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## The Poetry of Dance: Vindication of former selves through our Secret Dance Lives

Esther Kentish and Sparishita Dey

Dance, as a poetic expression, showcases our ability to convey emotions and freedom through movement. This hidden dance life provides a sense of liberation for our past selves. From a Physics perspective, we aim to explore the essence of dance, a creative expression with aesthetic and symbolic movements. Acting as a language, aesthetics, and a form of memory, dance shapes our past and constructs a path for future expression. This examination spans both the poetic and physics perspectives.



### Dance as Language

*Poetry is an echo, asking a shadow to dance.* — Carl Sandburg

Dance can be performed in groups or solo. However, having a secret dance life is unique because it encourages the pursuit of solo, private expression of oneself through pronounced movement. Secret: not known or seen or not meant to be known or seen by others. Dance is the interlocutor between our public lives vs private lives. Dance also helps to reconcile our former selves. When using dance as a vehicle to access earlier periods of life and our past, it helps to access our memories. Laura Marcus states that “Language, as well as the workings of memory, shapes the past.” In terms of our secret dance lives, there is a particular interest that is taken because of the autobiographical lens that it has when allowing us to tell the story of ourselves. Secret dance enables people to express themselves in a manner that is open and safe. Also, dancing is a poetic language forcing others to showcase a part of themselves—their private selves. The reason that showing who you are in secret is easier is because you are able to showcase vulnerability. Vulnerability is the ability to reveal or showcase aspects of yourself that would otherwise make you feel sad and/or uncomfortable. Any language becomes beautiful when it is succinct but able to communicate a specific object or scenario through a single word or phrase and the perceiver is able to immediately relate to the person who is trying to communicate to them. Dance is a language in and of itself, specifically when language may not be available.

### Dance as Aesthetics

*I would define, in brief, the poetry of words as the rhythmical creation of Beauty. — Edgar Allan Poe*

Dance is connected to aesthetics or “beauty” in several ways. For example, there is a philosophical link to aesthetics. There is a beauty in dance, because dance in and of itself is an art form. Because dance is an art form, we can appreciate the beauty of the movements. One of the elements that we are particularly interested in examining is the phonaesthetics in poetry and lyrics or consonance/dissonance in music. Examining the connection between poetry and dance reveals a unique avenue for self-expression. Writing poetry allows individuals to liberate their internal ideas, crucial especially in challenging times. In physics, the beauty of a theory lies in its concise and compact appearance, hiding complex intuitions until revealed to the trained eye.

Dance, from a theoretical perspective, is defined by its predictability, compressibility, and unique perspective. Our bodies, as vessels of movement, contribute to a solid understanding of space. Fractals, tessellations, and repeated behaviors in dance echo symmetry, shaping experiences and fostering an imaginative exploration of symmetrical concepts. This dynamic motivates us to seek a more profound understanding of the world, resonating with nature’s hidden frequencies tuned to our bodies. Dance, as a universal language, relies on motion and rhythm, familiar concepts to all living bodies. Its aesthetic appeal lies in visual expression, especially when coupled with music, adding a deeper resonance through an orthogonal symmetry. Our affinity for repeated beats and rhythmic regularity mirrors the aesthetic appeal of dance. From an interdisciplinary perspective, mathematics and physics offer indicative models of aesthetics, characterized by minimal assumptions, succinct expression, a unique perspective, and providing general solutions. Special relativity exemplifies these traits, built on fundamental axioms yet capable of reproducing Newton’s laws, demonstrating aesthetic qualities through foundational formalism and practical utility. However, when a theory is able to successfully mask the complexity of its implications, while also standing the test of time, it supersedes the notion of simply being “aesthetic” in its form, it becomes elegant, a word often associated with classical dance forms like ballet. General relativity is celebrated for its beauty and elegance, captured in the poetic language of tensor algebra. It extends special relativity, portraying a universe with curved spacetime in four dimensions. This elegant portrayal is mirrored in dance, as seen in the Indian classical dance form Kathak. The term “elegant” describes the graceful appearance and disciplined movements of the dancer, highlighting the deliberate coordination and respect for fundamental rules, akin to the structured principles found in physics. Both disciplines, physics and dance, may seem rule-bound, but these rules stem from creativity, imagination, and individual expression, making them unique and nuanced.

### Dance as Shape

#### *The Movement of Dance*

*To read a poem is to hear it with our eyes; to hear it is to see it with our ears.* — Octavio Paz

Movement is an elemental factor in the ways that we process dance. Because dance is consistent with everything else that human beings have a sensory experience with in nature, it makes sense for dance to be a natural phenomenon. Humans are also a part of the same nature and sensory experience. Therefore, our comprehension of nature is something physics tries to describe through various “laws.” The use of physics to describe elements through laws creates parallels that can ultimately be drawn up. Arguably, the laws of physics birth dance. There are a few key elements in terms of dance, particularly rotation, swaying, leaping, and intentional entropy. These elements define the movement and the shape of dance. Rotation is a key element of many dance forms or what we like to do when we dance. The rotation that we examine or see in dance is also reflective of the phenomena that we experience in a sensory manner in nature, for example, orbits of stars, black holes, and other celestial experiences. Swaying becomes ubiquitous as oscillations that appear everywhere in nature, too, thus, becoming deterministic systems in time. Swaying is one example of a movement showcased and cast by dance. Twerking, a form of dance originating from Africa, also is actualised via oscillations, making the repetition a common theme for that particular dance type as well as for other forms of dance.

Leaping is another example, visible in dance forms like ballet and modern contemporary dance. The parallelism of dance in relation to nature appears as many things in nature manifest as “leaps” e.g. in order for things to happen at a molecular level, an activation energy must be reached by a molecule to react, or the photoelectric effect. Furthermore, dance helps us to organise our internal thoughts and process difficult, chaotic, and unorganised information. Dance is an intentional entropy-lowering action, particularly when the dance is choreographed. We argue our affinity to low-entropy states emerges from disarray. Dance tries to counteract the natural path of increasing entropy, but naturally things tend towards chaos. Engaging in the act of dancing serves as a means to fill a void, allowing us to navigate and comprehend the unpredictable nature of our individual identities. Dance serves as a means to reflect our emotions and modulate our sensory perception, leading to a fragmented or interrupted experience, which eventually aids in our cognitive processing.



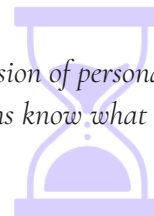
**Dance has a geometry, as do most things.**

*A mathematician, like a painter or a poet, is a maker of patterns. If his patterns are more permanent than theirs, it is because they are made with ideas. — G. H. Hardy*

When we try to model and understand the complex world around us, we break it up into cells, just like the individual components of tessellations. We try to study what goes on in each of these and find some logic or order to the way that the different cells interact. When comparing the analysis of microscopic systems with macroscopic systems, it is evident that a direct correspondence between the two is not obvious. Frequently, the macroscopic system does not necessarily exhibit deterministic behaviour that directly corresponds to the microscopic observations. Instead, random interferences may arise, leading to either disruption or additional effects. This introduces a component of “disorder” or “chaos” into the system. Similar to the realm of dance, wherein the analysis of movement can be deconstructed into the individual motions of distinct bodily components, it remains evident that the replication of such movements by different individuals is inherently unattainable. The reason that this is unattainable is because dance is unique to that particular person making it an individualised experience. This stochasticity emerges as an immanent outcome of the individual, manifested through their emotional disposition and personal interpretation of the surrounding reality they perceive. Dance, like analogical components, is defined by both motion and spatial dimensions. Its power lies in the oscillation through time and space, serving as a tool to release emotions and invigorate the soul. Liberating pain, dance fosters empathy and self-understanding. Introducing the dimension of time in dance expresses the human affinity for geometry more fully, allowing a deeper connection with lost parts of oneself and the wounds of the past. Time in dance becomes a means to travel both forward and backward, creating a subconscious connection that was initially absent. Through dance, we are able to exist and subconsciously experience four-dimensional space-time. It might, in fact, be one of the only ways we are able to comprehend time as a dimension, at an individual level. It is a way to communicate 4D reality to each other and it does so successfully where words may fail.

**Dance in the Pendulum (Time)**

*Poetry is not a turning loose of emotion, but an escape from emotion; it is not the expression of personality, but an escape from personality. But, of course, only those who have personality and emotions know what it means to want to escape from these things. — T. S. Eliot*



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Dance, intertwined with time, becomes a tool for navigating our experiences and constantly reshaping our sense of self. Through hidden choreographies, we engage with the world and ourselves, fostering a duality that ensures a connection with both our individuality and shared experiences. This multiplicity allows us to revisit and reevaluate aspects of our lives, finding redemption, especially after traumatic situations, through the combination of music and dance. The centrality of time in dance draws parallels to evolution, linking it to philosophical debates on determinism and free will. In mathematical and physical terms, dance reflects the dichotomy of determinism and stochasticism—order and chaos— as our movements, akin to a perturbed system, carry a unique and evolving language beyond explicit rules. Our movements, governed by unique rules, reflect our inner thoughts and emotions, adding a personal touch. Dance, an intentional extension of our body language, embodies these rules, creating a stochastic element.

Similar to perturbation theories in Physics, small fluctuations in our mental conditions can lead to chaotic dance motion. While our minds may seem chaotic, our inclination to move is a response to stimuli, reflecting conscious choices. In quantum physics, the concept of a wave function, describing a particle's state, aligns with dance variables like arm, leg, and hip movements. This dance wave function encapsulates potential expressions, awaiting observation or conscious processing. For example, choices and time delineate how movement, in particular, evolves through time and space. However, the way that we explore a specific movement can be weighed against the emotion that we have placed into the movement. For example, in modern contemporary dance, the way in which dance is constructed and choreographed may take on flowy and light movements, like twirls, spins, leans, and bends. However, these transcendent, angelic-like movements can be contrasted with hard, unpointed feet. Whereas in ballet, the dancers are positioned to have their toes pointed and the movements are very clean and elegantly executed.

Freedom comes when these actions are executed with free-will because the non-deterministic value increases and the dancer is able to be elevated into a new realm of belief, understanding, or experience. By doing so, this freedom give the dancers choices regarding time and also the awakening of the evolution of movement. Thus, creating a strong parallel between quantum mechanics, determinism, and free will. The many possible emotions and their mapping to movement exist at the same time in our mind, but once we translate it and actually move in real life, we collapse our wave function and this is what others observe. But the emotion of dance feels more than just that one movement, maybe because it came from the possibility of so many more because it was a consequence of all the different emotions and thoughts that induced that motion. We often look back and remember those emotions, and dance allows us to go back in time and relive the evolution of that wave.

Dance is a visual expression of continuous energy transfer, spiritualizing the process of experience. It serves as a means to reconnect with lost aspects of ourselves, especially from pre-traumatic or overwhelming life phases. Resonance in perception and emotion defines our painting of reality, and the intersection of reality and belief lies in imagination. Engaging in creation through imagination allows us to travel between systems, transferring energy and creating the dance experience.