evolves into a living system where structure and spontaneity coexist, with causality continuously negotiated through presence, perception, and interaction.

Through a continuous trial-and-error approach, the goal was to develop a model that encompasses all system components while also keeping it simple, ensuring the process remains manageable and communicable. In addition, the notion of simplicity allowed the group to delve into the exploration of the system without being buried under its potential complexity. It was a process of immersion, yet still allowing for understanding, reflection, and expansion of the system structure.

By conducting a series of iterations, the scores evolved and changed, ranging from script-based scores to maps and diagrams. The most efficient format appeared to be the diagrams, which can communicate not only the actions but also the way they are interrelated. Unlike scripts, which imply linearity and maps that can prioritize spatial layout, diagrams give form to the system's dynamic logic: they organise the flows of influence, the feedback loops, and the interplays between variables. They enable the simultaneous understanding of structure and function, not only portraying what is happening, but also how and why it arises. In other words, diagrams serve as both conceptual and practical tools, bridging theory and practice by externalizing the system's relational structure. Consequently, they not only document but are also integral to modes of choreographic thinking, aligning with systems theory's aim to redefine choreography as an adaptable and co-emergent structure based on interconnections, causalities, and feedback loops.

Here is the final diagram that reflects the "SYSTEM JOY" (2025) within the framework of the HOME OF PERFORMANCE PRACTICES, part of the Expositions of Artistic Research.
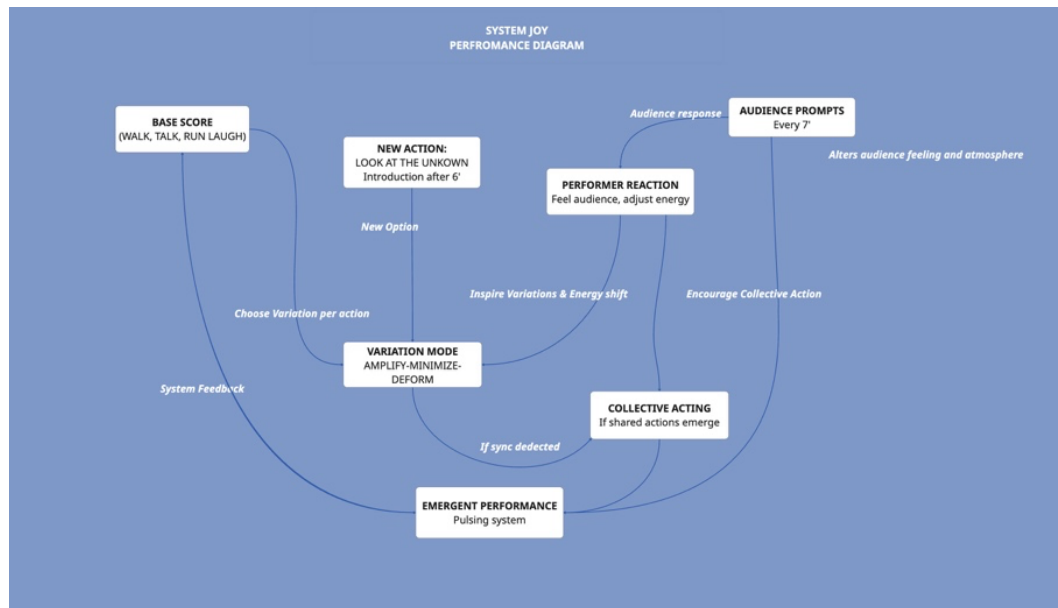
Figure 1. Diagrammatic illustration of "SYSTEM JOY" (2025)

A major limitation of this practice is the tendency to arrive at linear sequences or static scores, rather than embracing fully dynamic systems. It is essential to make a clear distinction between establishing rules or scores and truly encouraging self-organizing, emergent behaviors. On the other hand, the absence of a clear structure led to chaotic environments, excluding fundamental elements of system theory. I recognise that in the process of designing a system, the maker, in this case, me, has the responsibility to incorporate the components efficiently to arrive at a dynamic structure, a fundamental property of systems. The subjective nature of the maker actively influences the unfolding of the process. The blind spots were becoming apparent in each trial. Most of the experiments (trials) failed to incorporate the sum of the system components due to my design. Even though there has been a crucial refinement of the process, I still recognise that the potentiality of systems is not fully incorporated and elaborated in this artistic trajectory. This finding highlights the significance

of the concept of time. As a system can only be observed, explored, and analyzed within a continuum, the same applies to creating one.

2.2.2.2 TIMING AND RESPONSE

The idea of time is equally vital within the system. Referring back to the rule "When I move, you move and 'When you move, I move," timing and response are essential. After establishing our movements through specific actions, the next hurdle was timing. At first, the group began to achieve synchronicity, and the urgency to grasp the conveyed signal overshadowed the causality that the score relied upon. Consequently, this synchronicity diminished the score's potential dynamics. Thus, the idea of delay and manipulating time surfaced. Our reactions to the signals were based on a palette of options. We could respond either after the movement was complete, as soon as it was perceived, or with a delay. The concept of time was also applied to the duration of actions, addressing the question of how long we remain engaged in the action. The only rule in effect is that the actions must occur in the space according to the proposed order. Toward the final iterations of the score, when the team was very familiar with the system in play, timing became a tool to manipulate during execution. The duration and timing of actions depend on the interactions and dynamics of coexistence, thereby grounding the experiment in real-time and space. This temporal awareness signified a shift in approach—from following rules to perceiving system behavior as contingent and emergent. By adjusting timing—via delay, extension, or interruption—the performers started to engage with the score as a dynamic system instead of a static guideline. This evolution mirrors what systems theorists denote

as a shift from rule-based operation to pattern-based responsiveness, where the elements (the performers, in this case) focus not on executing predetermined results but on adapting to the unfolding circumstances of the whole. The finding, when engaging with this tool, resonates with the emergent behavior of systems.

In this context, time transcends being merely a framework for sequence and emerges as a medium in itself. It exemplifies self-organization through coordinated timing, anticipatory actions, and emotional pauses. In the latter iterations of the score, performers were not just reacting to signals; they acknowledged the potential for signaling—to what was not yet completed but imminent. This ability to create space for what is coming into being, anticipating without constraining, resonates with Francisco Varela's concept of the 'enactive now': time is not merely what elapses, but what interrelates—a relational field in which perception, cognition, and behavior intertwine in real-time (Varela, 1999).

This shift in focus towards time revealed the underlying aesthetic of feedback loops embedded in the system. Rather than striving for synchrony or accuracy, performers became attuned to loops, delays, and nuances, causing the choreography to operate more like a complex adaptive system—nonlinear, interrelated, and open-ended. Consequently, choreography transitioned from being a mere artifact to functioning as a processual ecology, where each action served as both a result and a precursor to subsequent actions.

2.2.2.3 REPETITION AND VARIATIONS

The subsequent question that arose from the process was, "Do the actions evolve/change over time, and if so, how?" The employed operation for tackling this question was repetition. Repetition in a system-sensitive practice transcends mere reproduction; it serves as a force of differentiation. Through Deleuze's concept of Difference and Repetition (Deleuze,1994), we can understand it not as a simple return to the same, but rather as a precondition for emergence, mutation, and variation. As we repeated simple actions such as walking, running, talking, and laughing, we began to perceive subtle shifts: alterations in timing, tone, energy, and interpersonal resonance. These variations emerged organically, stemming not from direct instruction but from the inherent properties of the system, which was influenced by feedback, adaptation, and attention. The transformation arose as an inherent quality of the system: performers interacting in real-time, adapting to one another, and iterating through their presence. The observable variations included amplification, minimization, or deformation of the actions. A stable score transformed into a landscape of possibilities, where a single gesture—delivered with a pause, a quickening, or a shift in spatial relationship—starts to enhance new dynamics throughout the system.

The performativity and variation of the actions, their capacity to affect and be affected, alongside the timely awareness, create the rhythm of the emerging dramaturgy of the experiment. Based on this concept, I want to emphasize the potential of this practice (the interplay between systems theory and choreography) in constructing emerging dramaturgies. By

viewing choreographic scores as systemic protocols tested in multiple trials, the study demonstrates how abstract concepts from systems theory can be transformed into performative actions, fostering the development of complex relational patterns from straightforward rules. The systemic, embodied dramaturgy aligns with Bojana Cvejić's (Professor of Dance Theory, Ph.D. in Philosophy, Center for Research in Modern European Philosophy) vision of dramaturgy as an open, adaptive process that is inseparable from the performative event itself, allowing for multiplicity, unpredictability, and the co-creation of experience (Cvejić, 2010). Thus, the systems-thinking practice not only informs but also practically enacts Cvejić's dramaturgical framework, providing a concrete model for how dramaturgy can function as a living, self-organizing process-oriented system within choreography.

This practice moves beyond improvisation try-outs or traditional score-making by enacting systems thinking as both method and structure. Rather than relying on spontaneous expression or fixed choreographic prompts, the process involved designing and testing dynamic systems composed of inputs, outputs, feedback loops, and emergent behaviors through iterative, score-based experiments. This process connects back to the question that ignited this artistic inquiry. It redefines choreography as a developing configuration— emergent, relational, and structurally dynamic practice. A system that can adjust internally due to the micro-political choices regarding timing, spacing, and intensity made by the performers. It is through this recursive, embodied variation that complexity emerges from simplicity, and the system comes alive.

2.3 EXPOSITIONS: PERFORMING RESEARCH

As mentioned in the Observer's Practice, the act of observation modifies the system simply by being observed. This insight becomes especially significant when considering the audience's role in performative systems. The audience engages with and influences the system as active agents. Von Foerster highlights the subjective nature of the observer. Observers are not neutral; they define boundaries, choose what is relevant, and interpret behaviors. The observer possesses biases, intentions, and goals that shape the system's interpretation. Systems are viewed as self-referential, meaning that any analysis of the system involves a reflection on how the analysis is conducted. Tying this to the creation of meaning, any attempt at interpreting a performative experiment shifts the performance according to who is experiencing it. This becomes apparent in performative systems where understanding is not just produced from what was done, but also how it was interpreted and what kind of reception it has to other people. The audience is a fundamental part of the system; rather than simply being passive observers, they are actively involved in creating meaning. Thus, the audience is an integral component of the system, serving as active co-creators of meaning. Their mere presence activates the inherent feedback loops in the performance, altering timing, energy, and behavior within the ensemble. In this context, the audience's body serves as an agent and activator within the system, broadening the relational field of choreography to include more than just the performers. This directly ties the agential and relational aspects of the work to systemic thinking, wherein every component of the system is interconnected in shaping structure, meaning, and experience. This understanding resonates with

Nicolas Bourriaud's concept of relational aesthetics, which emphasizes the importance of intersubjective encounters in the creation of art (Bourriaud, 2002). Just as observation alters the system, audience involvement within performative situations contributes to a shared construction of meaning, suggesting that art is not (solely) an insular activity, but a collective one.

To explore these concepts, various performance experiments were presented to the audience. The aim of the exposition is to reflect on and evaluate the developed system in real-world conditions while broadening perspectives. Exposing audiences to choreographic practices rooted in systems theory can challenge their preconceived notions of performance, investigating how this interplay affects the lived experience. This exposure enhances deeper engagement with the complexities of relational dynamics in art.

The first presentation was a performance lecture titled "SYSTEM JOY, A PERFORMANCE LECTURE" (2025) presented in 4bid gallery, Amsterdam.

Figure 2. SYSTEM JOY- A PERFORMANCE LECTURE, 4BID GALLERY, 2025, Photo by Theo Van Loon

The exposition aimed to communicate how the system's theory and choreography are already interconnected through the audience's participation. The participatory segments were based on the rule "When you move, I move", positioning the audience within a co-regulatory feedback loop. Spectators transitioned into responsive agents, making the act of watching indistinguishable from participating. As the rules unfolded, audience attention itself became an input–generating new timing patterns, relational tensions, and subtle changes in behavior. This mode of engagement aligns with what performance theorist Erika Fischer-Lichte describes as the "autopoietic feedback loop" of performance, in which performers and the audience affect and produce each other's presence in real time (Fischer-Lichte, 2008, p. 47).

The second exposition, titled "INPUTS" (2025), featured a task-based system that displayed a live score on screen, inviting audience members to intervene and write their instructions through a laptop.

The aim was to investigate the notion of inputs within structures. This invitation transformed the audience into a different type: not merely responsive, but generative. They became active contributors to the score, providing external inputs that influenced and changed the system during the performance. This reflects how inputs in cybernetic systems adjust internal dynamics, with each new instruction or suggestion modifying performer behavior, task sequences, and the flow of emergence. In this scenario, the audience was not simply part of an autopoietic loop, but rather a distributed node within the system, capable of influencing its direction by positioning themselves as designers within the score's mechanism. This performance embraced the concept of open systems,

where the distinctions between creator, performer, and observer are intentionally blurred.

The final sharing of "SYSTEM JOY" (2025) incorporated the fundamental components of system theory (inputs, outputs, feedback loops, etc.), with the audience receiving various prompts that influenced the unfolding trajectory of the piece.

Figure 4. SYSTEM JOY, EAR, ArtEZ University, 2025, Snapshot

Through the prompts, the audience transformed from spectators into active, distributed agents within a decentralized framework. Their engagement evolved from being merely invited or reactive to being fundamentally integrated into the performance's generative logic (see the documentation in Appendix B).

Nonetheless, each participatory setup continues to raise intricate questions about legibility and authorship. This notion raises ethical

considerations for this research. To what extent can the audience's influence be seen within the system? Are participants aware of the effects of their input? Are the participants real agents in a performative setting?

The way the performance experiments were presented can maintain hierarchical dynamics: the performer is perceived as possessing embodied skill, while the audience is viewed as merely reacting. This results in an imbalance in the flow of feedback–performers adjust based on audience responses– as the audience lacks a structural mechanism to be physically and actively influenced, not only on a cognitive level. This one-way causality diminishes the system's complete circularity, restricting the potential for true co-emergence and limiting the degree of self-organization among all participants. Critically employed, systems theory enables choreography to be reimagined as a distributed, non-linear flow of agents, including the audience, whose actions and perceptions are actively involved in creating the conditions of the experience. Furthermore, the fact that the audience hadn't been prepared (e.g., through the Observer's Practice) creates a gap in fully understanding the multiple layers of their affect within the system. Based on the feedback collected after each experimentation, the common sentiment was that they recognized a system at play but did not comprehend the depth of their involvement within it. This gap highlights the fact that although systems theory provides potent tools to reconceptualize performance in terms of coemergent and participatory entities, fully effecting such a shift requires more developed strategies for integrating and activating the agency of the audience–a question to which more attention might be brought through future research.

Another limitation is the unclear nature of the audience's agency. Although the audience may be encouraged to take action, the framework often does not clarify how their actions impact the system. This situation risks fostering simulated participation, where engagement is more symbolic than structurally impactful—reflecting critiques from scholars like Claire Bishop (Professor of Art History at the CUNY Graduate Center) in her discussions on participatory art. If audience contributions are not genuinely integrated and redirected within the system, participation can become performative instead of transformative.

Lastly, the experiments continue to depend on the presence of a facilitator or orchestrator (the choreographer/lecturer), who ultimately maintains a level of control. Although systems might be crafted to enable emergence, the very process of designing and supervising them introduces a meta-position that complicates the aim of horizontal agency.

2.4 WORKSHOPS: SHARING TOOLS

Part of the process was also methodically sharing the knowledge and tools I acquired with others, allowing for different interpretations and applications of the process. The tools utilized in this study were shared for both pedagogical and ethical reasons. Firmly rooted in the relational ontology of systems theory, this approach acknowledges that knowledge is co-constructed and emerges from interactions. By making the research available to others in workshops, I attempted to decentralize authorship and incorporate multiple forms of knowledge. This raises a deeper issue: all systems, including choreographic structures, coexist in being sensed and acted upon together. The ethical commitment was about contesting

the enclosure of knowledge and affirming spaces in which we could experiment together and share uncertainties and ambiguities. By bringing the tools into the light, I was passing them forward and carrying a responsibility to make it possible for others not just to understand, but to challenge, reorganize, and transform the system from their unique perspectives, contexts, and desires.

The first workshop, titled 'PLAYING WITH THE SYSTEM" (2024), focused on communicating and integrating the fundamental principles and definitions of systems, introduced by Donella Meadows, into performance practices. The workshop unfolded based on the idea that the system is a complex whole, a network of interconnections, and the principles of identifying a system, introduced by Donella Meadows. Again, through simple tasks, the objective was to create small temporary structures and then reflect on them based on the given principles.

Figure 5.PLAYING WITH THE SYSTEM, The Room Project, Athens, 2024 Photos by Fotoula Gerakianaki

In the second workshop, titled "SYSTEM JOY" (2025), the focus was on the system components. The primary component explored during the workshop was the concept of the cloud within system theory. My interest in clouds developed as I explored how systems address unpredictability and the unknown. In system theory, clouds symbolize the unmodelled, the open-ended, much like the unpredictable nature of human presence within any structure. In their role, clouds are becoming spaces of potential, where emergence is not only possible but inevitable. The cloud contains the affective, the unconscious, the bodily – all the elements the system cannot fully predict or represent. Clouds are fields of intensity, zones of becoming. They are where subjectivity simmers, where performers hesitate, exaggerate, forget, or invent.

Figure 6. SYSTEM JOY -THE WORKSHOP, ArtEZ, 2025 Photos by Diamanto Hadjizacharia

The core finding of the workshops directly counterbalanced the

limitations observed in the performative expositions–particularly those

concerning authorship, legibility, and the uneven distribution of agency. More so than in Expositions, where the audience's participation could be at a performative level, Workshops nurtured a context of shared discovery. The systems thinking was not only shared but lived; it was not only represented but also enacted. The principles and structural tools of systems theory were communicated to participants, enabling them to truly engage. This transition established a relatively more ethical, non-hierarchical space within which feedback loops could be actualized more effectively and reflexively. More crucially, the workshops reframed agency; not just the capacity of participants to interact with and affect the system, but also the analytical lens to understand how what participants did actively enacted system characteristics. In this way, the workshops themselves were an ethical condition of the research (and its findings): not only to choreographically investigate the systems, but also to contribute to the capacities for intervening in them and   reorganizing them into a more inclusive and self-organizing collective process.

2.5 CODING

A further aspect of the process was to investigate coding catalyzed by a need to research the digital element of system interaction and its relevance to a choreographic domain. While the research extended beyond computational logic and coding, experimenting with coding created a landscape for exploring how this facet of systems theory reinterprets choreography practices. It specifically highlights the structural and experiential differences between a machine's rendering and a human's interpretations. Through interactions with this technology, in conjunction

with hands-on exploration, a more nuanced picture emerged of the constraints and affordances of systemic behavior in both digital and physical contexts.

The code disclosed the score's mechanical precision and determinism when devoid of interpretation, intention, or physical presence. In contrast, human interaction was characterized by fluidity, contingency, and relational dynamics, marked by delays, micro-decisions, and emotional exchanges between bodies. This contrast highlighted the complexities introduced by embodiment, such as emotion, physicality, and dynamics, that cannot be completely encoded, yet are fundamental to the functioning of a living system. Running the same score as a coded simulation with the live performance allowed for the observation of divergences, misunderstandings, and improvisations that typically go unnoticed. This process underscored that the ambiguity inherent in human iteration is not a flaw in the system but rather a generative condition that fosters emergence and transformation. Instead of aiming to perfect or clarify the score through code, this phase of the research focused on the significance of interpretation as a functional element of the system.

Thus, coding acted not as a substitute for movement but as a reflection of the limitations of formalization and the depth of embodied response. In simple terms, the coding machine follows instructions, whereas humans interpret, negotiate, sometimes even refuse, or recontextualize them. This difference highlights the significance of interpretation, ambiguity, and affect as integral components of how choreography operates within a systemic structure. Additionally, the research has expanded from live

performances to include coding, examining how machines perceive or "experience" a sensory translation. This situates the choreographic system within broader discussions of cybernetics, second-order systems theory, and post-human aesthetics, where the distinctions between the organic and synthetic are constantly debated and redefined (see the animated code in Appendix C).

2.6 DOCUMENTATION

Another critical aspect of the research was the documentation process, which functioned not merely as an archive but as an active component of system analysis and refinement. The scores (in all formats) reflect shifts not only in the content of the research but also in the context. They represented the system's evolution. With each research iteration, a score reflected accumulated experience, changing assumptions, and new discoveries. Thus, the documentation served as both memory and feedback for the subsequent design phase.

Alongside the scores, the video documentation showcases how these scores manifested. Every experiment was filmed and analyzed to provide feedback through reflection on the design of a functional system. As I reviewed the footage, I tracked causalities, delays, repetitions, and breakdowns, transforming each video into a diagnostic tool—a systemic mirror that revealed the design's affordances and limitations.

At the end of each experiment, we employed thick description—a method rooted in ethnography (Geertz,1973) —to convey the subjective, embodied, and inner experiences of interacting with the system. This

approach to reflective writing enabled me to capture not only the events that took place but also the sensations, implications, and activations they invoked. Consequently, it provided a deeper perspective on system behavior from an insider's view. The descriptions revealed patterns of emergence, emphasizing not only the conditions that triggered specific responses but also the emotional and cognitive landscapes navigated by performers within the system. The decision to include me in the embodied experiments was challenging. In the reflective writing, it became clear that, as the facilitator of the process, my awareness was not only focused on my operative role but also on whether the experiment was unfolding as intended, as I was simultaneously monitoring structure, outcomes, and group dynamics. Being both inside and outside complicated my embodied experience, creating a temporal dissonance that demanded cognitive elasticity – staying open and responsive during the experiment while mentally archiving experiences for later articulation.

The interaction among video, scores, and thick description fostered a complex documentation system, allowing movement to be interpreted through various modalities—visual, kinesthetic, and analytical—thereby facilitating a more comprehensive understanding of how systems function in performative settings. Importantly, this triangulated method not only captured what happened but also actively revealed the relational configurations that emerged within the system. The documentation layers didn't just record events—they made the invisible architectures of interaction legible. It revealed who influences whom, when influence shifts, how small decisions reconfigure the whole, and when a reaction

becomes a new action, highlighting once again the dynamic relational aspect of the research topic.

2.7 FEEDBACK AND DATA ANALYSIS

The Feedback and Data Analysis were evident throughout the entire process, closely related to the documentation process, to ensure the quality of the research. Each experiment, exposition, and workshop was followed by a feedback conversation, which was recorded with the participants' permission. I ensured anonymity and allowed participants to exclude parts if they desired to do so. I preferred to receive the feedback in verbal form, as the context of how conversations happen effectively mirrors the system structure. 'All thinking takes place in networks; all thinking is thinking together' (Maxted, 2019). The feedback framework employed was semi-structured, meaning that the starting point was the Observer's Practice framework (Situating, Immersing, Reflecting, and Reframing). Still, it allowed for deviations to promote expansion beyond my initial propositions and interpretations. Through conversations, the notion of emergence became apparent. Different perspectives gave birth to new ideas and understandings, weaving an endless web of interconnections.

The data analysis unfolded in two levels. The first level addressed the efficiency of the experiment to enclose the system characteristics. With the help of my External Mentor, Orion Maxted (Theater maker and director of the ArtScience research group in The Centre Leo Apostel (CLEA), we were able to assess whether the experiments accurately represented the

system's components and characteristics, and if not, identify the necessary steps to achieve this.

The second level examined the various interpretations of the collected conversations and feedback sessions. The analysis of the material led to the identification of five thematic categories, which examined how the experiments resonated with the different groups.

- Framing and System Boundaries - how participants initially construed and positioned themselves regarding the attended-to systems (Situating).
- Immersing – the auditory, visual, and tactile substance of their connection (Sensing)
- Embodied Perception and Affect – the sensory, emotional, and cognitive textures of their involvement (Immersing).
- Feedback and Blind Spots – Moments when the system "talked back" to itself, exposing hidden processes or, at times, contradictions.
- Emergence and Possibility – a reframing – changes of perception and the emergence of new systemic logics or performative rules.

Through the conducted analysis, the notion of relationality becomes apparent, especially in shared contexts. The multisensory and embodied engagement of the participants fostered a collective understanding of the complexity inherent in the inquiry. Strengthening the potential of the process to arrive at new knowledge through co-creation and collaboration.

CHAPTER 3: FINDINGS BEYOND METHODS

In detailing the methods of this artistic inquiry, I have framed the various findings according to the employed methods. Nevertheless, some findings extend beyond its methods and enrich the overall articulation of the research.

The primary finding of the research related to the question is that it constructs systems as actual operative choreographic structures. In this sense, choreography is not *like* a system; it functions as one. This is a shift from representational thinking to functional systems design in practice. This extends beyond existing analogies between choreography and systems theory to propose that choreographic practices, structures, and experiences constitute a mode of systemic thinking and doing. Through feedback loops, distribution of agency, and dynamic patterning, choreography becomes a means of investigating how dramaturgy emerges, how agency shifts, and how meaning takes form in the moment. Choreography is no longer conceived solely as the composition of bodies in space and time, but as the ongoing formation of relational configurations that are responsive, adaptive, and contingent. In doing so, the research directly responds to the question of how systems theory reimagines choreographic and performance practices, offering that choreography is not a descriptive outcome of systemic logics, but a medium through which systems can be enacted, embodied, and redefined.

As one of the primary goals of the research was to redefine the terminology of the system (system components) from a choreographic perspective, I am sharing my interpretation of these concepts based on the research findings. Through this interpretation, I propose a manual that can be used in choreographic experimentation, regardless of interest in the system theory.

Input: A stimulus–whether a movement, sound, thought, or spatial shift–that enters the choreographic system and affects its ongoing composition. Inputs can arise from within the system (a performer's decision) or externally (an audience reaction, a sound cue). They serve as the raw material of emergence.

Output: A choreographic response–an observable or perceptible action, formation, or atmosphere–that arises from the system's internal processes. Outputs convey the system's current state, often revealing traces of past inputs and internal negotiations.

Feedback Loop: A circular flow where a movement (output) re-enters the system as a new stimulus (input), affecting future actions. In performance, this loop can occur between performers (co-regulation), between performer and audience (affective resonance), or internally within a single body (kinesthetic sensing). Negative feedback stabilizes (e.g., syncing rhythms); positive feedback amplifies change (e.g., escalating laughter or tension).

Flows: The directional currents of energy, attention, and movement within the choreographic system. They intertwine performers, bodies, and space

across time, forming the piece's dynamic structure. Flows encompass both literal aspects (locomotion, eye gaze) and affective elements (vibe, urgency).

Stocks: Reserves of movement material, embodied memory, emotional tone, or spatial patterns from which the system draws. These elements accumulate (through repetition or rehearsal) and deplete (through use or transformation), shaping the work's texture and rhythm.

Clouds: The undefined, unknowable, or unchoreographed forces that hover at the system's edge—such as audience interpretation, atmosphere, subconscious habits, or social context. Clouds represent the poetic unknown: present but ungraspable, shaping the system from without.

Another crucial finding of the process was the encounter with the notions of ambiguity and joy. Joy became a vital territory within this systemic choreographic practice. This joy appeared not as a fixed result but as an emerging and evolving quality that flourishes in the system's openness, ambiguity, and unpredictability. Here, joy is viewed not merely as an emotional state but as a dynamic, generative force that emerges through engagement, exploration, and the playful negotiation of constraints within the system. Joy can become a method of research: an indicator of when systems remain alive, generative, and in a state of flux. Joy stands for the value of the unmeasurable –of laughter, surprise, and collective misalignment. Joy becomes part of the cloud, of the unsolved, unexplained, or unknown. In that sense, joy resists optimization. Joy appears in the transformation of the simple into the complex. In the

discovery of new meanings. In a process where each action could shift the course of the whole. At the edges of uncertainty without collapse.

DISCUSSION

The current artistic inquiry was driven by the question: *How systems theory reimagines and redefines choreographic and performance practices, structures, and experiences —and vice versa?*

The interplay between choreography and systems theory has been explored before, often aiming to expand or de-discipline the choreographic field by introducing new conceptual tools. The presented research enters that ongoing discussion but shifts its focus toward a more practice-based articulation of the relationship. While the theoretical, philosophical, and artistic connections between choreography and systems theory are well-documented, a clear gap remains in how these connections can be embodied and contextualized within a structured practice. Through a Practice as Research methodology, this work addresses that gap by developing concrete and sharable frameworks—such as the Observer's Practice, the Trial-and-Error Approach, and a choreographic reinterpretation of systemic vocabulary.

Beyond its practical application, the fostered methodology foregrounds a shift in understanding and enacting both choreography and systems theory. Echoing Manning's (2009) and Massumi's (2002) understanding of choreography as a more-than-representational process, the research reimagines choreography and performance practices as relational and emergent frameworks, not through analogy, but through operational convergence.

The ArtScience field proposes that choreography and system theory foster a co-constitutive mode of inquiry (Heylighen, Petrović, 2020). This artistic research advances the conversation by supporting the idea that choreography and system theory are already structurally and conceptually embedded within one another. Rather than using system theory to interpret choreography or choreography to illustrate systems, the research frames both as already interwoven epistemologies. This ontological entanglement can expand the ArtScience field towards an even more integrated model, where the co-constitutive parts merge, dissolving disciplinary boundaries.

The ontological entanglement alongside the operational convergence proposes that elements of the research could function as a boundary object, a concept introduced by Star and Griesemer (1989), which describes information, artifacts, or processes that are plastic enough to adapt to the local needs and constraints of multiple communities while remaining robust enough to maintain a common identity across sites. The study provides specific and communicable toolkits, such as the Observer's Practice and Trial-and-Error Model, that reflect the adaptive yet consistent quality of the boundary object. By encouraging an "operational convergence" and exposing an "ontological entanglement" between choreography and systems theory, the research suggests an alternative epistemological lens through which systems are known through lived, corporeal experience –resonating with Rheinberger's notion of experimental systems as epistemic lenses that shape how knowledge emerges through situated practices (Rheinberger, 2006)). This allows for some degree of communication and mutual understanding across

disciplinary lines, permitting diverse types of experts to dialogue over complex concepts on an intrinsic, experiential basis without requiring full theoretical agreement.

LIMITATIONS

Despite the advances of the research, it identifies limitations inherent in a conceptual and methodological shift—limitations at both the micro and macro levels within the artistic trajectory.

At the micro level, limitations emerged in the process of effectively applying system theory within the choreographic discourse and have been articulated with each method. Overall, there was a risk in adopting hierarchical control, rigid rules, and unsuccessful integration of system characteristics, as well as ambiguous participant agency. These issues highlight a significant tension between authorship and the autonomy of emergent systems, underscoring the need for adaptive methodologies that enable participants to observe, question, and dynamically modify the system in real-time. Furthermore, the conflict between design and emergence indicated that the system's potential for non-linear evolution was not fully integrated.

At the macro level, since the research is fundamentally practice-led, the emerged findings were derived from the application of the developed methodology and are influenced by subjective, experiential, and situational knowledge. Overall, the research relies on tacit knowledge— what is experienced and enacted—which may not be fully articulated or externalized. This limitation can impact the clarity, transferability,

replicability, and uptake of the research in contexts less familiar with somatic or performative inquiry. Thus, making the "reimagining and redefinition" more of a localized discovery than a widely generalizable claim within the broader research landscape. In addition, while the research investigates fundamental facets of system theory (the observer's role, feedback loops, and emergence from simple rules), its scope is vast and extensive. Thus, other systemic models (network and chaos theory) remain uncharted waters, narrowing the area of focus. The reimagining and redefining of choreography were primarily explored through the selected lenses, leading to a partial answer to the research question. This partiality also impacts the insights returned to the system theory. They are framed by the artistic methods and phenomena under investigation, rather than encompassing a broader re-evaluation of the entire theoretical domain.

FUTURE DEVELOPMENTS

An approach to tackle the micro-level challenges is to practice reflexive system design. Meaning, to make the system observable to itself: to let the structure, rules, or algorithms become part of the aesthetic field. And to allow performers and audience to question, modify, or reflect on the system mid-process. To create stage moments of self-reflection, allowing performers/audience to comment on their role, express confusion, or narrate their perception of system change. This builds a meta-layer where meaning isn't just in the doing, but in thinking about the doing —a crucial postmodern and systems-aware stance. Additionally, to create *autonomy zones,* where the participation operates under minimal instructions to

investigate deeper self-organization structures. Future research could explore broader participant demographics to grasp how diverse perspectives affect systemic dynamics in choreography. This approach can enhance the understanding of how system theory influences the choreographic and performance experience, a point addressed in the research question.

Regarding the macro-level limitations, broadening the systemic theoretical and empirical scope can provide a more comprehensive investigation. The next step is to explore the previously unexplored aspects of the system theory and revise the findings in light of newly acquired knowledge.

As a future development, I would like to include a systems dynamics theorist in the process to provide guidance and offer the analytical tools needed to deepen the understanding of system behavior. Their expertise can facilitate modeling the system characteristics in the performative system and enhance the translation of systemic concepts into embodied scores.

To counter the situational nature of the findings and to strengthen the boundary object nature of the research, the developed methodology can be applied to diverse contexts, from different choreographic styles to even non-artistic settings. A comparative analysis could reveal which "redefinitions" are context-based and which have a broader application.

SUMMARY AND CONCLUSION

The thesis presented a framework that intertwines systems theory and thinking with choreography. It introduces a methodology that is both theoretical and highly embodied. Operating within the broader scope of the ArtScience field, the research reveals the intricately interwoven relationship between choreography and systems theory, further blurring the boundaries between the disciplines.

The work highlights the creative possibilities arising from ambiguity, interaction, and temporal dynamics, which are essential for developing living, adaptive systems in performance contexts.

The very process of the current research –being bottom-up, practice-led, and operating as a boundary object– is overtly of deep sociopolitical significance. As a bottom-up inquiry, it fundamentally challenges hierarchical approaches to knowledge production. It democratises the "meaning-making" by deriving interpretations directly from emerging phenomena. It suggests a reevaluation of agency that is distributed, participative, and less hierarchical. The embodied understanding, reinforced by the practice-led nature of the research, creates a robust sense of relationality, recognising the nuanced connections among participants, the system, and the emerging outcome. Finally, as a boundary object based, this research can facilitate dialogue among numerous disciplines and social worlds. It constructs a common ground on which notions like emergent properties, relational dynamics, or unclear agency can be discussed and enacted by various communities, without a unified

and definite understanding. This particular function undercuts the question of where power and resistance are located in complex assemblages and contributes to a profound revaluation and enrichment of a sensitive politics of practice that is flexible and capable of recognizing the intrinsic heterogeneity and uncertainty of existence in the present times.

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APPENDICES

A

The Observer's Practice was formulated based on the proposed principles by Von Foerster. These principles are:

Descriptive Capacity:	Participatory Role:	Self-Referential Awareness:
The observer is defined by their ability to generate descriptions rather than merely receiving data. Observation is inherently interpretive and constructed.	Observers are not detached; by describing or naming, they influence what is observed. Thus, 'objectivity,' which excludes the observer's influence, is a delusion.	The observer must occasionally reflect on their observation. This recursive awareness introduces logical complexities akin to self-referential paradoxes but is vital for understanding human cognition and social behavior.
Blind Spots:	Autonomy:	Creator of Meaning:
The observer has cognitive limits—we often do not see that we do not see. These deficiencies	The observer autonomously stipulates their own purpose,	The observer, through language and interaction, creates social reality. The example of obscenity

require therapies that include the observer within the system observed.	contrasting with systems where observers are passive or driven by external goals.	illustrates that perceived qualities (like "obscene") reveal more about the observer than the observed.
Paradigm Dependency: Observers are constrained by paradigms—common frameworks used to connect and interpret descriptions. A paradigm shift happens when these frameworks either fail or are surpassed. This can occur not only due to their inherent flaws but also because they no longer accommodate the observer's changing viewpoint.		

Based on the Observer's Practice, I have analyzed two choreographic experiments focusing on emergent behavior, feedback loops, self-organization, potentiality, and Second-Order Cybernetics. These principles were also investigated and researched throughout the Practice as Research.

Weak Dance Strong Questions

The choreographic piece *Weak Dance Strong Questions* (2001) is a performance by Jonathan Burrows and the Dutch theatre director Jan Ritsema. It is a conceptual work exploring the relationship between the two performers based on three rules: to move as though in a state of questioning, not to negotiate time and space, and to be connected to the

other person (Burrows, 2004). In this context, movement represents a method of inquiry: it embodies a continuous doubting and exploration of possibilities, rather than settling into predetermined steps or conclusions gestures (Domm, 2019). While not initially framed using systems theory, this work articulates various systemic behaviors, such as emergence from simple rules, feedback dynamics, self-organization, and shared agency, through the choreographic and performative contexts it establishes. This makes it an exemplary case study for examining how systemic principles can be observed, embodied, and possibly adapted within artistic processes. It allows for the expansion of systems thinking beyond a purely theoretical framework into a tangible, relational, and creative practice.

Emerging behavior rooted in simple actions: Throughout the piece, the two performers (Burrows & Ritsema) negotiate their relationship based on simple rules. The first rule is to move as though in a state of questioning, which leads to a choreography that is not pre-designed; instead, the dance emerges moment by moment through the continuous questioning of movement. These straightforward rules create a dynamic, constantly evolving composition akin to how minor interactions in a system result in emergent properties. This principle directly supports the exploration of how complexity can arise from simplicity within choreographic systems. In my artistic research, I work with performative structures that do not prescribe fixed outcomes but instead establish conditions for emergence, where the material unfolds through interaction and responsiveness, becoming an engine for its own evolution.

Feedback Loops: Feedback loops are key in systems and cybernetics. Essentially, cybernetics operates with an input entering a black box, which transforms it into an output that returns, creating a feedback loop. (Foerster, 1952) During the performance, the performers' actions influence each other and the audience. The different bodies (performers and audience) function as black boxes that convert each input (movement) into an output (movement or thought), establishing a live feedback mechanism where movements are constantly adjusted in response to their relational presence. This reflects how utilizing feedback as a creative and methodological tool—both in the studio and in performance contexts—can generate material, reshape meaning, and acknowledge the agency of multiple bodies within the system. It supports the investigation into how feedback loops can be choreographed or allowed to emerge, contributing to a responsive and adaptive research practice.

Self-organization and non-linear dynamics: Because the piece's structure is open, the choreography unfolds in a self-organizing manner as the performers explore movement in the moment. This choreographic piece cannot be reperformed or technically refined; the only thing its repetition can strengthen is the relationship between the two performers as they explore the multiple possibilities of their interaction. The process emerges from the interconnected interactions among the agents involved. This piece functions as a decentralized choreographic system, where no single agent determines the outcome—aligning with principles of complex systems like distributed agency and adaptive behaviors. This piece generates an emerging dramaturgy, shaped by recursive feedback, co-regulation, and non-linear development rather than predetermined

narrative arcs. Rooted in system characteristics, this dramaturgical approach is elaborated in the Methods & Findings chapter, where it is central to the methodological dimensions of the Practice as Research.

One might argue that this piece is merely an improvised score, and that it arbitrarily illustrates selected elements of system theory—suggesting that if one looks hard enough, one can always find a system. My response to this critique is rooted in the practice of systems thinking itself. Referring back to Peter Senge, systems thinking is "a framework for seeing interrelationships rather than things, for seeing patterns of change rather than static snapshots" (Senge, 2005). It is not about seeking confirmation through isolated examples, but about training perception to observe and interpret dynamic processes—how elements interact, evolve, and influence one another over time.

While we are holding it together

The second case study of this research is the work of Ivana Müller' 'While we are holding it together' (2006). Five actors hold still in a tableau vivant for 66 minutes, providing the audience with imagined scenarios. They express conflicting interpretations of their abstract or figurative poses through sentences that start with 'I imagine...'. A significant aspect of the show's appeal revolves around its spectacle as the audience observes the performers persist through the physical challenge of holding their positions for an extended period. This piece is an excellent example of the expanded choreography field, where I can also see my work and artistic research situated. Traditionally, choreography is associated with physical movement, often overlooking other modes of movement. Ivana Müller's

early work explores the movement of thought, the choreography of the mind, and, in this case, the choreography of the imaginative.

This artwork can be analyzed using the three categories mentioned above, but I focus on two different ones.

Latency - Potentiality within a System: The performers do not physically enact scenarios; they remain still, not materializing them. The physical movement is potential rather than actual, and when it occurs, it emerges from the physical limitations of the human body. The work exists in both present reality and potential space. The performers' stillness highlights latency, representing a system's dormant capacities awaiting activation. The imagined scenes stay in a potential state not expressed physically, yet they remain vividly alive in the minds of the audience. This illustrates a fundamental systemic dynamic: possibilization. In Müller's work, the frozen movement reflects how systems can hold numerous unrealized potential paths, similar to how, in my practice, choreographic choices often arise from the latent conditions or limitations present within a structure.

Second-Order Cybernetics - The Audience as Part of the System: Second-order cybernetics, pioneered by Heinz von Foerster, shifts from conventional cybernetics to explore how the process of observation modifies the system itself. The observers interact with and impact the system. In this context, the imaginary scenarios exist only in the minds of the audience, making the piece highly dependent on their interpretation. Based on their subjectivity, each audience member creates a different personal version of the described image, 'changing' the performance according to who is experiencing it. Second-order cybernetics

incorporates the observer as an active agent in the system. The audience completes the system; a system that can only exist through their cognitive interaction. Karen Barad's (a quantum physicist and feminist posthuman theorist) notion of intra-action advances this relationship further. Intra-action suggests that entities emerge through their relational entanglement, emphasizing the system's interconnectedness and emergence. It is not merely an interaction between the performance and the audience; instead, it is an intra-action that continuously shapes perspectives and interpretations, fostering a process of becoming rather than simply being.

Müller's and Burrow's works, while they differ in form and tone, both demonstrate that choreography can operate as a living system—adaptive, relational, and temporally dynamic. Yet, a critical limit lies in the fact that these works were not developed through systems thinking as a methodology.

B

Here are the videos of the named Expositions:

"SYSTEM JOY- A PERFORMANCE LECTURE" (2025)

System Joy is a performance lecture that explores the intersection of systems, thought, and movement. Sliding through the layers of choreography and movement landscapes, it investigates how far we can think within the confines of a system and how far a system can push the boundaries of its own structure. The performance blurs the lines between mind and body, logic and improvisation.

https://vimeo.com/1061067495/50ba3a4f58

INPUTS, ArtEZ University, 2025, Snapshot

"INPUTS" (2025)

"inputs" is a participatory performance investigating the notion of inputs in cybernetics. The audience is invited to disrupt the unfolding of the performance by providing clear instructions for the performer.

https://youtu.be/L97-P7-xVRg

"SYSTEM JOY" EAR, Artez University, 2025, Photo by Steef Kersbergen

"SYSTEM JOY-EAR" (2025)

System Joy is the output of an ongoing artistic inquiry into the nexus between systems thinking and choreography.
Sliding through layers of movement landscapes, interconnections, and system thinking, this sharing offers the opportunity to explore the links that connect simple structures/patterns to emerging and complex relationalities. This is an invitation to explore the dynamics of an ever-evolving system, to grasp its potential, and to dive into a new way of perceiving and understanding the structures surrounding us.
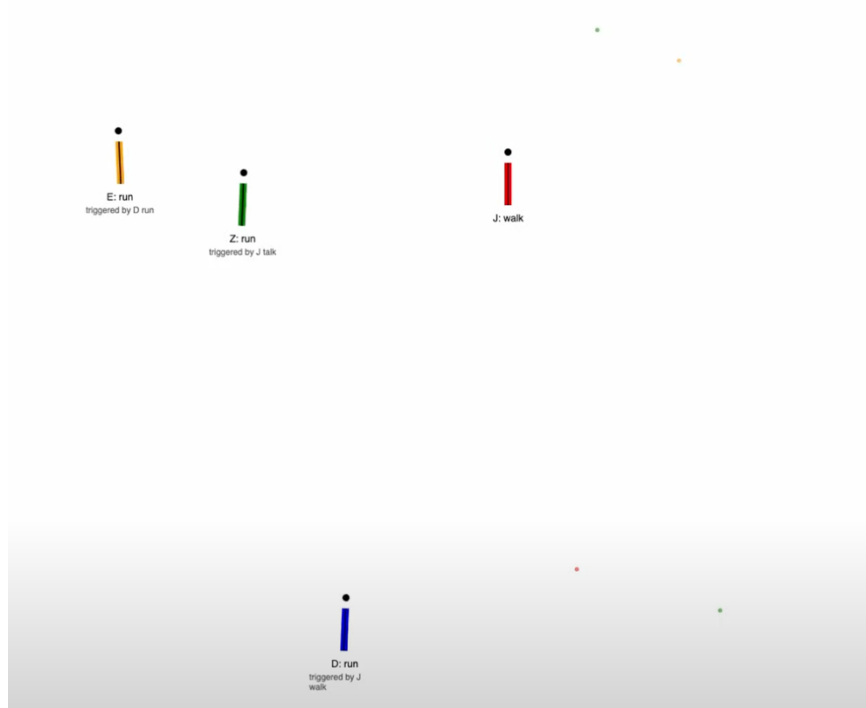And perhaps to find some j o y as we experience life with and through systems.

https://vimeo.com/1083101985/0d117491b8

C

The diagrammatic illustration of the final score:
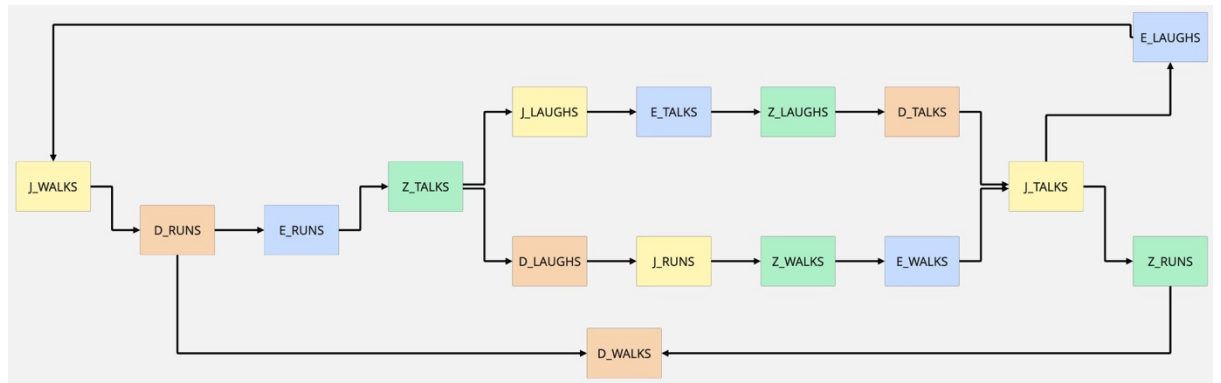
A diagrammatic illustration of the final score

The created animation by coding the final score:

https://www.youtube.com/watch?v=ciI0SjwEJPA