Choreographing Space

Master's thesis in Architecture and Urban Design

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Abstract

Choreographing Space - a study about understanding motion through drawing it and breaking it down. About architectural compositions that reveals the hidden forces in our surroundings - with the aim of enhancing our ***emotional experience in space***. With dynamic influences in architecture and space it is possible to create life and depth, thus obtaining a liveliness that serves as an alternative to the practically focused architecture of today - that is static, firmly mounted to the ground and at times heavy and stiff. The thesis addresses the ***occupation*** of spaces and observes architecture not as objects locked in time, but rather as a set of elements influencing the ***dynamics of space***. How do well designed spaces engage people in moving trough them, to explore and be inspired to use it to express themselves through movement?

The basis for this thesis has been the meeting point between architecture and dance - two fields of art that both revolve around spatial organisation. The point of departure for the process was to investigate ***why we dance*** and ***why movement catches our interest***, to collect impressions of dancing and an understanding of how dance is related to the way space is explored and understood. How do the actions taken by the dancer influence the room? How do the elements that make up architecture form the space, and how do the aspects of this space shape the characteristics of the dance?

Possibilities lie in the amplification of the forces in our surroundings, be it from ***wind, light, gravity, humans*** or the like. In moving the focus from architecture as an object that you look at - these actions have the ability to transform architecture into something you get lost in. By making use of the effect that movement has on the dancer and observer, architectural strategies with a similar effect on our emotional state in space are defined. With strategies for architectural compositions that are capable of reacting to unpredictable conditions the aim has been to be able to create environments that ***inspire movement rather than staticity***.

Keywords: dance, dynamic space, movement, dynamosphere, kinesphere

Image from preparatory study Static Motion. Photography: Linda Wallander (Wallander & Borgny , 2018)

Acknowledgement

I would first like to thank my thesis advisor Peter Christensson of the department of Architecture and Civil Engineering at Chalmers University of Technology. Frequently dropping by to see where my head was at, how the work was developing or just for a conversation in general. Consistently allowing for this paper to be my own work, putting confidence in me while steering me in the right direction whenever seeing the need. His guidance and open questions have helped me throughout the course of this research as well as the study *Static Motion*, carried out prior to this thesis.

Furthermore, I would like to express great appreciation to my examiner Morten Lund, department of Architecture and Civil Engineering at Chalmers University of Technology, for his invaluable advise and encouragement. Always seeing the potential in my work with great enthusiasm, offering immense motivation and inspiration.

My sincere thanks also goes out to Erika Hörteborn, Ph.D student of the ArchEng Group at Chalmers University of Technology, for her considerable advice and inspiration provided during, particularly, the preparatory study *Static Motion* but also during this thesis. I also wish to acknowledge my previous research partner Linda Wallander of the department of Architecture and Civil Engineering at Chalmers University of Technology. The stimulating discussions, her encouragement, inspiration and, above all, cheerful outlook on the studies have been invaluable throughout this past year and a half.

Finally, I must express my profound gratitude to Arika Yamada, dancer of the Dance Company at the Gothenburg Opera, for taking the time to provide me with great insight from the point of view of a dancer. Steering me into the right path from the very beginning with great willingness to give me her valuable time; sharing knowledge and views which has been essential to this research.

Malin Borgny, 16 June 2019

Personal Background

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Image from workshop carried out during the preparatory study Static Motion; blowing glass into textile moulds. Photography: Linda Wallander

Overlap of stills from Dialogue 09 by Sasha Waltz (2009)

Content

Choreographing Space - a study about motion

Figure 1.1 Image from workshop carried out in the preparatory study Static Motion, glass blown into textiles - resulting in ambiguous and unpredictable effects. Both in the structure of the glass and in the movements observed through the glass. (Author's own image)

1. Introduction

Background

This is a study about motion. About understanding motion through drawing it and breaking it down. About architectural compositions that reveal the hidden forces of our surroundings - with the aim of enhancing our emotional experience in a space. The thesis addresses occupation of spaces and observes architecture not as objects locked in time, but rather as a set of elements influencing the atmosphere and dynamic behaviour of space.

This thesis was initiated with the preparatory study ***Static Motion***, focusing on interpretations of motion and dynamic behaviour in architecture, see Chapter 1.1 (Wallander and Borgny, 2018). After the preparatory study a master thesis in Structural Engineering was carried out (Wallander & Borgny, 2019). During both of these studies there were many discussions surrounding the dynamics of space and structures. The main aspect brought along from these two previous studies was the questioning of the static conventional architecture, that is firmly mounted to the ground and at times heavy and stiff. Instead, attention is directed towards the qualities found in light, soft and, most importantly, dynamic architecture.

The basis for this thesis has been the meeting point between architecture and dance - two fields of art that both revolve around spatial organisation. The study experiments with light, shadow, opacity, wind, elements of low stiffness and motions of various kinds. These aspects define visual liveliness - and by dynamically reacting to forces in our surroundings they have the ability to enrich our perception of space. The title *Choreographing Space* is a means to emphasise that the elements of architecture sets the atmosphere for the spaces they compose, and to direct the focus towards the impact that atmosphere has on the people using it.

1.1 Static Motion

Preparatory study carried out in collaboration with Linda Wallander

Previous to this research, in the spring of 2018, a preparatory study was carried out in collaboration with Linda Wallander, department of Architecture and Civil Engineering at Chalmers University of Technology. This study surrounds textiles in motion and interpretation of movement in images that are, per definition, static:

"TEXTILE is an ever present material that we wear on our bodies, walk on, hang up and so on. Therefore, we have much experience of the material and a subconscious feeling for it; how it feels, how it moves and how it responds to external forces.

In architecture today the main usage of textile is in static tensile constructions where the dynamic properties of textile is not present at all. This study focuses on the billowing properties of a relaxed moving textile. The aim is to inspire ways to use textile in a new manner, as a reaction to the stiff textile architecture of today, thus resulting in a more lively spacial experience.

INTERPRETING MOVEMENT Due to our subconscious understanding of the material, how it responds to interaction with people and the surrounding context, we can ***interpret movement*** *even in photos which only provide us with a frozen moment in time. With the help of creases in the textile, its mass imbalance and the blurriness of its details we can, not only interpret movement, but also a direction of it in a static picture. …*

… Is it possible to suggest directions and tensions through creases in the textile architecture and thus create orientation, ***movement*** *and* ***meaning*** *- using a language that is based on life experience rather than something learned in school? …*

… CONCLUSION It is difficult to literally recreate movement in something static. However, it is possible to create direction, life and depth. In this way the ***liveliness*** *we were aiming for can be obtained. The perception of a direction is important to yield an impression of motion. Whether or not everyone needs to interpret the same direction is perhaps not important however. The aim of this study is to inspire how textile could be used in architecture to create more* ***animated spacial experiences****. An illusion of motion, or perhaps simply a* ***life-fullness****, might therefore be enough and a general understanding of which direction this illusion has might be superfluous. It is important to point out that the perception of movement is very personal and depends on one's own association to forces and forms. The direction of a moving textile depend very much on the viewers references."* (Wallander & Borgny, 2018)

While the central topic of textile has been subordinated, and replaced with motion in general; the overall aim of stimulating movement and obtaining an animated spatial experience have been brought along.

Figure 1-2 Interpreting motion in image of static textile Photography: Linda Wallander (Wallander & Borgny, 2018)

Figure 1-3 Light shining through glass which had been blown into textile moulds; motion is evident. (Author's own image)

1.2 Academic Framework

Purpose, Objective, Aim and Demarcation

Early on in the process parallels to dance were investigated; its relation to space and spatial organisation in particular. The objective has been to gain a deeper understanding of the dialogue between architecture - the space - and the user. To make use of the effect that movement has on the dancer and observers and thus inform architectural compositions with a similar effect on our emotional state in space. The research questions why architecture is often static, stiff and firmly mounted to the ground, A secondary purpose has been to demonstrate that principles from a neighbouring field within art can successfully be brought into architecture to inspire and widen its theories. Central to the process has been the aim of architecture that inspires movement rather than staticity.

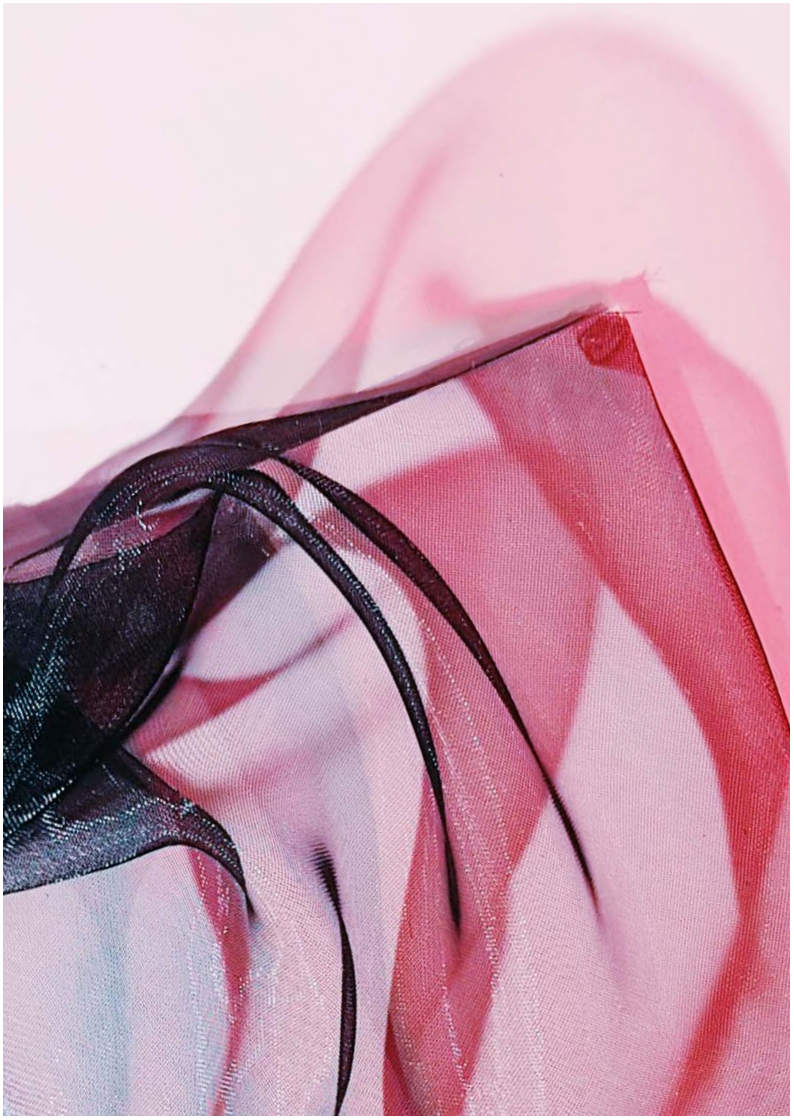
Possibilities lie in the amplification of the forces and actions that are always present in our surroundings, be it from wind, light, gravity, humans or the like. By amplifying these hidden forces within architecture and thus revealing them, they can be made accessible for the greater public, and enhance the effect that space and architecture has on our emotional state of mind.

Dance is a choreographed engagement between body and space - what if architecture was made to inspire such a dynamic engagement between body and space - what if architecture was the choreographer of our spaces and movements? The following questions has been used to help focus the research:

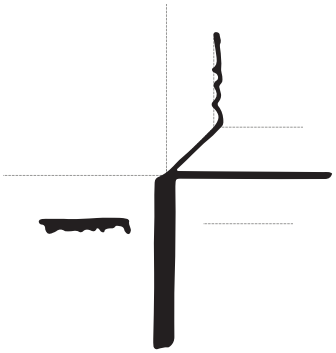
- What happens when architecture and space is allowed to dynamically react to the hidden forces of our surroundings?
- How do the aspects and characteristics of our spaces affect our emotional state?
- Is it possible to enhance the movement made by humans through space?
- How do well designed spaces engage people in moving trough them, to explore and be inspired to use it to express themselves through movement?
- How does dancers, architects and choreographers manipulate space?'
- In what way is our awareness of space affected when introducing uncontrollable and unpredictable features?

While the dance has been used to inform and increase knowledge, this thesis has been limited to the spatial experience of dance, on the reasons behind movement and its characteristics rather than the actual movements. Similarly, in regards to wind, movement of air, light and the like there are no predications of exact movements. Instead their characteristics - speed, direction, strength and the like - have been considered and how those affect our spatial experience.

Figure 1-4 Interpreting motion in image of static textile Photography: Linda Wallander (Wallander & Borgny, 2018)

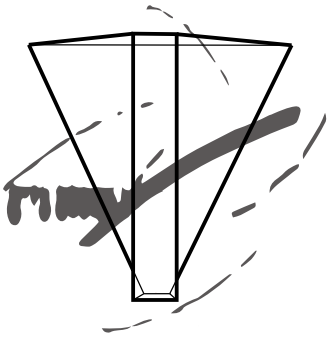


DISCOURSE



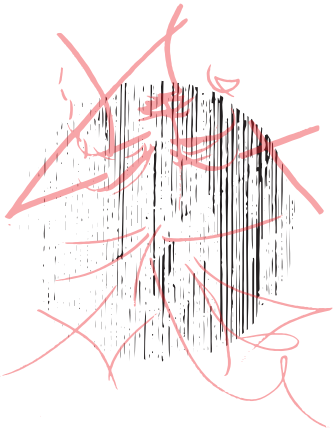
INTERPRETING MOTION
chapter 2. on page 9

PHASE 1



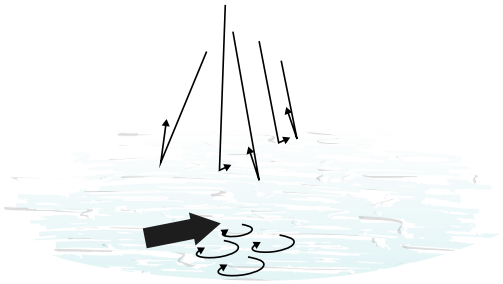
INTERPRETING DANCE
chapter 3. on page 37

PHASE 2



INTERPRETING SPACE
chapter 4. on page 49

PHASE 3



ELEMENTS & ACTIONS
chapter 5. on page 75

Figure 1-5 Concept for the process of the thesis (author's own illustration)

1.3 Method

A series of open ended explorations

This thesis was carried out in four steps, starting with a research phase and followed by an exploratory phase in three steps. The process has been open ended, with each step influencing the next without a set end result:

INTERPRETING MOTION The research phase, the discourse, was about gaining knowledge on motion in general, on the characteristics of movement and the reasons behind why we dance. Using the work of dancers and choreographers as reference, knowledge was gained on how dance is related to the way a space is explored and understood. On different techniques used to analyse, understand and communicate movement. Furthermore, the findings of three neuroscientist were studied, to develop an understanding of why movement catch our interest.

INTERPRETING DANCE In the first of the three exploratory phases, the knowledge and techniques gained in the discourse was applied to sequences of dance. The aim was to understand the spatial and emotional aspects of dance and how they relate to each other - to understand why the dancer move in a specific way and how the movements are affected by the characteristics of the surroundings.

INTERPRETING SPACE Here the focus was turned from the user to the space. While the previous step focused on how the characteristics of dance was influenced by the architecture and the space, this step focused on how the characteristics of the space was influenced by the architecture and the movements of the dancer. The architecture was broken down into the basic objects its composed from - walls, floor etc. - to pinpoint the effect of each individual element.

ELEMENTS & ACTIONS In the final phase the, previously mentioned, elements of architecture was put under the influence of the forces of our surroundings - to gain a deeper understanding of how the action from these forces animates and controls the atmosphere of spaces.

READING INSTRUCTIONS The layout of this booklet follows that of these four phases. Starting with the discourse attempting to find answers to Why we dance and Why dance and movement catches our interest. Followed by the exploratory phase and culminating in a discussion, summarising the obtained answers to the research questions.

Figure 2 | Layering consecutive moments in time (author's own image).

2. Why do we dance?

Discourse introduction

The point of departure for the discourse was to ask the questions *Why do we dance* and *Why does dance and movement catch our interest*? The goal was to collect impression of dancing and an understanding of how dance is related to the way a space is explored and understood.

What drives the urges to move?
Where is the source of movement?
How do dancers and choreographers manipulate space?

These questions were studied from the point of view of dancer and choreographer, as well as neuroscientist / philosopher specialising in behavioural neurology.

Dancers:

- Arika Yamada
- The dancers from the Gothenburg Opera Dance Company

Choreographers:

- Sasha Waltz
- Rudolf Laban
- Pina Bausch
- Wayne McGregor

Neuroscientists / philosopher

- Ivar Hagendoorn
- Vilayanur Subramanian Ramachandran
- William Hirstein

2.1 Dancer

Space and motion from the perspective of the dancer

The process of the discourse was initiated with an interview with a dancer from the Gothenburg Opera Dance Company, ***Arika Yamada***. She is an American with Japanese heritage who started dancing as a way to express herself when the clash of her surrounding cultures led to her refraining from talk - where dance became almost like a language for her. A language for expression of feelings that could not be put into words.

Each dance session for Yamada starts with a scan of the body, to find out how she feels that particular day, mentally as well as physically. She imagines the structure of the body and how it feels when she moves. After getting in touch with her own body, she starts to imagine the space she is taking up and her interactions with it. As a dancer, one is very aware of the space the body is inhabiting and the space used by the surrounding people.

A great inspiration for Yamada is seeing other people perform and explore their body and the space. Particularly the texture of the floor and walls is important, especially when it is a texture and structure that one does not recognise - if it is unknown one wants to explore it. If there are obstacles one wishes to explore those. No matter what it is, it is good to have some limitations. For example; in a workshop that was carried out during the previous study *Static Motion* (Wallander & Borgny, 2018), investigating textiles and Yamada's interactions with it, Figure 2-2, she felt like the fabric was controlling her, but once she got to know it a bit more, it became almost like a partner in the dance - where there was predictability but still some elements of surprise. (Personal communication, Feb 12, 2019)

Similar to Yamada, her colleagues in the Dance Company, when asked about the reasons behind why they dance, thought the ability to express how one feels without using words was important. To see other people perform, explore, struggle, let out there emotions and face their insecurities. To touch the surroundings, be playful, vulnerable and strong, on stage as well as off stage. (Gothenburg Opera Dance Company, n.d.)

Figure 2-2 Arika Yamada, Gothenburg Opera Dance Company. Photography: Linda Wallander (Wallander & Borgny, 2018)

2.2 Choreographer

Space and motion from the perspective of the choreographer

If dance is way to express oneself, what is the joy in performing someone else's choreography? A question directed towards the dancer Arika Yamada, section 2.1, Yamada responded that when the choreographer shows a set of movements, she tries to mimic what she thinks that he feels. She said that *"Our bodies are not the same and what we feel when we move is not the same. I can not do what he did and feel the same thing. I find my own way, translating his movements into my body."* (Personal communication, Feb 12, 2019)

According to choreographer ***Wayne McGregor*** there are three common ways in which the choreographer develops a choreography in conjunction with the dancers (McGregor, 2012):

1. Performing a combination of steps, with the dancer deciding *how* they are performed. For example *"Take her left arm", "High kick, right leg", "Turn"* - the choreographer guides the dance with his voice
2. Taking inspiration from the surroundings - in terms of shapes, imagining them in front of you and tracing them with different parts of the body - the choreographer moves and the dancers mimic
3. Taking inspiration from the surroundings - in terms of shapes that one imagines to interact with. For example *"Imagine a huge letter E. You are standing in the bottom arm. Point to the opposite top corner. The side of the E starts to fall towards you, what do you do?"*

The choreographers role is to challenge the dancer to explore and to challenge their body. A choreographer that really stood out for her way of manipulating space was ***Pina Bausch***, a deceased German choreographer. She used a lot more physical settings than what is common. For example, instead of telling the dancer to imagine a pond and how you are jumping over it, falling into it and splashing water everywhere - she would use an actual pond, see *Figure 2-4*. More on Pina Bausch on page 27. In addition to Bausch, the works of choreographers ***Sasha Waltz*** and ***Rudolf Laban*** has been studied. See page 24 and page 15 respectively.

Figure 2-3 Overlap of stills from Dialogue 09 by Sasha Waltz (2009) displaying dancers on top of a wall

Figure 2-4 Dancer from the dance company Tanztheater Wuppertal, in Vollmond by Pina Bausch. Photograph by Tristam Kenton for the Guardian (Tristam, 2013)

Figure 2-5 Overlap of stills from Dialogue 09 by Sasha Waltz (2009) showing a single dancer as she explores a small, closed off space of Neues museum

Rudolf Laban and his Dance notation systems

There has been many attempts at recording and documenting dance throughout history, with many failed attempts and centuries of development. Dance notation is equivalent to the notes used to document music. However, dance notation is more complex as dance exists in space, in addition to time. ***Rudolf Von Laban***, a Hungarian architect turned choreographer, was one of the pioneers of this particular field of art. His background in architecture provided him with a profound understanding of spatial awareness, and an interest in the relationship between human movement and space. In contrast to the earlier forms of dance notation systems, Laban kept the human aspect central - combining the movements paths through space with their flow of energy, motivation, expression and quality. This system is referred to as ***Labanotation***.

Labanotation has been further developed by numerous people, including Sigurd Leeder, Albrecht Knust and Ann Hutchinson, resulting in a system applied to many different field of movement. Furthermore, the physical aspect of Laban's work was developed by one of Laban's former student, Irmgard Bartenieff, into what is now called the Laban Movement Analysis (LMA). This has since been applied to a wide range of fields, from movement studies, dance and drama to movement therapy. (Guest, 2005)

While Laban's early work primarily included thoughts regarding spatial harmony, dynamic rhythm and 3D use of space - describing movements in terms of spatial models and concept - he later developed it to also convey the motivation or meaning behind movement. (Maletic, 1987) These two domains of space, the physical space and the more abstract emotional space, have been implemented in the scope of this research, see page 16 and page 19 respectively for further details.

Kinesphere

Laban defined theories regarding composition of movement from the point of view of form and spatial expression - his theory of *Spatial Harmony*. He distinguished the general, infinite, space from the space the body is able to immediately reach. According to Maletic he claimed:

"The human body is completely oriented towards itself. It stands free in space. Its only resource, if we can call it that, is its environment, the spatial sphere which surrounds it, and into which is can reach with its limbs."

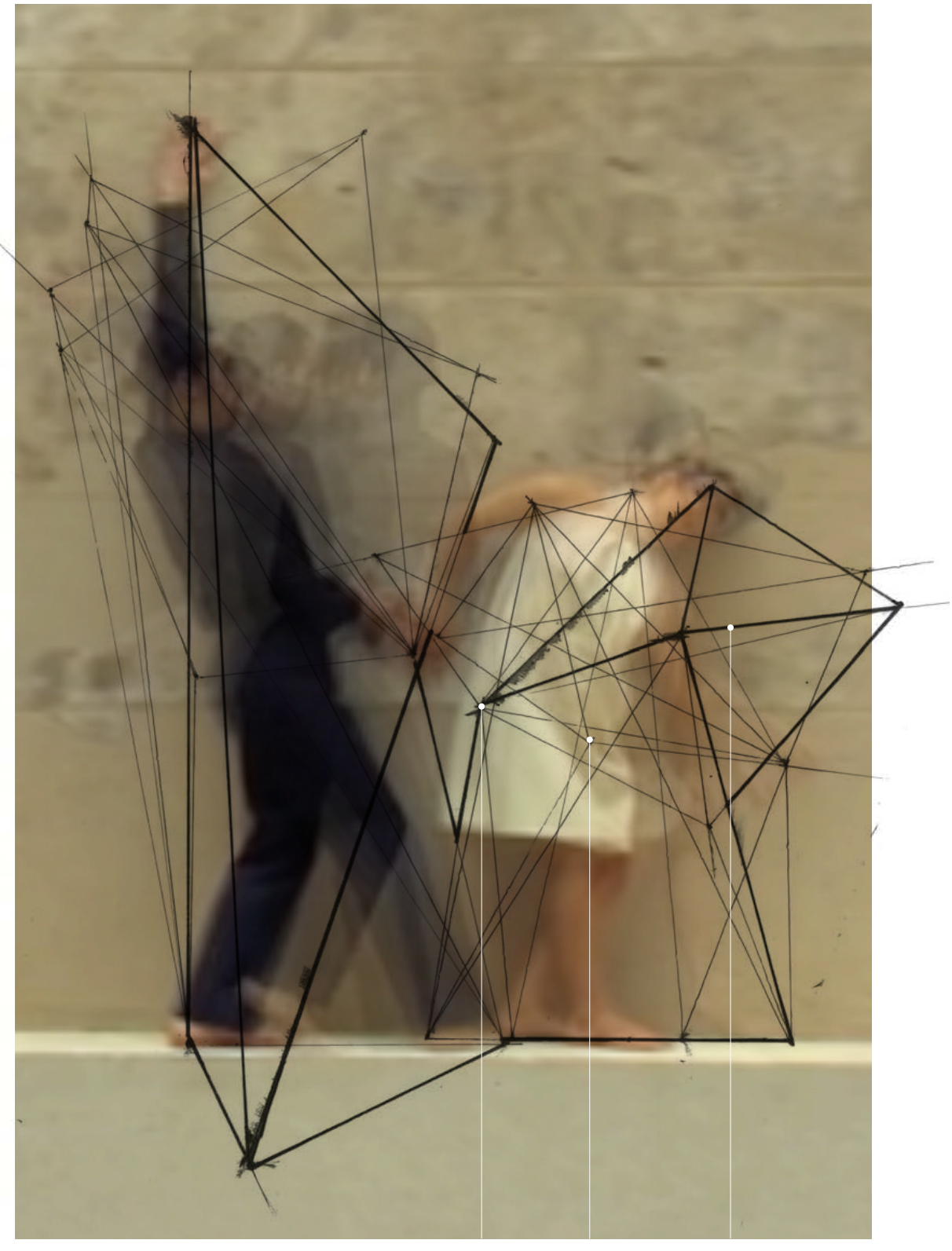
This space, the sphere of movement around the body, Laban coined the ***Kinesphere*** - the reach space of the body at each point in time:

"With every movement innumerable single tensions arise in the body ... They appear to our eye and perception of tensions as at least four components which we imagine irradiating from the centre of gravity. The simplest way to describe a person is to determine the placement of the ends of the limbs in relation the centre of gravity of the body."

In this manner Laban described the basis of the kinesphere with different number of direction paths through the centre of gravity of the body. For the simple case of a person standing straight up, these takes on the forms of octahedron, cube, icosahedron or sphere depending on the number of these direction paths. (Maletic, 1987)

Similar to how Laban considered the kinesphere of the body in relation the centre of gravity and its reach - the reach space of the dancers in Figure 2-6 was determined through imagining what parts of the body was used for support and which limbs were able to easily extend. In contrast to Laban's simple platonic bodies, a symmetric body was not the result as this situation had more complexity - e.g. closeness to a wall to be used for support. Furthermore, where Laban allowed for a change in mass distribution - for example switching the weight from two feet to one foot to be able to reach further - here only the limbs not used for support for each point in time were considered.

Figure 2-6 Overlap of stills from Dialogue 09 by Sasha Waltz (2009), displaying the dancers physical reach space, or kinesphere, one kinesphere for the first three of each frozen moment in time (author's own illustration)



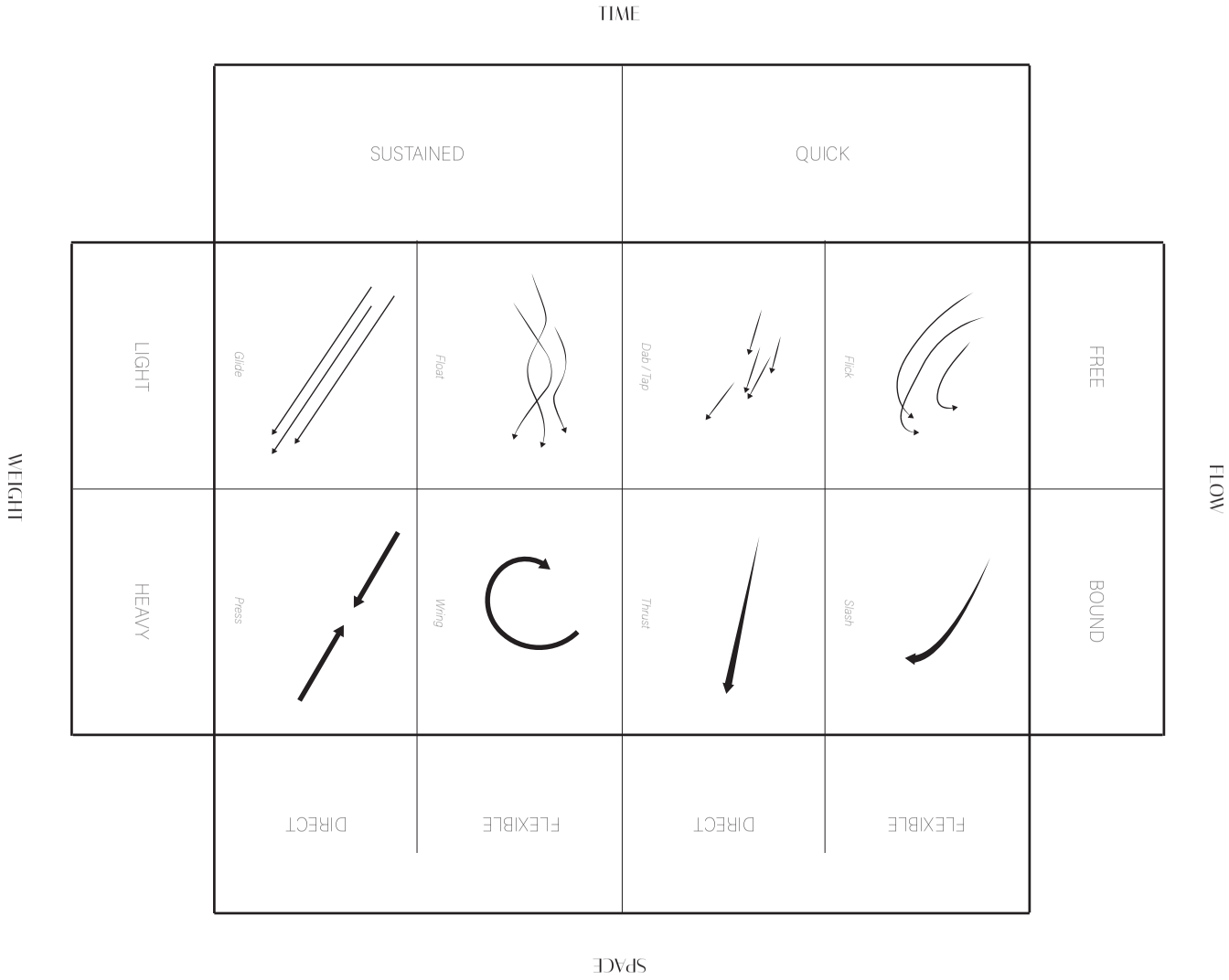


Figure 2-7 The eight efforts of movement, as defined by Rudolf Laban (Maletic, 1987). (Author's own illustration).

Dynamosphere

"While ***space harmony*** *deals with spatial relationships of movement which implies a harmonic relationship of bodily structure and its movement patters in space,* ***harmony of movement*** *considers the relationship of the dynamics of bodily actions and their spatial patterns."*

Whereas the main tendencies of movement, according to Laban, were those of the basic directions and forms, the secondary tendencies he identified are what is emphasised in this thesis. These are associated with the *nuance*, or intensity, of movement. Laban defined four regulators, or intensities, to this - ***weight, time, space and flow*** - and their respective polarities:

- WEIGHT - light/weak or heavy/strong - variations of this aspect in movement indicates sensibility - control of muscular tensions communicates a consciousness of the bodily functions
- TIME - slow/sustained or quick/sudden - has the ability to give an alert, nervy effect to motion, as well as communicate decision making qualities
- SPACE - direct or flexible - an aspect able to communicate orientation or organisation, by either focusing the movement or giving it a multi-focused quality
- FLOW - free/loosened or bound/rigid - frees or binds the continuity of motion - resulting in an either controlled or outgoing/enthusiastic aspect

Combined these characteristics results in what Laban called the eight efforts of movement, which is basically eight different types of movement. These are; ***flick, dab, float, glide, slash, thrust, wring and press***, see Figure 2-7. All including varying blends of these four intensities. In Maletic's words:

"In its performance, every human movement engages all four factors of motion - space, weight, time and flow - in a more or less active or clear fashion. There is no movement which does not evolve in space as well as time, bringing the weight of the body into flow."

For example, a press is; heavy, bound, direct and sustained. This abstract domain of emotional space, Laban called the ***Dynamosphere*** - *"the space in which our dynamic action takes place"*. He believed that the influence of mental and emotional qualities, along with bodily structure, determines the dynamic characteristic of movement, and used these four intensities, or qualities, to categorise and describe them. (Maletic, 1987)

The Effort graph

Laban had theories connecting these two domains of personal space, the physical kinesphere and the emotional dynamosphere. Taking the example of the octahedron as the kinesphere. This is a result of six dimensional directions through the centre of the body, high-low, left-right and backwards-forwards. Each of these six directions can be connected to a specific dynamic nuance. For example, an upward motion may be considered light while a downward movement is heavier. Similarly, sideways across could be considered direct, and the direction forward with a slow or sustained quality. These theories were developed into eight diagonal directions of the kinesphere - of which each could be connected to a particular set of the dynamic qualities mentioned in the previous section - one diagonal direction for each of the eight efforts (flick, dab, float, glide, slash, thrust, wring and press). From these, Laban developed the ***Effort-graph***, Figure 2-8. Laban's intention with the effort graph was to document and communicate these four sets of characteristics; time, weight, flow and space. The graph has four parts, one for each category, with two sub-parts for each of the two opposing polarities of that category. By including the polarities corresponding to the aspects of a specific motion, one is able to communicate the intentions and dynamic quality of that movement. Taking the example of the press, it would consist of the bottom part of the vertical axis (heavy), the right part of the horizontal axis (bound), the left of the two bottom parts (sustained) and finally the horizontal of the two axis' in the back (direct), see Figure 2-10 (Maletic, 1987).

Laban used this geometric figure to communicate the *intentions* behind movement. However, in this study, his techniques has been expanded to also include the essence of them in the drawing techniques used to draw the diagrams. This was done by using, for example, a light/heavy and slow/quick movement of the pen. Ultimately leaving behind a trace of the motion with the same qualities as the motion its attempting to communicate. Moreover, the method was developed into also tracing actual movements with these same drawing techniques, as can bee seen in Figure 2-9 and Figure 2-10. Further on, this practice of describing the characteristics of movement was farther expanded to describe the atmosphere of space as well. For example, one might describe the pressing atmosphere of a small room as heavy, bound and slow - more on this in Chapter 3.

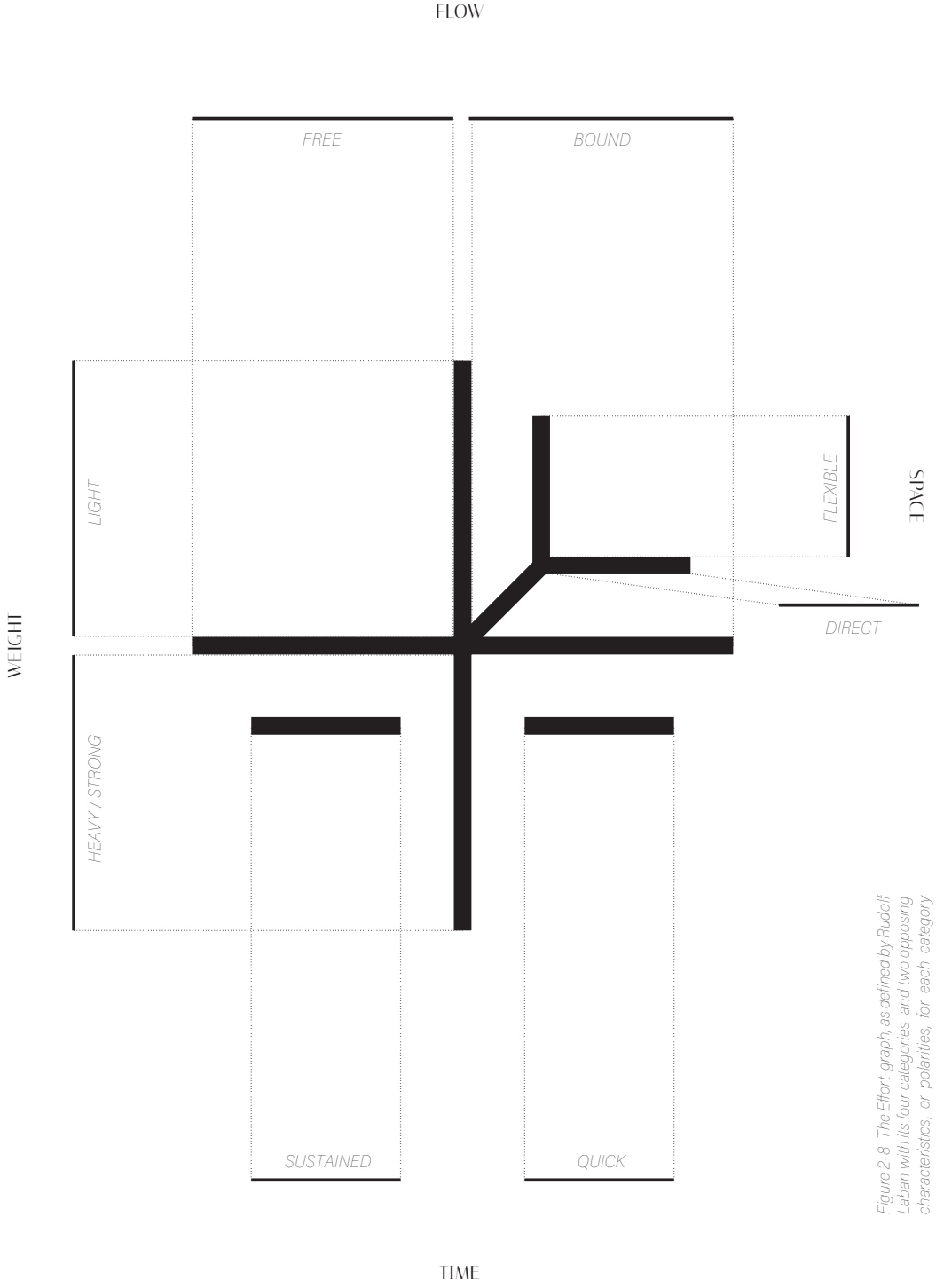


Figure 2-8 The Effort-graph, as defined by Rudolf Laban with its four categories and two opposing characteristics, or polarities, for each category (Maletic, 1987). (Author's own illustration).

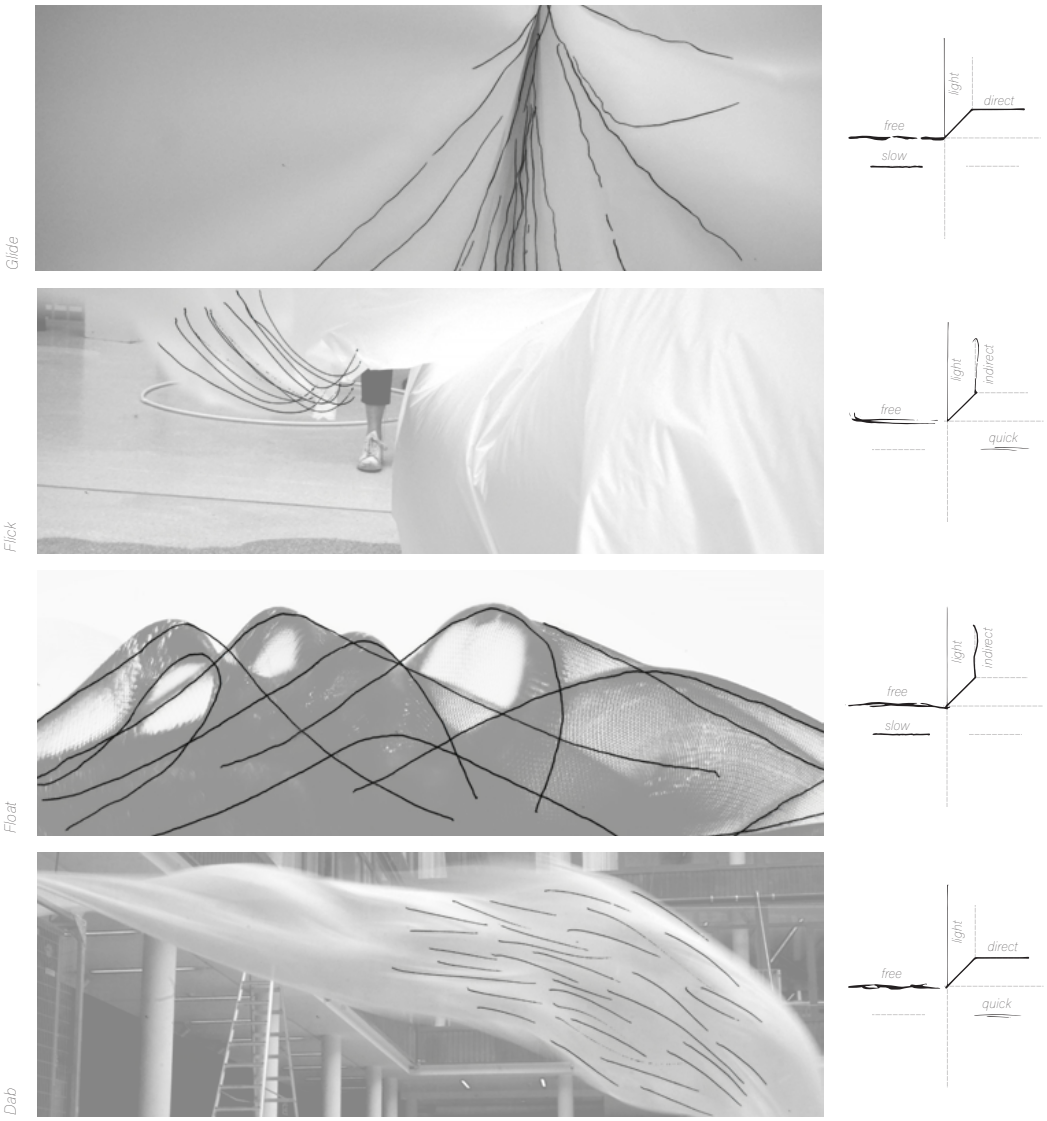
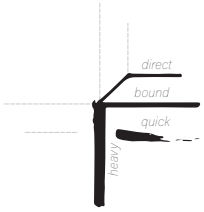
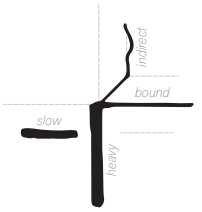


Figure 2-9 Four of Laban's eight efforts of movement - dab - float - flick - glide. All characterised by their light and free qualities, in a combination of fast/slow and direct/flexible (Maletic, 1987). Tracing of actual movement as well as each movements respective effort graph, copying the essence of the motion with the way the pen is moved over the paper (author's own illustrations). Photography: Linda Wallander (Wallander & Borgny, 2018).

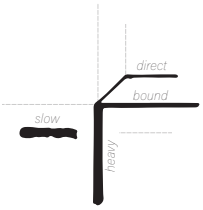
Figure 2-10 Four of Laban's eight efforts of movement - slash - press - wring - thrust. All characterised by their heavy and bound qualities, in a combination of fast/slow and direct/flexible (Maletic, 1987). Tracing of actual movement as well as each movements respective effort graph, copying the essence of the motion with the way the pen is moved over the paper (author's own illustrations). Photography: Linda Wallander (Wallander & Borgny, 2018).

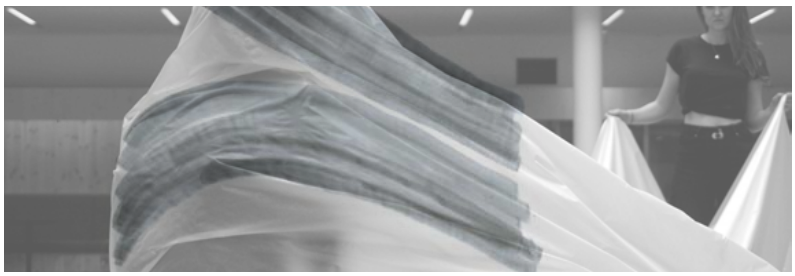


Thrust



Wring





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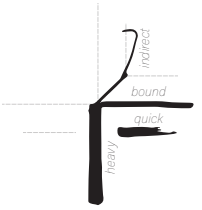
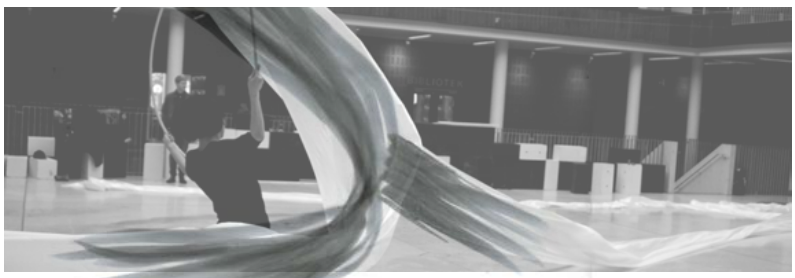




Slash

Sasha Waltz

Sasha Waltz is a German choreographer, dancer and director, co-founder of the dance company *Sasha Waltz & Guests*. She is a choreographer that offers a unique relationship to architecture, with an interest in ordinary buildings and the non-stage spaces provided by them. Waltz invented the improvisational format *"Dialogue"*, in which she and her dancers enter into a dialogue with the architecture and the spaces it enclose - and perform a *"danced response to architecture"*. These have been set in a number of different settings; Neues Museum in Berlin, the Jewish Museum in Berlin and MAXXI National Museum in Rome to name a few. (SW&G, 2019)

One of these architectural dialogues, *Dialogue 09* (Waltz, 2009), has been closely studied in this research. It is set in the vacant interior of Neues Museum in Berlin, after almost a decade of renovations, by David Chipperfield Architects, but before the reopening of the museum. Here Waltz and her dancers plays with the notion of stage, using the architecture in unexpected ways such as walking on top of walls, hanging in between pillars and walking sideways, back and forth, in the stairways. In the words of Irina Vinnitskaya for ArchDaily (2012):

"The bodies of the dancers are very self-conscious – conscious of the details of the space they are in and the way their bodies interact with it. They are finding cracks and niches to fit within and manipulate the "everyday spaces" in unexpected ways. They are "talking to architecture" by pushing the boundaries of where the body belongs in space."

In the film of Dialogue 09 it is evident that the strong architecture increases the spatial awareness of the dancers. They explore and interact with objects and elements of the architecture in unusual ways. They walk along the edges, searching for patches of light, hanging of edges, balancing, touching the walls and interacting with pillars - going around them, hitting them, circling, even mimicking their shape and hiding behind them.

There is a beautiful contrast between the static and dynamic - in open spaces without obstacles Waltz uses stagnant people to provide this contrast. These obstacles, real or human, increases the level of imagination for the viewer - one is able to imagine how the dancer would interact with the obstacles, taken by surprise when they do something else. There is also a contrast between the movements and the architecture in some scenes - e.g. the dance taking place in a heavy, static and stiff space is characterised by being soft, gliding and billowing. Furthermore, in many of the situations the dance takes place with heavy back-light , resulting in striking shadow plays - or behind frosted glass to only reveal the silhouette of the dance. (Waltz, 2009)

Figure 2-11 Dance performance Exodos by Sasha Waltz & Guests. Photography: Carolin Saage (2018)

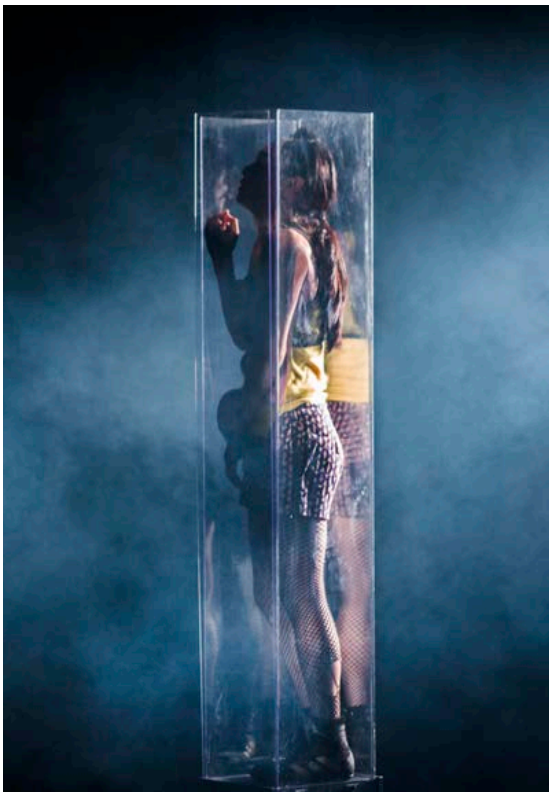


Figure 2-12 Dancers in Vollmond by Pina Bausch. Photograph: Naoto Iijima (2006)

Pina Bausch

Pina Bausch was a German choreographer and dancer, internationally renown from an early age and one of the most significant choreographers of our time. She was the leader of the dance company *Tanztheater Wuppertal* with whom she developed new genres in the field of dance theatre - such as dance opera, combining dance with drama and theatre. She observed people already from an early age, interested in what drives them. Once saying:

"I'm not interested in how people move but what moves them."

Her works often originated in people's essential emotions - their fears, wishes and desires - with the exposure to war in her childhood being reflected in outburst of panic and fear in many of her pieces. There was often not much conventional dancing in her choreographies and her pieces often stood out for their way of manipulating space. In the words of Norbert Servos (n.d.):

"The spaces created are poetic, with the outside often brought in, the stage expanded into a landscape. And the spaces are physical, affecting the dancers' movements. Water and rain allow the body to be seen through the clothes; earth makes every movement a feat of strength; the dancers' steps are traced in a layer of fallen leaves."

In the movie *Pina*, by Wim Wenders (2012), these aspects of her choreographies are evident. She used a lot of actual props throughout; instead of telling the dancer to imagine a pond and how you are jumping over it, falling into it and splashing water everywhere - she would use an actual pond - similar to the piece in Figure 2-12, *Vollmond*. There is this one scene in the film where they covered the stage in sand and dressed the dancers in very primitive pieces of fabric. A red fabric is passed around, startling in contrast to the surrounding earthy colours. It seems to symbolise danger, and coupled with quick and flexible movements in a combination of light and heavy, it communicates fear. Moreover, similar to how Sasha Waltz, in Dialogue 09, coupled the architecture with a contrasting set of movements in her choreography; there is a situation in Pina set in an industrial scenery combined with contrasting movements such as light, quick, tapping and billowing steps.

Throughout the film interviews with her dancers are displayed, showing how they looked up to her way of observing their intentions and feelings - providing them with an outlet for emotions, a language for expression:

"Meeting Pina was like finding a language finally. Before I did not know how to talk, and then she suddenly gave me a way to express myself. A vocabulary."

2.3 Why does movement capture our interest?

Human cognition

According to the study *Static Motion* there are five aspects that help communicate the illusion of motion in images that are, per definition, static:

- CREASES / general SHAPE - such as billowing shapes or creases that are directed in another way than the gravitation
- KNOWN FORM OF MOTION - such as a wave motion
- MASS IMBALANCE - when an object - a mass - is for example not touching the ground it implies that the mass can not stay in that position, and thus that it is heading somewhere to find balance
- BLUR - commonly communicates motion, when something is moving fast enough to not be caught properly on film

Furthermore there are two aspect that are discussed as enhancers of the illusion of motion:

- CONTRASTING CONTEXT - between something that seems to be in motion an something else, such as a person, being static in the image
- SHADOWS - can enhance the illusion of motion as they are often blurry and somewhat hard to read, the uncertainty of what is happening communicates motion

These are aspects that are applicable, first and foremost, to images of textiles in motion. However, as the study suggests can be expanded to include images of other sorts as well (Wallander & Borgny, 2018). In Figure 2-13 there is mass imbalance as the bird defy gravity, as well as creases taking on recognisable forms as the plastic on the building ripples slightly in the wind. The back-light from the sun increases the blurriness, in the images as well as in real life. This light also increases the contrast in the images, yielding shadows which enhances the effect of the above mentioned qualities. Furthermore, in Figure 2-14 motion can be read in all four images, there is blurriness and known forms of motion - light plays that we recognise, that we know the typical motion pattern of.

Figure 2-13 Overlap of images from a building under renovation in Gothenburg, the plastic sheets ripple slightly in the breeze while the bird to the left glides past, defying gravity. (Author's own images)

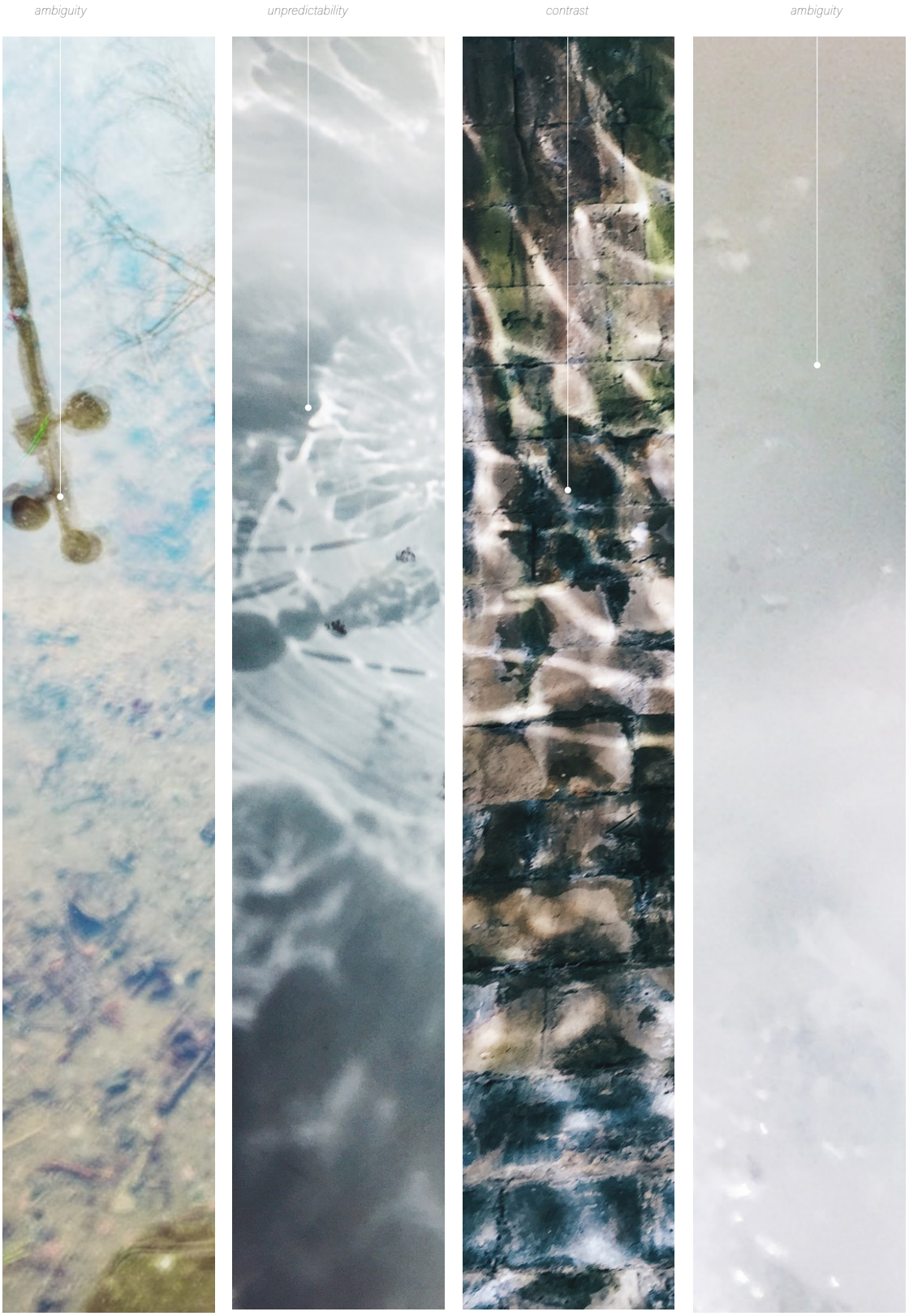


Figure 2-14 Close-ups of phenomenons of motion which engage the viewers interest (Author's own images).

Ambiguity Contrast Unpredictability and Isolation

We can see that there is motion present, but why does the movement in these images catch our interest? Four aspects are highlighted in this research, as reasons being accountable for engaging our interest; ambiguity, contrast, unpredictability and isolation.

Neuroscientists ***Vilayanur Ramachandran*** and ***William Hirstein*** discussed this in their article *The Science of Art* (1999). They coined their "eight laws of artistic experience", describing eight ways in which art works to capture the viewers interest. Three out of which, have been applied to this thesis:

CONTRAST By removing unnecessary information and enhancing contrast one might help the brain allocate attention - relieving the discovery of objects, the primary objective of the visual system. The retina of the eye and the visual cortex responds mainly to edges, as opposed to homogeneous surface colours.

AMBIGUITY *"Perceptual problem solving"* - the thought that when viewing something without an explicit explanation *"the visual system struggles for a solution"*, with the idea of discovering an object being rewarding for the viewer. *"An object discovered after a struggle is more pleasing than one that is instantly obvious."*

ISOLATION Similarly to contrast, isolation works to help allocate attention, allowing one to more effectively enjoy what is being displayed. Again, Ramachandran and Hirstein suggest this might reflect that the cells in the visual system are *"adequately stimulated by edges and are indifferent to homogeneous regions".*

Furthermore, ***Ivar Hagendoorn*** referred to these eight laws in his article *The Dancing Brain* (2003) and discussed reasons behind why they may just as well be applied to dance. However, he also claimed there is one important aspect which is missing:

UNPREDICTABILITY When observing a movement, the brain attempts to foresee the next set of movements:

"...both perception and action are essentially predictive. In his view, the brain acts as a simulator, creating mental models of the body and the world, models that it constantly updates with newly arrived information from the senses."

If the brain fails to predict the next set of movements correctly, one is taken by surprise. When the brain expectations are challenged in this manner, us human receive pleasure. This explains why a performance of dance might come of as boring to some humans; *"they do not hold our attention by varying from our expectation".*

Figure 2-15 The dancers movements and her interactions with the textile are complex and thus not able to be predicted by the viewer, resulting in contrasting and unpredictable effects. Photography: Linda Wallander (Wallander & Borgny 2018)

Figure 2-16 The reflected light from the opposite facade created ambiguous light plays on the facade in the picture at the bottom. Light also has the ability to create ambiguous shadow plays, e.g. when shining through tree crowns moving in the wind (top image). Again, movement carried out by humans are often unpredictable, here enhanced by the fact that the viewer is not able to read the facial expression of the dancer. (Author's own images)

Reflection

Chapter 2, Why do we dance? and Why does dance and movement capture our interest?

Why do we dance? To communicate abstract emotions that we can not put into words - dance is a language for expression. According to the dancer Arika Yamada it is all about the feeling of the body - physically as well as mentally - and those are feelings that we as humans seem to not be able to express verbally.

From this research it is evident that architecture has much more to offer than shelter and space, more than to help us practically in our everyday life. It has the ability to affect our emotions and mental state, to bring out an understanding of how we feel and an inspiration as to how those feelings could be expressed and communicated. Important aspects when exploring architecture and its space - and consequently ones interaction with these - are:

- Other peoples interactions with architecture and space
- Textures of walls, floors and the like
- Obstacles - they force you to consider what the spectators are seeing, as well as having the ability to take on the role of a 'partner' - in particular obstacles which are loose or in other ways dynamic or able to move/be moved
- Limitations of other sorts - heightens ones awareness

Furthermore, Labanotation - dynamosphere and kinesphere - provides the ability to communicate, document and analyse movements. With these one is not only able to communicate stance and position in space - but emotional drives and characteristics of space as well. Laban recognised that these aspects are as, if not even more, important than ones physical position in space. In this study, it has been crucial in the way it has brought another way of observing movement, using it for analysis has been vital, whereas using it for documentation and communication has been secondary.

Why movement capture our interest? In most of the cases studied, ambiguity and unpredictability seemed to be the aspect that was most often present - the steps taken by the dancer can not be predicted by the spectator. Obstacles and such provide an interesting limitation for the viewer, as you are more able to imagine how the dancer might interact with the obstacles - and then taken by surprise when the interaction differs from the prediction. Finally, the quality of contrast in movement is similar to what was concluded in Static Motion (Wallander & Borgny, 2018). Moreover, it somehow goes hand in hand with isolation - as it offers a contrast between what is in motion and what is not. However, isolation proved to be more difficult to capture and communicate in images and figure, and as a result it is not as present in this research.

Figure 2-17 Image from workshop carried out in the preparatory study Static Motion, glass blown into textiles - resulting in ambiguous and unpredictable effects. Both in the structure of the glass and in the movements observed through the glass. (Author's own image)

Figure 3-1 Overlap of stills from Dialogue 09 by Sasha Waltz (2009) showing a single dancer as she explores a small, closed off space of Neues museum

3. Interpreting Dance

Investigating the dialogue between architecture - space - user from the point of view of the dancer

While the previous step was about exploring motion in general, and gain understanding on movements and emotional drives in dance in particular; this following step was more about investigating the motion of the dance in relation to the architecture and the space:

- How do the actions taken by the dancer by the dancer influence the space?
- How do the elements that make up architecture form the space
- How do the aspects of this space shape the characteristics of the dance?

Taking inspiration from Rudolf Laban's way of analysing and describing the essence of dance, with the kinesphere and the dynamosphere, answers to the questions above could be obtained. These aspects of the dance was identified in the film Dialogue 09 by Sasha Waltz (2009), see page 24 for more information. With Laban's notation system, the vocabulary of the movements and the configuration of the dancers could be analysed. It was interesting as it provided the ability to imagine the dancers awareness of space, and an understanding of what affected the way they moves.

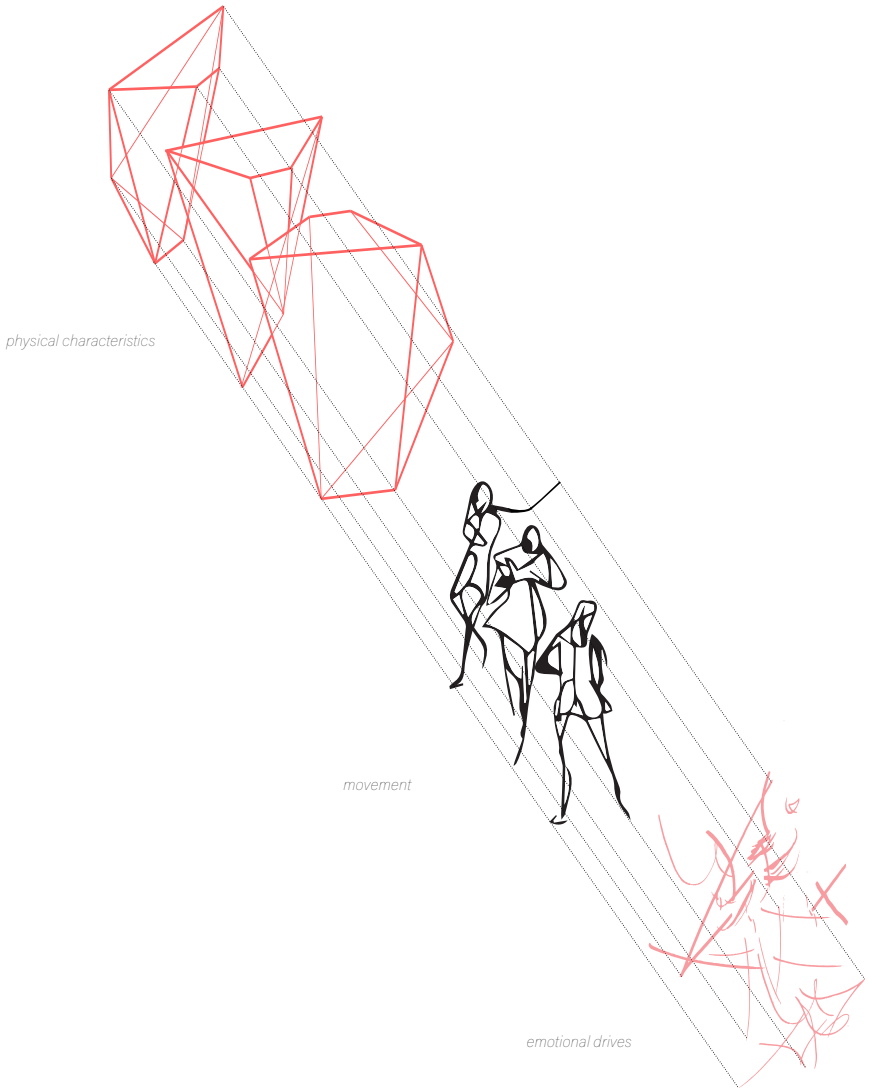
Concept

The movements in Dialogue 09 was understood by observing them through the eyes of Rudolf Laban - by identifying them and breaking them down into the two domains of space - the physical and the emotional, the KINESPHERE and the DYNAMOSPHERE.

Stills from short sequences of the movie was taken out - e.g. 10 frozen moments from a 10-15 second sequence. For each moment identifying the:

- KINESPHERE: Imagine the distribution of weight for the each dancer, what limbs were able to move without breaking or changing the stance - in which directions and how far. Sketching these as three dimensional bodies - see *physical characteristics* in Figure 3-2. Drawing these on top of each other, as in Figure 3-4 and the drawings on page 42 and page 43 - ultimately telling a story of where the dancers are, physically, in that very moment, as well as where they could possibly go in the next moment.
- DYNAMOSPHERE: Imitating the essence of each dancers movements based on the four characteristics of Laban's notation system, as described in paragraph *Dynamosphere* on page 19 - their weight, speed, direction and restriction, see *emotional drives* in Figure 3-2. In contrast to the physical characteristics, these are not a description of the characteristics of the movement in that very moment. As a movement needs time to be carried out, a frozen moment of a movement is not a movement, and thus is not able to hold a characteristic. These are rather a description of the characteristic of the movement taking place in between each moment and the following moment. Furthermore, these are not traces of the exact steps and motions, but imitations of the essence of the movements.

Figure 3-2 For each frozen moment of the dance, the physical characteristics - the kinesphere - and the emotional drives - the dynamosphere - was identified (author's own illustration)



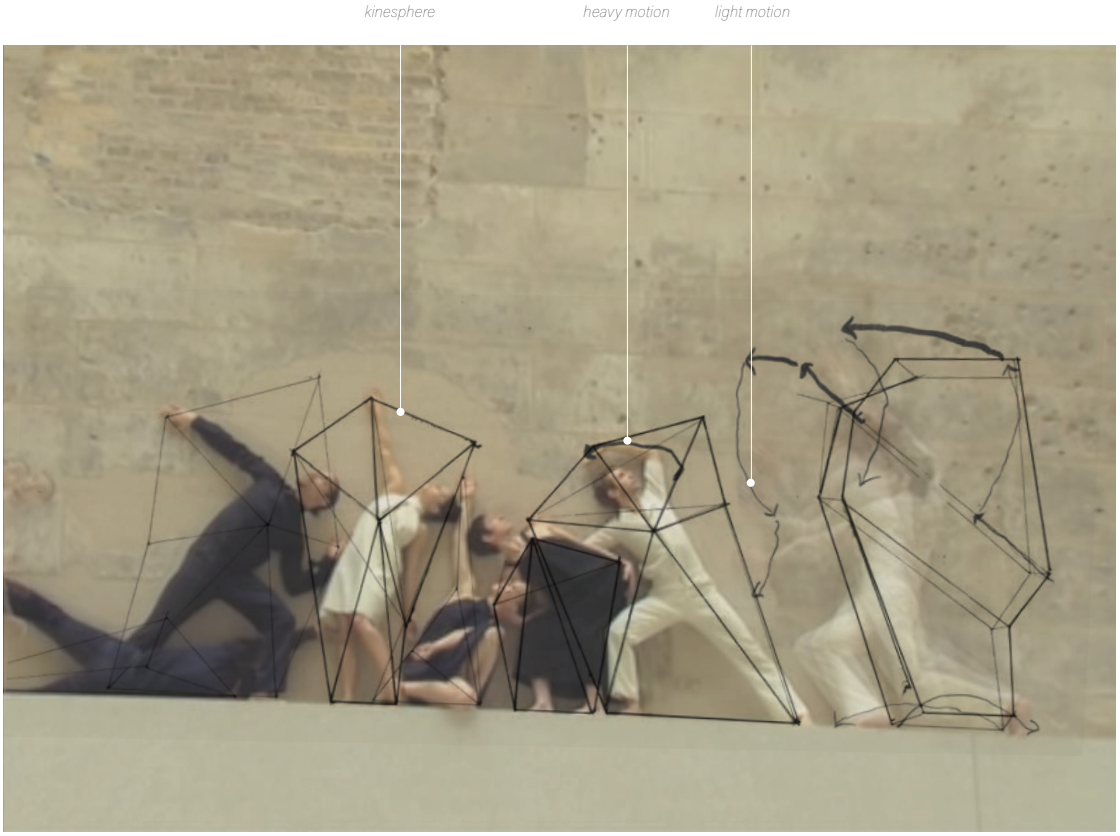
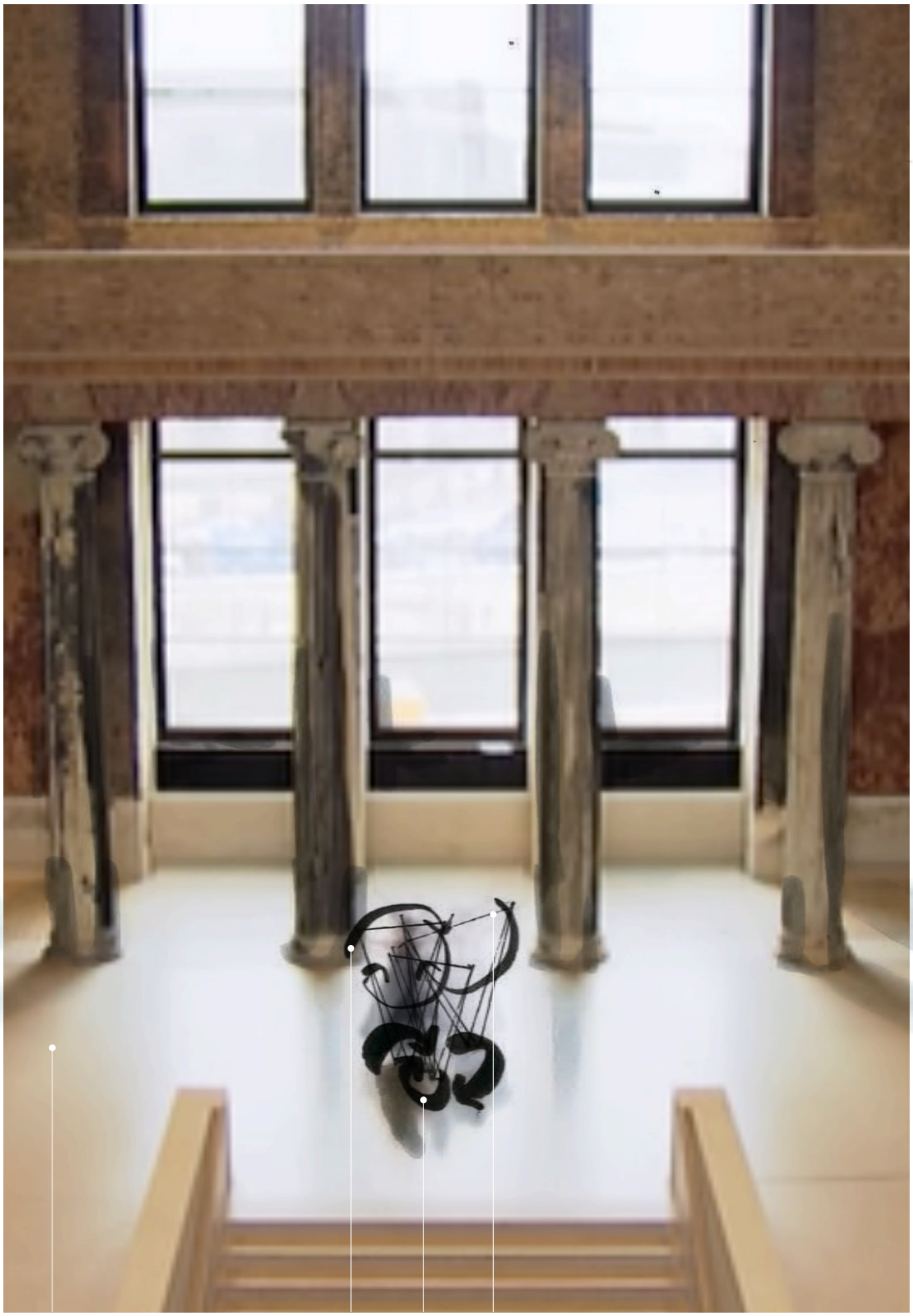


Figure 3-3 In a still from Dialogue 09 (Waltz, 2009) the reach space for each dancer - the kinesphere - and the characteristics of the movements - the efforts - was identified. The kinesphere for each dancer is affected by the obstruction of the wall and the kinesphere of the other dancers. The characteristics of the movements if affected by the rough texture of the original stone wall - slow and stuttering (indirect) and in a combination of light and heavy (Author's own illustration)

Figure 3-4 In stills from Dialogue 09 (Waltz, 2009) the physical reach of the dancer and the characteristics of her movements, as well as the characteristics of the space, was identified. How she turns around over and over in a light upwards manner reminds of the pillars in the background, reaching up towards the high ceilings - set in the light patch right in between the shadows cast from the pillars. (Author's own illustration)



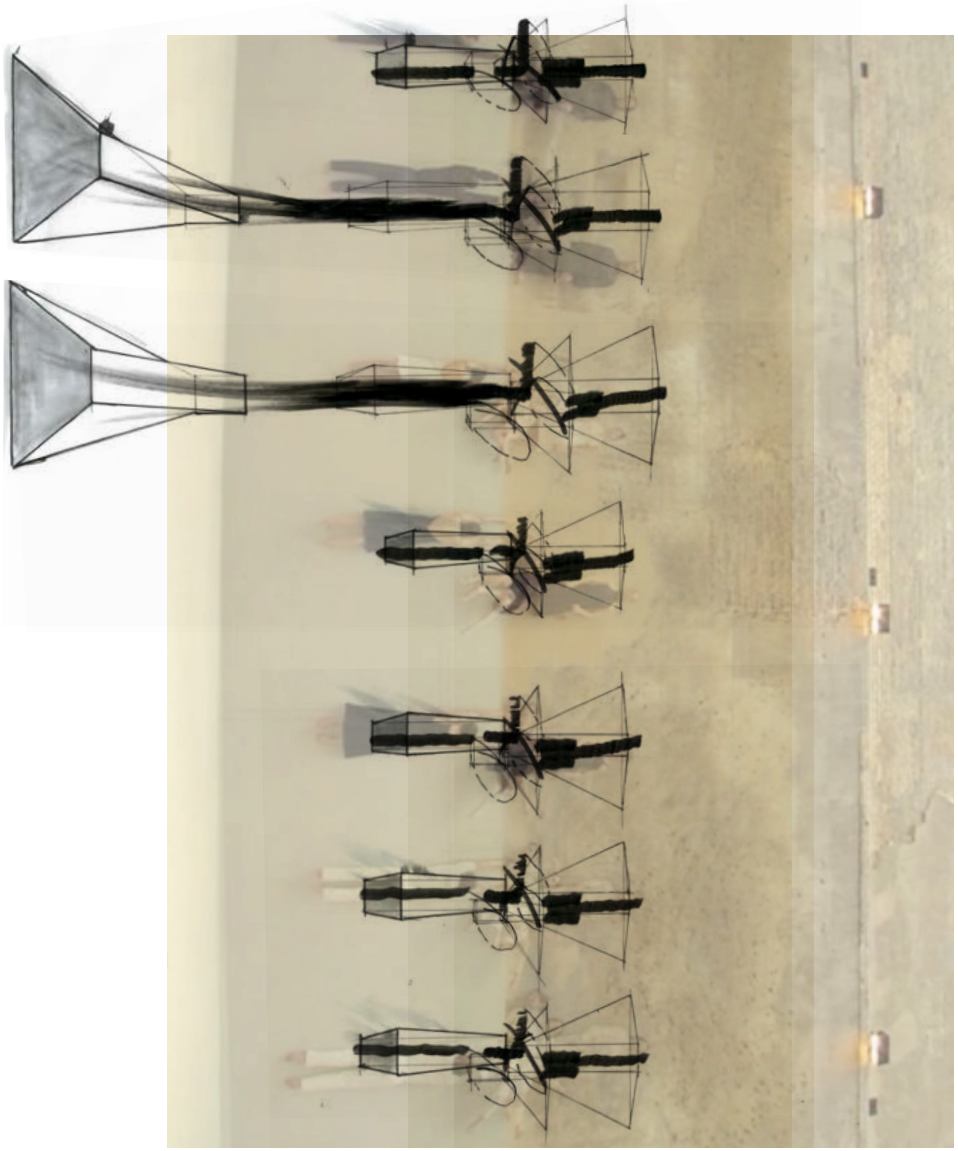


Figure 3-5 In a stills from Dialogue 09 (Waltz, 2009) the reach space for each dancer - the kinesphere - and the characteristics of the movements - the efforts - was identified. The characteristics of the movements if affected by the rough texture of the original stone wall - slow, stuttering (indirect) and heavy. Compared to those affected by the newly added piece of stone which is much smoother - here the movements are much quicker and smoother. (Author's own illustration).

Figure 3-6 Overlap of stills from Dialogue 09 by Sasha Waltz (2009)

Figure 3-7 Kinesphere and dynamosphere of the movements taking place in Dialogue 09 (Waltz, 2009). Hints of the textures of the architecture (author's own illustration)

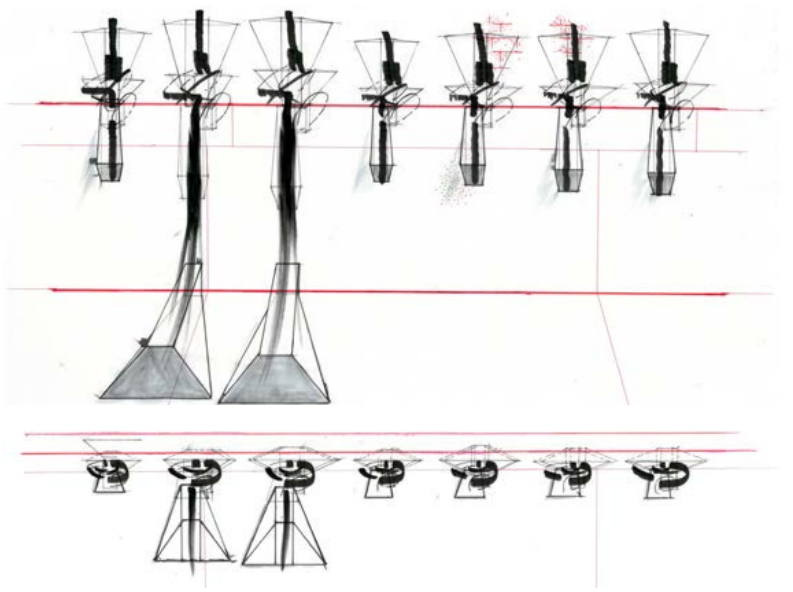


Figure 3-8 Dancers from Dialogue 09 (Waltz, 2009) and their interactions with the light and shadow patches of the space, as well as the contrast between dancers in motion and dancers in stillness - leaving the spectator wondering whether or not they will join the dance or stay 'asleep' (bottom image) . Unconventional use of space and interactions with the obstacles of the architecture (top).

Figure 3-9 Dancers from Dialogue 09 in a sequence of exploring the original and the newly added piece of stone wall in a museum dating back to pre-war times, damaged by bombings during WWII. Here (top image) synchronously falling, perhaps as a pointer to what caused the original stone walls of the museum to shatter. Unconventional use of space, going back and forth sideways and turning, circulating the stairs (bottom image). (Waltz, 2009)

Reflection

Chapter 3, Interpreting Dance

This step allowed for understanding of the dancers awareness of space, how their reach space is affected by the architecture and the dancers around them. How the qualities of their movements is affected by the characteristics of the architecture - its textures, forms and obstacles:

TEXTURES affected the speed and weight of the movement - a rough texture was explored in a slower, heavier manner, while a smooth texture was explored with quick, sliding movements.

LIGHT and SHADOW patches was explored and 'chased', providing the observer with circumstances that allowed for assumption of their movements - yielding unpredictable and ambiguous effects.

The use SEMITRANSPARENT surfaces greatly increased the ambiguousness of the dance.

UNCONVENTIONAL use of space was central, working with known architectural elements in unexpected ways - e.g. walking sideways back and forth on staircases, going around pillars in circles, punching walls and so on.

Exploring UNKNOWN architectural compositions throughout - e.g. on top of a wall, in circular hollow sections, in sand

Figure 3-10 Overlap of stills from Dialogue 09 by Sasha Waltz (2009) displaying a dancer on top of a wall

Figure 4-1 Touching,exploring surfaces and textures. Enhancing the ambiguous effects with additions of water and light, and the unpredictable features of human interaction. (Author's own image)

4. Interpreting Space

Investigating the dialogue between architecture - space - and user with focus on the atmosphere of space

How does the elements that make up architecture affect the atmosphere of the spaces they compose? This was investigated through imagining what would happen to a sequence of motion taking place in the space,

- What are the characteristics of this dance?
- How is that affected by the space? What are the qualities of that space?
- What happens to the dance when altering these elements of architecture?

This was carried out in two substeps; firstly by taking an already existing couple of architecture and dance and describe:

- The ARCHITECTURE, or the elements of architecture - here defined as the physical objects
- The USER, or in this case the dancer
- The SPACE - here something more abstract than the physical objects of architecture - how the light falls and reflects in the surfaces for example, or the movement of the air.

Secondly; by imagining what would happen to the essence of the dance and the space when altering these elements of architecture.

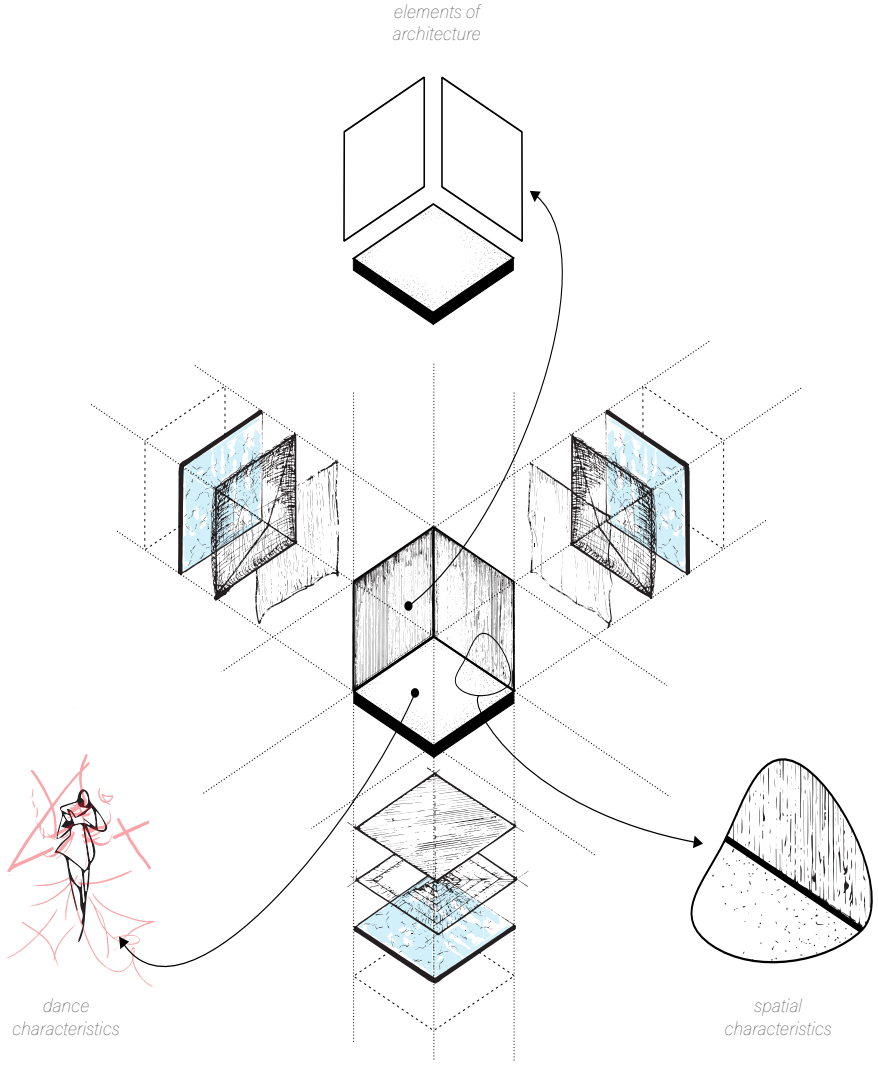


Figure 4-2 Concept for the first substep; identifying the elements of architecture, the essence of the dance and the characteristics of the space. (Author's own illustration)

4.1 Identifying elements of architecture

Concept - first substep

The first substep was about taking an already existing couple of architecture and dance and describe:

- The ARCHITECTURE, or the elements of architecture - here defined as the physical objects - the attributes of the floor, walls and ceilings, the sizes, materials and textures
- The USER, or in this case the dancer - the essence of the dancers movements. Described in the same vocabulary as Laban's efforts (dynamosphere) but expanded to traces of actual movements, copying the essence of the movements when moving the pen over the paper - using heavy or light motions for example.
- The SPACE - here something more abstract than the physical objects of architecture - how the light falls and reflects in the surfaces for example, or the movement of the air. Here, yet another expansion of Laban's vocabulary was made. While Laban used his efforts, the dynamosphere, to describe the characteristics of movement - here it is used to describe the attributes of space as well. For example, the pressing feeling of a small space might be described as sustained, heavy and bound, see Figure 4-7 on page 54.

By describing these, focusing on one at a time, an understanding of how they affect and relate to each other can be obtained.

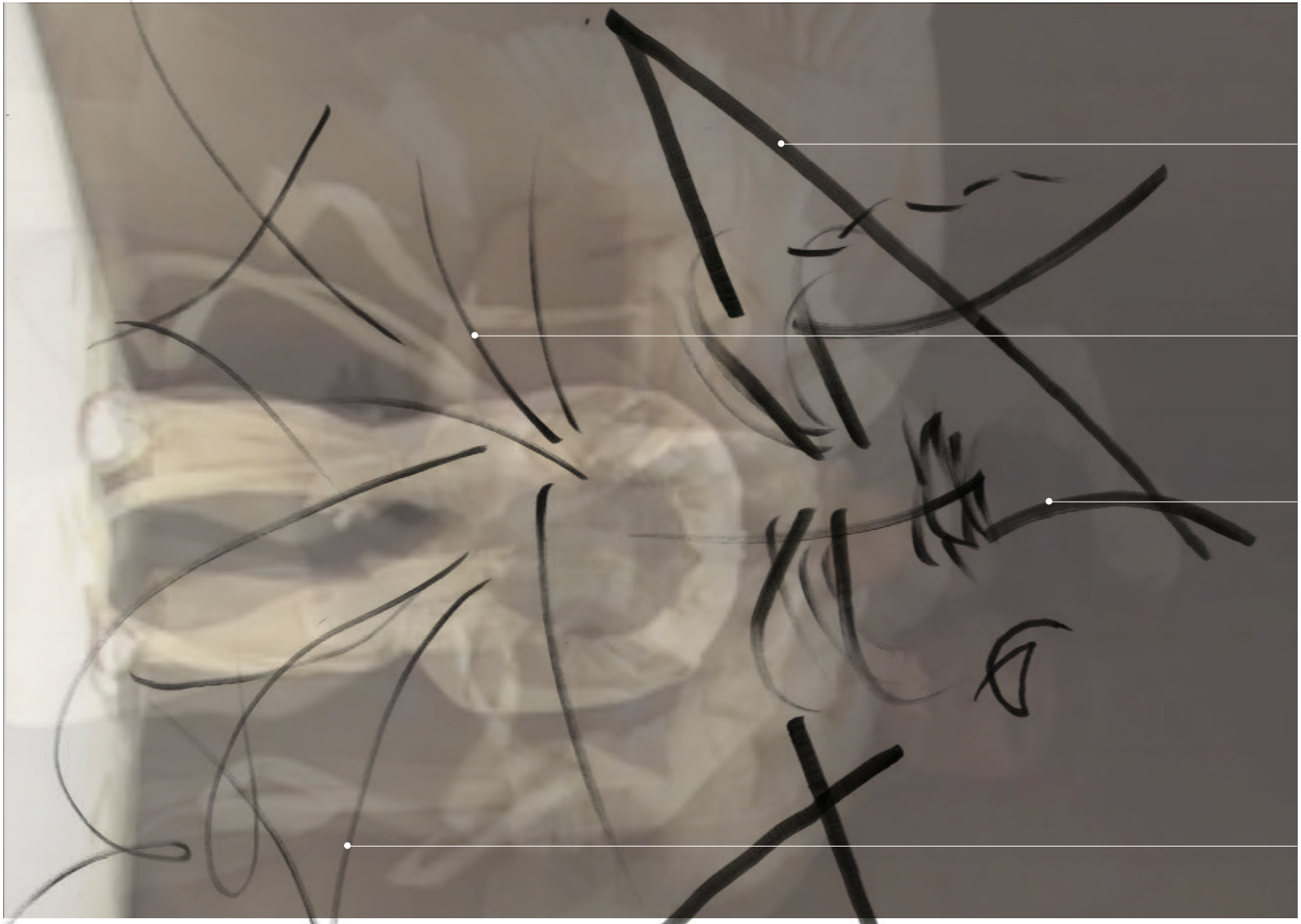
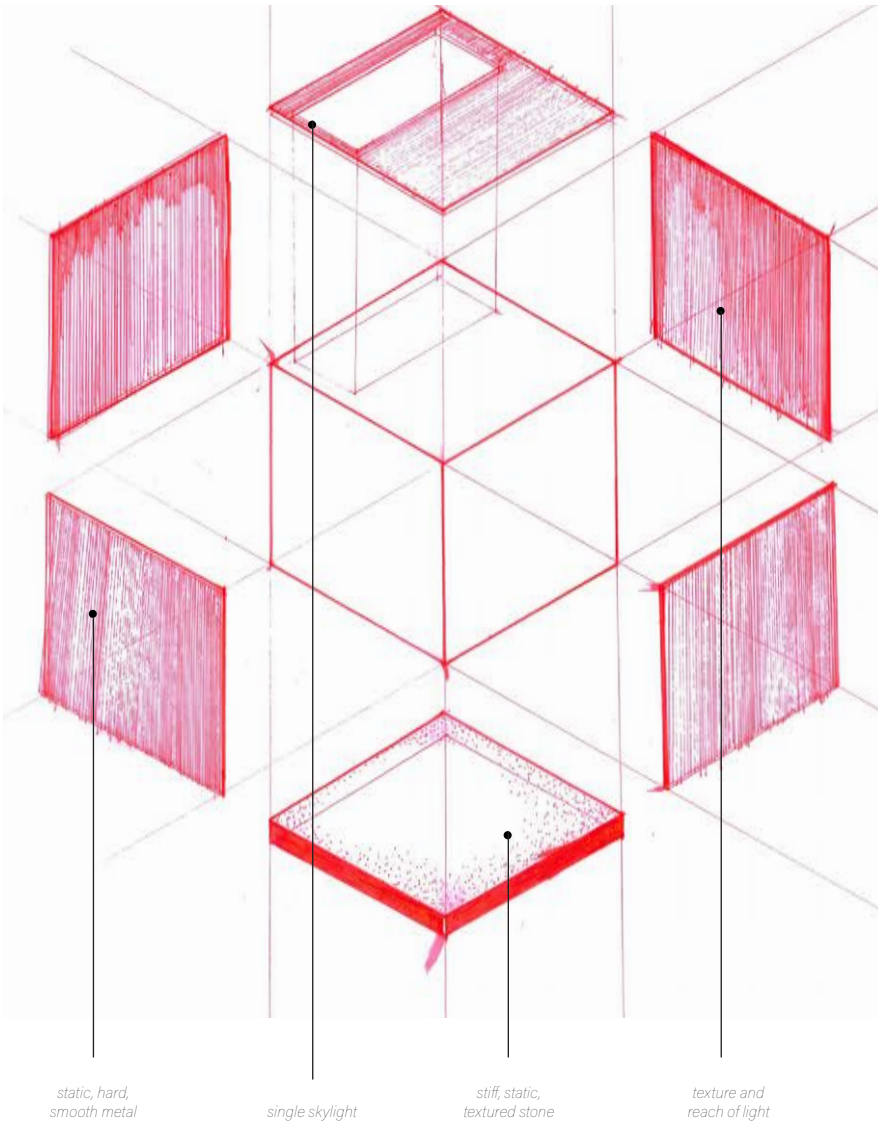


Figure 4-3 Overlap of stills from Dialogue 09 (Waltz, 2009), displaying a single dancer in a small, tight and confined room as she explores the space with heavy movements, in a combination of fast-slow and direct-indirect. The essence of these movements have been traced by hand, copying the characteristics of the movements when moving the pen over the paper - as can be seen for example by the heavy strokes (author's own illustration).

Figure 4-4 The sequence of dance in Figure 4-3 takes place a plain quite small room, with a stiff, static, hard floor of stone, walls in metal, and a single skylight as the only light source. These make up the elements of the architecture, the objects, as can be seen below. They have been drawn by hand, putting effort into communicating the textures of the surfaces and the reach of the light. (Author's own illustration).



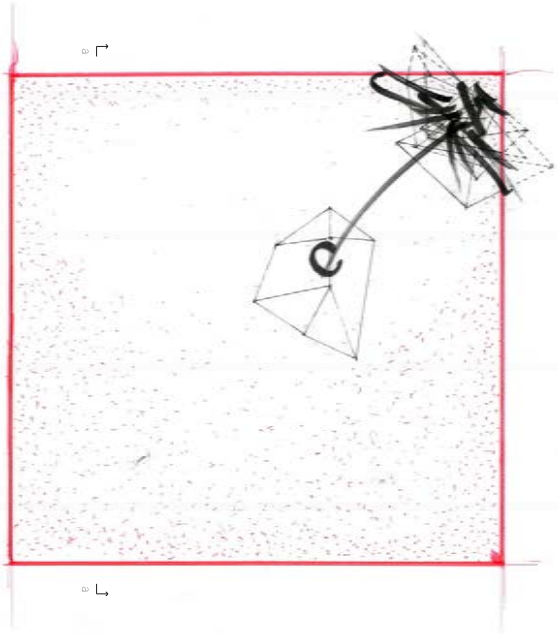


Figure 4-5 plan view —— 1 m

Figure 4-6 section a-a —— 1 m

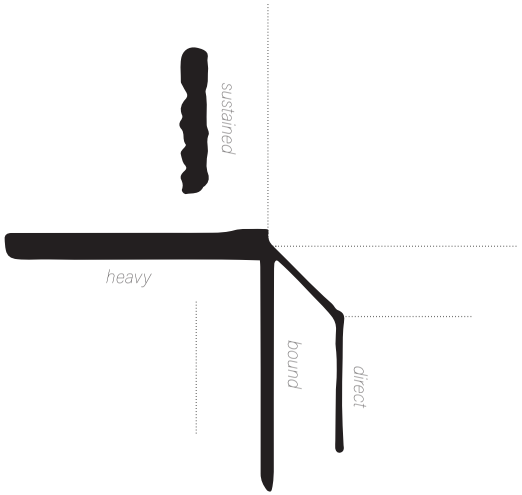


Figure 4-7 The space feels tight, dark and confined - a PRESSING feeling

(Author's own illustrations)

Original Scene

The original scene chosen, from Dialogue 09 (Waltz, 2009), as can be seen in Figure 4-3 is a sequence with a single dancer in a plain quite small room, with a stiff, static, hard floor of stone, walls in metal, and a single skylight as the only light source. These make up the elements of the architecture, the objects. In Figure 4-4, Figure 4-5 and Figure 4-6 they have been drawn by hand, putting effort into communicating the textures of the surfaces and the reach of the light.

The movements carried out by the dancer are all quite heavy movements, in a combination of fast-slow and direct-flexible. These characteristics have been traced in Figure 4-3, Figure 4-5 and Figure 4-6.Not the exact steps but the essence of them, by copying the characteristics of her movements with the stroke of the pen over the paper - as can be see for example by the thickness and weight of the lines.

Together these characteristics convey the perception of her feeling trapped, on a spectrum from desperate and slightly panicked to hopeless. Resulting in a space that feels quite tight, dark and confined - or with the same vocabulary as Laban's eight efforts - a pressing feeling, i.e. heavy, bound, direct and sustained, Figure 4-7.

Finally, the physical reach - the kinesphere - in each frozen moment have been determined as well, Figure 4-5 and Figure 4-6. Telling a story of how the dancer distributes the weight, which limbs are used for support and which are free to move. How the reach is affected by the limitations of the architecture.

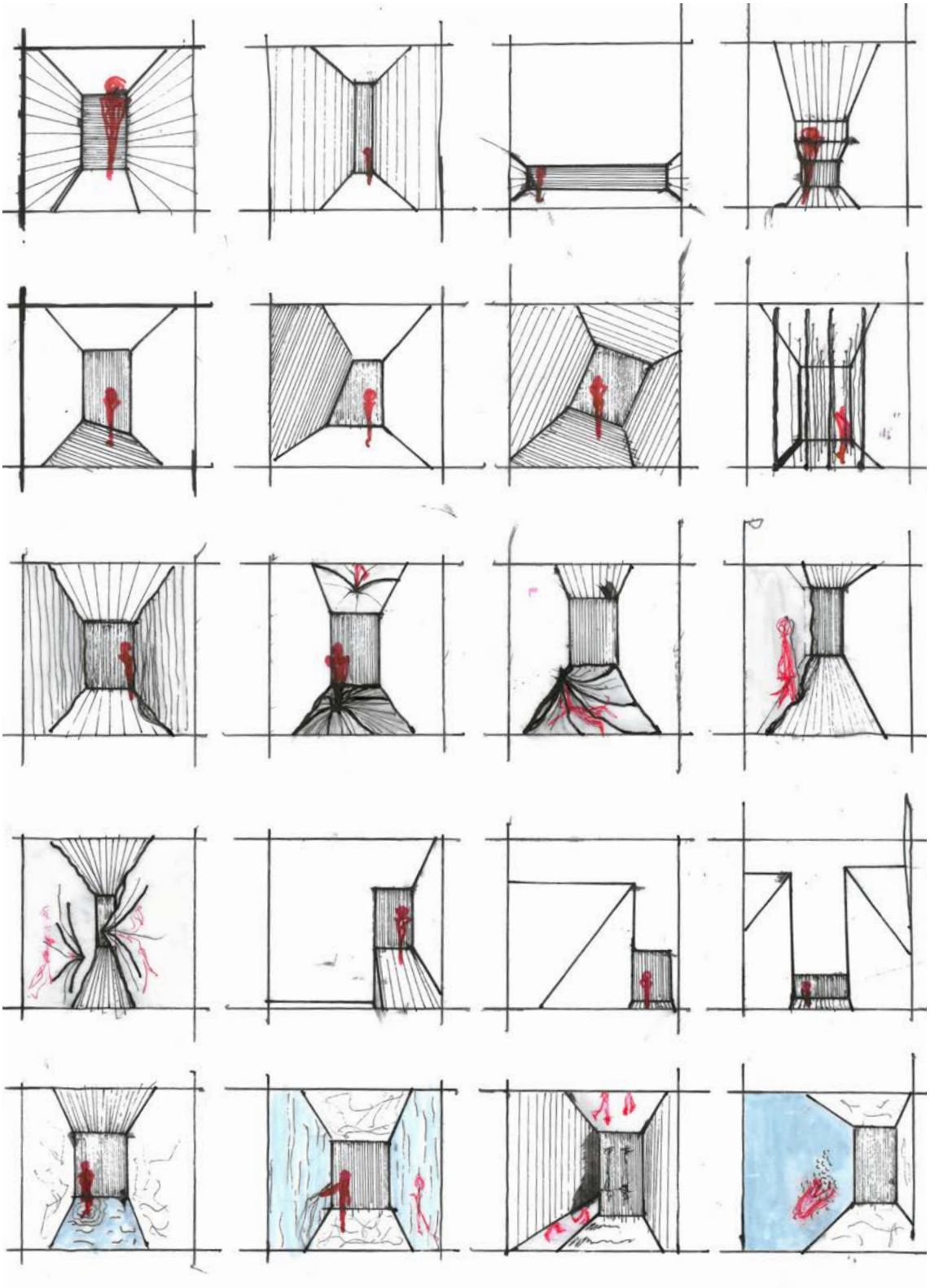


Figure 4-8: Alterations to the elements of architecture was made in the second substep - ultimately to gain understanding over how these elements affect the characteristics of the space and the movement carried out by the user. (Author's own illustration)

4.2 Imagining changes in elements

Concept - second substep

After identifying the relationship between the architecture - the space - and the user of the original sequence presented in the previous section - an investigation into what effect alterations to the elements of architecture would have was carried out.

What would happen to the essence of the dance and the space if making alterations to the elements of architecture?

For example; is changing the material of the walls from hard, static metal to a light, flowing fabric, see page 59. A relatively large number of alterations was carried out by:

- Removing one of the elements from the original scene- e.g. the floor or the walls - and substituting it for an element with a different set of attributes.
- Determine how that change would affect the essence of the dance from the original sequence - would the movements be lighter? Heavier? Quicker or slower? More flexible or more direct? Freer or more bound? Taking into account the textures of the elements, whether or not they have dynamic attributes or if their presence have any mental connection to a specific set of emotions.
- Using these revelations to identify the changes they might have entailed for the qualities of the space - still using Laban's effort to break the problem down and in that way ease the process.

Figure 4-9 What would happen to the qualities of a space and the characteristics of the movement made by humans through the space if changing the material of the walls into a light, flowing fabric - such as the one in this image? (Author's own image)

Loose walls and elastic floor

Two of the changes made were those of:

1. Changing the material of the walls from hard, static metal to a light, flowing fabric - such as the one in Figure 4-9.
    - The architecture of the room would change from heavy, stiff and static to loose, dynamic and light, Figure 4-10.
    - The main changes in the movements would be those of the weight - this space allows for lighter movements and a more exploratory overall sense - see Figure 4-11 and Figure 4-12.
    - This results in a space that feels light, free and content - or with the eight efforts - a floating space, Figure 4-13. When comparing these effort graphs of the original scene and the altered (Figure 4-7 and Figure 4-13) - the qualities of the space changes from heavy to light, from bound to free and from direct to flexible.

2. Altering the stiff, static stone floor into an elastic floor in textile.
    - The architecture of the room would change from stiff, static and heavy into dynamic and light, Figure 4-14.
    - The movements would be quicker, altering between heavy and light, see Figure 4-15 and Figure 4-16.
    - Resulting in a space that feels tight, unsettling and unbalanced - or with the eight efforts - a dabbing space, Figure 4-17. The qualities of the space in the original scene changes from heavy to light, bound to free and sustained to quick.

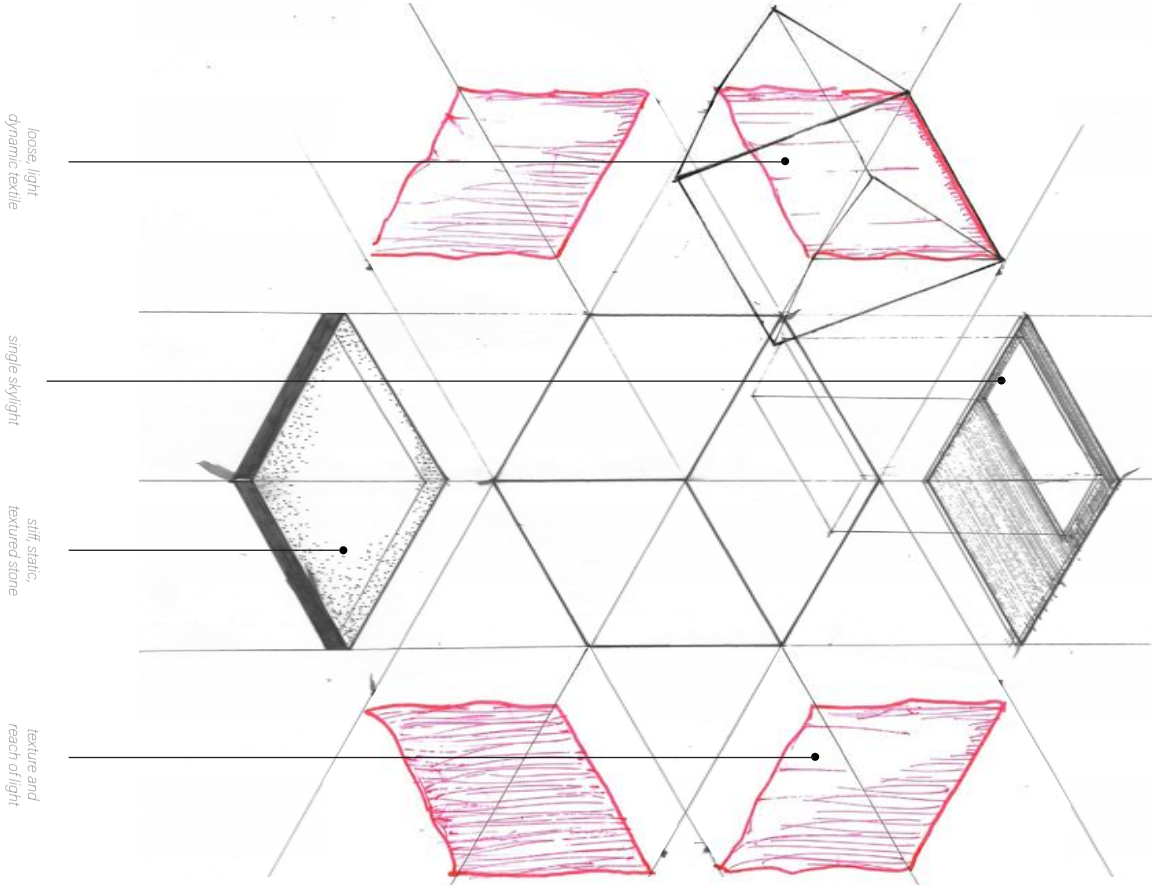


Figure 4-10 What would happen to the sequence of the dance in Figure 4-3 if taking place in a room with a stiff, static, hard floor of stone; walls in a light, flowing and dynamic fabric; and a single skylight as the only light source? (Author's own illustration).

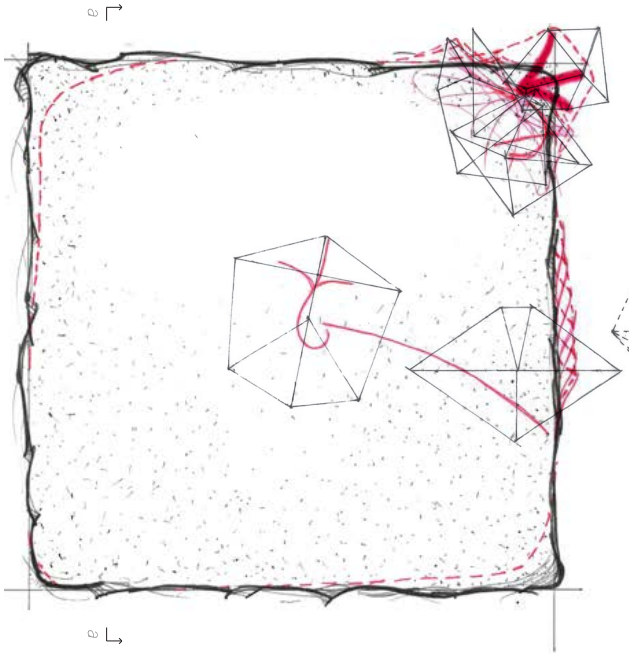


Figure 4-11 plan view 1 m

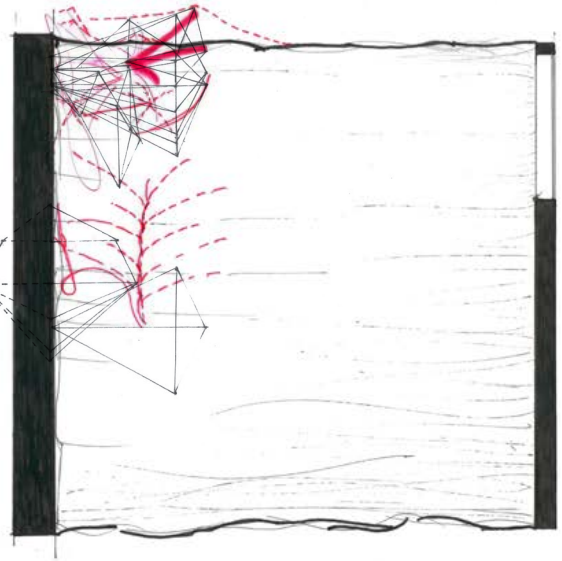


Figure 4-12 section a-a 1 m

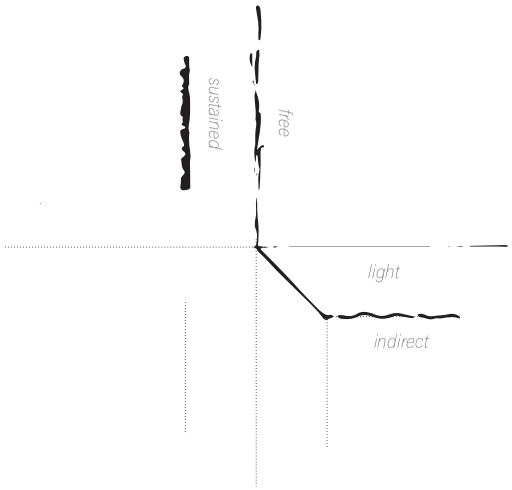


Figure 4-13 The space feels free, light and content - a FLOATING feeling

(Author's own illustrations)

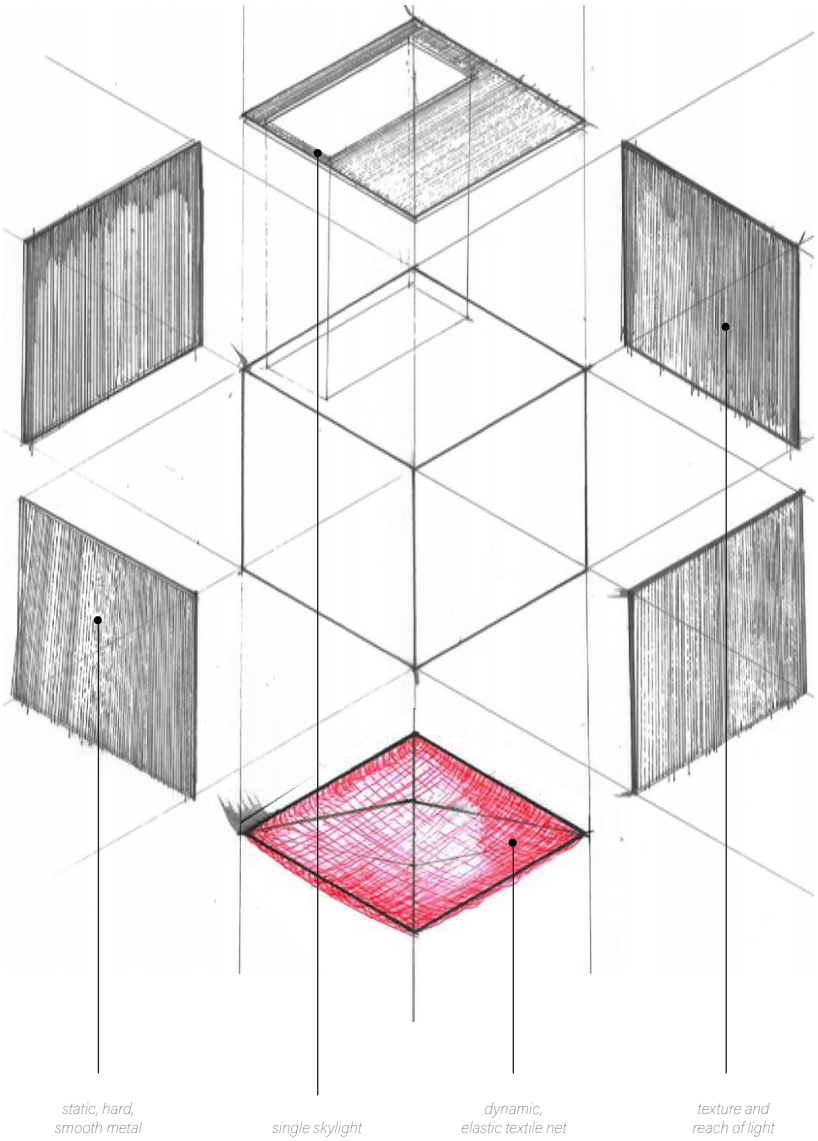


Figure 4-14 What would happen to the sequence of the dance in Figure 4-3 if taking place in a room with a dynamic and elastic textile floor, walls in metal; and a single skylight as the only light source? (Author's own illustration).

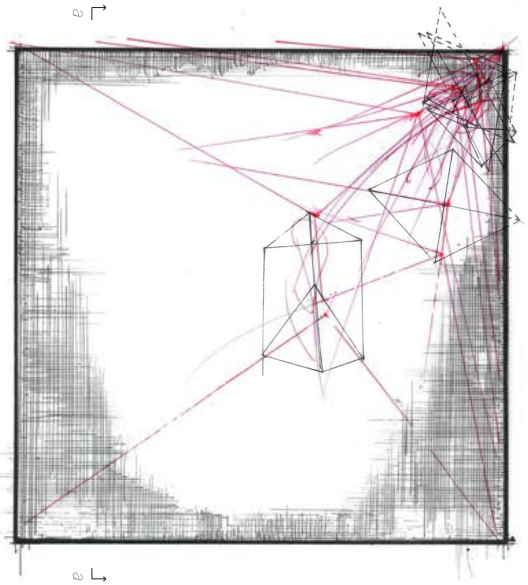


Figure 4-15 plan view 1 m

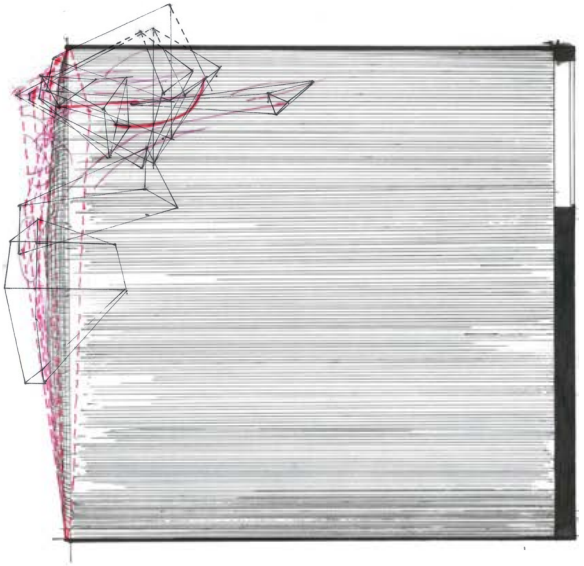


Figure 4-16 section a-a 1 m

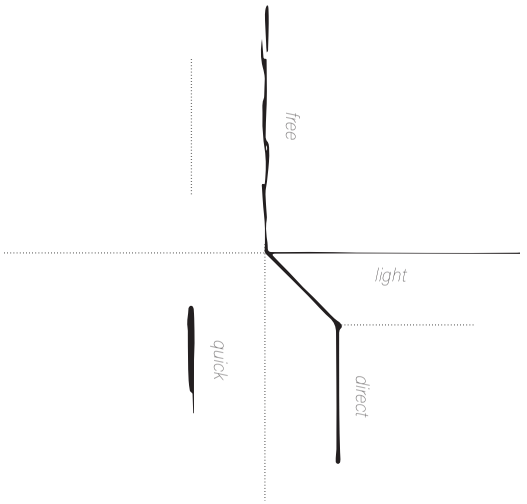
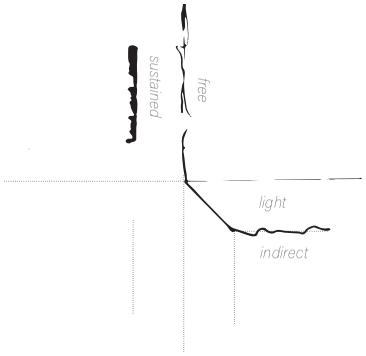


Figure 4-17 The space feels tight, unsettled and unbalanced - a DABBING feeling

(Author's own illustrations)



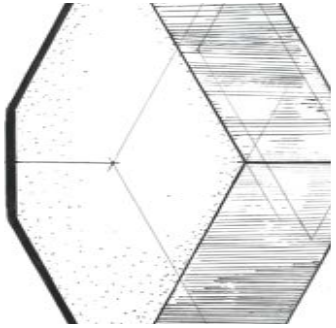
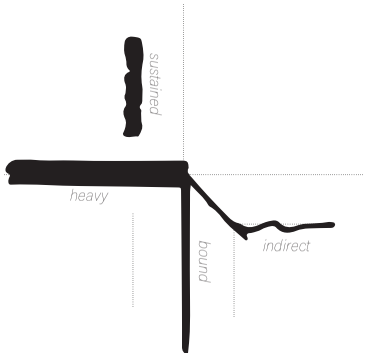
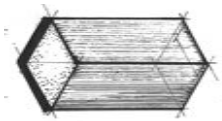


Figure 4-18 A larger room resulting in a FLOATING space





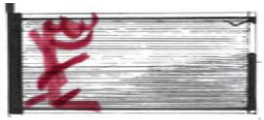


Figure 4-19 A smaller room resulting in a WRINGING space

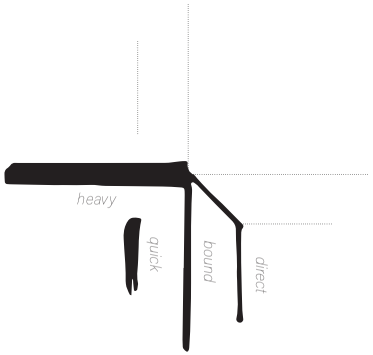


Figure 4-20 A tilted room resulting in a THRUSTING space

(Author's own illustrations)

Further alterations

The same method, see previous section, was used for a number of alterations; changing an element of the architecture - determining what would happen to the sequence of dance taking place in the room - and finally identifying the qualities of the altered space in terms of Laban's eight efforts. A quite large set of changes was made - ranging from geometric ones - such as a change in size or angles, to changing the characteristics of the floor, the walls and finally by adding things into the space - such as obstacles or even wind or complete darkness. Inspiration as to what changes would be made was, among others, taken from the stage designs presented by Sasha Waltz and Pina Bausch, page 24 and page 27 respectively. The images in Figure 4-21, Figure 4-27 and Figure 4-31 were used to imagine the atmosphere of the spaces. Hand drawings were used to really be able to imagine the materiality, trying to draw them while thinking about their textures and how the light and shadow falls. Finally, projecting the movements of the dancer in the original scene onto these new situations led to an understanding of the qualities of the altered spaces.

GEOMETRIC The changes made in Figure 4-18 to Figure 4-20 were purely geometric - making the room smaller or bigger, or tilting the whole room. While this does not yield dynamic architecture, some of them have the ability to affect the dancer in such a way that the dynamics of the space is increased - a tilted room for example quests the user into attempting to reach the top - thus continuously moving. All with its own effect on the characteristics of the space.

WALLS In Figure 4-22 and Figure 4-23 further alterations to the walls are presented - elastic walls and wet walls. Enhancing the exploratory sense of the space with the increase in action - both sets of element are dynamic - yielding flexible qualities as one would want to move around, touching and interacting with the architecture. Where the elastic walls yields a strong, heavy sense, with quick movements, the wet walls results in a lighter, freer and more sustained atmosphere.

FLOORS The changes presented on page 68 are those of wet, translucent or reflective floor properties. Again, resulting in quite flexible and exploratory qualities. All with a light and free sense, but in a combination of quick and sustained.

OBSTACLES On page 70, the addition of obstacles or such to the empty interior of the room can be found. These were additions of elastic strings or wind, and even complete darkness. All yielding heavy and bound qualities, making one feel even more trapped than in the original scene.

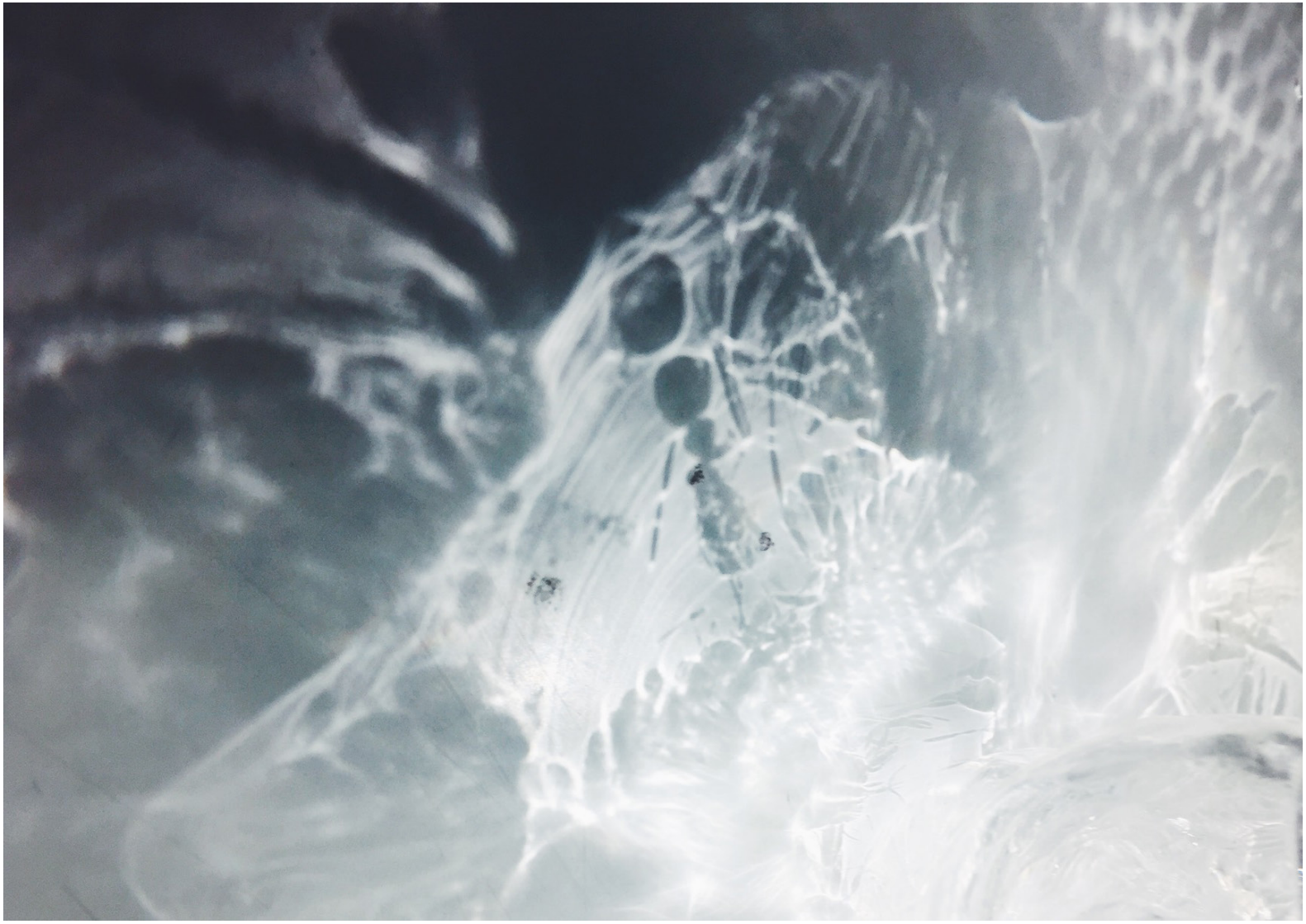


Figure 4-21. Hinting at the possible atmosphere of a space with wet walls or floor. How the light is able to shine through and reflective, yielding ambiguous and unpredictable effects - contrasts even - that results in a free, content and floating feeling. (Author's own image)

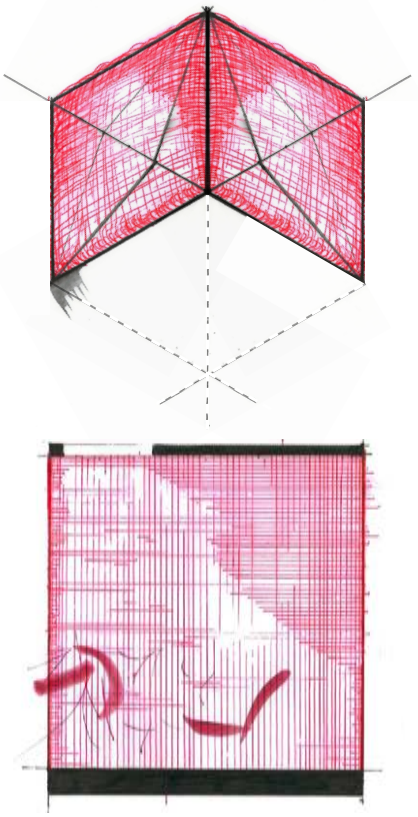


Figure 4-22 *Elastic walls resulting in a SLASHING space*

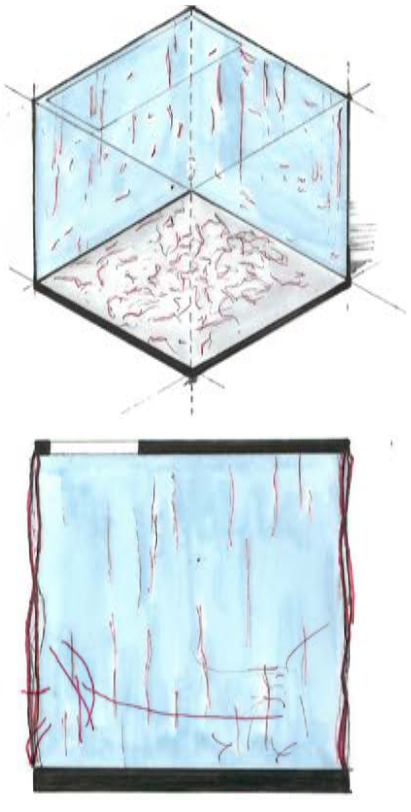
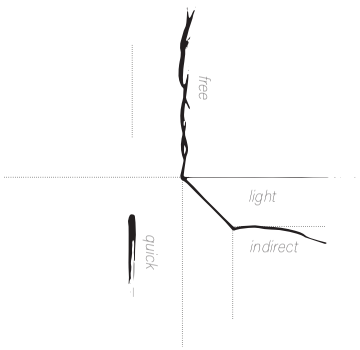
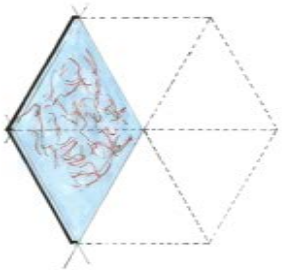


Figure 4-23 *Wet walls resulting in a FLOATING space*

(Author's own illustrations)





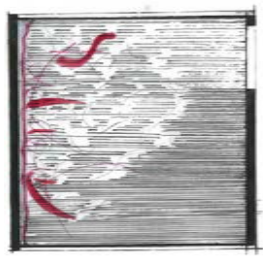
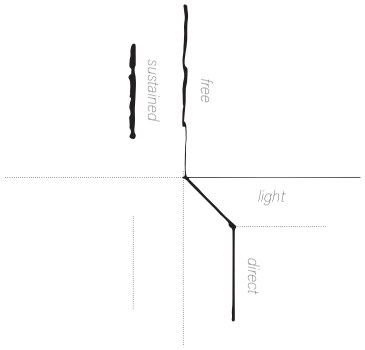
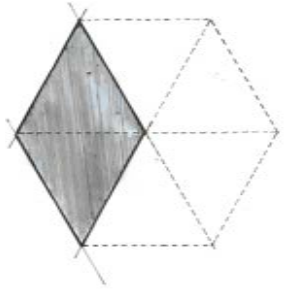


Figure 4-24 Wet floor resulting in a FLICKING space





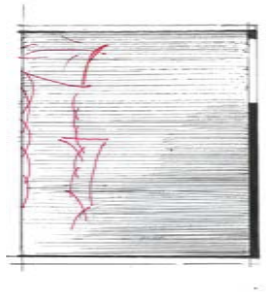
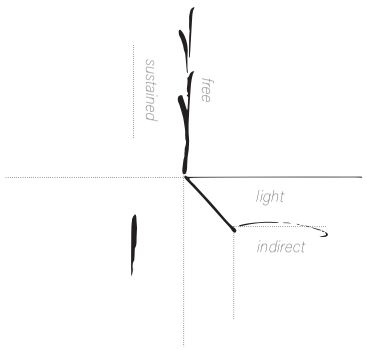


Figure 4-25 Translucent floor resulting in a GLIDING space



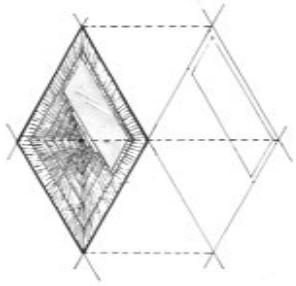


Figure 4-26 Reflective floor resulting in a FLICKING space

(Author's own illustrations)

Figure 4-27 Rooms with translucent, reflective , wet or loose materials might have atmospheres similar to the ones seen in these images - ambiguous, unpredictable, quick, light, flexible and free. (Author's own images)

Figure 4-28 A dark room resulting in a WRINGING space

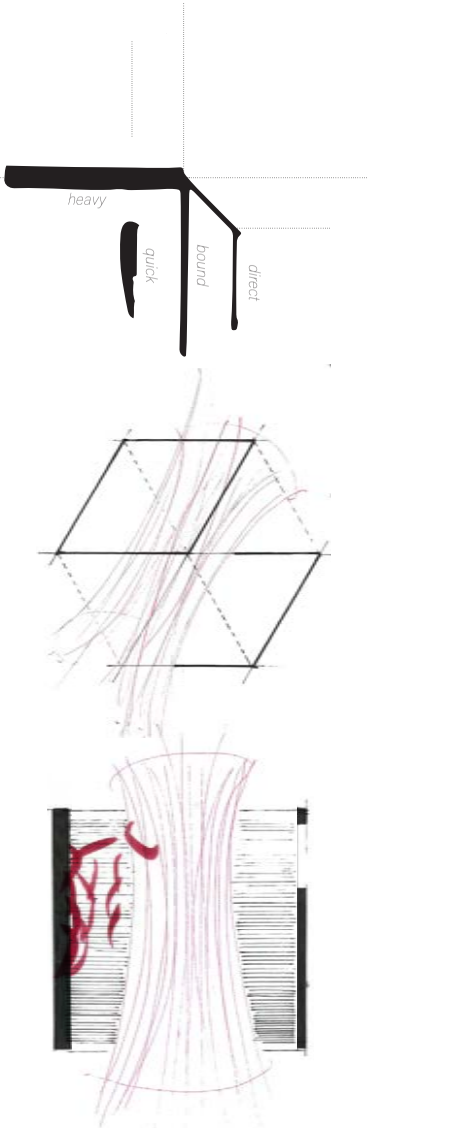


Figure 4-29 Addition of wind resulting in a THRUSTING space

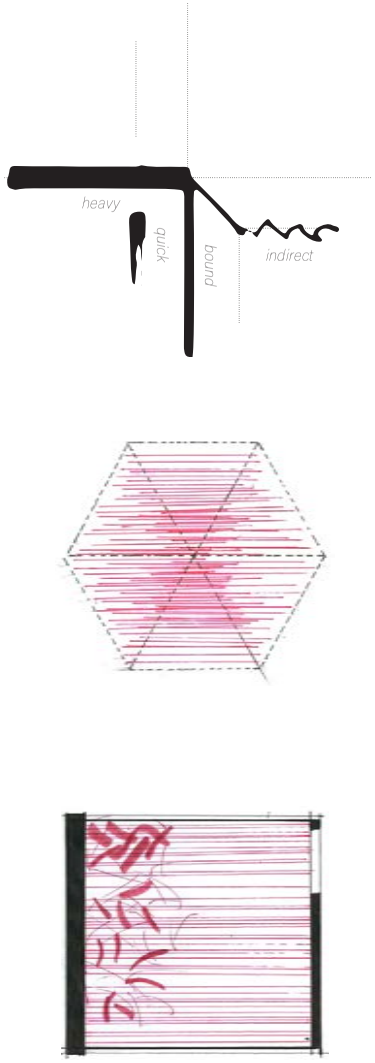


Figure 4-30 Addition of elastic obstacles resulting in a SLASHING space

(Author's own illustrations)

Figure 4-31 The use of textile in architecture have the ability to yield dynamic effects in space - providing elements able to take on the role as a 'partner', or choreographer even, to the movements carried out by the user. Ambiguous, unpredictable, contrasts, quick, light, sustained, flexible, free are just some of the qualities commonly supplied by this. Photograph: Linda Wallander (Wallander & Borgny, 2018)

Reflection

Chapter 4, Interpreting Space

Changes in elements changes the characteristics of the dance, but also the characteristics of the movements - which can also affect the characteristics of the space - it is a situation where:

1. The architecture forms the space and sets the characteristics when there are no users present
2. The user is affects by the characteristics set by the architecture and has the ability to change or enhance the characteristics set by the architecture

A space has always got some characteristics and, although with varying strength and clarity, is always able to be defined with the eight efforts of Laban. This is true even for spaces comprised solely from static architectural elements. However, from the explorations made the conclusion is drawn that those kinds of spaces are in need of the movements of a user to come alive, whereas spaces with dynamic architectural elements have a distinct tone and atmosphere of their own.

The addition of translucent and reflective surfaces, wet even, yield lighter, freer, more flexible spaces - with a more exploratory overall sense. Obstacles weights down the space and restricts the movements of the user, yet also increases the spatial awareness and exploratory perception. There are possibilities to achieve all of Laban's eight efforts with alterations to the elements of architecture, however with the quality of flexibility seeming to be far more achievable than that of directness.

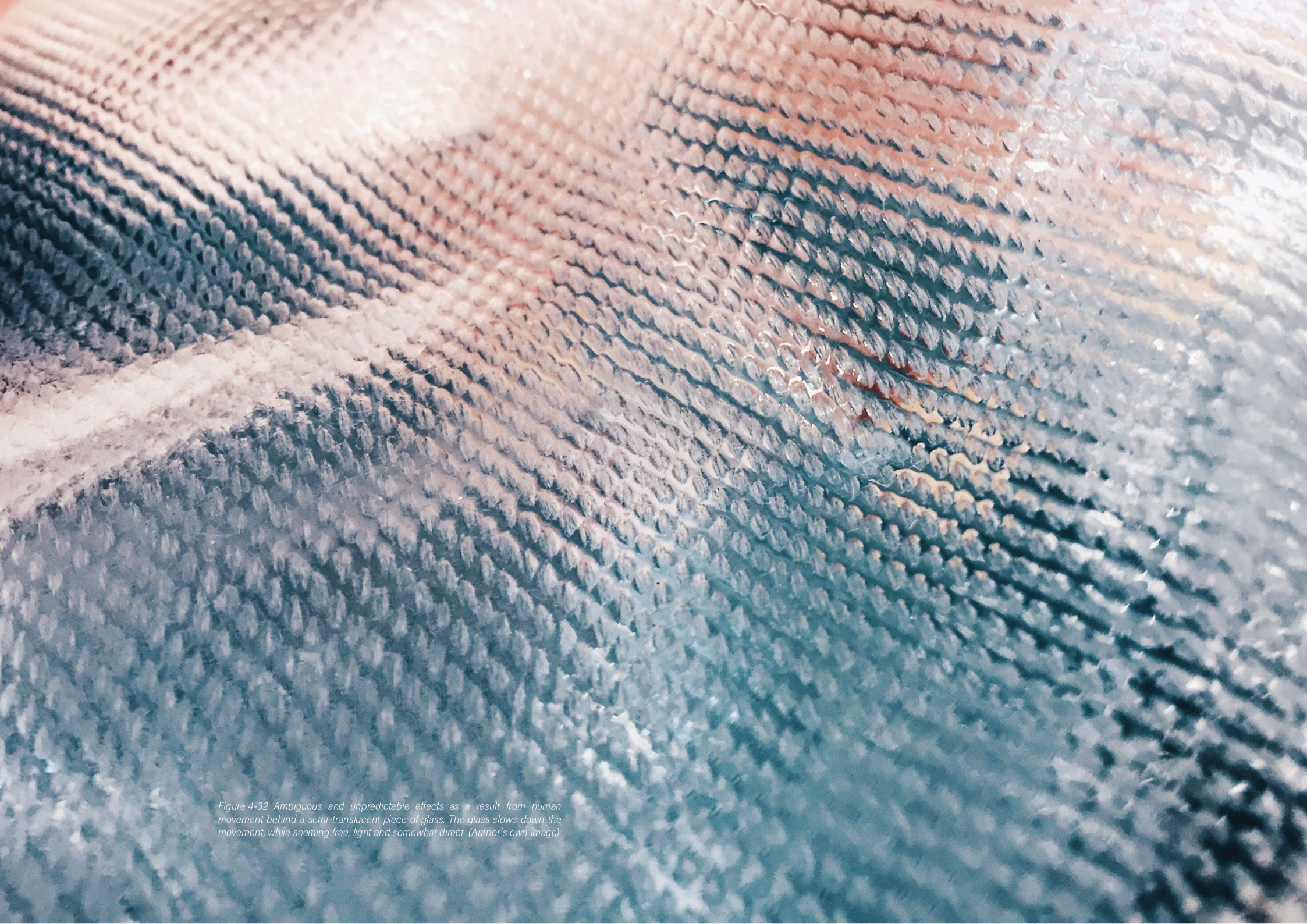


Figure 4-32 Ambiguous and unpredictable effects as a result from human movement behind a semi-translucent piece of glass. The glass slows down the movement, while seeming free, light and somewhat direct. (Author's own image).

Figure 5-1 Combining light with reflective and translucent surfaces to increase ambiguity and unpredictability, yielding strong, quick and flexible qualities. (Author's own image)

5. Elements and Actions

How to obtain a dynamic spatiality with a distinct effect on human cognition

The previous three steps have been about gaining knowledge of the relationship between architecture - space - and user. Identifying characteristics of movement in general, how the steps in dance is affected by the attributes of the architecture and the space, and how the atmosphere of space is affected by the elements of architecture and the essence of the movements taking place in the space. What is missing is the how - how to obtain this dynamic spatiality that has been considered to affect the movements of humans.

What ingredients are needed to obtain architecture that is not dead - with a distinct dynamic effect in space - what elements under the influence of what action?

This phase was carried out in two substeps:

1. First by identifying scenes and situations in the city that captures interest - identifying why and what the necessary ingredients were for that particular situation to occur.

2. Secondly, by recreating these affects - taking the identified ingredients and combining them in various manners - to obtain spaces with other distinct qualities.

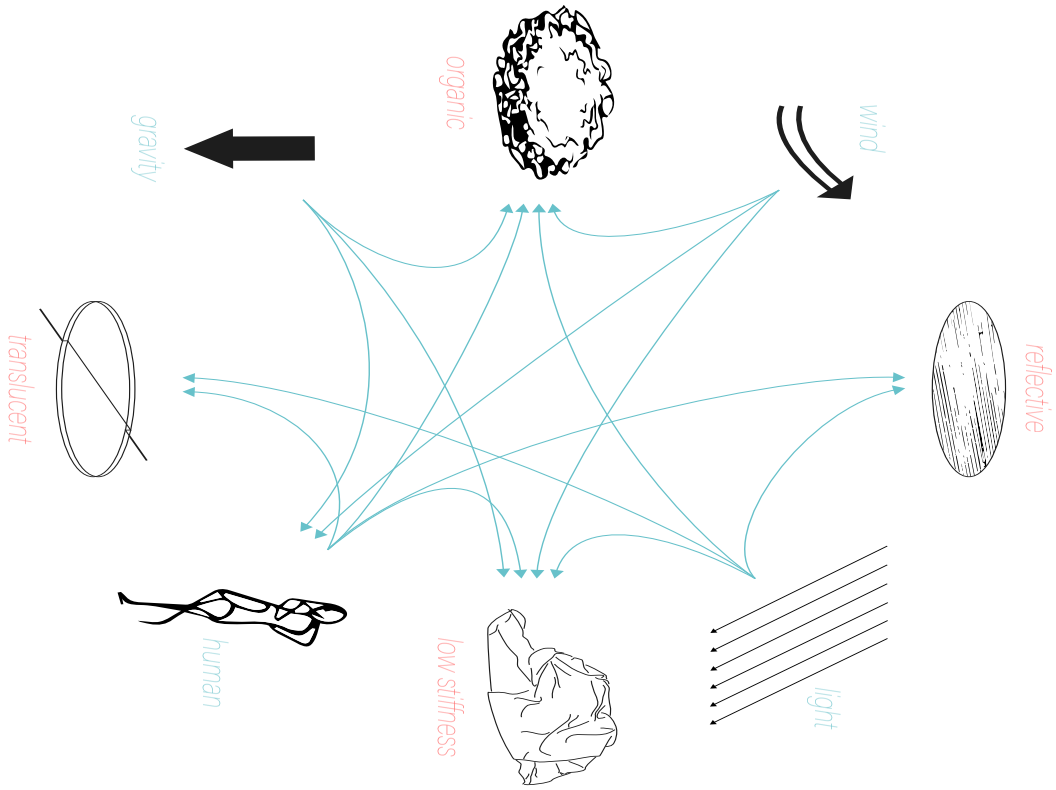


Figure 5-2 Identified actions (blue) and properties for the elements (red) needed to create distinct dynamic spatiality. Note that humans are identified as both an action and a property. (Author's own illustration)

5.1 Identifying actions and element properties

Concept - substep one

In the first substep - ingredients needed for distinct dynamic effect in space were identified. These were found in everyday situations, such as the ones presented on page 78 to page 81. These ingredients were divided into two categories:

1. The actions - which is what causes something to move. Four actions were identified:
   - The influence from humans
   - Gravity
   - Wind
   - Light

2. The properties of the elements - which is basically the properties of the physical objects that were involved in the creation of the dynamic effect. Five properties that were important for the elements were found:
   - That they were unstable, or had low stiffness - like textile, plastic and water
   - That they were alive - like humans who's movement can be influenced by these actions
   - Organic - like trees and plants
   - Reflective
   - Translucent - like glass and water

Ingredients

The following actions were identified:

HUMANS have the ability to use the power of the muscles and the mind to move both the own body as well as things in its surroundings. Pushing and pulling with varying strengths, forms directions and weights. Able to work in ambiguous, uncontrollable, contrasting and isolating manners.

GRAVITY works with constant strength and direction. However, combined with humans and angled surfaces - such as in the case in the top left picture of Figure 5-3 - it has the ability to yield rather striking effects. Possibly the most predictable of the four actions, yet still rather striking.

WIND has the ability to yield more or less controlled movements, with varying speeds and strengths, but often in a rather flexible manner. Highly unpredictable to the observer, with possibilities for ambiguous, contrasting and isolating effects.

LIGHT often result in effects that are rather quick, light, free and flexible - but with possibilities for variations of all four. Similar to wind, light usually yields ambiguous, uncontrollable, contrasting and isolating movements.

Combined with the element properties described below distinct dynamic effects may be obtained:

ALIVE Living creatures such as humans and animals who's movements can not only be affected by direct forces, but who's movements have the ability to be affected mentally as well

ORGANIC There is something in the recognition of the patterns of nature that speaks to our senses. The effects in the first picture in the second row in Figure 5-3 captures the attention with its ambiguous and unpredictable movements.

UNSTABLE Elements made out of an unstable material, perhaps one of low stiffness, are often present in the creations of dynamic effects - rather obvious in the way they are able to be affected by the action from forces, possibly not being able to withstand even the lightest touch from the movement of the air

REFLECTIVE Working possible mostly with light, and the influence of humans, to create ambiguous and unpredictable movements.

TRANSLUCENT Similarly to the property of reflection, translucent materials are most often affected by light and interference from humans

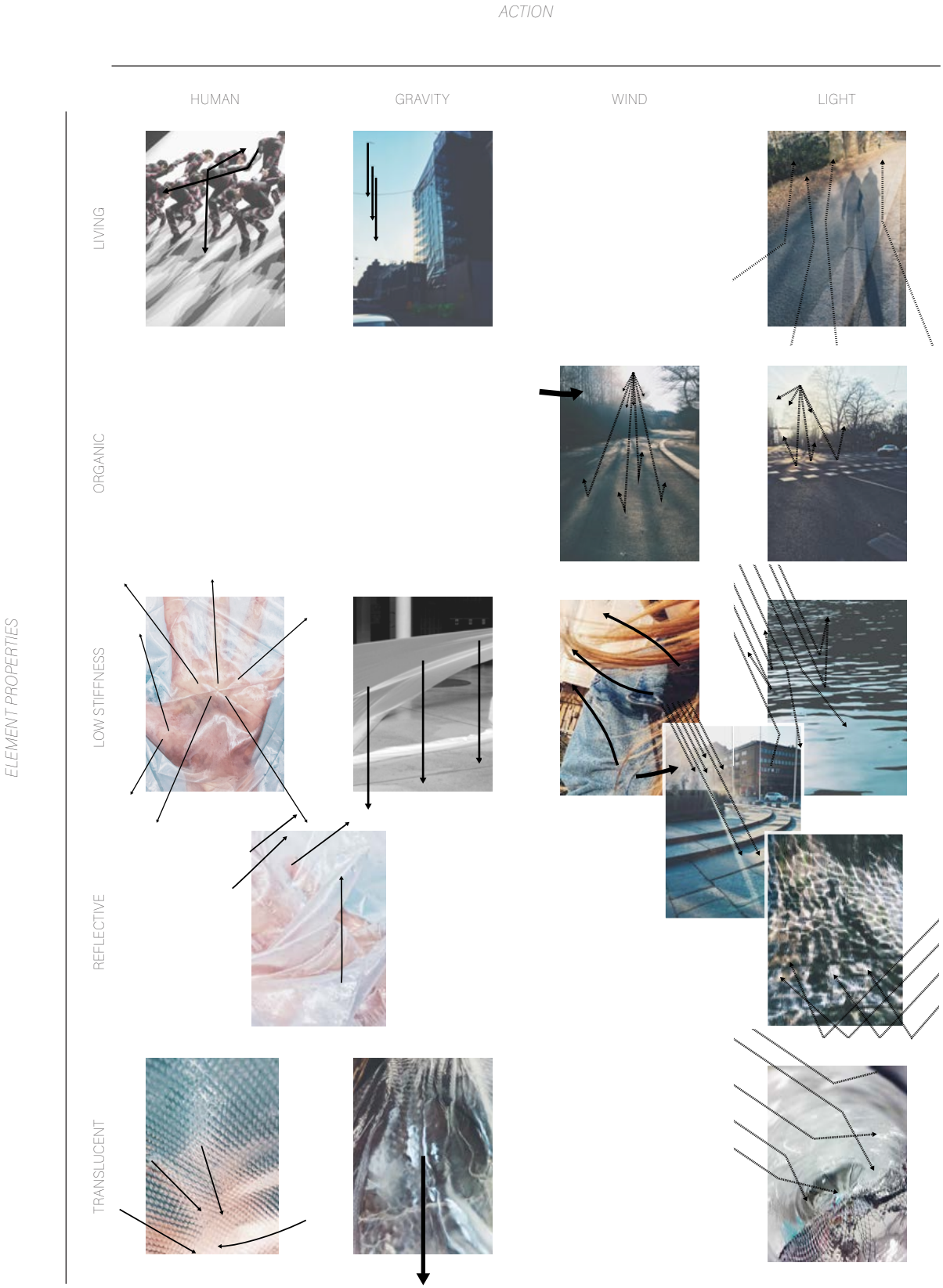


Figure 5-3 Examples of situations with a distinct dynamic spatiality, identifying the ingredient necessary to obtain this effect through determining what element properties that were needed, under the influence of what actions. (Author's own images and illustrations)

In Figure 5-4 a scenario were the sun rays were reflected in the windows across the street can be seen - resulting in a beautiful and somewhat ambiguous effect on the facade. The action in this case being that of LIGHT and the element property mainly being that of REFLECTIVE.

In Figure 5-5 two scenarios with element properties of low stiffness are presented. The left also being reflective, as water commonly is, under the influence of light and wind resulting in uncontrollable, quick and flexible effects. The right, a sheet of plastic, being affected by wind to result in wavelike motions along the facade.

Figure 5-6 displays an example where light shines through the trees while the wind is affecting the positions of the trees and thus also the position of the shadows on the ground - resulting in movements that are both unpredictable and ambiguous.

Figure 5-4 The element property reflective being affected by the action light, resulting in the ambiguous light play on the facade. (Author's own image and illustration)

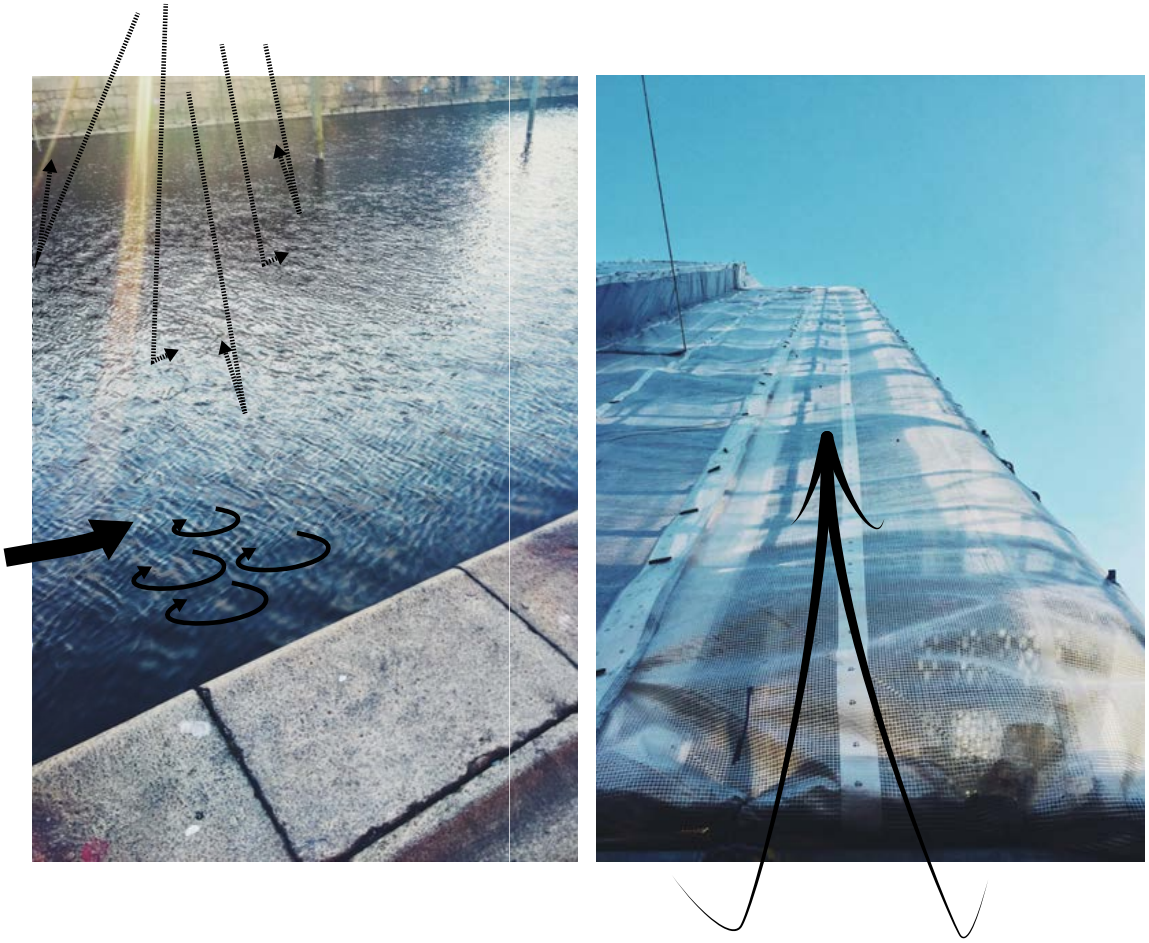


Figure 5-5 The actions light and wind affecting the surface of the water, being reflective and unstable , to yield rippling movements (left). The action wind affecting the unstable element of plastic to yield wavelike movements.(Author's own images and illustrations)

Figure 5-6 The action light shines through the trees while the action wind affects the position of the trees, thus also the position of the shadows on the ground. The properties of the elements, the trees, being those of organic and unstable. (Author's own image and illustration).

5.2 Recreation

Concept - substep two

The second substep was an attempt to recreate the dynamic effects of the previous subchapter. Taking elements with the mentioned properties and putting them under the influence of the identified actions. As an example, in Figure 5-7, the action wind causes the element water, with the properties of being unstable and reflective, to ripple while light shines through - yielding a quiet uncontrollable motion that is quick, flexible, light and free - a flicking motion, see Figure 5-9. This results in the ambiguous light plays seen in Figure 5-8.

The influence of wind, Figure 5-10, can result in a more or less controlled movement to a material of low stiffness, with possibilities of varying speed and weight, but often with a rather flexible motion.

Light has the ability to give an almost vibrating motion if combined with an unstable and translucent material that breaks the lights path - as in the above mentioned example the effect is often rather quick, light, free and flexible but with possibilities for variations of all four.

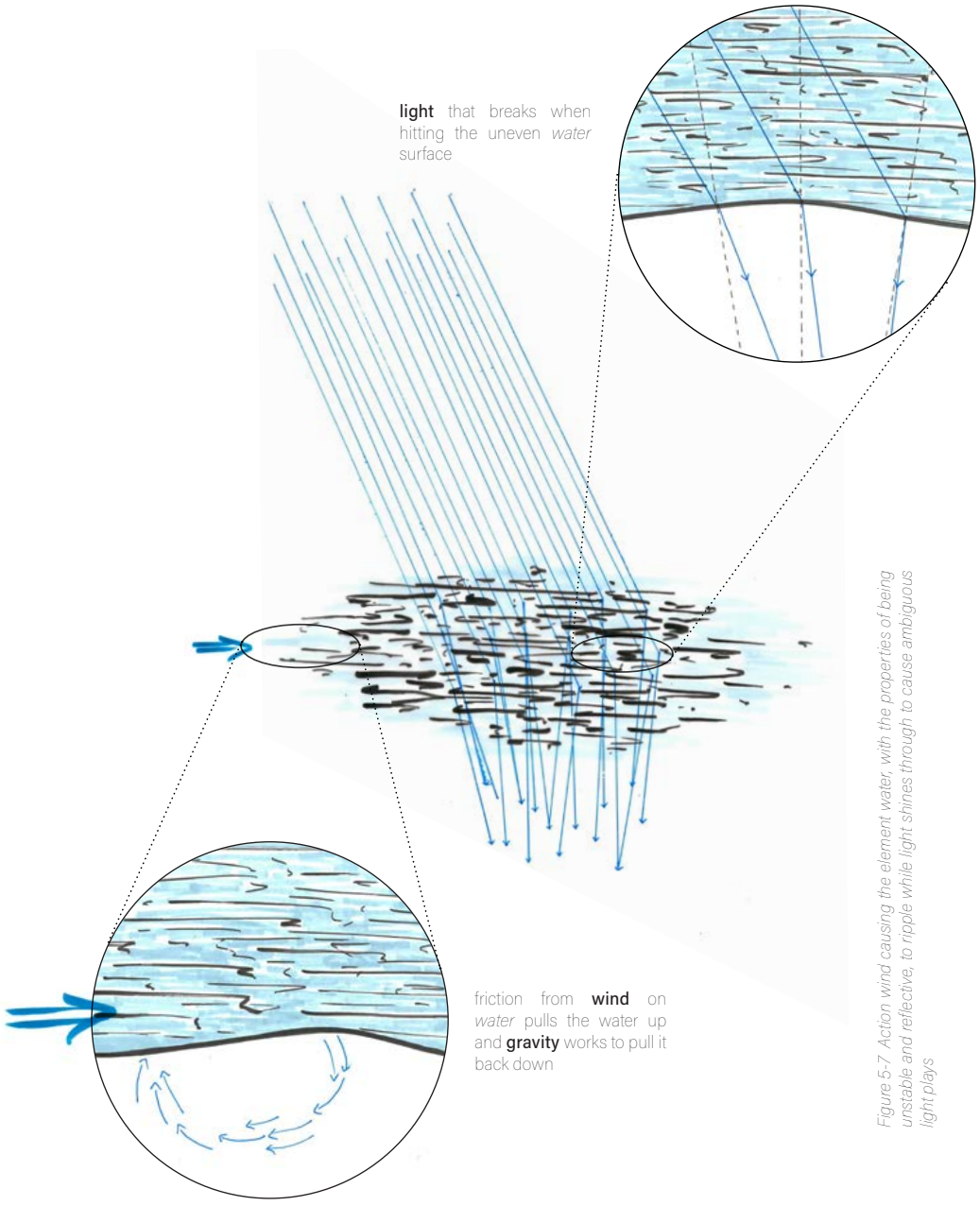


Figure 5-7 Action wind causing the element water, with the properties of being unstable and reflective, to ripple while light shines through to cause ambiguous light plays

Figure 5-8 The light shining through the rippling water surface results in this ambiguous and unpredictable light plays. (Author's own image)

Figure 5-9 The ambiguous light plays to the right results in a space that feels light, free, quick and flexible - a FLICKING atmosphere (author's own illustration)

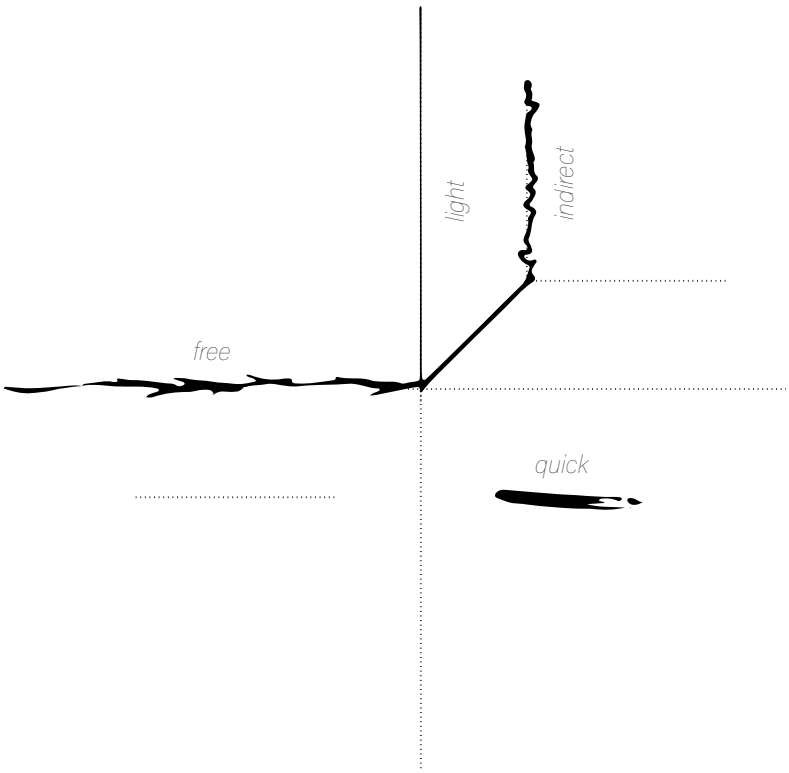


Figure 5-10: The action wind causing the element textile with the properties of low stiffness to a wavelike motion (author's own image)

Figure 5-11 The space to the right is light, free, quick and direct - a DABBING atmosphere

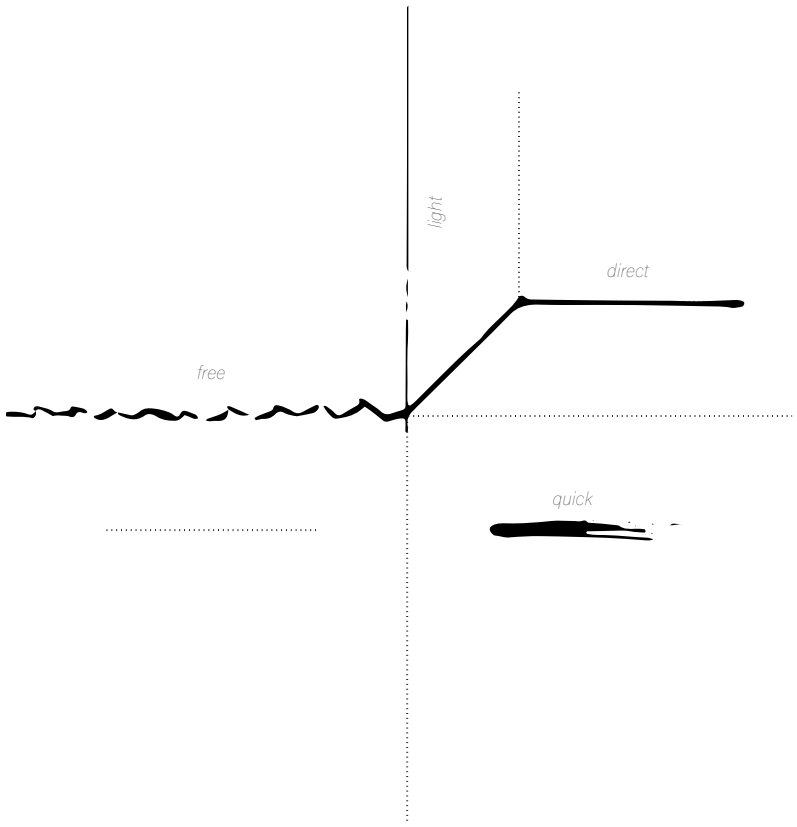


Figure 5-12 From left to right: a pressing atmosphere from wind and textile; a gliding tone from translucency and human interaction; a floating essence from light and translucent materials; flicking qualities from light, wind and water. (Author's own images)

Figure 5-13 A dabbing atmosphere from light and layers of translucent textile; a wringing tone from wind and textile; gliding qualities from wind and plastic; a slashing essence from light, reflection and translucency. (Author's own images)

Reflection

Chapter 5, Elements and Actions

The utilisation of the actions of nature in combination with responsive architectural elements yields spaces that are able to affect our emotional state distinctively - spaces that do not rely on people to come alive. Light seemed to be one of the more effective actions, along with the interaction from humans - although not as closely studied in this past chapter.

Some likely additional actions and element properties that could be studied, for example:

- Fire
- Moire
- Geometric properties - angles and sizes
- The internal structure and forces acting internally in different materials - yields different behaviours when under the influence of external actions

Figure 5-14 Ambiguous effect of human movement behind semi-translucent surface. (Author's own image)

6. Discussion

Choreographing space

The area of investigation for this thesis was at the very start of the preparatory study Static Motion chosen due an interest in textile as a light and flexible building material, and did throughout its course spark an interest for dynamic and responsive architecture. With the knowledge gained during the preparatory study, as well as during a previous thesis in structural engineering on a similar topic, a sufficient amount of knowledge was gained in order to carry out this master thesis successfully. This addition of structural engineering studied alongside the architectural degree, meant the focus on how architecture responds to the forces applied to it from humans, the air and the wind has been of out most relevance.

By amplifying the forces in our surroundings, attention can be directed towards the hidden beauty that already exists around us - resulting in architecture that enhance our perception of space - architecture that makes people move inspired by the dynamic spatiality around them. Why do we dance? - to express emotions that cannot be put into words. What if architecture inspired us to move and thus express feelings we had failed to communicate, or did not even know we had?

Figure 6-1 Dancer from Dialogue 09 (Waltz, 2009)

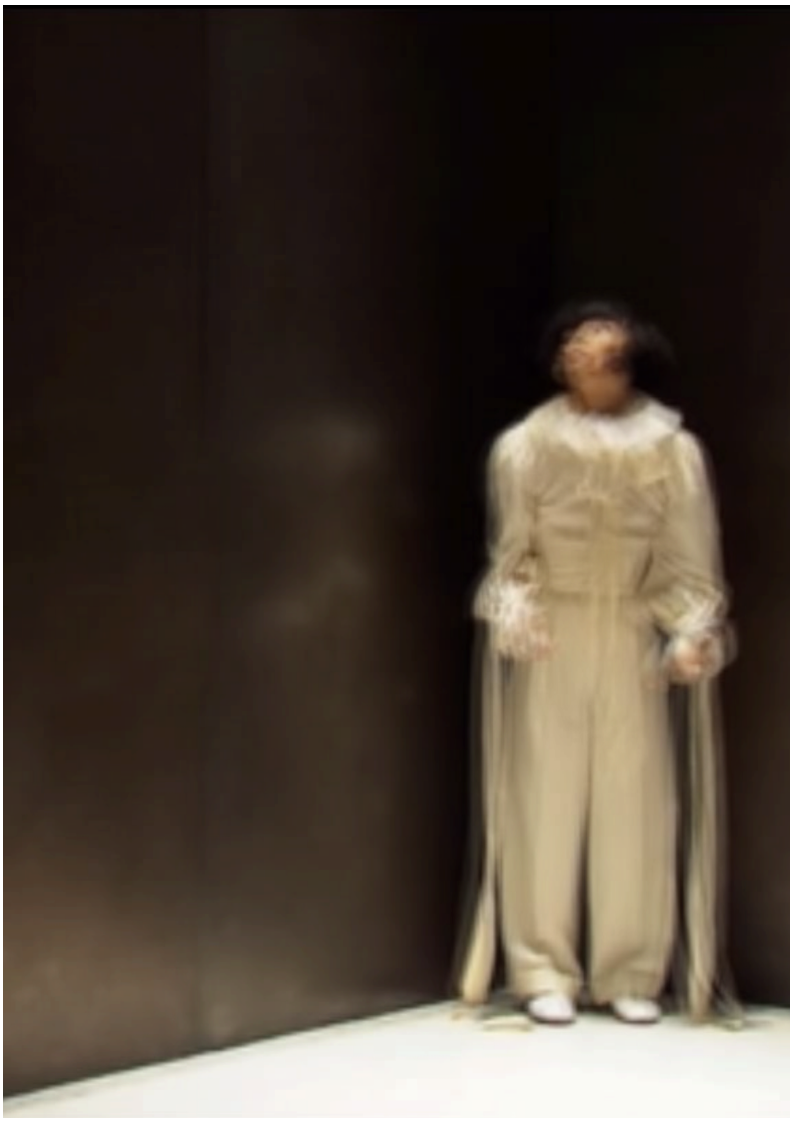


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Figure 2-4: Kenton, T. (2013). *Free rain: Pina Bausch's Vollmond at Sadler's Wells - in pictures* [Online image]. Retrieved from https://www.theguardian.com/stage/gallery/2013/feb/26/pina-bausch-vollmond-pictures

Figure 2-11: Sasha Waltz & Guest (SW&G). (2018) *Press & Downloads.* [Online images] Retrieved from https://www.sashawaltz.de/en/press-downloads/#

Figure 2-12: Pina Bausch. (2006) *Vollmond.* [Online Image] Retrieved from https://www.design-is-fine.org/post/74532093319/pina-bausch-vollmond-full-moon-premiered-2006

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