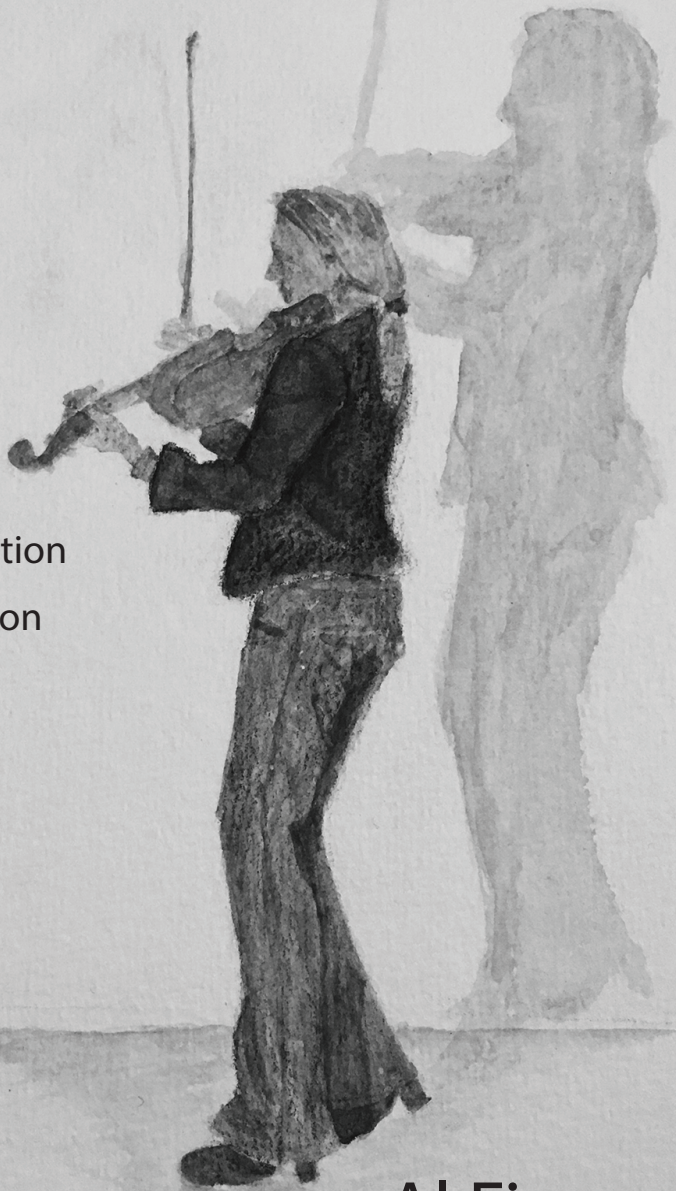


Da Capo

Standardisation
Diversification
Translation



Al Fine

Da Capo

Standardisation

Diversification

Translation

Bachelor Thesis
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Cover: water-color painting by my daughter Cecelia Palumbo, 2019
of a photograph by Sylvia van den Oudewater made during a presentation at the
Rietveld Academie in 2017

INTRODUCTION

When exactly does repetition lead to standardisation and when does it lead to diversification?

Repetition can be a means of improvement, thus benefitting the initial idea. Repetition can, over longer periods of time, also transform into a habit or into a tradition; a repeating element of connection between people and places. It can be used to force concentration and exclude non-essential inputs, as in a mantra. Sometimes repetition is used as a technique to free-up the mind, which might lead to new ideas through total understanding of a process.

For this thesis I research the role of repetition and the appreciation of the space in between repetitions. I search for overlapping factors within the field of music practice, textile production and education.

For examples with a historical context, and where crafts and repetition are an integral part within a social setting, I focus on the invention of the first knitting machine by William Lee in 1589.

Most chapters are intertwined and I hope, by surveying a variety of examples and disciplines, to discover new insights on repetition between the fields that are touched:

The knitting machine of William Lee, the statements of Queen Elisabeth I, the citations of Hume, Deleuze, Sennett and Chomsky, the initiatives: The London Cloth Company and the Textile Research Center and my own experiences as a musician and textile student.

The title of this thesis is a musical reference: to start over again from the top (da capo) and proceed to the ending (al fine).

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HISTORY

Repetition

Understanding a movement.

William Lee

William Lee, who, after more than 10 years of research, in 1589 invented the first knitting machine, grew up in Calverton, England, a village in an area famous for its wool production. At that time, wool processing and garment production was organised in guilds. Knitting guilds were further extended by a system of affiliated knitting schools, which offered the poor, the sick and children a source of income. The knitting guilds carefully checked whether these schools met required standards, and controlled that correct materials and models were applied. There was little room for innovation. Surprisingly, this particularly conformist setting became a source of inspiration for Lee, allowing him to make a keen analysis of all the parameters of the manual knitting process. This would lead to his mechanical simulation of the hand-knitting techniques he observed.

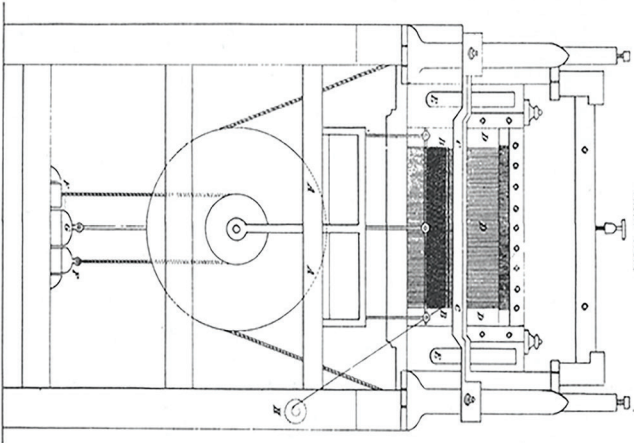
First of all, we have the visible factor dealing with knitting: needles, yarn and patterns and the interaction between these three elements.

The second factor, less visible but of equal importance for the success of repeating the knitting stitches on a knitting machine, is the human extension. What exactly do I do with my arms and fingers?

FRONT VIEW.

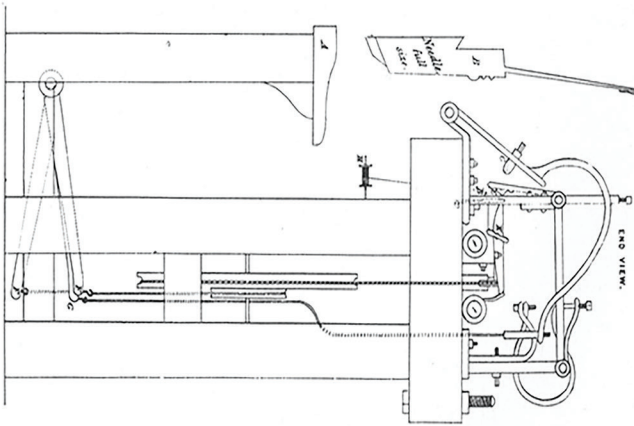
STOCKING FRAME.

END VIEW.



- A. Workman's Seat.
- B. Needles or hooks.
- C. Presser.

- D. Sinker.
- E. Frame handles.
- F. Treadles for drawing locks.



- G. Treadle to force down the Presser.
- H. Rabbit supplying yarn.
- I. Locks from the cords of which sides D are suspended.

W. Wilson, 1844.

This can vary from knitter to knitter, but it is certain that all hand knitters become routinized through the constant repetition of the same movement, and that, between repetition of the knitting stitches, knitters analyse and apply improvements iteratively starting from the very first stitch. The concept of a knitting machine, the transfer of what happens with two arms, two hands, two knitting needles and 1 thread, to a device that produces the same knit with multiple needles, bears witness to a very inventive mind.

While studying the process undergone by Lee in his quest for perfect mechanical replication, for making the details work, through trial and error, the constant loop of repetition and analysis, I also reflect on my own work. What role does such a quest for perfection play in music practice?

The Frame-work Knitting Machine

Drawing of the first knitting machine: the amount of hooked needles (b) corresponds with the amount of stitches on the knit. A thread (h) is laid in front of the needles. By using one pedal (f) sinkers (d) between the needles make sure the tread is pushed down. The thread is pushed into the hooks by the presser (c) using the middle pedal (g). Release of the sinkers by pushing the other pedal (f). By pushing the frame handles (e) forward, the thread slides through the loops, and by setting the frame handles back again, a row of stitches is made.i

PLAYING AND KNITTING

Viola I

I have just finished reading a fascinating book by Milton and Anna Grass about the life of William Lee. This book describes the social setting in which Lee operated and tells about his personal life, for as much that it is known.

In the period that I was reading the book I was asked to participate in a recording session, as the violist with a string quartet. Below a snippet from the rehearsal: "Let's play this passage again, taking the intonation a bit lower, especially with the F-sharp," the sound engineer is telling me through the speakers. With the headset on one ear, I put the second violin on my console a little louder and we play the same passage again. I estimate the placement of my second finger, the F-sharp, half a millimetre lower on the fingerboard of my viola.

All four of us in our quartet use a click-track, a metronome on the headset, but we are especially keen on keeping an eye of each other's fingers to play rhythmically together.

I realise that there are a lot of similarities between playing and knitting; the same efficient analysis and application of the ideas for improvement. Whereas with playing there also is the auditory factor. The knit is the performed or recorded music so to speak. With my viola I seem to manoeuvre between knitting needles and a knitting machine; however, the instrument, my viola, is a lot more complex than two knitting needles, but still the majority of the movements are manually done, just as is the case with hand knitting.

Practical implementation and conceptual thinking are complementary to each other, both in knitting and in music. Understanding a movement in music starts with step by step seeing and feeling the movement, the direction, the tension, the size of the movement, the pressure applied by the fingers and the use of gravity and speed. Understanding all these aspects is only possible by endlessly repeating the movement and each time focusing on a different detail. Zooming in. Then, and in between, merge elements and zoom out again to the result, thereby approaching the process from a different perspective and repeating it again. Repetition in this situation is made to establish parameters and standardise the output in regards to intonation, rhythm, tempo, dynamics and musical phrasing.

As much as this might seem like a solitary process, receiving feedback and adjusting one's goals play a major role as well. The learning path for a musician is not only based on one-on-one tutoring or solitary practice sessions, but also on group rehearsals and regular performances in front of an audience. Learning combines mental and physical efforts, listening, reading, reflecting and repeating.

Can we say that these repetitive processes are based on traditions? And at what point do we give them that distinction?





TRADITION

The Queen

Traditions are repetitions embedded in society. These repetitions appear to be extremely important, to such an extent that stepping away from them will disrupt life dramatically for the people within that society.

William Lee, an inventor focused on making his knitting machine a success, perhaps did not fully realise how large the socio-economic impact of his machine would be on the knitting industry in England. Queen Elisabeth I at that time, however, did:

'My Lord. I have too much love for my poor peoples, who obtain their bread by the employment of knitting to give my money to forward an invention which will tend to their ruin, by depriving them of employment and thus make them beggars.' ⁱⁱⁱ

Citation of Queen Elisabeth I, after William Lee in 1589 showed his knitting machine to her and asked her for a patent on it. With this plea, the knitting machine of William Lee is an early attempt at speeding up a textile production process with the use of a mechanical device. Its use would have replaced multiple individual manual actions of different knitters, their different hands and minds, by a machine that was, through a flow of repetitive movements by identical needles, quicker, more uniform in the output and probably more reliable.

There was a practical and financial reason for Lee to ask the Queen for a patent on his machine. By granting Lee a patent, the Queen would de facto have approved the invention and this would have opened doors to production.

The knitting machine would have had the opportunity to gain access to one of the existing guilds (weaving or knitting) or to form its own guild, which then again would have enabled the renting of a workspace or shop and the selling of goods. However, Queen Elisabeth I denied the patent and therefore the British market was, at least for that time, deprived of Lee's invention and of machine knit products.

The application for a patent posed moral questions to Queen Elisabeth I regarding the value of efficient repetitions versus originality in the knit-work, quantity versus human quality of living. To her, there was also a concern regarding independence and control; if the knitting machine were to be a success, the knit production would be soaring and it would be more difficult to control the production process. With the existing traditions regarding the making and selling, things were tightly managed within the existing guilds.

The interesting matter here is that Lee, by repeating and deeply internalising the hand knitting process, came up with a new invention, his knitting machine. In terms of production techniques, it represented an alternative method, or diversification. The machine itself, a product of meticulous study, was a new thing that changed the process of knitting while at the same time standardising the outcome. The Queen and her advisers wanted to maintain the manner of knitting production that was already standardised by the guilds, preserving therefor the diversification in the output. So while William Lee was innovative, the knitting machine actually caused a more monotonous output. Here innovation caused standardisation (the knitting machine) while standardisation (in the form of tradition) caused the conservation of diversity (hand-knitted items).

Just as Queen Elisabeth I protected the traditional way of knitting, the classical music world is similarly hesitant to embrace innovation; where some instruments have gone through an evolution, from harpsichord to grand piano, for example, other instruments have virtually stayed the same over the past 350 years. On my viola, built in 1745, the only adaptation so far was a slight lift of the fingerboard and different quality strings. Contemporary violinmakers still consider the old Italian instruments exemplary and these makers are repeating the building codes of the old masters. I feel that repetition here contains a mix of fascinated mysticism of an alchemist kind, paired together with the practical notion that the old ways of building string instruments actually have technically been proven to produce the best sound.

There are contemporary examples of a choice made between live-music versus recorded music in theatre and ballet performances. The Musician's Union in the US for example has negotiated that on Broadway a minimum of three live players have to be added to all recorded scores, to protect the work for musicians.

Are there, in the field of textiles, contemporary examples of the preservation of traditional skills as well?

AWARENESS

The Textile Research Centre

The Textile Research Centre in Leiden reaches back to pre-industrial textile techniques, and connects in that way with the era of Lee and Queen Elisabeth I. Queen Elisabeth I's objective was to preserve the market of hand knitters, using repetition to protect standardisation. William Lee, at the same time, invented the knitting machine by close observation of hand knitting, and thus spawning innovation. The TRC again underlines the standardisation aspect of repetition. Not to protect the market, but to preserve the skills by creating awareness of manual textile production techniques that we were once, or still are, able to execute.

'The basic aim of the TRC is to give the study of textiles, clothing and accessories their proper place in the field of the humanities and social sciences. The TRC does so by providing courses and lectures, carrying out research and by the presentation of textiles and dress from all over the world. The two main focal points of the TRC are (a) dress and identity: what people wear in order to say who they are and (b) pre-industrial textile technology.' iv

I spent my internship at the Textile Research Centre in Leiden where I was primarily documenting garments and other textiles that were donated from all over the world. I learned about the production techniques and about the history and the usage of these garments and accessories. I was absolutely thrilled having all these textiles go through my hands, and loved learning about their fabrication and usage. It was there that I had the opportunity to read from their extensive library, which is where I found the aforementioned book of Milton and Anna Grass on William Lee.

In the depot of the TRC 25.000 pieces of garment and dress from all over the world are stored, ranging from ancient fragments of a Chinese tunic dating 2000 B.C., to a Yellow Vest, used last summer in the Paris demonstrations. From hundreds of different veils to hand-stitched shoes from a Himalayan farmer and a handkerchief embroidered in 1947 by women Nazi-collaborators held in a post-war detention center. The TRC makes sure that all textile techniques found in its collection are traceable. Specialists of the TRC give workshops to become skilled in these techniques and offer presentations and exhibitions on the history, usage and social settings of the garments.

I strongly feel that this awareness of manual skills, in the case of the TRC, textile techniques, is important. Manual skills are at the basis from which all machine and computer-related techniques stem. Manual textile techniques tell us about the history and social habits of societies. Besides this, working with these manual techniques can have a therapeutic effect on people's well-being.

The TRC focusses on pre-industrial textile techniques in its workshops and presentations. They are concerned with the kind of repetition that keeps existing manual textile production skills alive. They leave active innovations to other institutions.

Tweeds

Whereas most businesses in textile production constantly seek cheaper and more efficient production methods, often through outsourcing, off-shoring, disregard for the environment, and modern mechanisation, at times there are new initiatives emerging that I would consider to be counter trends. Some initiatives preserve skills, similar to what the TRC does, by revisiting. Other initiatives are also actually employing manual textile production methods. They return production to its historical location, often closer to the customer. When this return occurs, the production returns with a different status.

An article in the Financial Times about the start-up of David Harris illustrates one such case. *v*

David Harris founded the London Cloth Company in 2011. He started with one old loom that he had found. He refurbished it returned it to working order. His fascination with the mechanism of the old loom led him to acquire more antique looms. He began weaving tweeds on them, both on commission and for his own production. Harris's stated aim, according to the article, is 'to reignite the manufacturing industry in Britain and to conserve diminishing skills and crafts'.

Harris started his company out of curiosity for an old skill; weaving with a mechanical loom. His sense of ownership and aim for originality are his motors and add an innovative layer to the idea of re-ignition. I do feel connected to the fascination that Harris feels to figure out how these old looms function, and his intention to stretch their possibilities.

It is interesting that while in William Lee's time the knitting machine was seen as a mechanical device, in contrast with hand knitting, nowadays the weaving of Harris on his old looms, which are actually just as mechanical as Lee's knitting machine, is considered handwork, in contrast to the much bigger, computerised electrical looms. The definition of 'handwork' clearly depends on the time setting and the alternative techniques that are available.

Putting the effort of Harris in context with William Lee, I would say that, by totally understanding all aspect of hand knitting, Lee could develop his knitting machine which was very innovative at that time. Harris, by thorough understanding of the old loom, could go back to the old technique of weaving with a manual loom, which is, in modern context, also innovative!

History and reality are, to me, causing another interesting tension here: weaving on an old loom, in the case of Harris, is not a necessity but a choice. Locality, the fact that the shop is unique in London, brings additional value to the tweeds that the London Cloth Company produces.

The TRC and the London Cloth Company both apply repetition but in different ways:

The TRC institutionalises by collecting textiles to document the making and usage. This is reinforced by their teaching ancient techniques to future generations. They do not produce textiles themselves. David Harris is initially using repetition to perfect his weaving skills and then applying the repetition productively to create his own innovative myth, his tweeds, literally within the frame of the old loom.

Comparing this to the music scene that I am working in I see contemporary violinmakers follow the same procedure: using the old masters' methods to build their own instruments, trying to create originality, within the frame of the old school.

Production

One can distinguish three periods within textile production; the pre-industrial period when textile was exclusively manually made, the industrial era in which mechanical production replaced the manual production of goods, and the third period, which is the post-industrial era in which we, consumers and makers, find ourselves right now. This third era shows ever growing awareness of the negative effects of industrial production processes.

The moral questions regarding efficient repetitive mechanical production processes are massive. This is true of many industries, and is not less in the textile industry. Before the industrial revolution, textile was produced close to its users. Textile production provided a (modest) living, defined social structures and the products gave identity to both the makers and the users.

Now that nearly all production happens in foreign countries, far from our eyes, any connection between the maker and the user has all but disappeared. The maker is often badly underpaid and works in jurisdictions that provide few, if any, protections. He or she is complying with factory orders regardless of the quality of the products. The identity and situation of the maker is unknown to the end-user. This disconnect relieves the user from any social requirements to give respect or status to the maker. Such dynamics are often paired with a drop in quality that depreciates the value of textiles. This, in turn, is compensated for with overconsumption and overproduction.

The two previously mentioned institutions, The Textile Research Centre and the London Cloth Company, are examples of efforts to revive the interest in textile fabrication, where repetition in the shape of tradition and in the shape of innovation is taking place. In the case of the London Cloth Company, diversification, the personal touch in the textiles, is generating additional value.

But how does it exactly work, this emerging personal touch in repetitive processes; how does repetition allow diversification?

MULTIPLICITY

Hume

If I want to be able to freely use skills creatively, to think out of the box, I would want to use repetitions in a more experimental way. To become a highly skilled weaver, knitter, or musician, repetition of technical patterns is expedient to understanding the link between cause and effect. The eighteenth century Scottish philosopher David Hume, about a century after the knitting machine of William Lee had finally been accepted and was functioning in its own guild, succinctly sums it up:

'All human knowledge is solely founded in experience (...)' *vi*

In terms of building experience, repetition can be seen either as a way to establish the experience, or else as an intermediate step in inspiring new experiences. According to Hume, those new ideas emerge from impressions that are engrained in our minds through repetitions.

Hume continues:

'We must place the power of repetition within the enlargement of multiplicity.' *vii*

So, by multiplicity of instances that seem to occur independently, awareness of a pattern or repetition occurs. The more repetitions, the clearer we see a pattern, and that is where new ideas arise. In other words: by expanding the multiplication, we are able to recognise the repetitions and can (re-)act upon them.

An external example is the weather; with two dry and hot summers in a row we think this might be coincidence, whereas after eight dry and hot summers in a row we would consider this a pattern and can react accordingly.

A more personal example is when, while playing, I would notice that tones played with my first finger are consistently flat for intonation. I might question the correctness of my hand position, or consider changing something in my concept of how I am approaching placing my first finger.

Visualising Time

When I am knitting by hand, I am using two needles. The manual act of looping the thread around the needle, pulling the loop over and sliding it down, the stitch, is visually disappearing once it is completed. The time taken to knit is only recorded within the knit itself.

I realise that, from Hume's perspective, what Lee did with his knitting machine was to narrow down the imaginary space, making the imaginary space partially more concrete by adding as many needles as there are loops or stitches in the knit. In this way, the knitting machine establishes the maximum width of the knit. But there's more beauty in it: the knit itself has the ability to stretch out. So within the analog visualisation of time, one finds this hidden treasure. This hidden, subjective time, I consider the most attractive characteristic of a knitted textile.

Music

The same kind of visualisation of a repetition or narrowing down of the virtual space of a repetition, I feel, is present in the range of music practice; the more complex the mechanics of an instrument, the more visual its repetitive qualities are. In my instrument, the viola, we see four strings that are of different thickness. A logical conclusion therefore is that we are able produce four different notes or tones. All the other notes are hidden in the magic of the fingers of my left hand. Other instruments are highly developed in a mechanical way, similar to the knitting machine of William Lee or the looms of David Harris. For example a piano: fifty white keys and thirty-five black ones making eighty-five different tones! Or the pedal harp with forty-six strings of different length and therefore of different intonation. These possibilities are tangible, just as is the case with a knitting machine and a weaving loom. Using the shafts of a loom even visually reminds me of playing chords on a piano.

Both the piano and the harp are instruments of which the strings are tuned in half-tones.

The fingers are not at all concerned with defining the intonation, as they are on my viola. So, where the piano and harp have their intonation standardised, concrete and visible, the viola has an invisible, variable structure for intonation that reminds me of the hidden stretching potential of knitted textile.

All three musical instruments, piano, viola and harp, require constant repetitions of their players to get into this Hume power of recognising possibilities and obtaining new ideas.

Next to this aspect of repetition, musicians need repetition as well, to memorise and internalise and to expand on these new possibilities and ideas.*viii*



Viola II

Aware of repetition in music practice, I document the steps that it takes me to prepare a piece of music: In the practice room, while preparing a program, I first take an overview of the whole work. I isolate difficult passages, analyse them and repeat them using different strategies. With each repetition I focus on a different aspect, first intonation, then rhythm, bow use, pressure, coordination between left hand and right arm, placement of the bow on the string. I examine the musical aspects: what do I want to express in this passage, what is the mood and how do I want to use phrasing to express it? Having gone through this process, I put all the passages back in context. Usually, by then, I am able to play the passages from memory; I internalised the passages in all their detail. As a last step I visualise the actions in my mind and merge all layers into a multi-dimensional work of sound. The repetitions are not at all noticeable here anymore. The average listener has no way to hear or see how the preparation was built up.

In the end, what is the goal I want to reach with all these repetitions and ideas that emerge through multiplicity?

ORIGINALITY

Shifting parameters

When I am recording a CD, my parameters are differently geared than for a live concert situation. It is not acceptable to find errors of any sort on a CD. Recording techniques are highly advanced and only time is the limit. With technical perfection as base requirement, I should add free musicality and an original interpretation.

For a live performance situation the preparation is similar, but the parameters shift; in a concert I take more risk, prioritising interpretation to prevent the outcome from being boring or calculated. In a live performance I am communicating with the audience and reacting on circumstances like acoustics.

Comparing it with manual textile production nowadays; we do appreciate the variation in output and the fact that the maker is identifiable or at least traceable. While we expect machine-made products to be perfect, with manually produced textiles we do like to recognise the maker, even in the imperfections. There are still a lot of requirements in terms of quality but a piece's originality is what counts most. Be it a live performance or a locally-made textile, if there is a connection with the maker we will have a different appreciation for the product; it makes us clearly aware that the product is human-made. Sometimes this concept of identifiability is taken one step further, as in giving higher priority to the maker, or the idea or the concept. Repetitions then would become interpretations. Does the multiplicity of Hume lead to new ideas that in turn become new main parameters?

TRANSLATION

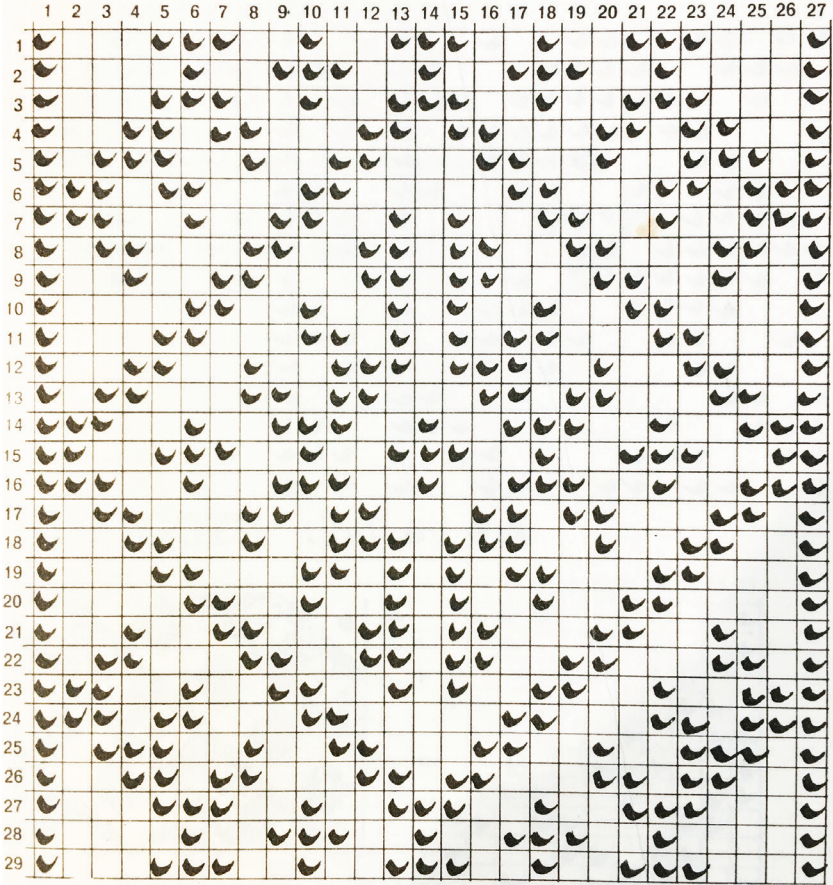
Experiment

What is the difference between a repetition and a translation? I have been thinking about it, and I realise that there is a big difference between the two concepts. In a translation I feel I am stepping away from the urge to keep similarity as a primary requirement. The connection between a first and a second repetition is concrete and inspirational, yet looser than in a strict repetition meant to improve the original plan. So, while a repetition where one is zooming in on the previous is a motivation, as an introvert internalising focus, with a translation, I would say, the aim is a stretching out of the original concept, which is more of an extrovert action.

With this in mind I executed an experiment:

I used a pattern that I found on a traditional Turkish hand-knitted sock during my internship at the Textile Research Centre. I wanted to translate this pattern multiple times, searching for what it would give me and how long it would inspire me. The pattern in itself is mirrored, both horizontally and vertically. *xiv*

PERDE curtain



(also called Kilim Stitch, Kilim Nakışı)



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First I knitted the pattern. *x* I experience the entwining of the wool to prevent holes in the knit. Starting with a bird-eye's view of the pattern, I zoom in to the repetition of the rows, then the stitches, the latching of the two threads, the tension. With each row I am unconsciously analysing and drawing conclusions on what could be done better, and what I would do differently the next time I knit this pattern, and also what I like this time around. I would choose wool that has been twined more evenly. I really do like the colour and I think the pattern would look beautiful in an actual sock.

Knitting has a rhythm, a quiet monotonous rhythm, only paused by finishing a row and reversing the work to knit the next row. As a musician I look at the pattern as if it were a score, here a change of field is emerging and the repetition is transforming into a translation. I imagine the empty boxes being rests, the filled in boxes being notes (see opposite page *xi*). But actually, this is not right since the empty boxes are not voids in the pattern, but the background colour. And the pattern involves continuous thread as well, and different stitches: knit & purl and the concepts of time and touch.

The pattern is transforming into a multi-layered sound work. For each row in knit I use the tonality of the major scales, for the purl I use the paired minor tonality. Which raises a dilemma; in textiles there is always a back and a front side. What would be the analogy in sound, what do I consider the back or front side of sound? Is indeed the minor tonality the back sided, shadow partner of the major scale? Repeatedly looking at the pattern and combining it with my experience in music practice is inspiring and leads me to new ideas, and reminds me of Hume's citations.

The multi-layered pattern interpretation you can find at YouTube.
Link: <https://youtu.be/ku9tIYtqrag>

Inspiration

I realise that, while knitting, one part of my brain is very concentrated, learning from the repetition and aware of what I want to change in the outcome, while another part of my brain is active and inspired, already conceiving totally new versions or translations; projecting options that urge you to reach beyond the obvious. Repetition in the context of changing fields is definitely leading to diversification. But what role does the space, time or place that lies between the repetitions play in the development of these so called repetitions?

PROGRESSION

Viola III

As a musician I am interpreting music of which the output depends, in addition to the aspects of musicality and intuition, on my technical skills on the instrument. In order to bring the sound production closer to my expectation or imagination I have to make the physical movements as effective and efficient as possible. To achieve this goal, I am constantly repeating passages and, by making mental notes in between the repetitions, slowly approaching what I want to hear. More than making meters, it is about analysing and adjusting; an interplay between ears, mind and circumstances. No repetition is a real repetition, even if nothing changes in the circumstances, I still am in the same room, playing the same notes on the same instrument. I am reacting on the previous round and therefore no repetition is an isolated event. So to speak; every repetition is a new proposal waiting for an answer that then again is a proposal waiting for an answer.

'Does not the paradox of repetition lie in the fact that one can speak of repetition only by virtue of the change or difference that it introduces into the mind which contemplates it? By virtue of a difference that the mind draws from repetition?' xii

Considering the above citation of Deleuze, which without a doubt is applicable within the field of music, I wonder how those knitters in the 16th century knitting schools were thinking about their work. Were they just knitting with their minds on a different planet, or were they thinking actively, with each stitch or with each stocking, challenging themselves to improve or embellish? Were circumstances such that there was room for inspiration?

Deleuze states that change always happens between repetitions. Circumstances, nevertheless, do make a difference, in motivation and the risk one is willing to take when making changes. I realise that both the space in between repetitions, the external sides, and the repetition in itself, the internal side, are changing. I illustrate this with the following example.

Socks

Recently I did extensive research on the fabrication of socks. I studied their history and use and I also was designing, knitting, felting and folding various types of socks. Soon enough I was confronted with the intriguing yet blunt fact that with socks you need two. A mirrored pair. Until factory production took over, starting with the invention of the knitting machine of William Lee, and delayed by the denial of the patent that Lee requested with Queen Elisabeth I, socks were made by hand, and, as it is with handwork, two identical items never turned out quite the same. To me this has to do with a philosophical precept: humans and human development are always in flux. The moment you make a work, perform an action, you learn. Circumstances are changing and therefore the conditions and parameters are changing and with this, the concept is altered, however slightly. We see this also earlier in the thesis where I write about music practise and in the above citation of Deleuze.

The industrial revolution has created not only the option to mass-produce, but importantly, has made replication possible to a point of precision that had never been a possible before.

With industrially produced textiles, many of the parameters that were flexible in hand-crafting have stabilised or become standardised; the machine hardly changes, tension and speed stay constant, intervals are shorter since production speed is higher, and one machine can do the work of multiple people.

Now that we are used to perfect industrial replication, are we conditioned to expect this level of stagnated creativity in handwork as well?

While experimenting with various techniques of making socks and foot wraps I found it quite frustrating to make a second, identically mirrored partner while my head was full of other ways to execute the job. I therefore decided to let go the idea of creating two identical socks one after the other, and instead focus on the development of thought and apply the new insights in the second item of each pair. This led to a collection of non-identical pairs of socks and foot wraps. Repetition became a window for diversity. Aside from the internal and external factors that influence repetition, can we optimise our use of repetition to extract more from it? *viii, ix, x, xi, xiii*









Rhythm

In his work 'The Craftsman', Richard Sennet discusses repetition as itself an essential thing of value in the work process:

'Doing something over and over is stimulating when organised as looking ahead. The substance of the routine may change, metamorphose, improve, but the emotional payoff is one's experience of doing it again. There's nothing strange about this experience. We all know it; it is rhythm. Built into the contractions of the human heart, the skilled craftsman has extended rhythm to the hand and the eye.'^{xiv}

Richard Sennett is referring here to the daily practice of a musician. But this idea could very well be applicable to sportsmen and dancers as well. And, moreover, almost everyone feels this kind of fulfillment in repetitive action itself, if it's done in a certain rhythm or natural flow.

When, in former days, a work routine needed stimulation for smooth repetition, songs were the perfect medium. Farmers, fishermen, and other workers have used songs to keep the rhythm going of their repetitive work. I am sure that, especially because of the human vocal factor, the environment was open to changes within the repetitions. Adjustments had to be made; if people were aging, or younger hands came in, the season or the weather changed, tools broke or demands were altered. The singing added a personal mark to the repetition, people were appreciated for their good voice and even though each individual was clearly part of a team, they each 'had a voice' in the matter.

So while Sennett's citation counts for the musician in the practice room, it also applies well to many other situations and activities that do not immediately require sophisticated hand skills.

Were the knitters in the 16th century singing while they worked? Did the singing comfort them and inspire their knitting? Was the ticking of the needles defining the tempo of their songs or vice versa? And was Lee humming in his beard while he assembled his second, more refined, knitting machine that had not 8 identical knitting needles per inch, but 20?!

Nowadays, most singing during production processes has been replaced by the rhythm of machinery and singing is reduced to entertainment, but we still find the power of it in education, for example, when children memorise the alphabet with a song, using melody, rhythm and repetition.

How do I use rhythm and repetition while teaching?

Next page: Celtic women singing while waulking the tweed.

<https://youtu.be/ekO8W0zSZO8> *xv*



INTRINSIC MOTIVATION

Education

The role of rhythm in concentration, as explained by Sennett, is very useful for musicians and music students. Another theory, complementary to that of Sennett, is put forth by the linguist and philosopher Noam Chomsky. Chomsky explains in one of his talks (*vi*) that a learning process is only worthwhile when the student is finding knowledge by exploring. By having the feeling that the discovery is made from within. Repetition and giving the time to discover and learn are indispensable in a learning process. Spooning up facts and working for exams just to get good grades is not enough. Real interest should be triggered.

When I teach violin, viola or chamber music I strive to activate this discovery process in students, no matter their level of playing or their age. If I do not do that, the teaching becomes impersonal and boring and knowledge will not stick. I literally see the happiness of students when they discover and truly understand how to tackle a tricky technique or passage. This is not because I told them to do certain things but because they were inspired to find the answers themselves.

Considering the idea of Sennett that the rhythm of repetition provides a reward in and of itself, and Chomsky's idea that experience can be derived from focused repetition, I would conclude that the combination of the two would deliver a "practice groove" in which there is very focused self-analysis as well as the capacity to look beyond the required task.

Knitting, weaving, practising, teaching, performing, recording, translating and inventing are all based on an active awareness of that what is and that what might be. Or, as my dear viola teacher at the Yale School of Music, Jesse Levine, had posted for years on the blackboard in his studio:

'Explore all possibilities'

CONCLUSION

In this thesis I researched the function of repetition within the fields of music, textile and education. I explored where repetition can lead to: standardisation, diversification, translation and innovation. I looked at the function that repetition can serve: as a tradition or as part of method. I discussed the concepts involved in greater detail, including what has been written about repetition over time and how I experienced repetition in my own work.

One of the discoveries I made while working on this thesis that every single thing we do is a repetition as soon as you identify it as such. Once a repetition is identified there is a choice to define it as standardisation or as a way to give room for innovation or diversification. Traditions and routines would fall into the definition of standardisation while translation, interpretation and innovation would be diversifications through repetition.

The Textile Research Centre and the London Cloth Company provided clear examples of repetition in the areas of textile conservation and fabrication. I included both my own professional work as a classical musician; the experience of playing concerts and recording sessions as well as teaching, and my activities as a textile student. As such, I conducted experiments to become more aware of the precise function repetition serves in connection with refinement of movement and motor skills.

To understand the evolution of repetitious processes in the field of textile production in a historical context, I reviewed the circumstances surrounding the invention of the first knitting machine in 1589.

Here I discussed the economic and social implications of this mechanical introduction. Citations of, among others, Queen Elisabeth I, Hume and Sennett guided my timeline into modernity and provided additional perspectives on the role of repetition in learning. Within the thesis itself, I applied repetition as translation as well, through my drawings and through the composition 'When a violist, two knitting needles and lots of books meet'.

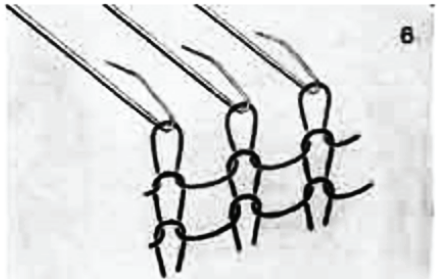
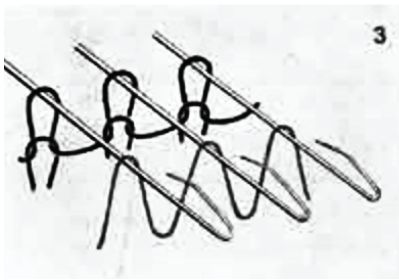
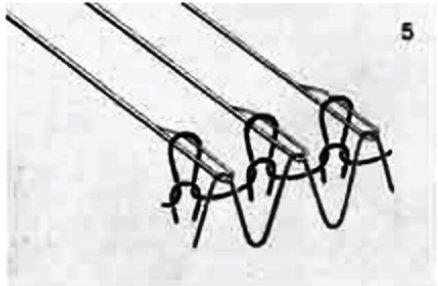
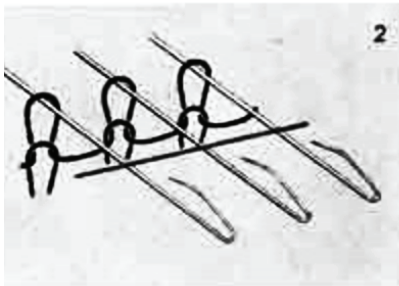
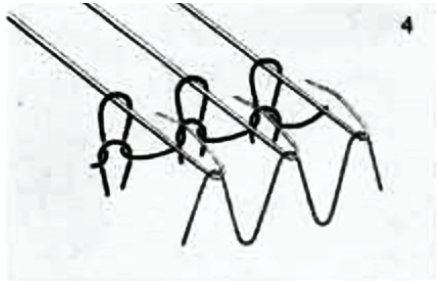
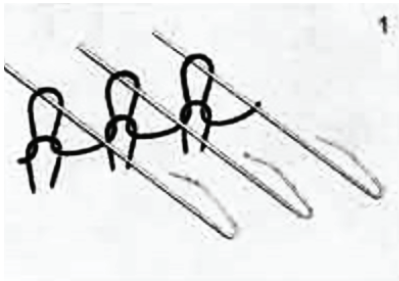
The journey of my thesis was a major effort which I thoroughly enjoyed. Standardisation and diversification through repetition are still every day exposing different insights to me and will keep me intrigued for the rest of my life!

Kyra Philippi
Gerrit Rietveld Academie
2020

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APPENDIX 1: Poem

The knit

I also have it.
The curves that knit,
The fingers that count,
The crossings that sustain.

I also have it.
I also have questions and that is why
I look into books for methods, for
stories - a glimpse of an instruction.

Rosa Mesquita

A poem written to me by a friend. Without knowing it from each other, we both were fascinated by the same picture, illustrating the 6 steps of knitting a row on William Lee's Frame work knitting machine. *xvii*

APPENDIX 2: Composition

WHEN A VIOLIST, TWO KNITTING NEEDLES AND LOTS OF BOOKS MEET

16th Century, real old times, knitting was done by hand
In an area full of virgin wool, Elisabeth I reigned the land
One man just really had enough, and made his brain spin round
Used repetition, motion exhibition and a detailed, analytic vision
The 'knitting machine taking over hand skills'
Is what slowly came to mind

The queen said no, it cannot be
A patent is not for you
Bad for business, no forgiveness
So it was France that Lee fled to

Long story short after 100 years, the patent was assigned
Innovation over conservation, replacing knitted variation
Industrialisation underlined

Entering modernity, my life and musicality
Here too repetitions apply
In concerts, shows and studio work
Sound is getting better, changes really matter

Recording in a studio, perfection is a must
We analyse, no compromise
Repeating and adjust

My internship shone yet another light to repetitions over time
Standardisation and preservation
The Textile Research Center has in mind

Where they then stop
David Harris goes on
Giving old looms back their lives
Re-igniting local manufacturing, his weaving workshop back in swing
With a modern touch, is what he clearly strives

Then Hume and multiplicity, and visualising time
To improve and/or to alter,
Changing actions, pace by pace
It gives an inner knowledge, applied where mental space

While practising my instrument, repetition's guiding me
To improve my tone while getting into the groove
Ideas are floating free

These free inspirations, give room to new creations
I would say: translations
A step further from repeat

Rhythm plays a major role, in work done with a group
In memorising, education, for tempo and good concentration
Read Sennett's *The Craftsman*, his excellent book

Repetition is tradition, where folks and places meet
The rhythm becomes a rhythm only when I do repeat

Chomsky also mentions: Exploring things is good
Owning by experiments are repetitions understood

Researching, Writing, Reading, Reflecting, Repeating

Kyra Philippi, 2020

BIOGRAPHY

Kyra Philippi was born in 1968 in Apeldoorn, the Netherlands. As a teenager she combined the Utrecht Conservatory studying viola and chamber music with the Gymnasium. From 1993-1997 she studied at the Yale University School of Music in New Haven, US, graduating from the master program as a Certificate Student, majoring in viola and chamber music. She worked as an assistant recording engineer and associate producer at the Fred Plaut Recording Studios at Yale, directing and assisting in numerous recording sessions and editing work.

Kyra was recipient of both a Fulbright Grant and a Yale University Grant. Before, during and after her studies she maintained her career as a musician in the Netherlands, Spain and the US.

Since 2015 Kyra is enrolled in the Rietveld Academy, the first two years as a DOGtime student, the last three years as a student in the Txt department.

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- viii Drawing: Kyra Philippi, Rittmuller Grand Piano, own collection
- ix Harrell, B. (1984). *Anatolian Knitting Designs: Sivas Stocking Patterns Collected in an Istanbul Shantytown*. Istanbul, Turkey: Redhouse Publications.
- x Photo: Kyra Philippi, own collection
- xi Print: Kyra Philippi, using Noteflight, 2020
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- xiii Images: Tabi socks with extra room for the toes, felted socks, Portyankis, traditional Tabi socks. Kyra Philippi design, 2019
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- Cover: water-color painting by my daughter Cecelia Palumbo, 2019
of a photograph by Sylvia van den Oudewater made during a presentation at the Rietveld Academie in 2017