

**Performing Geometries:**  
Embodying Regular Euclidean Shapes  
by Means of the Dancing Body.

**Case study: *The Square***

**Sofia Kondylia**

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**PERFORMING GEOMETRIES:**  
EMBODYING REGULAR EUCLIDEAN SHAPES  
BY MEANS OF THE DANCING BODY.  
**CASE STUDY: *THE SQUARE***

A Thesis presented by

**Sofia Kondylia**

to Master Performance Practices

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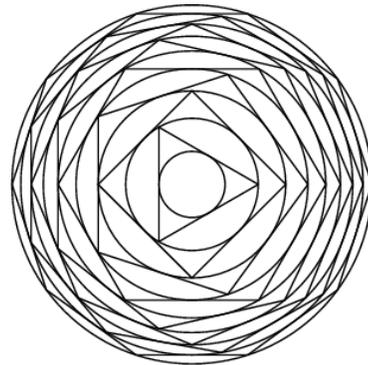
in Performance Practices.

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*“Only by looking at the interaction between the energetic life force and the tendency toward balance can we reach a fuller conception of the dynamics activating the human mind and reflected in the mind’s products.”*

*(Arheim, 1954, 37)*



Introduction Fig.  
*Polygon Circumscribing constant*



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## **Declaration by Student**

I, *SOFIA KONDYLIA*, HEREBY CERTIFY THAT I HAD PERSONALLY  
CARRIED OUT THE WORK DEPICTED IN THE THESIS ENTITLED,  
*“PERFORMING GEOMETRIES: EMBODYING REGULAR EUCLIDEAN SHAPES  
BY MEANS OF THE DANCING BODY.  
CASE STUDY: THE SQUARE”*.

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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# 1. Introduction

*Performing Geometries* research is engaging in the performative and dramaturgical potentiality of visualising regular Euclidean shapes in performance, through a dancing practice based on walking, informed by formalism, minimalistic repetition, and a physical impossibility of the practice to keep being performed infinitely. Three of the regular shapes have been selected for exploration, the equilateral triangle, the square, and the n-angled regular polygon (perceived as a never-met circle). Each one of them is forming a different case study on my research on regular shapes, while the main part of this thesis is devoted to my case study on the square shape. The other two shapes are yet to be explored. Through this research, I aim at identifying a mode of performance that leads to the embodiment of regular Euclidean shapes, by translating, qua kinaesthetic empathy, their structural properties, somatic and mental effects into dance.

Geometry is often related with mind operations, while dance with body operations. Manning's and Massumi's (2014, 103) research states that unexpected relational techniques reach their maximum creative potential when brought to their operational limits. This research follows this view, by actualising a most literal and simple coupling of geometry and dance, in order to show how the performativity and dramaturgy of relating them in this way, can offer a more constructive understanding

of them; of geometry as an embodied and sensorial experience and of dance as a mindful and thinking process.

Creating space and moving in it through dancing has the capacity to stimulate my sensory mind and mindful body in synergy and in equal terms, addressing them in a non-cartesian way. My research embraces this capacity of dance, while making explicit how fundamentally different those two creative mediums of processing information –the body and the mind– are. The need to show this emerges from a personal need to utter that we cannot take body-mind togetherness during dancing praxis for granted. Instead, it needs to be well acknowledged, by the dancer, that both body and mind operate within their limitations while dancing, conditioning the dance and the dancer's perception of it. This realization motivated me in finding my way, through dance and geometry, towards a more constructive understanding of my body-mind relation and operation during dancing and creating space.

Working with regular Euclidean shapes through dance has been based mainly on Arnheim's work (1954; 1969; 1971; 1982), which is explaining the psychological implications of visual perception of form, in the sense that a form may invoke feelings to its observer. Regular Euclidean shapes are described in his work as having the power to immerse their observers in a state of psychological balance by kinaesthetically empathising with their structural properties. Arnheim's research suggests, but does not explicitly utter, that regular shapes and non-representational form in general, have the capacity to act performatively upon the body of their observer and that spatial visualisation of form implies a spatial dramaturgy inherent in it. By undertaking this

research, I wish to take Arnheim's research into performance practice, expanding its significance for performance discourse. Furthermore, embodied knowledge for regular shapes, emerging from my research, may contribute to a phenomenological discourse related to kinaesthetic empathy for geometrical shapes.

Arnheim's research (1954; 1969) suggests that form and shape are the same since they always generate thinking within a particular context and, therefore, a form is simultaneously abstract and concrete. My research embraces his view and uses the terms form and shape as being the same throughout. Moreover, Arnheim argues that a Euclidean shape, being abstract and concrete at the same time, undoes any chasm between geometrical abstraction and concreteness. My research on the square shape has shown that there are practical implications of this non-existent chasm for the person visualising this concept through dancing in physical spacetime. My physical translation of this chasm through dancing practice has shown a capacity for transforming the way geometrical space was originally perceived and danced by me. Expansion of Arnheim's theory through artistic research has surfaced a performative and dramaturgical potential of perceiving visual form in a way that both my mentality and emotion fit in this non-existent chasm and in physical spacetime.

My dancing practice has been based on walking on, in and in relation to regular Euclidean shapes, and is informed by formalism, minimalistic repetition and physical impossibility of the dance to keep being performed infinitely. The action of bringing formalism, minimalistic repetition, and physical impossibility together has drawn particular inspiration from Brown's work *Accumulation with Talking plus Watermotor*

(1979). My research is transposing Brown's ideas into a geometrical context, which is visually and physically discussing the non-existent chasm between geometrical abstraction and concreteness. The process I have followed has shown that minimalism and physical impossibility, together, have the capacity not only to transform what a formalistic repetitive process originally was for me, but also to propound how the repeated form, the square, can be more constructively perceived concerning my body's mentality and emotion during performing.

The question conditioning my exploration of all three selected shapes is: *What is the dramaturgical and performative potentiality of embodying regular Euclidean shapes (in this thesis of the square) through a dancing practice of formalism, minimalistic repetition and physical impossibility in performance?*

This question has been answered within the framework of artistic research and pursued by deploying Practise-as-Research methodologies for creating *The Square* dance film. The scope of my research has so far been limited to visualising the square in space only by means of my dancing body. Therefore, of the three shapes selected, the square is the only implemented case study, and any generalisation of the method is still precarious. The challenge of testing my findings on the square through other dancing bodies is still to be explored. Finally, at the final research stage of my practice, my research was adapted to Covid-19 pandemic conditions, and research delivery format was changed from live to virtual, which shifted the delivery of the research from the creation of a solo, live performance for black-box theatre, to the creation of a dance

film. However, I believe that this unexpected turn in research has added to, rather than changed the performative and dramaturgical potential of my practical findings.

Overall, this research has shown that among all regular shapes, the square has the capacity to invoke the feeling of balance in my dancing body by highlighting the contradictory physical and mental tension I feel while dancing and creating it in space, through a minimalistic dancing practice of repetition and physical impossibility. Chapter 2 of this thesis explores the theoretical underpinnings of *Performing Geometries* research through the lenses of kinaesthetic empathy for non-representational form and regular Euclidean shapes. Arnheim's contribution to the field is analysed, and the concepts that need to be taken further, or reframed within performance practice are highlighted. Chapter 3 is devoted to my artistic practice on the square case study. Theoretical and artistic work related to my studio practice is explored, and my practice and findings are unravelled. Chapter 4 is devoted to critically reflecting and discussing the implications of my findings from the square case study. Chapter 5 lists my current findings and revisits my research question regarding the greater context of *Performing Geometries* research.

I have intentionally used the third person throughout the writing of this thesis, as I find it consistent with the context of my research, with the exception of the present chapter, and Chapter 3, as I find first-person writing more consistent with their content. Also, I find quite interesting that this shift may invite the reader to experience a “zooming in and out” process throughout the reading of this thesis, in the same way I have experienced it throughout the conduction of the research.



## **2. *Performing Geometries: Theoretical Framework***

The importance of empathy (*Einfühlung*) regarding the aesthetic experience of form has existed historically since the 18th century (Freedberg and Gallese, 2007). Today's notion of empathy is based on the work of Lipps (1903), who conceived empathy as the human body's vehicle for identification with other persons' mental states and actions, as well as with emotional engagement with non-representational artistic form through the operation of "an activity of forces", inherent in it (Arnheim, 1954, 448). The common ground of all empathy schools after Lipps is that embodied simulation is based on the body's ability to project personal feelings and actions into other physical bodies and objects, as if they were produced or suggested by them (Lipps, 1903; Arnheim, 1954; Currie, 2011; Coplan and Goldie 2011, xii). Today, the term "Empathy" within artistic discourse is also known as kinaesthetic empathy and is strongly linked with the dramaturgical discourse, (Foster, 2011; Reynolds and Reason, 2012), due to the synergetic role of kinesthesia<sup>1</sup> and empathy in embodied experience. Kinaesthetic empathy encompasses communication of the artistic, as well as of the geometrical form when seen through aesthetical lenses. Therefore, the geometrical form is possible to communicate performatively and dramaturgically through it, as will be manifested in this chapter.

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<sup>1</sup> The term kinesthesia was coined in 1880 by H. C. Bastian, standing for muscle sense. In 1966, Gibson "envisioned kinesthesia as a perceptual system that synthesized information about joint positioning, muscular exertion, and orientation within space and with respect to gravity. Gibson further posited that kinesthesia assisted in integrating sensory information from all other systems" (Foster, 2011, 6).

## ***2.1 Empathy in Aesthetic Experience of Non-representational Artistic Form***

Neuroscientific research of the past decades (Freedberg and Gallese, 2007; Currie, 2011; Finger et al., 2013; Gallese 2019) has shed light on the issue of empathy for non-representational form by the discovery of mirror and canonical neurons in the human brain, responsible for any kind of embodied simulation. Those neurons discharge the same way whenever a motor action is either executed or observed as well as whenever a felt emotion invokes in the body or deduces from the observation of another body's expressions and movements. The same applies to works where the creative gestures of the artist are evident as traces in the result, e.g., in Pollock's work *Number 14: Gray* (1948), as well as to non-representational works of geometrical stylized art, e.g., in Albers's work *Study for Homage to the Square* (1964). Non-representational works of art are possible to invoke the feeling of occluded movement, which arises from a consideration of their formal qualities (Freedberg and Gallese, 2007). This explains how architectural forms and of non-figurative graphic representations can invoke motor and emotional resonances within the body's muscular system (Freedberg and Gallese, 2007; Finger et al., 2013; Gallese 2019; Arnheim, 1954;1969;1982). All these paradigms have set the neural underpinnings of empathy for non-representational forms, grounding the ability of the human body to empathize with non-representational configurations and geometrical shapes.

However, Worringer (1908, 23) was one of the first art historians to ponder on the relationship of empathy and abstraction<sup>2</sup>, considering them both fundamental in artistic creativity and experience. He argues that empathy is enabling life activity to permeate the body in the form of inner motion and, for this reason, is fundamental for self-activation (1908, 5). On the other hand, abstraction and geometrical regularity in modern art are wresting form from its natural content, by purifying it to its absolute value; in this way, they are expressing a fundamental, human need for happiness and tranquillity (1908, 16-20).

Worringer was criticized by Arnheim (1969, 188-191) for those views, as being too dichotomous by assigning abstraction inclusively upon non-representational art. Any form, he argues, representational or not, is perceived as abstract and concrete at the same time (1969, 154), because visual perception of form stimulates thinking of it within a certain context; form always comes along with “a kind of content” (Arnheim, 1954, 96). The geometrical form is, then, perceived as a concept, and a separation between form and shape is not possible (Arnheim, 1969, 96). He writes:

*“Whenever we perceive shape, consciously or unconsciously we take it to represent something, and thereby to be the form of a content.” (Arnheim, 1954, 96)*

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<sup>2</sup> By the term “abstraction” Worringer refers to the making of and thinking through non-representational artistic work based on two-dimensional, geometrically stylized form, i.e. modern art of the early 20<sup>th</sup> century.

When it comes to geometrical shape, content lays upon geometrical idealization of nature. For this reason, the terms form and shape are used in the same way along the writing of this thesis.

The possibility to assign meaning to a geometrical shape through the “interplay between properties supplied by the object and the nature of the observing subject” (Arnheim, 1954, 5-6) constitutes an anchor point for this research. Arnheim’s examination of vision as a simultaneously sensory and thinking experience, assigned to it an objective element. This element based upon the *Gestalt theory*<sup>3</sup> of the early 20th century (Ellis, 1938; Wade, 2012; Finger et al., 2013), highlights the brain’s capacity of capturing a form’s structure and content simultaneously.

Arnheim’s work (1954; 1969; 1971; 1982), makes it possible for this research to unravel the manifold applications of his ideas in performance practice and discourse. His approach of form and shape wrests it from any symbolic, philosophical, or subjective connotations, which comes in tandem with this research’s pursuit of geometrical form as a simultaneously visual and embodied experience, which is capable of acting upon its creator’s and observer’s bodies by visualizing it in space through dancing.

Reflecting on Lipp's theory (1903), where the perception of artistic form is linked with an activity of forces, and combining it with *Gestalt theory*, Arnheim (1954)

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<sup>3</sup> *Gestalt theory*, which is discussed here, should not be confused with *Gestalt therapy* of mid-20<sup>th</sup> century psychological discourse.

explains the phenomenon of kinaesthetic empathy through the way a form's visual dynamics operate during aesthetic observation. He supports that visual dynamics emerge from the structural properties of a form (such as shape, size, and colour), either when a form acts upon its observer autonomously or within a greater synthesized whole. Dynamics of form become perceived as directed tensions, continuously acting along its *structural skeleton*<sup>4</sup> (1954, 13, 92-95). For this reason, directed tensions may invoke an illusionary effect of locomotion or occluded movement within their aesthetic contextualisation (1954, 416). This happens because directed tensions activate the nervous system<sup>5</sup>, "attacking" its internal balance, and the body responds by attuning its nervous and motor system with the simplest pattern provided in the form observed, i.e. its structural skeleton (1954, 438-439). This constitutes the expression of form an inherent property of its structure, showing that other, subjective parameters, e.g. style, taste, context, etc., are irrelevant for artistic experience (1954, 4-8, 439-454).

Overall, Lipps, *Gestalt theory*, Arnheim's research, and 21st-century neuroscience, have shown that empathy is possible to be invoked for any kind of form, making evident the possibility for humans to empathize with regular Euclidean geometrical shapes. Arnheim's research manifests that structural properties of regular Euclidean shapes are inherently expressive and become communicated qua their visual dynamics. This research shows that regular Euclidean geometrical forms act

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<sup>4</sup> The structural skeleton of a form is its simplest arrangement in space, i.e. a graphic representation of its structure (Arnheim, 1954, 96).

<sup>5</sup> Arnheim located kinesthetic empathy in the function of the nervous system far before 21<sup>st</sup> century neuroscience's advances explained embodied simulation qua mirror and canonical neurons.

performatively upon the body observing or creating them in space, in the sense that first, they convey a meaning, and second, this meaning is performed within the body of their creator and observer qua visual perception of dancing form and kinaesthetic empathy.

Since kinaesthetic empathy is the body's mechanism for invoking and simulating emotion, it is strongly linked with dramaturgical discourse. Non-verbal dramaturgies, e.g., dance, depend upon the mechanisms of the work for creating a perceptual context, invoking emotion, and generating thought in the viewer's body. The position of Arnheim on how structure, form, and expression are inseparably bound, suggests that these mechanisms are structural and, further, that each visual form suggests a spatial dramaturgy. The dramaturgical context of a geometrical form is, then, possible to be used, translated, and actualized within the non-verbal dramaturgical context of dance performance.

## 2.2 *Empathy in Aesthetic Experience of Regular Euclidean*

### *Shapes: The Triangle, the Square, and the Never-met Circle*

*“There is no point to visual shapes apart from what they tell us. This is why we shall constantly proceed from the perceived patterns to the meaning they convey; and once we endeavour to look that far, we may hope to recapture in depth what we lost in scope by deliberately narrowing our horizon.” (Arnheim, 1954, 4)*

Before explaining what visual representation of regular Euclidean shapes affords in terms of meaning, we should define what a shape (or figure, as Euclid originally put it), in plane Euclidean geometry is: “A Shape is that which is contained by any boundary or boundaries” (Euclid, c.300 BC, I, Def. 14).

*Regular shapes*, in plane Euclidean geometry, are close regions who have all their sides and all their interior angles congruent (James and James, 1992, 322) The first regular shape in the plane is the *equilateral triangle*, which is “a triangle with all three sides equal” (James and James, 1992, 427). The next regular shape is the *square*. It is “a quadrilateral with equal sides and equal angles” (James and James, 1992, 393). Regular shapes are named by the number of their sides, which is always equal to the number of their angles. All regular shapes are theoretically infinite (Euclid, c.300 BC, IV; XII; James and James, 1992, 322) and possible to be inscribed in a circle<sup>6</sup> of radius

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<sup>6</sup> A circle is defined as “a plane curve consisting of all points at a given distance (called the radius) from a fixed point in the plane, called the centre” (James and James, 1992, 60) and is also a locus. In plane Euclidean geometry, a locus (plural: loci, the Latin word for “place” or “location”) is “any system of points, lines or curves that satisfies one or more given conditions” (James and James, 1992, 255). Therefore, a circle can also be defined as the locus of points which equidistance radius  $a$  from a given point on the plane.

a (Euclid, c.300 BC, IV, Def. 3, Prop. 1-16). An *n-angled regular polygon* is a polygon of infinite sides and angles, possible to be inscribed in a circle of radius a, but its sides are so small and its angles so obtuse, that when inscribed in this circle, the n-angled regular polygon almost meets its circumscribing circle. For this reason, the n-angled regular polygon can never be a circle, but it is possible to be perceived as *a never-met circle* in the plane.

The structural properties of regular shapes designate them with *equilateral symmetry* and *visual balance*. Equilateral symmetry means that the shape is identical on either side, defined by the axes running through its geometrical centre and splitting the shape in half. Those symmetrical axes of the shape, together with the lines constituting its boundary, depict what Arnheim describes as the *structural skeleton* of the shape (1954, 13). Experiments on how the visual stimulus of a regular Euclidean shape affects gamma brain waves (Arnheim, 1954, 438-439) have shown that gamma motion<sup>7</sup> emerges from a vaguely circular spot at the centre of the shape and moves equilaterally along its structural skeleton. This motion creates an analogue of how the directed tensions of a regular shape assign to it its visual dynamics (1954, 14, 412, 438-439). Moreover, gamma motion showed that the centre of a regular shape operates as a centre of visual attraction and repulsion, where all directed tensions compensate one another, constituting it a restful position for the eye (1954, 13, 439). Furthermore, any

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<sup>7</sup> Here, Arnheim (1954, 438-439) refers to gamma motion, which is motion produced by the stimulation of the brain with images of regular Euclidean shapes that appear and disappear, which alter gamma waves rhythm and produce effects of motion on, in and out of the boundary of the regular shapes, to which the brain is exposed.

movement along the axes of a regular shape's structural skeleton emits a sense of stability to the observer (1954, 14-16, 439). Thus, the dynamic landscape of regular shapes, inherent in their structural qualities, characterizes them with visual balance, while the interplay of their directed tensions invokes feelings of psychological balance qua embodied simulation (1954, 14).

In this research, regular shapes are visualised in space only by means of the dancing body, creating them through its moving in space. Previous research (Kondylia, 2011) has shown that, space-making is strongly related to the dramaturgy of the movement creating it. Either in the case of architectural design (where the creating body is kinaesthetically active while drawing spatial geometries to be later inhabited) or of dance composition and improvisation (where the creating body is kinaesthetically active while creating spatial geometries to be occupied in real-time), the process of creating space is always infiltrated by the unique way space is perceived by the body of the creator. Thus, the creator's kinaesthetic empathizing with non-representational forms of geometry becomes fundamental in space perception, conception, and creation. In this way, the spatial dramaturgy of any conceived geometrical form is imprinted in all the stages of creative process, becoming evident in the structure, form, and inner rhythm of the result –many times in absentia of the creator. And, since movement creates space, any spatial dramaturgy is strongly related with the performative and dramaturgical dimension of the geometry of the movement that created it.

Within this context, it becomes fundamental for this research to explore regular Euclidean shapes only by means of the dancing body, to allow embodiment to unravel

their performative and dramaturgical potential in performance. Since the boundary of any shape constitutes its simplest visual arrangement (Arnheim, 1954, 53), and it is the first thing with which our vision is occupied<sup>8</sup>, when engaging with it, it must be explicitly visualised in space throughout the dancing. Gestalt experiments of the early 20th century (Ellis, 1938) have shown that the maximum grasp of a pattern's dynamic potential happens when the observer is *repeatedly exposed* to it (Arnheim, 1969, 30-31). Therefore, the full perception of a shape's visual dynamics, and within an aesthetic context, remains dependent on the time the observer spends with it. In a performance context, the recurrence of dancing form has the power to undo ephemerality, expanding the time of the form's visual perception and generating thinking and concentration on it (Kartsaki, 2017, 67). For these reasons, dancing repetitively on the boundary of a regular shape in this research is setting the ground for both perceiving, empathising with and embodying it.

The choice to work with regular shapes through a repetitive dancing practice is based upon the spatial dramaturgy of those shapes, along with what the dramaturgy a repetitive dancing practice on, in and in relation to them, may create. Arnheim argues (1954, 36-37; 1971, 32-48), that psychological balance, generated qua visual experience of form, comes about as pleasurable for both creating and experiencing art,

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<sup>8</sup> On the issue of how we actually see shape Arnheim (1954, 53) writes: "No person blessed with a healthy nervous system apprehends shape by patching it together through the tracing of its parts." I regard this research offers an alternative to this proposition.

because every natural system's deterministic fate is the entropic<sup>9</sup> reduction of its governing contradictive tensions. On the other hand, Manning and Massumi (2014, 103) support that techniques of relation show their maximum creative potential when engaging with the limit of what they are expected to do and can be thought of within particular contexts. This comes in tandem with the research's main motivation, which is to embrace, emphasize, and transform any contradictions the body and the mind of the dancer may feel while dancing and creating a regular geometrical form repetitively in space. In this way, the research pursues the dissemination of a more constructive understanding of the body's entropic tendency towards body-mind fluidity, harmony, and balance, and of geometry and dance as embodied experiences as well.

Expanding on all the above, this research tests in practice whether the visual dynamics of regular Euclidean shapes propose an experience of balance to the body dancing them repetitively in space. The regular shapes selected to be explored within *Performing Geometries* research context are:

- △ *the equilateral triangle,*
- *the square, and*
- ⊙ *the n-angled regular polygon, perceived as a never-met circle.*

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<sup>9</sup> "The amount of disorder or randomness of errors relative to energy or information" (James and James, 1992, 146). Entropy arises from the Second Thermodynamic Law and can be broadly defined as the tendency, any energetic system has, towards the reduction of energy and towards disorder, which brings it in a state of tranquillity and chaos (Arnheim, 1971).

Selection of these three out of the infinite possibilities of plane regular Euclidean shapes is based upon the realization that although their structural properties designate them all with equilateral symmetry and visual balance, each of them delineates an apparently unique quality of space and, therefore, another spatial dramaturgy. The way their directed tensions are distributed upon their structural skeletons designates each one of them with different emotional, performative, and dramaturgical capacity within a dancing practice of repetition, which shall have a decisive impact upon dance embodiment, guiding each of the three dances to different dramaturgical paths and research results.

This realization has been practiced firstly through a case study on the square shape, to which this thesis is devoted, and which is the first of *Performing Geometries'* research. Research is undertaken in the format of creating *The Square* performance and dance film. The other two case studies on the equilateral triangle and n-angled regular polygon (never-met circle) are yet to be explored.

### **3. Artistic Practice: *The Square* Case Study**

The posited theory has been put to practice through practice-as-research methodologies, based on minimalistic repetition, formalism, dance improvisation, and conditions of physical impossibility. The intertwining of studio practice with pertinent literature, similar artistic work, and constant self-reflection has led to the creation of *The Square* performance and dance film. As already posited, the square's case study was meant to be delivered in the format of a live dance performance for the black-box theatre, but due to Covid-19 pandemic outbreak conditions, research has been adjusted and delivered in the virtual format of a dance film (Ap. A).

#### **3.1 *Minimalistic Repetition, Formalism and the Dancing Body***

Studio practice of *The Square* has been conditioned with minimalistic repetition and a formalistic approach of dance from the very beginning, as the square's form needed to be simultaneously spatially visible and recurrent throughout the whole dance.

Minimalistic formalism, established by the pioneer dancers of the Judson era during the '60s and the '70s, was focused on abstraction of form (Burt, 2006, 10-12). Minimalist dancers supported that the dramaturgy of dancing form was difficult to be communicated (Rainer, 1968); therefore, it should move towards its "pure form" (Burt,

2006, 10), dismissing all other dramaturgical elements placed upon and related with it. Within this context, minimalist dancers conceptualized repetition as a way of analysing, working with, and conceiving dance, without searching for further meaning beyond it (Rainer, 1968, 275; Burt, 2006; Banes, 1987).

Rainer's (1965) *No manifesto*<sup>10</sup> was stating an impersonal, "object-like" (1968, 273-275) approach of dance, able to reveal the complexity of it. Rainer's repetition had to be studied thoroughly as a methodological structure since repetition for her was not only literal (i.e. a successive recurrence of an action), but also a means of maintaining energy consistency and concentration focus while dancing. This view was also embraced by Brown (1978). In Rainer's *The mind is a muscle, Part one: Trio A* (1966) and *Trio A* (1978), as well as in Brown's *Watermotor* (1978), repetition became a way of not prioritising any movement phase, maintaining the pacing of the dance, as well as the flow of it. This is proposing a practice of attention that conditions the dancing praxis with experiencing, in real-time, the shape of the created movement (Kartsaki, 2017, 37-40). Thus, repetition can become a practice of paying attention both to the shape of the movement and to the dramaturgy of it by placing the focus of the dancer in the visual dynamics of the movement's shape. This is of high importance for the dramaturgy of *The Square* since the dramaturgy proposed by the dancer's repetitive

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<sup>10</sup> " No to spectacle. No to virtuosity. No to transformations and magic and make-believe. No to the glamour and transcendency of the star image. No to the heroic. No to the anti-heroic. No to trash imagery. No to involvement of performer or spectator. No to style. No to camp. No to seduction of spectator by the wiles of the performer. No to eccentricity. No to moving or being moved." (Rainer, 1965)

action is interwoven with the dramaturgy suggested by the visual representation of the square shape.

The square's form comes along with a promise of psychological balance, as all regular Euclidean shapes do (Arnheim, 1954, 14-16). Its expressive potential arises from a most silent and continuous cancellation of the horizontal and vertical dynamic forces governing it (Arnheim, 1982, 71-73, 140-145). Because of its symmetrical, right-angled, quadrilateral centrality, the square holds the possibility of balancing in all four directions referring to its centre. Furthermore, the square's angles are not acute, yet not obtuse; its right angles are definitely "angular", standing in the middle of those two possibilities. The square, therefore, acquires an inherent capacity for softening contradiction, and practicing it, within its own spatial and dramaturgical context, is, then, a practice of how contradictory forces may become undone in a most sharp and intact way.

The need to assist the empathising process of the dancer by allowing to the square's dynamics to perform their own dramaturgy, without contrasting the dynamics of the dancing form, highlighted a need for establishing geometrical clarity in the square's and the dance's form during their repetition in space and time.

Minimalistic works produced by Childs during the '70s, such as *Dance* (1979; 2009), *Einstein on the beach* (1976; 2012) and *Plaza melody excerpt interior drama* (1977) are highly technical, repetitive explorations of complex Euclidean geometries through minimalistic dancing and music. Parallel lines, circles, diagonals, and elliptic

shapes are synthesized in the spatial composition of the dance, delineated on the floor by the dancers' movements. The dance is highly technical and rhythmical, while geometrical forms become merely distinguishable due to the placement of the focus to the dancers' endurance, speed, flow, and movement precision within spatial complexity (Banes, 1987, 140-141). Geometrical complexity in the spatial structure of Childs' dances resulted in a highly technical and virtuosic practice of repetition, where the dancing body was stretching its limits, becoming as "geometrical" and precise as Euclidean geometry is.

Stein (1935, 166) suggests that "if anything is alive, there is no such thing as repetition." Every time a movement is created, its previous and following ones will only emphasize the singularity of the event (Deleuze, 1968; Kartsaki, 2017, 91). Euclidean geometry's sharpness, clarity, and precision, therefore, are not possible to be literally met in the dance of the square, for the body, naturally, performs the concepts of Euclidean shapes (as posited by Arnheim) and not their actualization when dancing them repetitively in space. The perfect square will never be met; slight alterations of the square's size and location, as well as differences in the body's breathing, movement, and rhythmical pace, will always change its form in space. Geometry is an invention, an idealization of form; dance consists of the natural forms a body's energy and physicality produce in spacetime. Even though the repetition of the square's form in space serves a recurrence of its visual representation, it is exactly this recurrence that accentuates the body's impossibility of (literally) "becoming geometrical."

However, this impossibility of the body to accurately repeat its own movements should not be perceived as a failure of the body to create an accurately repeated square in space. As Arnheim has observed,

*“When a person reports that he sees a square, he is referring not to a physically deficient specimen but to the pure shape of the perfect square, with which geometry is concerned. He sees a figure with truly right angles and truly equal sides. Whether or not his percept is reporting faithfully on the particular physical object [...] –if indeed the person is looking at any object at all while visualizing the square– is irrelevant [...].” (Arnheim, 1969, 224)*

The square’s form is not the shape the vision captures; on the contrary, it is a concept. The concept of the square, then, comes along with the geometrical context it belongs to, and the dancing body is perfectly capable of finding its way through geometry’s abstraction and concreteness. For this reason, accuracy in the square’s form and dancing is important, but only to the extent that the concepts of their visual representation allow them to act performatively upon the dancer and in space.

De Keersmaeker explored the repetition of Euclidean geometrical form in some of her early works included in *Fase: four movements to the music of Steve Reich* (1967-1972), all of them accompanied by the minimalistic music of the composer in the title. In *Violin Phase* (1967), De Keersmaeker is deploying dance repetition on the structural skeleton of a Euclidean circle, which is inscribed on a floor filled with sand. Her repetitive dancing on the periphery and the diameters of the circle results in

writing the same circle on the sand again and again. This is producing an effect of persistence, which is emphasized by the subtle changes and recurrences of the dancing patterns (Kartsaki, 2017; Burt, 2006, 138-147). Like Childs', De Keersmaeker's dance is conditioned by the formal qualities of the circle's geometry, though, in this case, the circle is visualised explicitly in space. Her choice to work with only one shape, and her repeated exposure to it, manifests how the shape's visual dynamics (balance, symmetry and circularity) have acted performatively upon her dancing body, conditioning her dancing with formality, recycling energy, constant flow, and a concentration focus, which resembles a "trance-like repetition" (Njaradi, 2012, 26).

This kind of repetition is also evident in Beckett's *Quadratt I + II* (1981) television plays, but in this case, the body is moving on the square in the simplest possible way: it walks on it. In *Quadratt I*, four bodies, dressed in different colours, are walking repetitively on a square, arranged in a perfectly synched canon. They enter the stage through the diagonals, coexisting in the square for some time, and then leave. During the play they must never touch, never talk, never meet, nor enter the centre of the square (Worthen, 2010, 1-13). "100.000 years later", the same bodies appear in *Quadratt II*, indulging in a slower, grey, and almost silent restage of *Quadratt I*. (Kartsaki, 2017, 30-32; Worthen, 2010, 1-13). Since the square is already marked on stage with light, the dramaturgical context of *Quadratt I+II* does not emerge from the action of creating the shape repetitively in space, as it happens in De Keersmaeker's work. The square in Beckett's work is "a pre-existing place" (Worthen, 2010, 8), where

the players find themselves in a mathematical practice of walking, which is perfectly accurate, isotonic, synchronized, and independent at the same time. In Beckett's *Quadratt I+II*, four players are playing the same game, but they are not playing with each other. The square's spatial properties designate the four bodies with great closeness and formality, but their performing with unfulfilled interaction. This invokes a strong empathetic emotional response to the viewer, which is materialized upon the square's visual dynamics. Beckett's *Quadratt I+II* manifests the possibility of allowing the square to create a balance between the emotional and the mental during repetitive and mathematical acts.

Deleuze argues that "repetition changes nothing in the object repeated but only in the mind which contemplates it." (1968,70). Brown's *Accumulation with Talking plus Watermotor* (1979), is exemplary of how this thought can be actualized through minimalistic repetition and formalism. Brown deployed the choreographic device of movement accumulation; a mathematical structure with the capacity to push the dancing body's physical limits while performing. As suggested by the work's title, the difficulty of executing the accumulation of both movement and talking form was increased so much, that co-ordinating the dance became impossible. During performing, Brown started sharing her thoughts with the audience, while keeping the body in flow, making the mechanisms behind the dance transparent, as well as her effort in co-ordinating them (Burt, 2006, 146). Brown's decisions shifted what it means for a dancing body to fail while indulging in an impossible mathematical task, inviting,

in this way, the viewer to empathise with her situation. This shows a possibility for transforming the way the initial form and content of a formalistic dance deploying mathematical tools can be thought of and perceived.

The possibility to think of the relation of dance and mathematical repetition in such a constructive way comes in tandem with the motivational force of this research, which is to work, through repetitive dancing of a regular Euclidean geometrical shape in space, towards a more constructive understanding of the synergetic operation of the body and the mind during the process. Drawing inspiration from all the aforementioned works, and especially from the work of Brown (1979), studio practice of *The Square* has been based not only on geometrical formality, minimalistic repetition, concentration focus, and spatial accuracy, but also on one more condition: on creating an impossibility of the geometrical task to keep being physically performed infinitely.

### ***3.2 Impossibility, Fractal-inspired Geometry, and the Dancing Body***

Making the square undanceable and pushing the body's physical limits while dancing in space, can be easily done by guiding the process out of human scale. By gradually reducing the square's size in space during the dance, the non-existent chasm between the physical world of nature and the idealized world of geometry is surfaced.

In this way, formalism and minimalistic repetition are framed by physical impossibility.

To design a spatial structure allowing the square to be, first, efficiently established in space, and second, undanceable in human scale, fractal geometry was deployed. Fractals are never-ending, infinitely complex patterns, found in nature. They are created through the repetition of the same pattern over and over, in an ongoing, self-generating, feedback loop. Fractals do not operate within our familiar dimensions<sup>11</sup> (Patrzalek, 2006; Fractal Foundation, 2020).

To design a fractal-inspired spatial structure (Fig. 1) applying to the context of Euclidean geometry and the square, two of the main concepts of fractal geometry have been deployed: *self-similarity* and *infinite change of scale*. The structure shown in Fig.1 must be executed in a one-way, spiral-like dancing path, starting from the biggest square and moving towards the smallest one the dancer's body can create, without losing the dancing flow. This decision has been based upon the need of experiencing all concentric squares of the structure successively and across all different scales. In this way, the square becomes conceptualized as an infinite, self-similar form, which the closer it is looked at, the more it minimizes<sup>12</sup> itself, *ad infinitum*.

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<sup>11</sup> Fractals are characterized by their non-integer dimension, which means that they operate in between the first, second, and third dimension of Euclidean geometry (Patrzalek, 2006).

<sup>12</sup> This procedure actually happens conversely in fractals. Because of their non-integer dimension, the closer a fractal is looked at, the more it magnifies and generates itself across different scales (Patrzalek, 2006).

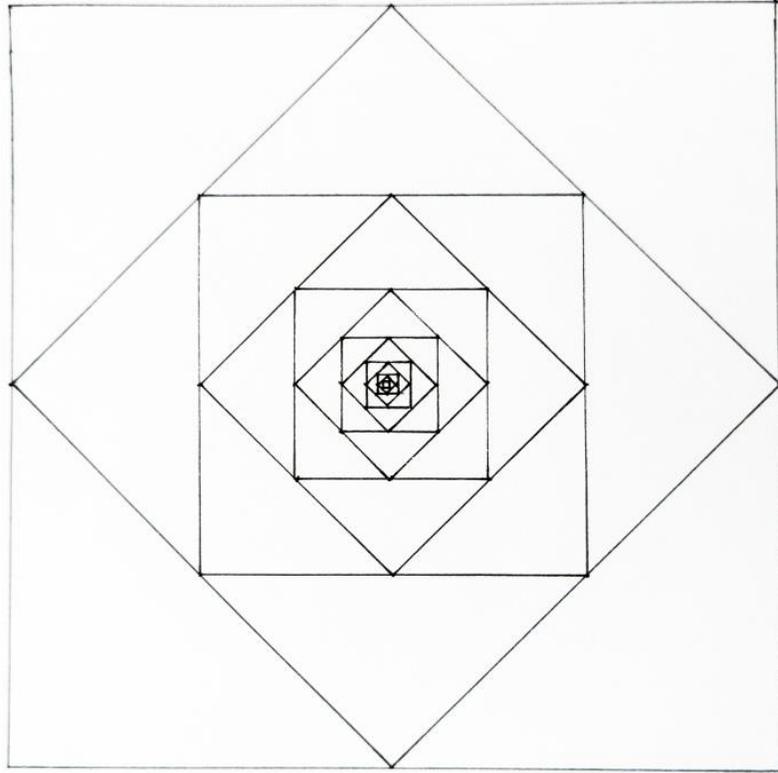


Figure 1. The fractal-inspired spatial structure of *The Square*. Drawing of the author 2019.

Conditioning the dance with a reduction of the square's scale in space designates the dancing body with predetermined physical failure. In contemporary performance, repetitive and predetermined to fail tasks have been theorized as the insisting preference of a person in not subjecting to imposed socio-political productivity and purposefulness of action, expectations for competence, increasing performance and success, without these being exhaustive (Cocker, 2010, 154-162; Feuvre, 2010, 12-21; Bailes, 2011). Sisyphean repetition of predetermined to fail tasks

have been theorized by Cocker (2010, 160) as a refusal to perform, in the sense of positing a negative preference, a *preferring not* to move towards completion. Moreover, the concept of failure serves an entry point to the unknown, for the realization of personal limits, comes along with the understanding of the person's place in a world of open-endedness, holding the possibility for change (Feuvre, 2010, 12). Therefore, in predetermined failure resides a possibility for personal transformation and change.

This research draws inspiration from the idea that personal transformation can be achieved through indulging in predetermined to fail task but suggests a different stance regarding the concept of refusing "to perform". In *The Square* performance failure arises from the physical limitation of the body to enact geometrical abstraction in the same way the mind can do, which is more close to Brown's (1979) use of the concept. This kind of failure is stating the possibility for the body to transform the originally established shape of space (i.e. a formalistic approach of the square) so that it can fit in it, even when not in human scale. Therefore, conditions of physical impossibility and predetermined physical failure in this research are inviting the body in a finite journey of challenge that points towards transforming the dancing body's emotional and mental relation with the square shape.

### **3.3 *Improvisational Studio Practice***

The geometrical pattern of the fractal-inspired spatial structure (Fig.1) should be danced according to the following score:

*All squares depicted on the fractal-inspired geometrical pattern must be accurately inscribed in space, only by means of the moving body. Starting from the biggest possible square, the dancer walks on it, repetitively, one-way, while paying attention to the generated movement and keeping the body in flow. Once the body proposes a new movement or alters the pace, the dancer expands on it without losing the flow, through movement transformation. The dancer spends enough time creating repetitively the perfect square in space. When there is a need for change that cannot be suspended or transformed through the movement, the dancer may pass to the next successive, concentric square, by maintaining or instantly transforming the dancing form and the body's flow. This procedure is followed successively for all possible squares of the pattern, from the biggest to the smallest one, without stops, interruptions of flow, or gaps in the transformation of movement. When the square is not possible to be danced anymore, the dancer continues dancing the square.*

Minimalistic repetition, formality, and dancing impossibility in *The Square* have been informed by all the theory and the artists mentioned by now and taken into practice through dance improvisation on the fractal-inspired spatial structure of the dance (Fig. 1).

Da Silva (2010, 53, 56) argues that representation and experience of dancing form are inseparably bound while improvising. This thought applies to this research because visualizing each square of the structure, while improvising on it, is surfacing the dancer's emotional experience of the particular square. Dance improvisation has been deployed during the rehearsals as a tool for listening to the ways the representational and the emotional, give feedback to the dancer while creating the squares of the fractal-inspired spatial structure. This has been pursued by means of empathy for non-representational form before, during and after studio improvisation.

Embodied simulation has been invoked through movement repetition in each square while committing the dancer with a need for maximum spatial accuracy regarding each square's form and position in the fractal-inspired structure of the dance. Since an efficient visualisation of geometry cannot be achieved in the literal sense during repetition, achieving the concept of it has become of high importance. Commitment in spatial accuracy regarding all "fractalized" squares was achieved through the development of a method for marking the squares on the floor during the rehearsals (Ap. B). After the size and location of each square of the structure were adequately established by the dancing body, marking was redundant. When the marks

were removed, commitment to spatial accuracy was translated into the dancer's pursuit for constant micro-adjustments of the body to the located squares in space, as well as her prompt spatial corrections when a square was significantly "lost". This resulted in an efficient visualisation of all "fractalized" squares throughout the dance, as well as in highlighting a tension between the emotional and the mental while dancing in space. The dancing body was undergoing a procedure of trying to create the "perfect square", constantly failing and correcting itself. Finally, the dancer's continuous effort in mastering the arrangement of the different squares in space has put the body in a state of either suspending decision or acting instantly upon it.

This raised a need to question what it means for the body to maintain its flow during a physically impossible geometrical task. The dancer's path on the fractal-inspired spatial structure had to be inward, one-way, and spiral-like, because conditions of physical impossibility had to be gradually introduced to the body, and after all danceable squares had been adequately embodied. That posited a need for achieving concentration focus while keeping the body in a continuous flow, despite the implications of the dance's spatial complexity. To tackle this issue, the movement had to be simple.

It was decided to develop the dance through a dancing practice of walking and the choreographic device of movement transformation, starting from the biggest square. Movement transformation allowed to the experience of each square to be immersed in the movement by giving to the body time for concentration focus and

freedom to develop the material in a varied rhythmical pace, according to how much time the body needed for comprehending its movement. This led the body in a “trance-like” repetition (Njaradi, 2012, 26) across all squares that needed a gradual “slow-down” towards reaching the smaller squares of the centre. Moreover, in the bigger squares, movement transformation had multiple implications, since the body was always proposing new material, and was not able to handle all of it without losing its spatial accuracy and flow. Interruptions of flow were then inevitable, and fatigue was highlighting this issue. A need to think of the term “flow”, as well as of movement transformation in a broader sense, was evident, which was also highlighted by the need to condition the practice with working with each square of the fractal-inspired structure separately.

Dance improvisation through the lenses of movement transformation has been deployed as a practice of paying attention to the real-time dramaturgy generated by the successive creation of all concentric squares of the spatial structure of the dance. Perception of the visual dynamics of each square is different when operating in a relational way and synthesized in a greater whole, in terms of size and orientation, with the other squares of the structure. Therefore, each square of the fractal-inspired structure operates in a different way within the dramaturgy of the whole. This constitutes the perception of the square shape in this performance simultaneously as an abstract visual entity (a “fractalized” form) and as a concrete magnitude of the physical world (a specific square in spacetime), practically underlining the non-existent chasm

between geometrical abstraction and concreteness. And since placing the dancing body in between geometrical abstraction and concreteness motivates this research, empathising with each of the concentric squares of the structure has been pursued autonomously, as well as in relation to its dramaturgical operation within the whole dance.

Conditioning of dance improvisation in each square has been done in various time intervals. The experiential information gained by dancing each square for a long time has been infiltrated by deploying practices of automatic writing and non-representational drawing after directed improvisation. Experiential writing and drawing were done separately for each square of the spatial structure. The emerged drawings (Ap. C) formed the basis for revisiting each one of the squares in the studio, conditioning, this time, improvisation on each one of them with a second layer: the task of translating the visual dynamics of a square's drawing while dancing on it. This resulted in deciding what the dramaturgical function of each square is, within the whole dramaturgy of the performance and how it can be consistently translated in terms of movement.

While at first movement transformation was thought as a tool for developing the movement material of each square, the need for a linear dramaturgy, emerging from the predetermined path of the dancer, called upon thinking movement transformation as a tool that could link all squares, starting from and based on the developed walking practice. Without being literal in terms of how movement is developed through this

choreographic tool, a second layer of infiltrating the material became urgent. The movement(s) that better served the dramaturgy of each square and the whole dramaturgy, as well as the notion of transformation (e.g. in terms of experience, rhythm, level, speed, a form of movement) were selected and organised in sequences through a method of drawing documentation and in the format of a catalogue of pictographic glyphs (Ap. D).

This method assisted a thoughtful passing from semi-structured improvisation to choreography. By organising the movement in sequences serving the concept of transformation (rather than the literal actualisation of it), across all successive squares, the dramaturgical line of the work was possible to be surfaced. Inviting the viewer to empathise with the dancer's desire to infinitely keep creating the "fractalized" squares, gradually shows how this process is transforming the initial form of the dance and, through this, the dancer's perception of the square and the dancer per se. Finally, the possibility of transformation in multiple levels through the quest for an impossible geometrical task becomes apparent. Through the empathetic relationship the work is seeking to establish with the viewer, the realization that an impossible quest is possible to transform the original form of space both literally (of the square) and metaphorically (of the dancer's perception of space and, though that, of the space between them) becomes apparent.

### ***3.4 Covid-19 Adjustment***

After the Covid-19 pandemic outbreak in March 2020, studio research, as well as its planned delivery in May 2020, were suspended. Delivery of *The Square* in the format of a live performance, designed for the black-box theatre was not possible anymore, while research delivery had to be adjusted in a virtual format to a maximum 30-minute duration. Given the nature of the work and the lockdown restrictions, practice was decided to move outdoors and be delivered in the format of a dance film.

Outdoor practice conditioned the research with a different relation of the body to the ground and the city setting. Not all movements practiced indoors were possible to be included in the dance, while the body was either inclining in performing a rougher version of the indoor material or proposing new material out of its relationship with the outdoor setting. Some micro- movement and slow-motion material were also disturbed by the lack of dance floor. In most of the squares, the dancing material had to be reframed, thus, improvisation was deployed on-site again. Moreover, a considerable amount of attention, needed for the dance, was occupied by distracting parameters of the city life. Finally, lack of music stimulation generated a relationship of the body's personal rhythm with the mathematical rhythm of its steps while creating the squares in space.

A spatial narration of the dance was planned to develop within 50 minutes, while the virtual version had to shrink to a maximum of 30 minutes. Therefore, the

time structure of the dance was reconsidered, by reducing the duration of each square, depending on its size, speed, and dramaturgical function within the dance. Improvisation material was infiltrated again and organized in new choreographed movement sequences, able to serve the notion of movement transformation across all squares.

Another point of concern was the fact that the filmed version of this work would form a new choreographed version of the dance, emerging from the already choreographed movement sequences and the choreography of editing. This new form of delivery, coming along with the camera's guided gaze, constituted filming and choreography of editing generic elements of the film's dramaturgy.

Overall, although core elements of the practice (dance physicality, space organization, formalistic repetition, and impossibility) were unaffected by the unexpected change of plans, the research shifted its focus on adapting the practice from indoor to outdoor conditions, as well as on achieving an efficient and relevant way of virtual delivery. However, this unexpected turn of the research offered a compelling opportunity: to reconsider *The Square* within a new dramaturgical context, that of cinema, which would be expanding on the previous one and could also afford to unfold the perspective of the person enacting the shape.

### **3.5 Research Delivery: ‘The Square’ Dance Film**

Delivery in the format of a dance film (Ap. A) was selected as the most appropriate, since cinema narration allows time to be perceived in different ways than in real-time narration, making it possible to preserve spacetime linearity within a 30-minute time frame. Since film making and watching are not based on the simultaneous physical presence of the performer and the audience, silent interaction between them could not be summoned in the same way as in the live performance. This placed the focus on establishing an interaction between the person and the camera, aiming at communicating *The Square* performance as the person’s *inner journey* in relation to the square, creating, in this way, a virtual entry point to the research’s dramaturgy.

To create an analogue to the person’s inner journey, a cyclical structure consisting of three parts was deployed. In the first part, the viewer experiences the person’s itinerary in the city from within one-point perspective camera shots (subjective view). In the second part, the viewer experiences the person’s itinerary following the fractal-inspired spatial structure at a specific site of the city from within two-point perspective camera shots (objective view). In the third part, the first-point perspective (subjective view) is restored by a single shot of the person’s walk in the city – completing, in this way, the cyclical structure of the film. The purpose of using the camera this way was to stimulate the viewer’s empathizing with the person dancing in the square, from a different perspective.

## 4. Critical Reflection

This research has emerged from experiencing the way my own body works while dancing and creating space. For this reason, my practice has been inevitably conditioned by constant self-reflection. However, opening a retrospective space for being critically reflective allows me to go deeper in my findings and understand the future paths and implications of this research.

Reflecting on the way *The Square* dance film has been created and on the way the camera has been used, I see clearly now that through the making of this film a translation of my experience of dancing *The Square*, as well as of my process in taming the contradictive forces that have governed the creation and the conduction of my research, has been actualized. The “zooming in and out” of the camera manifests my process in tackling some creative problems I have encountered while dancing on, in and in relation to this shape: the need to zoom in and out of each square’s spatial dramaturgy in a methodical way; the need to film, edit and choreograph each square both as an autonomous entity and as a part of a whole; the need to create *The Square* performance because of the personal and then distance myself from it because of the performative. I now realise that this “zooming in and out” process reflects the mechanisms my creative body works. I need to zoom in as much as I can, to ponder the problem, to analyse it, break it down to parts, cluster it. Then I take some distance from it because I need to see it as a whole and from a more detached perspective. This

“surfing in and out” of a creative problem may stop only when I feel that a balance between the two perspectives has been established.

I now believe that this research is, indeed, all about establishing balance wherever imbalance is not constructive. Furthermore, it is about finding flow within the blessing of irregularity and interruption and about understanding how being open to the possibility of transformation has the capacity to embrace change –not as an occurrence in time, but as an inherent property of time.

The idea of maintaining my dancing flow within interruption and pause was a great shift during the making process. When flow was understood from within my dancing body’s and mind’s differences and contradictions, I learned how to embrace what the body needed and what the mind was capable of while dancing, and conversely. Practicing the infinite, self-generated, and reduced squares in space constituted dancing flow a common goal for both my body and mind, and a practice of “talking and listening” between them, in a figurative sense, was established. Without me being perfectly aware of it, I observed their “talking” while dancing my predetermined with physical impossibility geometrical task, being determined to infinitely keep creating the squares, no matter what. Retrospectively thinking, I find it funny that a productive “listening” between my body and my mind was allowed to happen only when I stopped controlling the way they wish to operate during my process; only when I became the observer and facilitator of their “talk”. Flow was, then, their common path of coming together, of establishing their own balance during my process. The emerged

transformation of the dance and the square shape is, then, the imprint they left because they took this path together.

Working with transformation through predetermined physical impossibility also made me acknowledge my own strengths and incapacities. Opening my dancing body to transformation, in a different sense than the literal, as a choreographic tool, eventually opened my dancing mind as well. I had to “let go” of a particular kind of control in the dancing form while allowing another kind of control to emerge: that of acknowledging that control is not about knowing and defining form, but about daring to question what the experience of a form is or brings within the context, wherever it is proposed. Understanding form and structure via experiencing it, made me see the trap formalism entails for my choreographic practice. When I arrived at the point I had to admit that, no matter what, I would never become enough “squared”, I realised the shift I needed to do in the way I was thinking of the square shape and dancing it. “The body does not even have a single line!”, my mentor had said to me, when I presented him with my first ideas for *The Square*. I must admit that inside of me, I was determined to prove him wrong. He was right, of course, and I could apparently see that. But my stubbornness and persistence in not admitting it, made possible any impossibility of dancing and embodying this shape: I was gradually led in a more cyclical way of understanding it. The more I pursued the straight lines and right angles of the square, the more organically and rhythmical my articulations had to work, generating undulated paths in the body, but visualising straighter lines and sharper angles in the space. My body had found its way in “becoming geometrical”.

The mode of performance I have identified for dancing and embodying the square according to the score of the performance is now a practice that I feel confident to share with other dance practitioners and test its applications through its encountering with another body, or, maybe, with more than one body. I believe that this will change the practice and entirely transform it, and I am curious to see this happening. I acknowledge that much of the suggested and produced material has emerged from my personal pursuits and empathetic connection with the shape, which I cannot know whether it will serve another body in a similar way. Moreover, I cannot know what the results from the other two case studies will be. Whether they will have such a strong and transformative impact on the way I feel and think as an artist, researcher, and person, is also out of my present knowledge. What I know for sure, is that my relation between being and acting, who I am, and how this is manifested, has been guided, through this research, to a place where flow, observation of change and transformation hold a space for discovery, creativity and personal and artistic balance.

## 5. Conclusion

Overall, the most important findings of this research could be summarised as follows:

- Visual representation of non-representational form (and geometrical shape) is performative and suggests a specific spatial dramaturgy. Non-representational form (and geometrical shape) has the capacity to generate emotion to its observer(s) and creator(s), when kinaesthetically empathising with its structural properties in space.
- A dancing practice of formalism, minimalistic repetition and physical impossibility based on visualising Euclidean geometry's abstraction and concreteness in physical space, can lead the practitioner in experiencing the transformation of the original form of the shape, and of the dance, if, while dancing, flow is maintained (in the literal or figurative sense).
- A mode of performance leading to the embodiment of the square has been identified. This was achieved by translating its structural attributes, emotional and mental effects into dance during the making of *The Square* performance. This performing mode can be outlined as follows:

- There has to be an impossibility for the dancer to create the square infinitely, in a formal and physical way.
- The dancer is following the predefined repetitive geometrical pattern of the fractal-inspired spatial structure of the dance in a one-way, inward, spiral-like path, while maintaining the dancing body in continuous flow, no matter the irregularities, interruptions, or fatigue of the dance.
- Geometrical clarity and spatial accuracy are of high importance. Any mistakes while creating the squares of the fractal-inspired spatial structure of *The Square*, must be corrected either gradually or instantly, depending on their impact for the whole clarity of the dance, and without losing the dancing flow.
- The dramaturgy of the dance is based on the intertwinement of the square's spatial dramaturgy and the dancer's repetitive action of creating them in space.
- Movement complexity is disregarded. The dancing starts from a practice of walking on the boundary of the biggest square and is developed according to the choreographic device of movement transformation along all "fractalized" squares.
- Repetition is used as a practice of paying attention both to the square shape and to the shape of the generated dancing form. The dancer's performing state must allow concentration focus to be on the structural, inherently

expressive, and performative dynamics of the shape and of the dancing form in real-time.

- The kinaesthetic body and sensory mind of the dancer must be in balance while dancing repetitively on, in and in relation to it. Balance is possible to be established by kinaesthetically empathising with the square's inherent capacity for softening contradictive forces, leading, together with repetition, in embodying the square.
- The dancer's performing state has to be transparent, allowing any effort in establishing balance between the emotional and the mental to arise naturally.

Returning to the posited question of *Performing Geometries* research (see Chapter 1), it has been proved that the dramaturgical and performative potentiality of embodying the square through the proposed dancing practice, is to lead the dance practitioner in transforming the original way of perceiving the shape's and the dance's form along the process.

Finally, working with the visual representation of Euclidean geometry, while translating concepts of other geometries (e.g. fractal geometry) into the spatial structure of the dance is possible to amplify the non-existent chasm between geometrical thinking (abstraction) and its visual representation in physical space (concreteness),

leading the dancing body in paths of physical and mental transformation through the impossibility of representing this concept physically in space.

The findings of this research could be of interest and applications for the artistic research and dance community, as well as for architecture, other timed-based arts, and phenomenological discourse. However, before generalizing them for other, or all regular Euclidean shapes, the mode of performance identified, needs to be adjusted to and tested through the other two regular shapes selected (equilateral triangle and n-angled polygon) and further developed through them. Also, the research findings of *The Square* need to be tested with other dance practitioners.

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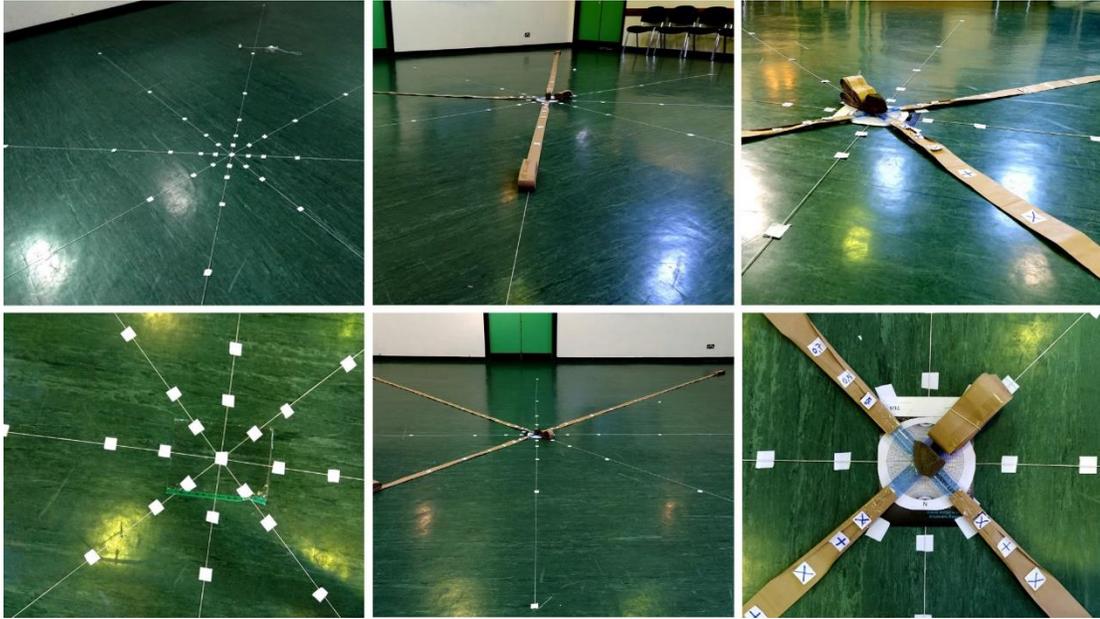
## **Appendix A**

DVD: *The Square* dance film, 2020 (Full movie and trailer).



# Appendix B

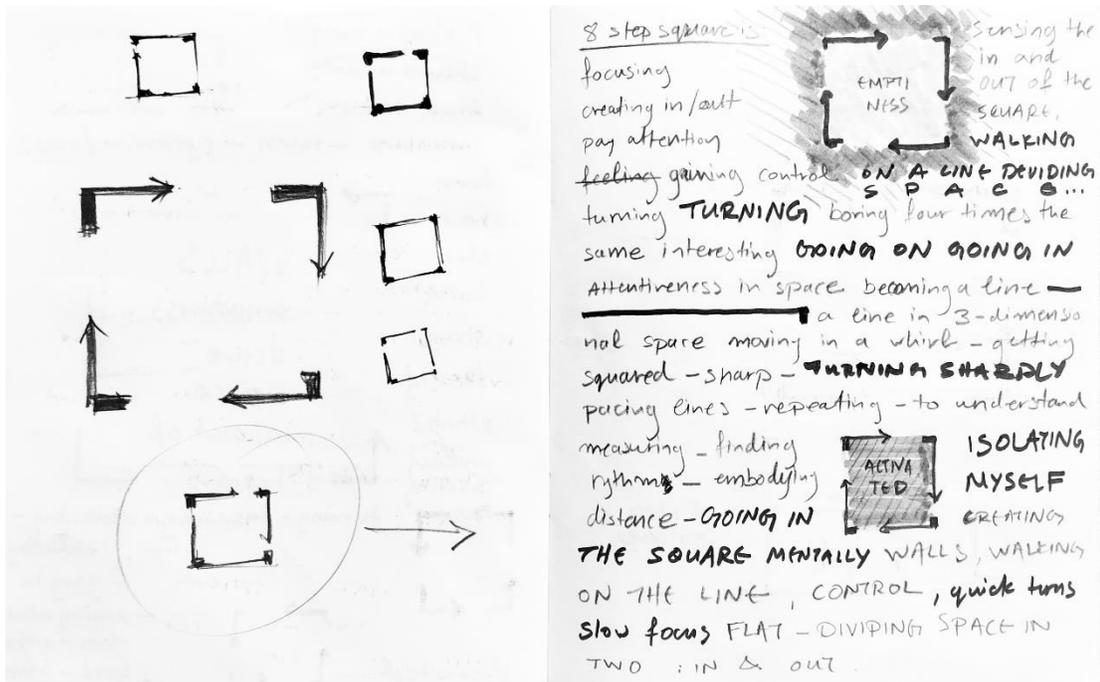
The developed method of marking the squares on the floor.

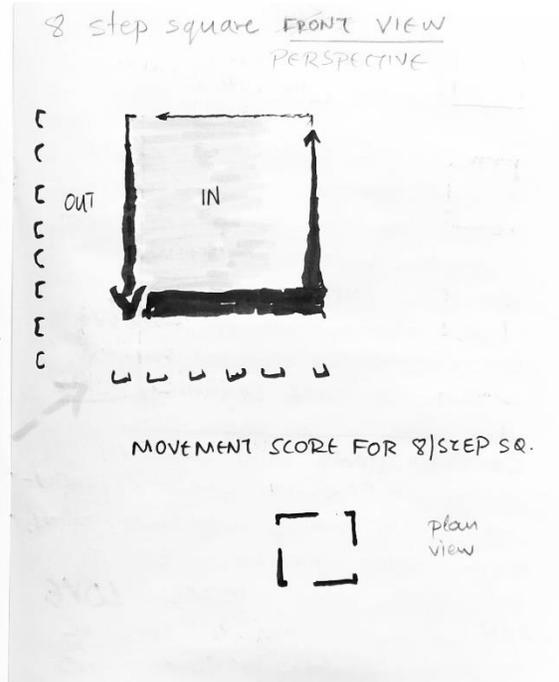
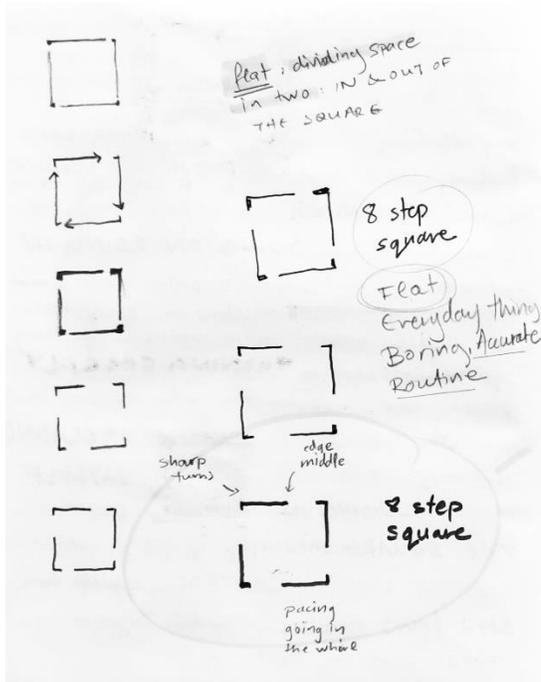




## Appendix C

Results from the developed method for translating the experience of each square into geometrical form through automatic writing and drawing. Drawings from the choreographic notebook of the author, 2020.





6 step square (5 1/2)

This half changes the rhythm

↓

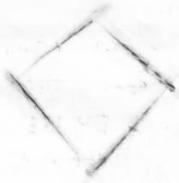
rhythmic, joyful, exploring space ON THE LINE, A CHANGE OF PERSPECTIVE expanding the line / SHARP CUT change of direction LIGHT IT'S FEELING release of ENERGY control ~~to~~ release - control relationship LOVE expanding space / cutting space a thing in itself organic linear & circular at the same time

**CONTRADICTIONS** AIR DANCING RHYTHMIC - EXPLORING SPACE - SEDUCTIVE CHALLENGING SPEED A GETAWAY THING TRANSCENDING - NOT REALLY - BUT IT GIVES THIS SENSE UNSTABLE LOVE

**PUN** PERSONAL RHYTHM - IT'S PERSONAL IN TWO ENERGETIC / IT CUTS THE SPACE AND

THE SPACE REGENERATES ITSELF  
IT'S WHAT I LIVE BEHIND → NOTHING,  
IT'S TRANSPARENT. IT'S MAKING AIR  
SENSIBLE IN THE FACE. CUTTING THE  
AIR (THICK?) IT CUTS THE AIR AND  
THE AIR REGENERATES ITS MOLECULES  
BEHIND ME. IT'S ALWAYS NEW  
IT'S  
SUPERPOWER ? IT'S seductive  
LOVE SUPERPOWER ...

6 step SQUARE  
FEELING SPACE / BODY  
CUTTING THE AIR  
QUICK  
ENERGETIC  
INFATUATING  
SEDUCTIVE



Movement score for 5 1/2 steps square

ENTERING ANOTHER KIND OF SPACE...

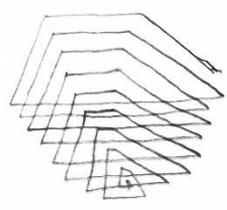
TIRING BUT RISKY (to lose the square, the accuracy) UNSTABLE

FEELING SPACE, CUTTING THE AIR - DANCE RHYTHM - SPEED - LOVE SEDUCTIVE - STRETCHING PERSONAL LIMITS SEARCHING BALANCE BETWEEN FREEDOM AND CONTROL... ENERGY, SHARPNESS IN FLOW FLOW, LINEAR & CIRCULAR AT THE SAME TIME CONTRADICTIONS EXPLORATION MOVEMENT

4 STEPS SQUARE

TIRENESS -> LOW LEVEL

ROUTINE EVERYDAY -NESS DAILY THING COULD BE ANYONE IN THERE. THE BODY BECOMES CONSUMED BY ITS ROUTINE. THE BODY IS FREE AND SLAVED AT THE SAME TIME... THE BODY LOOKS DOWN THE BODY STOPS THINKING THE BODY DOES TIRING BUT CANNOT STOP UNTIL WHEN? HOW MUCH OF ROUTINE IS SETTING ME FREE, WHEN DO I BECOME A SLAVE OF IT. SAME THING EXPLORING THE SAME THING TRANCE STATE I LOWER BUT THERE'S UP IN THIS EVERYDAY TRANCE REPETITION

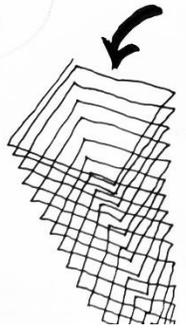


4 step square:

movement score

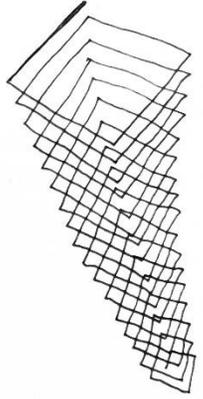
A whirl that A square swamps It's not a swamp

A dive in a square vortex



Square of 4 steps movement score

ALWAYS THE SAME BUT LOWERING WHEN DOES IT STOP?



4 steps square movement score

A DIVE IN EVERYDAY TRANCE REPETITION A VORTEX THAT FREES ME AND MAKES ME A SLAVE AT THE SAME TIME BECOMES EMOTIONAL

WHEN IS THIS OVER? WHEN DO I BREAK?

3 STEP SQUARE

REGAINING MY ENERGY - TURNING  
 3 STEPS IS TRICKY IN COORDINATION  
 QUICK - NEEDS CONTROL ENTERING  
 TRANCE gradually ON MY  
 FEET AGAIN TURNS COME SO QUICKLY  
 ON MY FEET TURNING IN THE CORNER  
 PLAYING WITH COORDINATION AND  
 SPEED NEED TIME AT THE CORNERS  
 SUSPENSION OF THE TURN REGAINING  
 MY ENERGY GROUNDING ON THE  
 TURN TIME GROUNDING AGAIN  
 UNCOORDINATED COORDINATION  
 SUSPENSION AT THE CORNERS  
 CLOSED SYSTEM OF REPETITION  
 INTROVERT - LINEAR - STRETCHED  
 ON THE CORNERS - EXTRA TIME

CONTROL - FREEDOM - PLAYFULNESS  
 RELATION - PLAY WITH COORDINATION -  
 INDULGE IN - DIFFICULTY - TAKING  
 TIME TO CHECK THE BODY -  
 WHERE I LOOK IS NOT WHERE I GO  
 BUT THE SQUARE IS THERE

MINDFULNESS  
 A MOMENT TO  
 SENSE THE BALANCE  
 TRANCE REPETITIVE  
 IN ITS DIFFICULTY

STRETCHED  
 TAKING CONDENSING  
 TIME IN THE  
 CORNERS →  
 RELEASING IT  
 ON THE LINEARITY  
 OF THE EDGES

**STRETCHING  
 THE LIMITS**

TESTING ROUTINE  
 AGAIN *(but...)*

IT'S GROUNDING TRANCE  
 REPETITION OF ROUTINE

**BECOMING A MASTER OF  
 ROUTINE [OF THE SQUARE?]**



3 Step  
 SQUARE

MOVEMENT  
 SCORE

A SQUARE OF  
 INTEGRITY  
 GROUNDING THE  
 WAY I TRANSCEND  
 TRANCE IS QUESTIONING  
 LIMITS - PLAY - STRETCH  
 LIMITS  
 COORDINATION HAS TO  
 BE EMBODIED  
 TESTING THE IDEA  
 BEING COORDINATED  
 IN THE SQUARE THOUGH  
DISRUPTING  
 COORDINATION

*like  
 shaman  
 dance  
 controlling  
 trance  
 limits  
 MYSTICAL...*

BECOMES UNEMOTIONAL  
 IT COULD GO ON  
 FOR EVER....

2 STEP SQUARE

GOING MORE IN - TAKING ANOTHER  
 STEP DEEPER IN THE GEOMETRY  
 A SHUT DOWN FROM REAL LIFE,  
 ENTERING THE 3-DIMENSIONAL OF  
 THE LINES AND CORNERS / SENSING  
 THE CORNER# SUSPENSION IN THE  
 CORNER EMBODYING THE CORNER  
 TRANCE IS GOING DEEPER IN BOTH  
 DIRECTIONS

↑ UP (TRANSCENDING)

AND ↓ DOWN (GROUNDING)

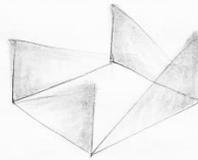
CONTRADICTION FORCES OF  
 ATTRACTION AND REPULSION  
 AT THE SAME TIME

SUSPENSION GAINING MORE  
 HEIGHT AND GROUNDING AT THE CORNER

REPETITIVE FORCES OF  
 ATTRACTION AND REPULSION  
 EACH TIME I SENSE THE CORNER

- TO REPEAT
- TO GO DEEPER
- TO GO MORE AWAY FROM HERE
- TO SENSE
- TO BECOME ORGANIC
- TO BECOME A RIGHT ANGLE
- TO BECOME 2 dimensional  
 in 3 DIMENSIONS
- TO LOSE HEIGHT AND GAIN IT  
 BACK AT THE CORNER BY  
 SENSATION

EMOTIONAL TRANCE



2 step  
 SQUARE

MOVEMENT  
SCORES:



MYSTICAL  
 TRANCE  
 ATTRACTION/  
 REPULSION  
 RELATIONSHIP  
 SENSING  
 THE CORNER  
 GAINING  
 HEIGHT AND  
 GROUNDING  
 AT THE CORNER  
 SENSATION

SENSING THE **LINEAR**  
 3 DIMENSIONAL **TRANCE**  
 OF THE 2 DIMENSIONAL  
 REACHING THE DIVINE  
 THROUGH THE MUNDANE (NO SURPRISES)

1,5 STEP SQUARE

TEARING THE AIR - EXTRA LINEAR  
 HYPNOTIC LINES ARE THICK AND  
 TALL THE EDGES ARE  
 METALLIC.  
 IT SENSES LIKE ITS  
 QUICK - COULD BE NOT

LOWER THE LEVEL TO BECOME MORE  
 QUICK - CONTROLLED - LINEAR  
 MECHANIC → UNEMOTIONAL  
 THE TASK IS TO GO FORWARD  
 IT IS A FORWARD THING, BUT TOO  
 SMALL, IT'S TALL TOWARDS  
 INFINITY...

I AM BECOME AN EDGE IN 3 DIMENSIONS  
 BECOME VERTICALLY FLAT



ONE THOUGHT  
 REPEATING ITSELF  
 A MANDRA

1,5 STEP  
 SQUARE:  
 perspective  
 view

A  
 GRAIN  
 IN  
 ETERNITY

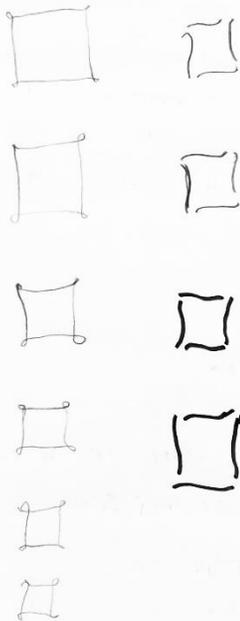
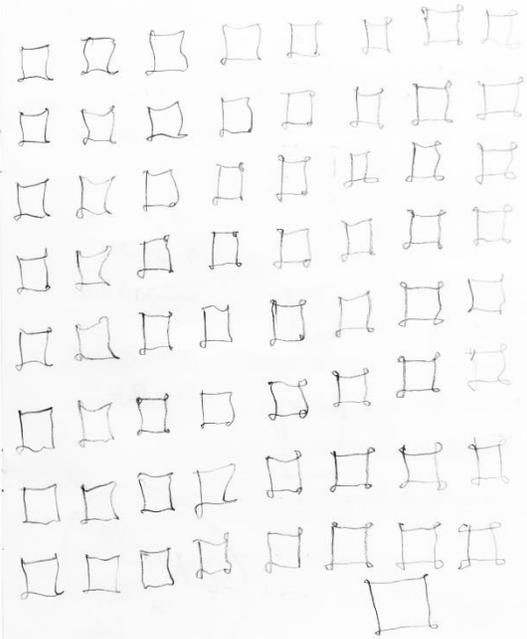
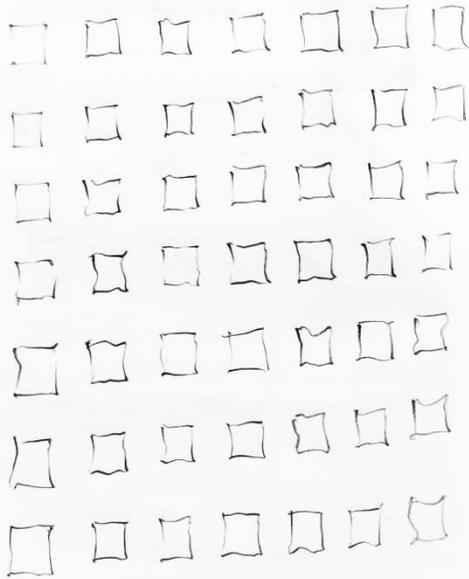
plan  
 view

STH  
 THAT  
 APPEARS  
 INTERRAL  
 AND SMALL  
 AND EFFICIENT  
 BUT  
 EXTENDS...

SENSING THE EDGES - SUPER  
 LINEAR - EFFICIENT - MECHANIC  
 HYPNOTIC  
 BECOMING THE EDGES THAT  
 EXTRUDE TOWARDS INFINITE  
 HEIGHT **SPATIAL TRANCE (LEVELS)**  
 SMALL SPACE → GETS FREEDOM IN

↑ HEIGHT

1 STEP SQUARE



1 STEP  
SQUARE

MOVEMENT  
SCORE

REPEATING  
TIME

ONE STEP - CHANGE OF FACING  
ORGANIC - TRIBAL

SENSING THE RHYTHM OF THE  
SQUARE REPETITION

4 TIMES THE SAME OPENING  
TO OTHER LEVELS

FACING THE WORLD (SPACE)  
THROUGH THE SQUARE'S RHYTHM

CIRCULAR LINES

ARE MORE LINEAR LINES

EXPLORING / SENSING / EMBODYING

THE CIRCULAR OF THE SQUARE  
(TIME)

RYTHMICAL REPETITION

TRANCE ESOTERIC MYSTICAL

IN THE THROUGH RHYTHM

**0,7 STEPS SQUARE**

CONTRACTION / RELEASE  
RELATIONSHIP

SHIFTING THE TORSO

~~PLASTIC~~ // SENSING THE VOLUME  
OF THE CORNER // **VOLUME  
TRANCE**

PLASTIC  
SLOW

MOULDING THE BODY

IN THE SQUARE

OPENING AND CLOSING

**BREATHING**

THE ORGANIC OF THE SHAPE

**LIFE, BREATH DIVINE**

RELATIONSHIP OF THE BODY WITH THE SQ.



0,7 STEP SQUARE  
MOVEMENT SCORES:  
LIFE - BREATH  
VOLUME TRANCE



**0,5 STEPS SQUARE (AND SMALLEST...)**  
0,25

SLOW, NO SPACE

THE SQUARE IS THERE

WHAT IS MOVING, STILL

WHO IS DOING THE SQUARES



0,5 0,25



0,5 steps square  
0,25 steps square  
movement scores

EMOTIONAL  
SPATIAL  
TRANCE

MOVING STILL  
INNER TRANCE  
THOUGHT  
EMBODIMENT  
GEOMETRY  
FRAGMENTAL AND COMPLETE



## Appendix D

Results from the developed method for documenting the dance of *The Square* performance. Drawings from the choreographic notebook of the author, 2020.

