

SAIL

An Exploration of Self-Touch Through the
Medium of Textile for Well-being.



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Preface

I am proud to present this thesis project, which explores the role of self-touch for well-being through the medium of textiles. This project immerses in the significance of self-touch in our everyday lives and how textiles, through their texture and softness, can enhance and encourage this experience.

Driven by a personal interest in psychology, human behavior, and well-being, I embarked on this project to understand the fundamental role of self-touch in human experiences. I aim to introduce the concept of self-touch to my target audience and challenge its common association with masturbation. This journey of learning and designing for such a personal yet universal experience has been exciting, occasionally challenging, and always rewarding.

I am deeply grateful to Gijs Huisman and Stefano Parisi for their invaluable support, time, and expertise throughout this project. Their guidance and encouragement have been crucial in shaping both this project and my development as a designer. I would also like to thank the individuals who participated in this project for their valuable insights and contributions.

Lastly, I extend my heartfelt thanks to my friends, family, and fellow designers, with whom I've had countless discussions about the project. Your support and dedication have been invaluable. I am truly grateful for the opportunity to undertake such an interesting and relevant project, and I hope it will illuminate the important role self-touch and textiles play in our daily well-being.

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Abbreviations & Glossary

Abbreviations

MDD: Material Drive Design

Ma2E4: Material to Experience

sFSTS: Head, Face, and Neck - Spontaneous Facial Self-Touches

Glossary

Affective Theory: It explores the role of emotions and feelings in human behavior, cognition, and social interaction. It emphasizes how affect (emotion) influences and is influenced by various aspects of human experience.

Psycholinguistic Theory: The mechanisms by which language is processed and represented in the mind and brain; that is, the psychological and neurobiological factors that enable humans to acquire, use, comprehend, and produce language.

The Feldenkrais Method or Therapy: The method uses gentle, mindful movements inspired by principles from physics, biomechanics, psychology, motor development, and martial arts. It focuses on understanding how the body moves and develops by "learning to learn" through playful activities. This approach helps people gain better control and awareness of their movements.

Introduction

This section lays the groundwork for the project, starting with the context, scope, and the focus. It explores the initial question that gave rise to the design approach followed throughout the project, highlighting the research goals, methods, and tools used during different phases of the study. This provides a clear roadmap in understanding the project's progression.

1.1 The Context

1.2 The Scope and Focus

1.2.1 Initial Research Question

1.2.2 Target Audience

1.3 Methodology

1.3.1 Material Driven Design (MDD) Framework

1.3.2 Material to Experience (Ma2E4) Toolkit

1.4 Project Approach & Activity

1.5 Personal Ambition

1.6 Key Takeaways

1.1 The Context

When we examine the early stages of our lives, particularly infancy, touch emerges as one of the first senses to develop as part of the embryo (Field, 2014). It plays a fundamental role in our human experience, encompassing the entire body through a range of receptors in the skin (Fulkerson; Matthew, 2024). From infancy to adulthood and later in old age, touch fulfills many functions, from mundane tasks like finding our keys in our pocket, to more important ones, such as medical care or preparing food (Jenkins & Lumpkin, 2017). Most of these everyday activities are carried out through our hands, which serve as the primary tool for deliberate and non-deliberate actions (Leader, 2016).

During everyday life, our hands often come into contact with our own bodies (image 1). For instance, we may place a hand on a hip, on our chin, cross our arms, and so on (Kronrod & Ackerman, 2019). The movement of the hands on the body or onto each other is a ubiquitous phenomenon and is defined as self-touch (Barroso & Feld, 1986). Self-touch is often performed spontaneously, with or without awareness in both social and nonsocial contexts (Barroso & Feld, 1986). It directs our attention towards ourselves and amplifies how we assess things and experiences (Kronrod & Ackerman, 2019). Just as touching objects can influence how we perceive them, self-touch may also impact how

we perceive the outside world (Kronrod & Ackerman, 2019). This behavior can have both positive and negative effects. On one hand, it is associated with stress, tension, and negative feelings, as described by the affective theory (Harrigan, 1985). On the other hand, the psycholinguistic theory suggests that self-touch is linked to the coordination of information production or processing (Harrigan, 1985). These wide ranges of perspectives highlight the complex role of self-touch in our lives. Despite its abundant presence, there is a lack of awareness and utilization of the benefits of self-touch in our daily routines, especially in a time when we are constantly overwhelmed by information, people, and the environment around us. The research discussed in the following chapters shows that self-touch is influenced not only by our cognitive state but also by our interactions with others. This raises the question of what self-touch really is and how we can use it to reconnect with ourselves in the presence of others.

Current practices, such as self-FI (Functional Integration®), are derived from the Feldenkrais Method (Basis Principles | the Feldenkrais Method, n.d.). This method is said to reorganize the connections between the brain and body, thus improving body movement and psychological well-being through enjoyable and playful movements (Stalker & Glymour, 1985).



Image 1: Different types of self-touch actions carried out in daily life.

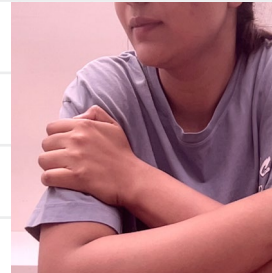
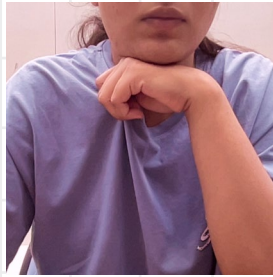


Image 2: Different types of clothing-mediated self-touch actions

These methods have been used since the mid-20th century to enhance direct sensing of body movements (Lewis, 2009). There are trainings available, and professionals in the field which use it as a form of therapy.

However, most of these practices are typically limited to private settings. **One possible way to incorporate the benefits of self-touch into our everyday life is by integrating it into our clothing or textiles.** We are most often clothed due to societal norms and expectations, which makes skin-to-skin contact to certain parts of our body more rare than clothing-mediated self-touch (image

2). Additionally, individuals often subconsciously engage with their clothing by squeezing cuffs, pulling zips, or fastening and undoing buttons (Coulter, 2023b).

By understanding the multidimensional nature of self-touch in relation to textiles, we can influence design geared towards well-being by recognising the emotional significance in expressing feelings and fostering connection. This understanding encourages interactions with textiles that go beyond mere touching, becoming integral to the emotional experience of the individual (Petreca et al., 2013).

1.2 The Scope and Focus

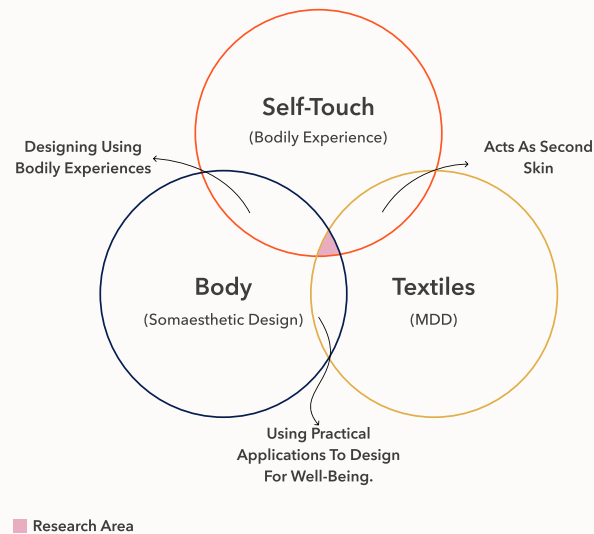


Figure 1: Research area defining the scope of the project

The scope of this project is to gain a thorough understanding of self-touch behavior by using the **Research Through Design (RtD) approach**. This approach allows for hands-on exploration of the topic by using design techniques to build upon the existing limited literature. To achieve this, we will draw from the Material Driven Design framework (Karana, E., Barati, B., Rognoli, V., & Zeeuw van der Laa, 2015) that helps in understanding and developing a material for creating an experience. Further, the project uses the material-to-experience toolkit (Camera & Karana,

2018) to understand how individuals interact (performative level) with materials, evoking different emotions (affective level). Through a combination of literature review and workshops, using qualitative and quantitative analysis the study **will define and critique the term self-touch and explore how we can use it to reconnect with ourselves in the presence of others through the medium of textiles**.

By integrating these approaches we seek to offer a taxonomy of self-touch, along with a taxonomy

of textile with respect to self-touch. This provides a framework for **understanding** various types of self-touch actions and its interaction with the body. The visual representation of research scope is shown in figure 1. The project's main goal is to **initiate a dialogue on the subject of self-touch and inspire the creation of designs that foster a connection with our bodies for well-being**.

1.2.1 Initial Research Question

The initial questions were formulated to explore existing literature and identify research gaps related to self-touch. These questions also aimed to establish connections between the role of textiles in experiencing self-touch. The following questions guided the literature review include:

Understanding self-touch.

What is self-touch?

What are the different types of self-touch actions?

How are they different in a social and a private setting?

Why do people perform self-touch actions?

Understanding the role of textile in self-touch.

How do textiles create a soothing experience?

What role do textiles play in well-being?

How do people interact with different prop-

erties of textiles?

How can textiles evoke different emotions?

How do people engage with textiles through self-touch?

1.2.2 Target Audience

The target audience for this project is **university students aged 18-29**, also known as emerging adults (Arnett et al., 2014). This group goes through various **life transitions** related to living arrangements, such as the transition to university life (Coulter, 2023), relationships, education (e.g., exam pressure, student workload) (Thompson et al., 2022), and employment (Arnett et al., 2014). They also face financial pressures, such as cuts in university funding (McCloud and Bann, 2019), long waiting lists, and limited support resources, which worsens mental well-being issues (Docherty and Thornicroft, 2015).

In the USA, the rates of **major depressive** episodes among young adults aged 18-25 increased from 8.1% to 13.2% between 2005 and 2017 (Arnett et al., 2014). In Japan, **mood disorders and anxiety disorders** are the most prevalent psychiatric disorders among individuals aged 20-34 (Arnett et al., 2014). The COVID-19 pandemic has further worsened existing mental health issues for university students (Pereira et al., 2020). According to the Student Mental Health Survey

2020 (Pereira et al., 2020), **one in four students reported having a mental health condition in 2019**. Additionally, it is estimated that almost half of university students choose not to disclose their mental conditions to universities (Thorley, 2017) due to **fear of stigma** (Matteo and You, 2012). Students often lack the confidence to speak out about their issues or trust the confidentiality of university support mechanisms (Coulter, 2023). Therefore, there is a **need for an alternative solution where students can take early action and gain control over their well-being**, making them the suitable target audience for this project.

1.3 Methodology

This section explores the Material Driven Design (MDD) framework, which enhances my understanding of textiles and guides the development of materials for specific experience, as mentioned before. Additionally, I discuss the Material to Experience (Ma2E4) toolkit, which equips me with tools for comprehending the various experiential qualities of materials.

1.3.1 MDD Framework

This project is **grounded in the MDD framework** (Karana, 2015), which offers a fundamental structure for understanding and developing materials for specific experiences. It combines practical experimentation, user studies and envisioning. Starting with a material proposal and ending with a product and/or further developed material concept.

The method consists of four stages that provide a framework (figure 2) to the research and develop a material: (1) Understanding the material, (2) Material Experience Vision, (3) Material Experience Patterns and (4) Designing Material/Product concepts.

The first phase (1) focusses on understanding the material in its broadest sense. It addresses the origin of the material, its production process and explores the material properties through extensive tinkering. Technical tests and user studies help to define the technical and experiential characteristics. A material benchmark functions as a bridge between the first two phases as it

gives insights in the opportunities of the material. These opportunities support the formulation of the Material Experience Vision, the second phase of the method (2). The vision represents the 'design goal' of the project and helps to translate the material qualities into a product. Here both technical and experiential qualities are taken into account. The third step (3) translates the abstract experience qualities (e.g. natural, honest and nostalgic into more tangible material patterns. In the final step (4) the vision steers the concept development to ensure an outcome that emphasizes the qualities of the material. The embodiment of the material in a product allows to validate the concept.

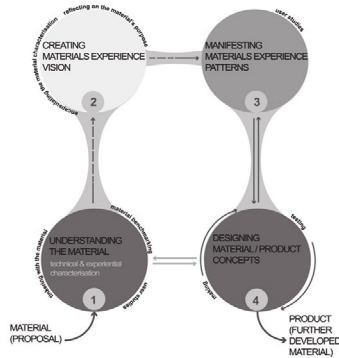


Figure 2: MDD framework

1.3.2 Ma2E4 Toolkit

Traditionally, materials have been primarily analyzed for their technical properties, such as structure, behavior under different conditions, and performance. However, this toolkit emphasizes the need for materials to elicit meaningful user experiences by considering **what a material is, what it does, what it expresses to us, what it elicits from us, and what it makes us do.**

The Ma2E4 toolkit facilitates the experiential characterization of materials through four distinct levels:

Sensorial Level: The sensorial level focuses on the direct sensory interactions between the user and the material. This includes the tactile, visual, auditory, olfactory, and gustatory sensations that a material can evoke.

Interpretive Level: At the interpretive level, the focus shifts to the cognitive and associative responses elicited by the material. This involves uncovering the meanings, associations, and symbolic interpretations that users attach to the

material based on their prior experiences and cultural context.

Affective Level: The affective level examines the emotional responses and feelings that a material can provoke. This involves understanding the moods, emotions, and affective states triggered by the material during interaction.

Performative Level: The performative level considers the functional and practical aspects of the material in use. This includes the material’s performance characteristics, such as durability, flexibility, thermal conductivity, and other technical properties that affect how the material behaves in different contexts.

In the upcoming chapter, the toolkit is utilised to design workshops that helps in gaining a better understanding of textile experience through the affective, performative and interpretative level in relation to self-touch.

1.4 Project Approach and Activity

This section outlines the approach employed in this project to explore self-touch and understand its relationship with textiles. The visual below (figure 3) illustrates the timeline and activities followed during the study.

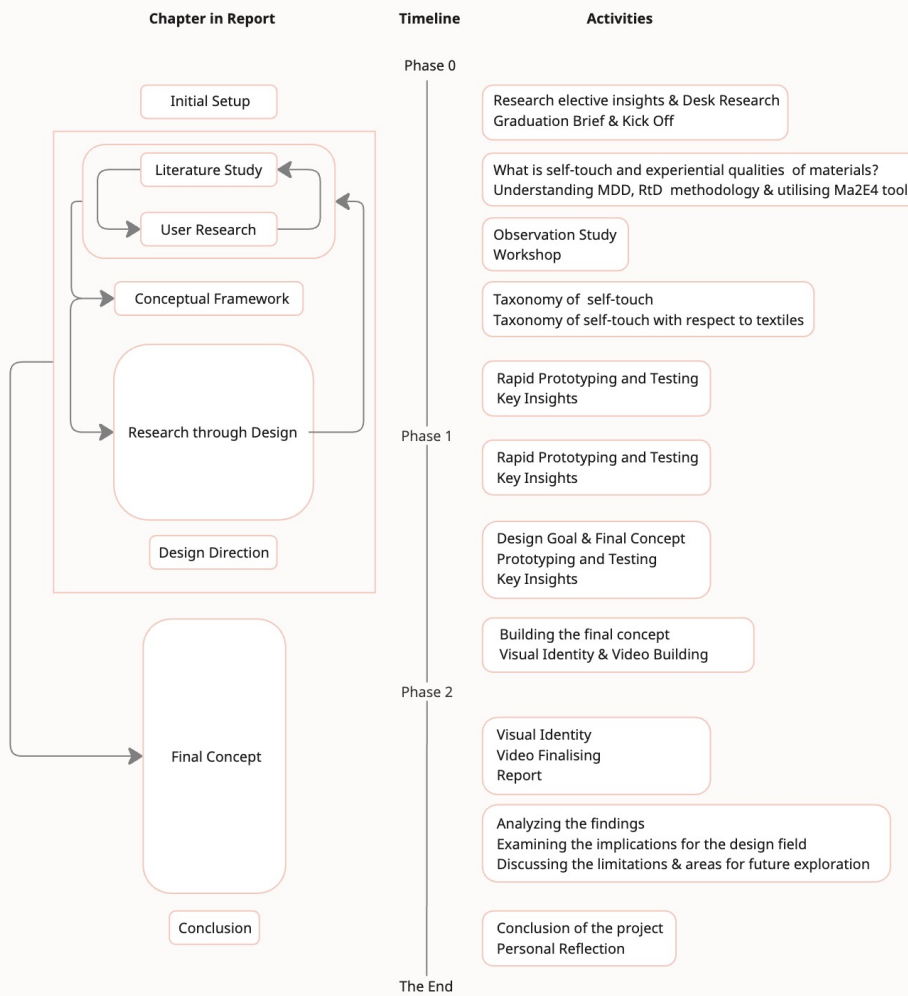


Figure 3: Project approach and activities done during the duration of the project

1.5 Personal Ambition

This project is deeply personal to me as it emerges from a time when I was trying to understand my own emotions related to intimacy and vulnerability. It serves as a means of self-reflection, leading me to explore the intricate relationship between my body and how it responds to others through design. Using my own experiences, I hope to create a design outcome that is **a conversation starter**.

For a long time now I have been thinking about the vulnerability that comes with being touched. Is being touched by someone the most intimate thing or does the most relieving and personal experience lie within the experiment of self-pleasure?

Personally, it's taken me quite some time to come to terms with the concept of self-touch. After having spent countless hours searching online wrestling with the idea of it being something to be ashamed of, with time (quite literally), I have come to understand how powerful and uniquely personal the act in itself can be.

But this makes me wonder, is the act uniquely personal even when we decide to share it with someone else? or does it just become a source of their presence, reminding you of everything you can and can't have? Making me question, can self-pleasure, really just be about your "self?".

As a designer my primary objective was to develop and refine my research skills, particularly in the area of exploratory research. I adopted the "Research through Design" (RtD) methodology to gain expertise in research and experimental design techniques. To validate my findings, I conducted hands-on workshops and user tests.

Additionally, I aimed to improve my time management skills and effectively plan my research project. By actively engaging in this project, I aimed to cultivate a strong foundation in haptics and acquire valuable skills that would contribute to my growth as a researcher in the field of design for well-being.

1.6 Key Takeaways

Touch and Self-Touch: Touch, especially through the hands, is fundamental throughout life. Self-touch is a pervasive behavior that influences our perceptions and emotions. It can have both beneficial and adverse effects, highlighting its complex role in our daily experiences.

Underutilized Potential: Despite its frequent occurrence, the benefits of self-touch, especially for well-being, are often overlooked in daily life.

Textiles as a Medium: Interaction with textiles offers a promising way to incorporate the benefits of self-touch, enhancing emotional well-being in everyday life.

Research Question: The project aims to explore self-touch and how can it be used to reconnect with ourselves in the presence of others through the medium of textiles.

Research Method: The project uses research through design (RtD) approach, which involves hands-on exploration and building upon existing literature. The study will also utilize the material driven design framework and the material-to-experience toolkit to understand how textiles can evoke different emotions.

Target Audience: The project is aimed at university students, addressing their unique challenges and mental health needs.

Literature Review

In this section, we delve into the concept of self-touch through behavioural, phenomenological, anthropological and personal standpoints with a specific focus on the hands as the primary means of its expression. This multidimensional approach aims to offer an in-depth understanding of self-touch, examining its definition, significance, and the mediums through which it is manifested in our daily lives. Additionally, we investigate the role of clothing and textiles, emphasizing the importance role textile properties play in our well-being. We also benchmark different design solutions to understand how textile properties relate to touch and provide inspiration for the project.

2.1 Understanding Self-Touch

- 2.1.1 Definition of Self-Touch
- 2.1.2 Significance and Benefits
- 2.1.3 Role of Hands in Self-Touch
- 2.1.4 Areas of Self-Touch
- 2.1.5 Comparison: Touch vs. Self-Touch

2.2 Perspectives On Self-Touch

- 2.2.1 Learned Behavior
- 2.2.2 Body and the Self | Phenomenological Standpoint
- 2.2.3 Self-Touch and Others | Anthropological Standpoint

2.3. Textiles Through Clothing in Daily Life

- 2.3.1 Textile in Wellbeing & Design
- 2.3.2 Sensorial Properties of Materials
- 2.3.3 Benchmarking of Textile - Well-being Through Touch

2.4. Conclusion

2.5 Key Takeaways

2.1 Understanding Self-Touch

In order to fully understand self-touch, the research process began with an extensive exploration of the concept of touch. This step was crucial for grasping how touch is experienced by the body and its functioning in different contexts.

Once a basic understanding of touch was established, the research shifted its focus specifically to self-touch. However, this presented an **unexpected challenge: the existing literature on self-touch is scattered across different sources, lacking a comprehensive compilation of information**. This dispersion indicated the need for a more nuanced and exploratory approach, rather than a traditional systematic review. The research adopted a snowball method, starting with an analysis of the role of self-touch in self-formation. From there, the inquiry expanded to cover a variety of related topics, including the relationship between self-touch and social interactions. This involved reviewing a diverse range of research papers, journals, and articles that addressed different aspects of self-touch. Given the non-systematic nature of the literature, the approach aimed to be exploratory and informative, piecing together insights from various sources.

To address this complexity, section 2.2 will provide a detailed examination of self-touch from multiple perspectives. This approach aims to integrate the different dimensions of self-touch,

encompassing its behavioural, phenomenological, and social aspects to develop a more complete and nuanced understanding of the topic.

2.1.1 Definition of Self-Touch

"In **nonverbal communication, a conscious or unconscious gesture** involving an individual **contacting their own body**: for instance, touching their hair, temple, nose, chin, or ear with a **hand or finger** (Chandler & Munday, 2010)."

It provides sensory stimulation and fulfills bodily needs while offering comfort, release of emotional arousal, or self-care (Freedman & Hoffman, 1967).

2.1.2 Significance and Benefits

The behavior of self-touch is associated with a range of emotions, both negative **stress, tension, and anxiety** (Harrigan, 1985) and **coordination of information production or processing** (Harrigan, 1985). In a study (Harrigan, 1985), self-touch behavior in physician-patient interactions was examined to support the psycholinguistic theory. The conversations involved a mixture of information processing by both the doctor and the patient, evoking various emotions. This study found that patients engage in more self-touch actions than doctors. For patients, self-touch may be a result of anxiety, tension, and stress related to their medical needs (affective theory), as well as a way to focus their attention and verbally

express information about their illness to the doctor (psycholinguistic theory). These emotions likely contribute to an increase in **self-touch as a coping mechanism**, especially when patients are having difficulty organizing their thoughts or dealing with complex information. On the other hand, for physicians, self-touch actions may occur during specific types of speech acts, such as asking questions, providing answers, and making statements. This could be influenced by the process of interviewing patients, gathering information about their symptoms and complaints, and listening to them expressing their feelings. This study emphasizes the significant role of self-touch in information processing and language. While self-touch may sometimes be associated with negative emotions, it is important to recognize that it is a more **complex behavior** than simply indicating anxiety, hostility, or stress. It is not only a reflection of our emotions, but it also **directs our attention towards ourselves** and influences how we **perceive the external world** (Kronrod & Ackerman, 2019). Furthermore, research (Dreisoerner et al., 2021) has shown that engaging in self-soothing touch can reduce cortisol responses to stress. In the study participants who practiced **self-soothing touch experienced lower average cortisol levels** compared to those in control conditions. This suggests that self-soothing touch has the potential to effectively mitigate physiological stress responses (Dreisoerner et

al., 2021). In addition, this research highlights **how self-touch can serve as a reliable signal to create a sense of self-induced safety, love, and care during moments of distress**. These findings support the idea that self-touch serves various purposes, including assisting information processing, providing emotional comfort, as well as reducing stress.

2.1.3 Role of Hands in Self-Touch

Here, we examine hands as the main means of self-touch. From birth, we have a natural tendency to **explore and engage with our surroundings** by instinctively extending our hands and touching objects (Gençer, 2018). Therefore, hands play a crucial role in our lives, enabling us to carry out both intentional and unintentional actions (Leader, 2016), due to their **responsiveness and adaptability** (Streeck, 2020). They continuously make adjustments in terms of position, pressure, and motion based on **sensory feedback** received (Streeck, 2020). This phenomena in psychology is defined as **action-perception loop** (Gibson, 1979). It is a feedback loop that helps us understand the world through perception and action being closely connected, each influencing the other in a continuous feedback loop (Dijkerman & de Haan, 2007). For example, when we reach out to touch an object, the sensory feedback from our hand's interaction with the object informs our perception of its properties such as

texture, shape, and temperature, which then guides our next action. In respect to self-touch, this phenomenon highlights how through tactile experiences and the continuous connection between perception and action, our hands shape our understanding of our environment during self-touch interactions.

2.1.4 Areas of Self-Touch

This section talks about the different body parts commonly involved in self-touch. We look into self-touch in relation to our physical interactions with our body, particularly during cognitive and emotional states (Harrigan, 1985; Spille et al., 2022).

Head, Face, and Neck - Spontaneous Facial Self-Touches (sFST)

Spontaneous face touching is a behavior that is commonly observed in individuals of all ages, genders, and ethnicities (Spille et al., 2021). **On average, people touch their faces up to 800 times during their 16 waking hours each day** (Spille et al., 2021). This behavior occurs in both social (Goldberg & Rosenthal, 1986; Knöfler & Imhof, 2007) and private interactions, with individuals using one or both hands to touch their own faces (Grunwald et al., 2014; Mueller et al., 2019; Nicas & Best, 2008). The head and face play a

crucial role in expressing emotions (Ekman & Friesen, 1971; Argyle et al., 1994; Dittmann & Llewellyn, 1968), which is why face-touching is most commonly observed in situations that require **cognitive and emotional effort**, such as tasks involving attention, memory, anxiety, discomfort, and uncertainty (Spille et al., 2021). Touching the face may also be a result of sensory stimulation traveling along neural pathways from brain centers associated with affective states (Harrigan, 1987). For example, feelings of anxiety or tension **may lead to chemical changes or receptor activation in these areas**, resulting in sensations like itching, which can be relieved through scratching or rubbing. Moreover recently, there has been growing scientific interest in spontaneous face touching and its **potential role in self-infection with pathogens** (Spille et al., 2021), especially after COVID-19. It is crucial to understand this behavior, as a considerable number of respiratory tract infections in humans are believed to be transmitted through hand contact with contaminated surfaces, followed by contact with the mouth, eyes, and/or nostrils (Nicas & Best, 2008) hair, face, neck, and shoulders (Zhang et al., 2020) as shown in figure 4. **This emphasizes the importance of redirecting our self-touch actions to other parts of the body that can fulfill our cognitive and emotional needs safely.**

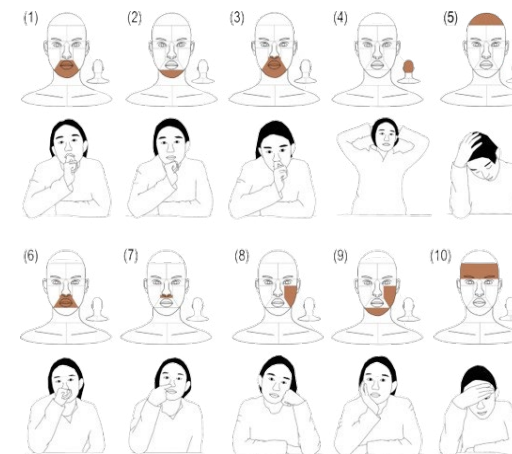


Figure 4: The most frequently carried out sFSTs

Most self-touch actions fall under the category of sFSTs due to which there is limited data on self-touch behaviors that don't fall into this category, highlighting the need for further research in this area. Here, we will explore the involvement of other body parts in self-touch behaviors, drawing from Jinni A. Harrigan's discussion of self-touch behavior in physician-patient interaction mentioned in section 2.1.2. Jinni A. Harrigan's study highlights that both patients and doctors most commonly and frequently engage in self-touch actions on the head, neck, and face areas. Following these actions, they exhibit different types of self-touch behaviors associated to hand-to-hand and hand-to-arm, grooming, and adjusting clothing and legs.

Hand-to-Hand & Hand-Body

It was observed that patients frequently engaged in self-touch behaviors, such as **manipulating their fingers, stroking their arms, or scratching their wrists** during their interaction with the doctor. These hand movements helped patients concentrate by reducing distractions, allowing them to focus their attention and better articulate their medical issues. These actions might resemble fidgeting, and if left unchecked, they can become an amplified and negative display of anxiety (Janet Coulter, 2023). **When channeled positively, these actions can act as a self-soothing experience.**

Grooming & Clothing

One of the most **accessible mediums** for fidgeting is clothing, as it is close-at-hand and individuals often subconsciously play with their clothing, squeezing cuffs, pulling zips up and down, or fastening and undoing buttons (Janet Coulter, 2023). In this study, the doctors similarly adjusted their clothing or objects like ties or glasses as part of self-touch actions. They often touched their clothing before speaking, helping them **prepare for social interactions and supporting their information processing**. This highlights the important role clothing plays in directing our self-touch actions after direct skin-to-skin touch.

Legs

Touching the legs and trunk is less common, likely due to social etiquette rules that limit such actions in interactions (Schefflen, 1965; Goffman, 1975). In medical consultations and other social settings, hand contact with the trunk or legs might be considered inappropriate because it can be associated with **sexual connotations or personal**

grooming activities. Moreover,

In conclusion, self-touch actions in relation to the body differ on the basis of the emotional and cognitive state which plays a significant role in understanding our physical interactions with ourselves.



2.2 Perspective on Self-Touch

As previously mentioned, in this section our understanding of the complexity of self-touch in our daily lives is formed by examining literature from various fields. Despite the limited availability of literature on this topic, this approach allowed us to gain an overall understanding that considers the **interplay between our actions, body, cognition, emotions, and the surrounding environment**. This comprehensive analysis helps in defining and categorizing self-touch for the purpose of our study.

2.2.1 Learned Behaviour

Here, we explore the concept of self-touch from the perspective of learned behavior, specifically focusing on non-verbal behavior. **Non-verbal cues** play a significant role in how we perceive others and help in interpreting people's emotions, intentions, goals, personality, and more (Harrigan et al., 1987b). Self-touch can be categorized as a type of non-verbal behavior known as **adaptors** (Ekman & Friesen, 1969). According to them, these movements are initially learned as part of our adaptive efforts to **fulfill bodily needs, carry out actions, manage emotions, or establish and maintain interpersonal connections**. They further divide adaptors into three types: self-adaptors, alter-adaptors, and object-adaptors. In this discussion, we will specifically focus on self-adaptors, as they are closely associated

with self-touch. Self-adaptors are **learned behaviors** that serve various purposes or fulfill specific needs. They are often carried out unconsciously, without any explicit intention to communicate. Some self-adaptors help us regulate sensory input through hearing, seeing, smelling, tasting, or touching while others are learned for grooming, cleaning, or enhancing the attractiveness of the face. Moreover, most self-adaptors are acquired through parent-child training practices and shaped through socialization processes. For example, during adolescence, there is a heightened focus on appearance and physical changes. This period is when grooming self-adaptors are re-learned. Additionally, self-adaptors are especially noticeable in situations with high emotional arousal, private settings, intimate relationships, or disruptions in one's personality. By understanding self-touch within the context of self-adaptors, we can gain insight into its role in **both individual self-regulation and interpersonal communication**. Self-adaptors are mostly performed unconsciously, might have a purpose, are influenced by the environment, and vary depending on the presence of others. Therefore, self-touch presents itself as a learned behavior that is deeply ingrained through parent-child training practices and social interactions.

2.2.2 Body and the Self Phenomenological Standpoint

In this discussion, we explore Maurice Merleau-Ponty's perspective on self-touch and its connection to the body. According to Merleau-Ponty, there is a **strong link between the self and the body**. In his work "Phenomenology of Perception," he challenges the dualistic view that separates the mind and body as distinct entities. Critiquing Descartes, who suggested that pain in the foot is not actually felt in the foot but rather in the mind caused by some damage to the foot (Johnson, 2024), Merleau-Ponty argues that the body is not an external object but an integral part of our being (May-Hobbs, 2024).

In his unfinished work, "The Visible and the Invisible", the duality and reciprocity of self-touch are seen as a valuable source of phenomenological insight: "It cannot be by incomprehensible accident that the body has this double reference; it teaches us that each call for the other" (Merleau-Ponty, 1968, p.137). This perspective is also highlighted in the work of other phenomenologists, such as Edmund Husserl and Matthew Ratcliffe. According to them, when our own hand touches one's other hand, it symbolizes a profound aspect of our experience, illustrating the dynamic and reciprocal nature of our perception in the form of the perceiver and the perceived

(Hoffmann, 2017). The exploration of self-touch by phenomenologists suggests that these **experiences may play a significant role in shaping different aspects of the self** (Hoffmann, 2017). Through these interactions, self-touch not only reinforces the interconnectedness of the body and self but also enhances our understanding of how we perceive and relate to our own bodies in the broader context of our lived experiences.

2.2.3 Self-Touch & Others Anthropology Standpoint

In "Video-Based Studies of Human Sociality," Jürgen Streeck examines the concept of cooperative self-touch as a manifestation of the inherently social nature of the human body. **Cooperative self-touch refers to situations where two or more individuals engage in self-touch behaviors simultaneously or in a coordinated manner during social interactions.**

Streeck presents sequences from video recordings that show participants engaging in coordinated self-touch, suggesting that self-touch can serve as a display of engagement rather than just a form of self-involvement or disengagement. These sequences demonstrated that participants often perform self-touch actions like adjusting their clothing or grooming in the presence of others, indicating a sense of mutual responsive-

ness and coordination.

To illustrate his points, Streeck provides examples from conversations recorded in Germany and the Philippines, as well as from the "Tonight Show with Johnny Carson." In one instance, Johnny Carson adjusts his tie while his guest performs a similar action, showcasing motor mimicry or autonomic internal mechanisms like mirror neurons. These examples highlight how self-touch behaviors can be mirrored or mimicked during interactions, emphasizing the social nature of these actions. The phenomenon of self-touch relays, where self-touch actions travel among a group of interacting individuals, underscores the social organization of these behaviors. For example, in a conversation involving three women in the Philippines, self-touch actions like covering the mouth to cough, adjusting clothing, and combing hair occur sequentially and in response to each other's movements. These coordinated actions demonstrate that self-touch can be an integral part of the interaction order, contributing to the mutual coordination required in social interactions.

Streeck argues that the concept of cooperative self-touch challenges the traditional view of the body as a singular entity governed by a central mind. Instead, it highlights the relative autonomy of **different body parts and their ability to engage**

in independent yet socially responsive actions.

This perspective highlights the complexity of the living body and its numerous socialized actions. It also emphasizes the significant role that hands, often involved in seemingly private actions, play in maintaining social interaction and communication. Thus, cooperative self-touch offers valuable insights into the social functions of self-touch behaviors.



2.3 Textile Through Clothing in Daily Life

In the age of social media, people now have a platform to freely express themselves, with online trends often shaping social norms. These trends have a significant influence on fashion and clothing, which serve as a means of showcasing individual identity and reflecting societal changes. As a result, fashion provides a valuable perspective on the evolution of cultural values (Hallak, 2023).

One of the most fundamental values in this context is the expectation of being dressed. Throughout our lives, from birth to death, textiles constantly surround us. Clothing covers approximately 90% of our skin and is always in contact with our bodies (Axisa et al., 2005), impacting our daily lives significantly. We frequently fidget with or touch our clothes, engaging in actions like pulling zippers, adjusting cuffs, and unbuttoning buttons, as they are always within reach (Coulter, 2023). Clothing serves as both a source of tactile interaction and a medium for self-expression, playing a crucial role in shaping our identity, known as “enclothed cognition” (Adam & Galinsky, 2012). This phenomenon explains how clothing influences our mental state and performance, having a symbolic meaning and the physical experience of wearing clothes (Adam & Galinsky, 2012). For instance, wearing a coat or blazer to work can enhance productivity and performance due to their associations with intel-

ligence and professionalism. Conversely, spending the entire day in sweatpants or pajamas, can negatively impact productivity due to their associations with laziness or leisure.

In line with this, a recent study (Lindeman et al., 2023) investigated the relationship between clothing and mood, concluding that relaxation is linked to comfort achieved through soft and warm materials, as well as a loose fit that allows for unrestricted movement. Thus, the abstract meanings we attach to our clothing can profoundly influence our behavior and well-being (Feria, 2022).

2.3.1 Textile in Wellbeing & Design

"Clothing holds memories and is intertwined with our histories and identities, becoming an integral part of our lives (Cobb & Lapolla, 2019)." Textiles, particularly clothing, play a pivotal role in our lives, influencing not only our tactile experiences but also our emotional well-being. The tactile qualities and forms of textiles extend beyond mere physical touch, shaping our emotional experiences and interactions with the world (Petreca et al., 2013). The relationship between our bodies and textiles is constant and performative (Larsen, 2016), emphasizing how these interactions continually shape our behavior and thoughts. Whereas, some argue that

these interactions can even shape our behavior and thoughts (Eco, 1986). According to Eco (1986:192), “as a rule I am boisterous, I sprawl in a chair, I slump wherever I please, with no claim to elegance: my blue jeans checked these actions, made me more polite and mature.”

Textiles evoke positive feelings and a sense of calmness, which can help reduce anxiety (Morse et al., 2016). For example, fiddling and fidgeting with clothing are associated with playfulness and have been shown to calm and comfort individuals with dementia who instinctively twiddle with their clothing (Stephens et al., 2013). Additionally, a study on sensory design for dementia patients (Jakob & Collier, 2017) demonstrated that textiles used in spaces provide a variety of sensory exploration and experiences that cater to people’s preferences and psychological needs for comfort, security, identity, occupation, and pleasure. Certain textile qualities, such as softness, breathability, plushness, gentle color palettes, and cocooning forms, have been found to enhance serene experiences (Parisi, 2024). For example, the Napping Pillow (Ostrich Pillow, n.d.) and the inflatable seat Siesta Matter developed by Ainhoa Cortes (The Swedish School of Textiles, 2022) shown in Figure 5. Other studies on the tactile perception of materials, particularly textiles, suggest that feelings of security, relaxation, and comfort are associated with silky and

soft fabrics, often made from fibers like rayon, silk, and cotton, in contrast to restrictive spandex and itchy wool (Ramachandran & Brang, 2008; Kyriacou et al., 2021).



Figure 5: Inflatable Seat (1), Napping Pillow (2)

Moreover, these qualities of textiles can be enhanced in interactive garments or experiences. For example, the soma matt (fig 6), supports the

ability to direct your attention by providing heat feedback to different parts of your body while you follow the instructions of a pre-recorded session. Other example of a shift in design and technology from being solely focused on efficiency to considering contemplation and reflection through embodied practices (Höök, 2018) is of Body Wonders by Pauline Van Dongen (fig 6). Body Wonders was created in response to the overwhelming environment and the need to maintain physical distance in a post-COVID world. This innovative smart shirt utilizes touch as a means of communication, allowing individuals to experience messages, emotions, and feelings in a new and unique way through their skin.

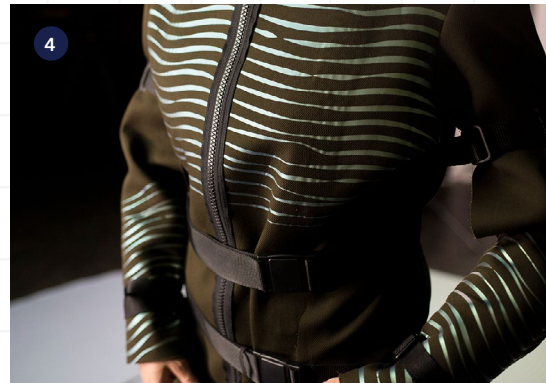
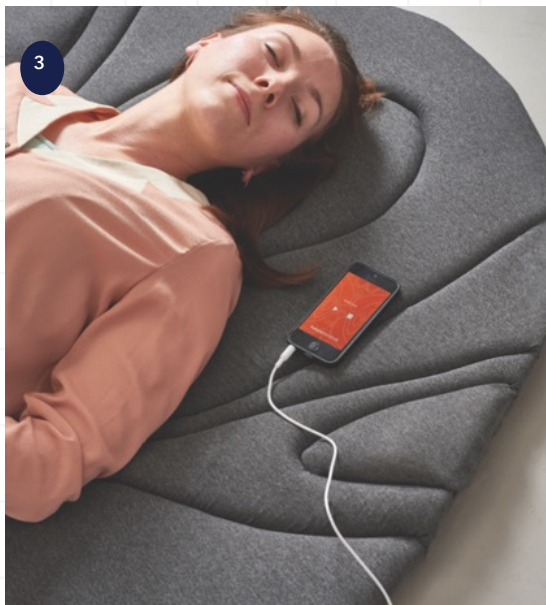


Figure 6: Soma Matt (3), Body Wonders (4)

2.3.2 Sensorial Properties of Materials

In this section, we will explore the sensorial properties of textiles and how they influence emotional responses and user perceptions. Based on the research of Elvin Karana, Paul Hekkert, and Prabhu Kandachar, we understand that a product's meaning is influenced by various factors such as its form, material, function, color, context of use, and user characteristics. Any change in these factors can alter the meaning attributed to the product.

Out of the five primary senses—sight, touch, smell, taste, and hearing—the tactile qualities of **textiles have a significant impact on our emotional responses**. The interaction between these sensory properties and user perception is cru-

cial (Özçelik Kayseri et al., 2012). For example, smooth surfaces often evoke feelings of comfort and elegance, while shiny surfaces are typically associated with high-tech or futuristic qualities. Designs with symmetric, repetitive patterns in textiles have been found to have a calming effect on emotions (Stylios & Chen, 2016). Additionally, sensory properties like warmth and pressure can create sensations similar to being hugged or massaged, providing comfort to the user (Price et al., 2022; Foo et al., 2021).

To evaluate these sensory qualities, the concept of “fabric hand” is commonly used. **“Fabric hand” refers to the overall sensation experienced when touching or manipulating a fabric** (Özçelik Kayseri et al., 2012). This method is essential for experts and consumers alike, who rely on their sense of touch to assess a material's quality based on the sensations it elicits (Kawabata, 1980). Karana and her colleagues have identified several key sensory properties that relate to the tactile experience of textiles:

Ductility: The ability of a material to deform under tensile stress, often associated with flexibility and adaptability.

Elasticity: The capacity of a material to return to its original shape after deformation, linked to resilience and durability.

Roughness: The texture of a material's surface, evoking responses ranging from ruggedness to coarseness. While roughness can also be perceived visually, this study focuses on the tactile experience.

Softness: A measure of how a material yields to pressure, commonly associated with comfort and gentleness.

Strength: The ability of a material to withstand applied force, indicative of durability and robustness.

Warmth: The sensation of heat conveyed by a material upon touch, often creating a feeling of coziness and comfort.

Weight: The heaviness of a material, influencing perceptions of solidity and substance.

These properties are interconnected and can be grouped (fig 7) to help us understand how to utilize the tactile qualities of textiles to evoke specific emotional and perceptual responses. For instance, **softness is a fundamental aspect of tactile perception** and plays a significant role in how textiles are experienced globally (Dhong et al., 2019). Factors like **indentation depth and contact area are crucial in representing softness**. The deformity of the finger into the textile and the extent of contact with the material have a

significant impact on the perception of softness (Dhong et al., 2019). Texture is another critical tactile quality that represents the surface quality of fabrics and is essential in textile design (Zeng et al., 2024). The perception of texture can evoke various psychological feelings and emotions. For example, soft and smooth fabrics like coral fleece and velvet are known to stimulate positive emotions. The emotion-fabric texture model suggests that both hard/soft and rough/smooth textures can significantly enhance feelings of pleasure (Zeng et al., 2024). An example of how textiles can communicate emotion is seen in the FELT (Davis, 2017) project, which is a computational textile panel measuring 5" × 6" (150 cm × 180 cm). Designed to explore how static and shape-changing textiles convey emotions through vision and touch, FELT illustrates that different textural expressions—whether they are static or dynamic—can communicate various emotions depending on whether people experience the textiles through vision alone or both vision and touch. By understanding and utilizing these tactile qualities, textiles can be designed to serve dual purposes: functionality and evoking specific emotional responses. This enhances the overall user experience in a profound manner. By exploring these tactile qualities, we can further delve into the phenomenon of self-touch, as clothing acts as a medium for both physical and emotional responses.

TACTUAL	pressure	> softness (soft- hard)
	force	> weight (light- heavy) > ductility (ductile- tough) > strength (low- high) > elasticity (low- high)
	friction	> roughness (rough- smooth)
	temperature	> warmth (warm- cold)
VISUAL	light reflection	> reflectiveness (reflective- not reflective) > glossiness (glossy- matte) > transparency (transparent- translucent- opaque)
	color	> colorfulness (colorful- colorless) > intensity of color (intense- mild)
	odor	> odorous (natural- odorless- fragrant)
OLFACTORY		

Figure 7: Sensorial Properties of materials

2.3.3 Benchmarking Textiles for Wellbeing

This benchmarking report explores the intersection of textile design and well-being, with a particular focus on how various textile properties contribute to sensory interaction and emotional experience. The tactile qualities of textiles—such as texture, warmth, and softness—are not just physical attributes but are intimately connected with emotional well-being. The objective of this benchmarking study is to identify and compare a range of textiles and wearable designs that enhance well-being through touch, in order to understand how current industry products leverage these tactile properties to create positive emotional and sensory experiences. Objective: The primary goal of this study is to explore the role of textile properties in promoting well-being through touch. The study aims to:

- Identify and compare various textiles and wearable designs that utilize tactile properties to enhance well-being.
- Understand how these designs are practically applied in everyday life.
- Analyze the tactile experiences provided by these designs, focusing on how they engage the sense of touch.
- Understand the emotional impact of these designs, particularly how they evoke feelings of comfort, security, or joy through their tactile qualities.

Methodology

This benchmarking study utilizes a comparative analysis approach to assess a selection of textiles and wearable products that prioritize enhancing well-being through tactile interaction. Each product was evaluated based on four key criteria:

- Dimension of the textile:** How the design allows for various forms of sensory engagement, such as heat, vibration, or shape-changing elements.
- Practicality:** The extent to which the product is applicable and useful in daily life.
- Tactile Experience:** The quality and nature of the touch-related experiences that the product provides.
- Emotion:** The ability of the design to evoke positive emotional responses through its tactile qualities.

Data Collection

Information was gathered from a variety of sources, including academic papers, industry reports, and discussions with fellow designers specializing in well-being and touch. Additionally, the study took an exploratory approach by examining artistic works that offer creative interpretations of the relationship between textiles and emotions.

Keywords and Search Strategy

Keywords such as "touch and well-being," "self-touch," "textile and emotions," and "smart textiles" were used to search for relevant industry standards and innovative products. This search revealed a gap in design innovation within the field, particularly in products that specifically address the relationship between textiles and self-touch. This gap highlights the need for further exploration and development, making this benchmarking study an important step in identifying areas for innovation

Comparison and Analysis

The following design products were selected based on the criteria mentioned above. Table 1 illustrated the comparison in detail.

Design Intervention	Tactile Experience	Textile Dimension	Practicality	Emotion
1. Soma Bits by Vasiliki Tsaknaki and Kristina Höök.	Communicating sensations through the design by placing them on different parts of the body.	Form and the texture Allows for heat, vibration, and shape-changing to be placed on and around the body.	Prototyping toolkit	Curiosity and a sense of playfulness, potentially reducing stress and enhancing emotional well-being through touch.
2. ISSHO - A smart denim jacket by Studio Pauline van Dongen	Communicating with the wearer through gentle stroking movements.	Change of material or form: Embraces denim's characteristics to hold a unique dialogue with its wearer.	Experiential wearable product	A feeling of connection and engagement
3. The Healing Imprint by Laura Deschl	Textures provide a unique tactile experience, combining touch with physical therapy through acupressure.	Texture: The texture on the material holds the acupressure balls in place embracing the textural and stretchiness of the material.	Award winning thesis	Feelings of calm and relaxation
4. Haptic Labs by Emily Fischer.	The soft, warm texture of the quilt provides a comforting tactile experience, reinforcing the emotional narrative embedded in the design through touch on your body.	Texture, Softness & Warmth: Uses texture on quilts to communicate a story - to bring in memory of home through the warmth of the quilt.	Daily use, currently being sold.	Feelings of warmth, comfort and love.
5. Kozie by Filip Studio	The softness of the material and the sensation of being stroked create a deeply comforting tactile experience	Texture & Softness: It uses the softness and the texture of the material to form a soothing experience of stroking to play orchestra.	Therapeutic application	Feelings of safety and calm, using touch to provide emotional reassurance and reduce anxiety.

6. Napping Pillow by Ostrich Pillow	Provides support to the body parts through textile, soft tactile experience.	Form and the softness: Blocks out light and noise and creates an immersive experience for the person to focus on themselves.	Daily use, currently being sold.	Feeling of comfort, warmth and relaxation.
7. Soma Matt by Kristina Höök	Feeling of heat through the body, communicating with the body.	Form, softness and texture: A matt that allows for a comfortable lying down position to indulge in a experience by your own.	Experiential, introduces a new concept to the field of design.	Feeling of comfort, warmth and relaxation.
8. Vollebak's Relaxation hoodie	The touch of the textile on the body.	Form, softness and texture: The textile create an environment through its properties which creates a space inbetween bed and an isolation tank.	Daily use, currently being sold.	Feeling of comfort, warmth and relaxation.
9. Tactile Orchestra Filip Studio	The use of hands with the textile for stroking.	Form, softness and texture: The textile create an experience for the user through the movement of hands on the texture creating sound.	Experiential installation.	Feeling of playfulness, symphony and happiness.

Table 1: Benchmarking of textiles for well-being through the medium of touch.

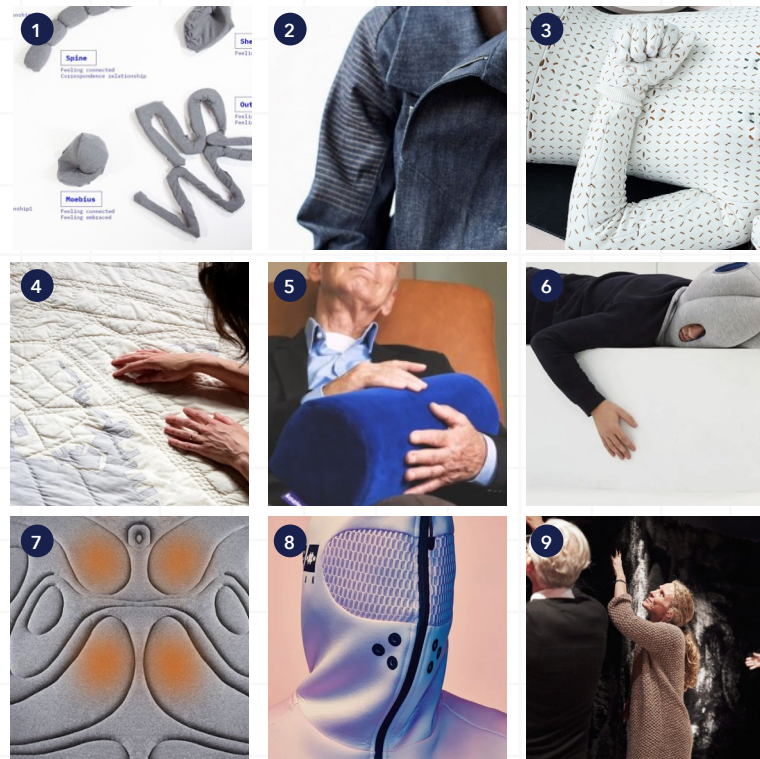


Image 3: Design interventions chosen for benchmarking (numbered as table 1)

Conclusion

The benchmarking study highlights various textile design interventions that combine tactile experiences with emotional well-being enhancements. Designs like the napping pillow by Ostrich Pillow and Völlebak's relaxation hoodie prioritize comfort by using soft, adaptable materials, ensuring practicality and promoting relaxation in daily use. Experiential designs such as Some Bite by Vaeltilä Tokkonäki and ISSHO by Studio Pauline van Dongen offer dynamic interactions that respond to body heat or movement, fostering a deeper emotional connection. Innovative pieces like Somate by Kristine Höck and Healing Imprint by Laurie Deschl incorporate thermal and therapeutic textures, showcasing

the dual role of design as both art and a tool for wellness. The playful tactile interactions from Filipp Studio's Kozie and TexTile Orchestra also demonstrate the contribution of joy and playfulness to emotional resonance. This study indicates a growing recognition of textiles in enhancing well-being, with proactive efforts to develop sensory-appealing products that cater to emotional health. These findings underscore the potential of textile design to blend aesthetics with functional wellness, reflecting a shift towards integrating sensory experiences into broader health strategies. They provide a solid foundation for future innovations and serve as inspiration for this project.

2.4 Conclusion

In this chapter, we have explored the multifaceted concept of self-touch from various perspectives in order to create a comprehensive understanding. Initially, we defined self-touch as a nonverbal gesture that involves touching one's own body, providing sensory stimulation and fulfilling emotional needs. We examined the significance and benefits of self-touch, noting that it is linked to a range of emotions and serves functions such as stress relief, emotional comfort, and information processing. We emphasized the role of hands, highlighting their natural tendency to explore and engage with our surroundings, which plays a crucial role in self-touch through the action-perception loop.

We also examined parts of body through which we indulge in self-touch actions such as the head, face, neck, legs and clothing. Additionally, we further explored self-touch from behavioural, phenomenological, and anthropological perspectives due to the absence of clear categorization and one comprehensive literature source on self-touch. This perspective allowed us to view self-touch as a behavior, a social act, and a means of defining our relationship with our bodies. It revealed the intricate interplay between our actions, bodies, cognition, emotions, and the surrounding environment. Moreover, through this literature review we discovered a lack of practical applications for this natural phenomenon.

In the context of textiles, we examined how clothing, a fundamental part of our daily lives, plays a significant role in shaping our behavior and emotional state. Through the concept of "enclothed cognition," we explored how the tactile qualities and forms of textiles influence our mental state and performance. For instance, we found that soft and warm materials associated with relaxation can enhance comfort, while restrictive or itchy fabrics may cause discomfort. Studies on sensory design further highlighted how textiles can provide sensory exploration and experiences that cater to psychological needs for comfort, security, and identity. Lastly, the benchmarking study provided a comparison between current design practices in the field of textiles and touch which serves as an inspiration for the project.

The key takeaways from this chapter help us ahead in the project to explore the phenomenon of self-touch, through clothing, as clothing mediates experiences and combines physical and emotional responses.

User Research

In this chapter, we build on the insights from the literature review by conducting an observational study and a two-day workshop. The goal of the observation study was to explore and understand the various types and uses of self-touch, address gaps identified in the literature, and validate the findings. The observations further informed the workshop designed to deepen our understanding of self-touch and its relationship with textile properties.

3.1 Observation Study

- 3.1.1 Research Question
- 3.1.2 Environment of Study
- 3.1.3 Participants
- 3.1.4 Observations
- 3.1.5 Conclusion

3.2 Workshop

- 3.2.1 Aim of the Workshop
- 3.2.2 Participants
- 3.2.3 Layout & Set-up
- 3.2.4 Procedure
- 3.2.5 Research Ethics
- 3.2.6 Results
- 3.2.7 Conclusion

3.1 Observation Study

The literature review gave us a basic understanding of self-touch and the role of textiles. However, it also **revealed several gaps** that hindered a comprehensive understanding of self-touch as a **daily occurrence** (fig 8). To **address these gaps and confirm our findings in a real-life context, we conducted an observational study and a workshop**. I found it challenging to relate the literature to everyday life, as it was very theoretical and limited. Our ultimate aim was to gain insights into how people engage with textiles through self-touch.

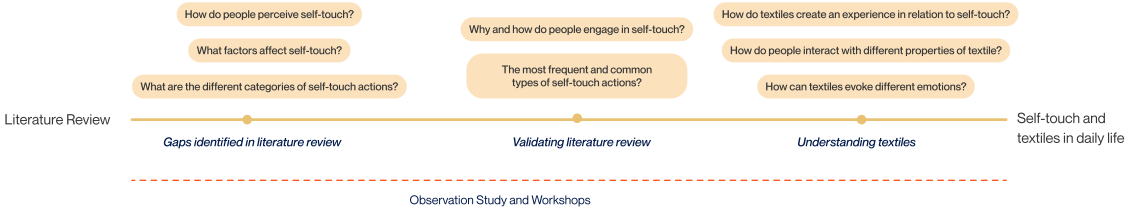


Figure 8: Overview of the aim of the observation study and workshop

Gaps identified in literature review

- What are the different categories of self-touch actions?
- What factors affect self-touch?
- How do people perceive self-touch?

Validating literature review

Why and how do people engage in self-touch?
The most frequent and common types of self-touch actions?

Understanding textiles experience

- How do textiles create an experience in relation to self-touch?
- How do people interact with different properties of textile?
- How can textiles evoke different emotions?

3.1.1 Research Questions

- The aim of the observation study is:
- What actions do people perform as self-touch actions?
- What factors influence self-touch?
- How frequently do people engage in self-touch?
- Which parts of the body do they touch?

3.1.2 Environment of Study

The environment chosen for the study was a **coffee shop(caf  )**, a dynamic setting where people came in group of 2-3. This setting was particularly interesting because it accommodates **both relaxed and tense interactions, conversations ranging from casual catch-ups with friends to formal online/offline interviews**. It is also a place where people come alone as well as with others, providing an opportunity to observe self-

touch behaviors **both direct (when with a group of people) and indirect (working on laptop) in the presence of others**. The study took place over two days (1 hours each day) at two different cafes. Observations were made from a table in between the main seating area observing people sitting across each other with a table in between them as well. The atmosphere was warm and sunny, with the study being conducted indoors.

3.1.3 Participants

The group of people observed at the cafes were diverse in terms of age and nationality with mostly equal proportion of male and female.

3.1.4 Observations

As an observer, I positioned myself within the crowd, allowing me to observe people in various directions. My main focus was on the **movement of people’s hands in regard to self-touch**. I paid particular attention to the body part they were touching through their hands, their role in the conversation (whether they were speaking or listening), and their gender. To assist with my observations, I quickly sketched what I saw and took notes to record other details.

It was observed that people engage in different self-touch actions during their conversations with others, figure 9 illustrates the various types

of self-touch actions that people engaged in. These actions have been categorized into groups (Appendix A) based on the number of people who engaged in them, resulting in a list of the parts of the body people touched with as shown in table 2.

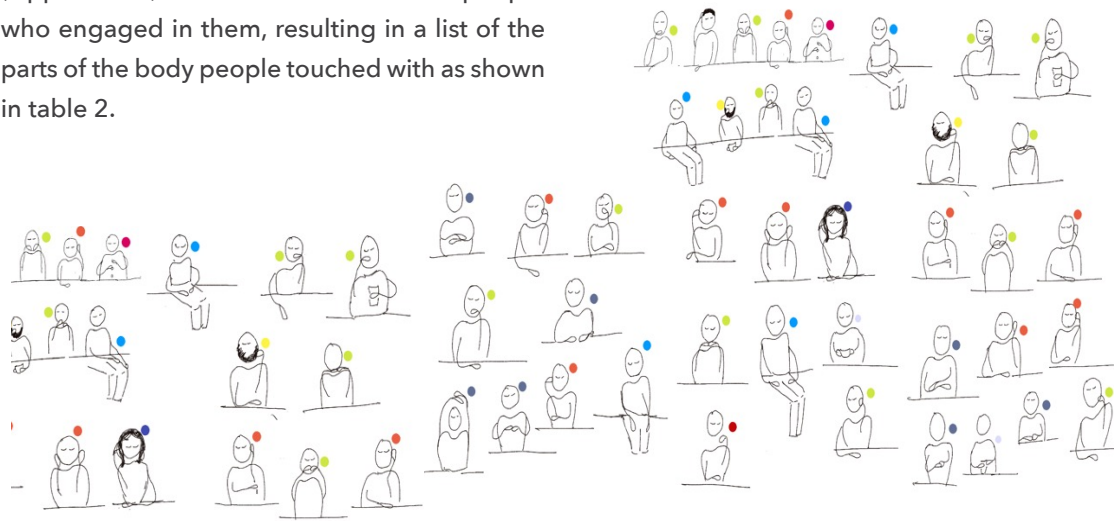


Figure 9: Various types of self-touch actions observed in a coffee shop

Gender	Surface touched during self-touch actions
Men and Women (both)	Upper Cheek, Lower Cheek, Chin, Lips, Neck, Arm & Thighs
Men (only)	Beard, Pockets & Hair
Women (only)	Hair & Accessories

Table 2: The most common parts of the body touched during self-touch actions.

Personal factors	Contextual factors	External Factors
Gender	Weather factors	Objects (accessories, clothes, table, cup, laptop)
Nationality	Environmental factors (vibe of the place)	-
Body parts	Type of conversation	-
Position of the body	Cognitive task (attention and memory task)	-
-	Social presence	-

Table 3: Factors affecting self-touch actions in a public setting

Another interesting aspect of self-touch observed was the role of **external stimuli in the interaction**. These stimuli included personal objects like accessories, clothes, as well as items such as a table, cup, and laptop, highlighting how different factors influence self-touch. Additionally, **contextual factors** influencing self-touch in this context were:

- Gender of the person
- Weather conditions
- Type of conversation (formal or informal)
- Position of the body (sitting or standing)
- Role in the conversation (listening or speaking)

These different factors are further categorized as personal, contextual and external factors that influence self-touch (table 3).

3.1.5 Conclusion

The observation study provided insights into self-touch behaviors and the factors that influence them. It confirmed the existing literature on body parts, particularly with regards to sFST being the most commonly involved area followed by arms and legs. The study found that there was very little variation in the types of actions performed during self-touch, with the hands consistently being engaged. Most self-touch actions were carried out unconsciously, as a natural form of expression. The study also confirmed the existing literature on the significance of self-touch in information processing, showing variations between individuals in the roles of speakers and listeners.

Additionally, the study highlighted the impact

of external objects on self-touch, which had not been previously addressed in the literature. It emphasized the importance of our actions adapting to changing environments. As a researcher, this study made me more aware of my own self-touch actions and how they are influenced in the presence of others.

However, due to the study being conducted in an uncontrolled environment, further investigation was needed to understand variations of self-touch actions as well as identify factors which directly influenced self-touch. Moreover, it was also important to understand how people interpret self-touch in order to fully comprehend its impact on individuals. To achieve this, a 2-day workshop was conducted as the next step towards gaining deeper insights.

3.2 Workshop

A 2-day workshop was conducted with two main objectives. On the first day, participants were asked about their understanding and use of self-touch in their daily lives. This exercise aimed to increase their awareness and observation of their self-touch actions. On the second day, building on the awareness developed on the first day, textiles were introduced to the participants. With a clearer understanding of self-touch actions from the previous day, participants explored how textiles could enhance or diminish their self-touch experience. By examining how participants interacted with textiles and identifying the qualities that resonated with their self-touch, insights into the emotions evoked by different textile qualities, such as comfort or discomfort were gained in relation to self-touch.

3.2.1 Aim of the Workshop

Day 1

- How do people interpret self-touch?
- How do they define it in a social vs private setting?
- Which parts of the body do they touch the most, in a social vs when private setting?
- Why do individuals engage in these actions and what purpose do they think they serve?
- How does self-touch change in different situations evoking different emotions?

- Can raising awareness or providing education alter people's perspectives on self-touch?
- How does gender and nationality impact self-touch?

Day 2

- How do individuals use textiles to modify self-touch? - increase or decrease it.
- Which materials do they use and why?
- What quality of material can make them feel self-touch? (validating literature- pressure, force and friction)
- How does the material while engaging in self-touch make them feel? (Affective + Performative level of material)

3.2.2 Participants

A diverse group of university students were selected, with a focus on gender and nationality as key factors in recruitment. A total of four participants were recruited through whatsapp message, ensuring an equal gender distribution.

Research Ethics: Prior to taking part in the workshop, the recruited participants were asked to read and sign an informed consent form (Appendix B). To ensure the protection of people participating in the study, all data was anonymized.



Image 4: Setup for the workshop day 1

3.2.4 Procedure

The following is a detailed breakdown of the activities that took place on Day 1. These activities were specifically designed to gradually increase awareness and establish a solid foundation for exploring the relationship between self-touch and textiles on day 2. The session lasted for 55 minutes.

Day 1

Introduction (5 minutes): The workshop commenced with a brief introduction to the theme of exploring self-touch through materials. After which the participants were oriented towards the goals of the workshop, emphasizing on the significance of self-touch beyond its common misconception of self-pleasure. The session aimed to explore various aspects of self-touch and its potential impacts on well-being.

Question 1 (5 minutes): Participants were prompted to individually reflect on their interpretation of self-touch and jot down their thoughts (Appendix C). This initial activity set the stage for a subsequent group discussion.

Open Discussion (5 minutes): A group discussion followed, allowing participants to share their perspectives on what self-touch meant to them. Topics included which body parts are typically engaged in self-touch and whether participants had noticed these behaviors in themselves or others.

Presentation (5 minutes): Scientific definition (as defined in section 2.1.1) of self-touch was presented to participants to compare it with their personal experiences, aiming to enrich their understanding and provide a broader context.

Question 2 (2 minutes): Participants were instructed to close their eyes and recall their last experience of self-touch in a social setting with support of an audio 1* playing in the background. The guided visualization exercise encouraged participants to remember specific actions and associated emotions in a specific context.

Activity (3 minutes): Upon opening their eyes, participants recorded their reflections on provided sheets (Appendix C), detailing the actions

they recalled and the emotional responses they elicited.

Question 3 (2 minutes): Following the previous activity, participants closed their eyes again, this time visualizing an experience of self-touch in a private setting with the support of an audio 2**.

Activity (3 minutes): After reopening their eyes, participants documented their reflections on the second experience, focusing on the actions taken and their emotional reactions.

Open Discussion (5 minutes): The session concluded with an open discussion about the differences between social and private self-touch experiences. Participants shared their insights on how these actions made them feel and whether they perceived any benefits associated with self-touch.

Partner Activity (5 minutes): Participants engaged in paired conversations where they shared personal experiences of enjoyment and difficulty from the past week.

Activity (5 minutes): Following the partner activity, participants observed and documented the self-touch actions exhibited by their partner during the conversation. They noted down these observations alongside the topics discussed.

Discussion (10 minutes): The workshop concluded with a group discussion where participants reflected on how observed self-touch behaviors influenced their conversations. They exchanged observationsheets (Appendix C) with their partners, exploring the significance and personal meaning behind these actions.

As mentioned earlier, day 2 started by introducing textiles to the participants. These textiles were carefully chosen to have variations in texture, thickness, elasticity, and softness-roughness, offering a wide range of variables for the participants to explore.

The session began with participants engaging in a hands-on exploration also known as tinkering of materials, aligning with the MDD framework. They explored the tactile qualities of each material, encouraging an open interpretation helping them identify and understand the tactile characteristics (interpretive level - Ma2E4) and facilitate comparisons between different materials. By touching and feeling the materials on various parts of their bodies, participants related these sensations to self-touch, deepening their understanding of self-touch through textiles. After this exploration, participants made connections between the textiles and their actions of self-touch. Using the performative vocabulary of Ma2E4, they described their interactions with

*The audio 1 consisted of sounds from a restaurant creating an environment of being present in a public setting for the participant.

** The audio 2 consisted of sounds of children playing and people roaming around.

the textiles. The emotions evoked by the textiles were then recorded, using the affective level of the toolkit. This process provided a comprehensive understanding of how different qualities of textiles impact self-touch and the associated emotional responses.

Day 2

Open Discussion (2 minutes): Participants engaged in a brief discussion reflecting on any changes in their perception of self-touch since the previous day and sharing their interpretations of self-touch.



Image 5: Textiles used in the workshop

Textile Exploration (5 minutes): Participants were given various textile samples (image 5) to touch and explore, allowing them to familiarize themselves with the unique textures and qualities of each material. These samples included polyester, cotton, wool, and nylon, offering a range of textures, softness, elasticity, and thickness. Some of the samples also featured thermochromic properties, enabling them to change color with temperature variations.

Activity (15 minutes): Participants selected 1-2 textiles from the provided collection to modify or influence their experience of self-touch. They created one version of self-touch that enhanced the sensation and another that diminished it. Participants enacted self-touch using these variations and reflected on their choices.

Discussion (6 minutes per participant): Each participant presented their enactment of self-touch with the chosen textiles, discussing:

1. Reasons for their textile selections.
2. Emotions evoked during the self-touch activity.
3. Effects of the materials on their self-touch behavior.
4. Following each presentation, the textiles were passed around for others to explore and engage with.

For analysis of the quantitative data collected, card sorting and mapping method were used. This method aided in categorizing information into different categories, allowing for the identification of common themes and relationships.

3.2.5 Results

Perception of self-touch

The first part of the workshop explored participant's understanding and applications of self-touch in their daily lives. The findings show that, participants attributed various meanings to self-touch, categorizing it into three primary themes

(Appendix C) **self-care, functional acts, and self-love. Self-care emerged as a prominent theme**, where participants viewed self-touch as a method of nurturing and maintaining their physical and emotional well-being. Participant 1 said **"When you are looking for yourself and touching yourself, it is that you are recognizing yourself like feeling yourself"**. Activities such as massaging to alleviate pain or discomfort and functional acts such as grooming play a significant role in participant's perceptions of self-touch. Participant 2 said, **"messaging is a form of self-love through self-touch."** Additionally, self-touch was also recognized as a form of self-love and pleasure, as a means of physical sensations. Participant 4 said, **"for me self-touch is pleasure, be it from taking a bath to masturbating, it relaxes me."**

Self-touch in social vs private setting

All participants associated self-touch differently based on the setting. In **public settings**, self-touch was primarily linked to **negative emotions** such as anxiety, due to the presence of others, heightened self-consciousness about appearance, and increased attentiveness. Participant 3 said, **"I rub my nails together when I am anxious around people."** Participant 1 mentioned, "When I am talking to people, they tell me I move my hands too much. I am always conscious of how I keep my hands." Participant 2 added, "I am conscious of how I sit, and I keep adjusting my posture using my hands when I am surrounded by people."

Conversely, in **private settings**, self-touch evoked **positive feelings** of comfort and relaxation. Participant 3 remarked, "When I am alone, I touch myself without really thinking about it."

Parts of the body

These findings expand upon the partner activity mentioned above. During both enjoyable and challenging experiences, it was observed that participants engaged in self-touch actions (image 6) without being aware of them. These actions remained consistent regardless of the conversation topic. However, the specific actions did vary depending on whether the participant was a listener or a speaker. This observation was also noted during the observation study. When participants were listening, they tended to keep their hands together or near their face. On the other hand, when participants were speaking, they used their hands to express themselves or interact with objects in front of them such as a pen or the table.





Image 6: Self-touch actions participants performed during a conversation.

Use of textiles

During the workshop, participants explored different ways to enhance their experience of self-touch using textiles. At first, all participants focused on touching their face. However, when participants were encouraged to explore other parts of their body, they had difficulty moving beyond hand movements, revealing a limitation of the workshop. This limitation highlighted that sFSTs are the most common and frequent type of self-touch as mentioned earlier. The participants were so accustomed to these actions that they felt confused when asked not to touch their face, making it difficult for them to use the textiles in relation to self-touch.

One participant used the cushioning properties of the textile to support their head while resting their hand (image 7). Others experimented with using the textiles as gloves to intensify the sensory experience. Two participants found that the chosen textiles unexpectedly reduced their self-touch experience. This observation highlights how the visual perception of a textile can affect a person's expectations of its sensory experience.



Image 7: Participants exploring textiles through self-touch actions.

Qualities of textiles

In observing all participants, specific qualities of materials - **lightness, softness, texture, and**

stretchiness, were noted to consistently enhance self-touch experiences (Appendix D) as they invited the participants to touch and interact with them. Conversely, qualities such as **warmth, noise, and overly soft or spongy textures** were found to diminish the self-touch experience for participants as they created discomfort with touching the textile.

Affective and performative level of experience

The textiles evoked a wide range of emotions in participants, including confidence, attraction, comfort, surprise, curiosity, and fascination (see Appendix D). The materials' lightness and ability to change color were consistently noted as appealing and attractive. Participants enjoyed rubbing their hands together to see the color changes, with Participant 1 remarking, **"The change of color makes me want to rub it more."** Some participants even felt amused by the softness and warmth of some materials, which reminded them of cozy blankets. Participant 1 also said, **"Oh so soft, it feels so good just like my blanket."**

This highlights how textiles can evoke memories, associations, and meanings, aligning with the interpretive level of the Ma2EH toolkit. Although the primary focus was on the affective and per-

formative levels, some interpretive attributes were observed, demonstrating that emotions (affective level), performative aspects, and meanings attributed to textiles are closely linked and often intertwined. Emotions Evoked by different properties of textiles were:

Color Change: Evoked a feeling of playfulness (interpretive level) reminiscent of childhood.

Softness: Brought feelings of comfort and reminded participants of their blankets.

Texture: Provoked fascination and attraction as participants wanted to touch and explore the material.

Lightness: Instilled a feeling of confidence, as participants felt the textiles were a part of their body.

Warmth: Caused discomfort, as it became difficult to wear for extended periods.

However, when it came to the performative level of the textile experience, participants struggled with the vocabulary used (Appendix D), leading to its exclusion from the study.

3.2.6 Conclusion

The workshop provided us with valuable insights into different types of self-touch actions and how they relate to textiles. By exploring the tactile properties (image 8) of various materials and their impact on self-touch, we gained a better



Image 8: Textiles properties explored during the workshop.

understanding of which materials can enhance or diminish this experience as shown below. This knowledge will guide us in the selection of materials for future studies. Furthermore, we will experiment with these variables of the textiles to create a sense of comfort, playfulness, and nostalgia. This serves as a crucial step towards validating the literature and addressing the identified gaps, which informs the development of a taxonomy of self-touch and its relationship to textiles in the next chapter.

Conceptual Framework

This chapter serves as the base of our project. We present two new taxonomies that are essential for our project: 1. The Taxonomy of self-touch, which defines and categorizes various types of self-touch, and 2. The Taxonomy of self-touch in relation to textiles. These taxonomies are rooted in our literature review and user research and helps us select textiles and explore their various variables in relation to self-touch. These taxonomies will guide the design development phase of our project.

4.1 Taxonomy of Self-Touch

4.2 Taxonomy of Self-Touch in Relation to Textile



4.1 Taxonomy of Self-Touch

As mentioned above, the term “self-touch” currently lacks comprehensive literature, so it was necessary to define and categorize self-touch in order to understand it better and apply it in various fields.

The creation of the taxonomy is rooted in the user research, which involved grouping and mapping different types of self-touch based on the participants perceptions (section above). This led to the division of self-touch into broader categories with the support of ChatGPT. These categories were then elaborated and differentiated based on various criteria, **including functionality, purpose, and the level of awareness involved in performing self-touch.**

Functionality refers to the role or effect of self-touch actions, such as whether they serve a regulatory function (e.g., self-soothing during stress) or a communicative function (e.g., gestures that accompany speech). Purpose considers the underlying intent behind the self-touch, such as whether it is for comfort, concentration, or a means to express emotions. The level of awareness assesses how conscious or automatic the self-touch actions are, distinguishing between deliberate self-soothing actions and subconscious behavior.

To make the taxonomy more relatable and

practical, examples are provided for each category. These examples help readers or users identify and connect the categories to their own actions, making the taxonomy both informative and applicable, offering a useful framework for further research and application in areas such as psychology, design, and human-computer interaction.

The figure 10, illustrates the concept of self-touch, taking into consideration its functionality, purpose, and the state of awareness in which it is performed.

Self-touch is as a behavior where individuals contact their body, primarily using their hands or other body parts. These actions can occur with or without the individual's awareness and fulfills bodily needs in a stimulating and rewarding manner. There are two main categories of self-touch based on the medium involved:

1. **Direct Self-touch (or Unmediated Self-touch):** This type of self-touch occurs directly skin to skin.
2. **Mediated Self-touch:** This type of self-touch occurs indirectly or through some intermediary, such as clothing.

Direct self-touch can be further divided into four sub-categories depending upon the state of awareness and the purpose of self-touch:

1. **Functional Self-touch:** This intentional form

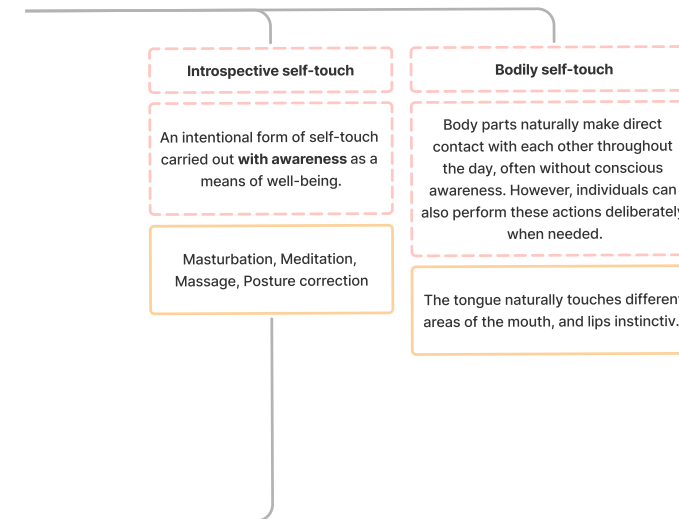
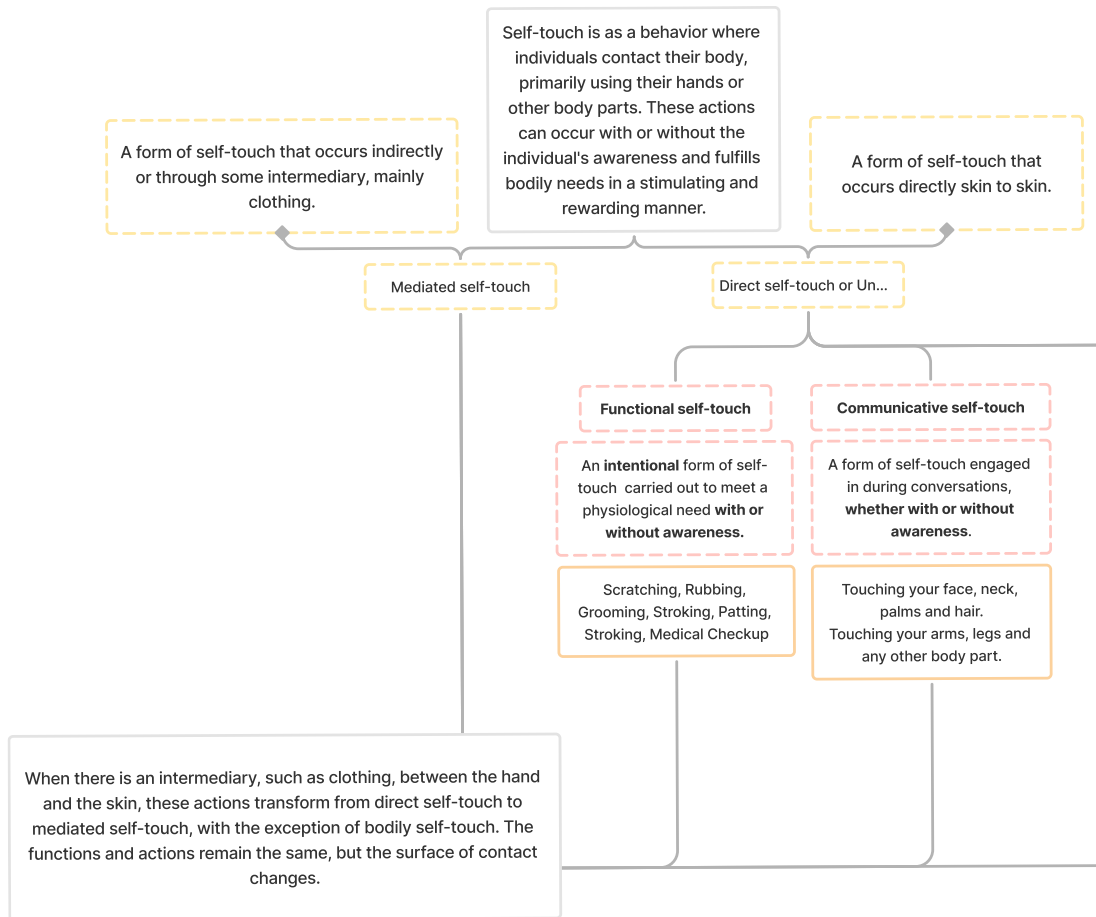


Figure 10: Taxonomy of self-touch

of self-touch is carried out to meet a physiological need, with or without awareness. Examples include scratching, stroking, rubbing, grooming, etc.

2. **Communicative self-touch:** This form of self-touch occurs during conversations, whether with or without awareness. It includes touching your face, neck, palms, hair, arms, legs, and other body parts.

3. **Introspective self-touch:** This intentional form of self-touch is carried out with awareness as a means of well-being. Examples include activities such as masturbation, medical checkups, medi-

tation, massage, posture correction, etc.

4. **Bodily self-touch:** Throughout the day, body parts naturally make direct contact with each other, often without conscious awareness. However, individuals can also intentionally perform these actions when needed. Examples include the tongue naturally touching different areas of the mouth and lips instinctively coming into contact with each other during various activities.

When there is an intermediary, such as clothing, between the hand and the skin, these actions transform from direct self-touch to mediated

self-touch, with the exception of bodily self-touch. The functions and actions remain the same, but the surface of contact changes.

This taxonomy combines various aspects of self-touch discussed in previous chapters, providing a comprehensive understanding of the complexity and overlaps in the actions our body performs to fulfill different needs. It serves as a foundational tool for further study and can inform the design of interventions aiming to enhance well-being through meaningful interactions with our own bodies. Additionally, the taxonomy has

applications in fields such as psychology and human-computer interaction. Researchers and practitioners in these areas can utilize the taxonomy to explore the impacts of self-touch on behavior, well-being, and interactions with technology. For instance, psychologists can study how different types of self-touch, such as soothing or stimulating, influence stress levels and emotional regulation. By grasping these nuances, psychologists can develop targeted interventions or therapies to assist individuals in managing anxiety and improving emotional well-being using their own bodies.

5.2 Taxonomy of Self-Touch in Relation to Textile

After gaining a clear understanding of self-touch, it was important to explore its relationship with textiles and the body. Our user research revealed that these three elements are closely interconnected, with textiles through clothing acting as a second skin. To better understand the impact of different textile variables on self-touch, it was necessary to categorize and map out their various aspects serving as a foundation for conducting experiments with different combinations of variables. It is based on our user research, where participants identified the textile variables that enhanced or diminished self-touch sensations when touched by their hands. The user research also helped narrow down the types of self-touch actions to stroking, rubbing, and pressing, based on their frequency and popularity. This taxonomy figure 11, illustrates the interactions between self-touch, the body, and textiles, categorized into different attributes. It is divided into three main components: self-touch, textile, and body where self-touch is central, indicating its importance in the interaction between the body and textiles. It is categorized into various variables describing each parameter.

For self-touch these variables are:
Direction: The movement of the hand on the body in form of stroking, pressing and rubbing.
Velocity: The speed of interaction of the hand on the body.

Duration: How long does the interaction last for.

The textile element is connected to self-touch through mediated interaction (mediated self-touch), indicating that textiles play a role in the experience of self-touch when used as an intermediary material between the hand and the body. The variables of textiles include:
Pressure: The amount of pressure applied is influenced by both the depth to which the textile deforms when pressure is applied and the surface area in contact.
Friction: The measure of softness and roughness of a textile.
Thickness: The measure of how thick the textile material is.
Texture: The surface quality of the textile which is influenced by the motion, density and the pattern of the textile.

The body element is connected to self-touch through direct interaction (direct self-touch), indicating that the body directly experiences self-touch without any intermediaries. The variables of the body include:
Location: The specific area of the body where self-touch is applied.
Hand to Body: The use of hands to touch different parts of the body

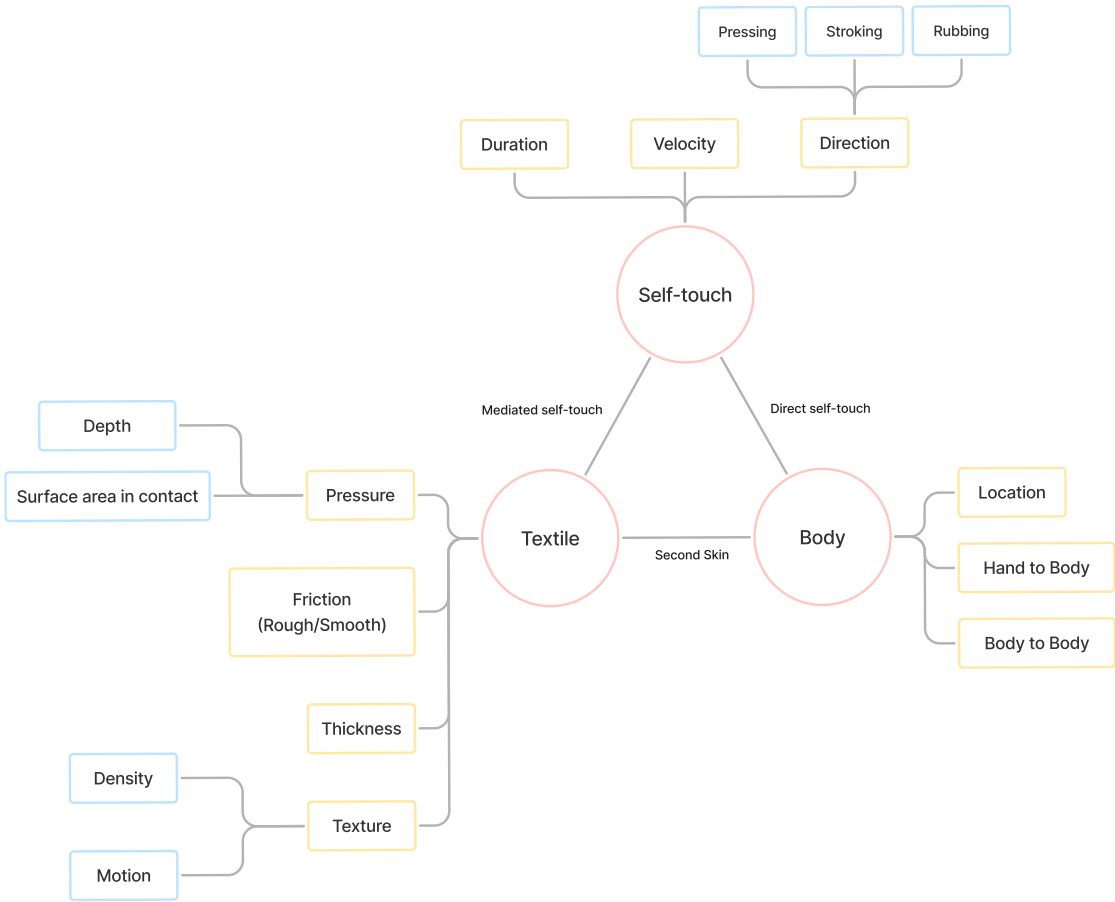


Figure 11: Taxonomy of self-touch in relation to textiles

This taxonomy helps us understand the crucial role textiles play in our experience of self-touch and details various variables that influence these interactions in our daily lives. It acts as a bridge, exploring the relationship between self-touch and our body mediated through textiles. Overall, these taxonomies offer a framework that enhances our comprehension of how self-touch applies to our daily lives and assists in creating textile designs that promote well-being. For instance, healthcare providers can create bandages or garments that provide pain relief by utilizing the knowledge of how self-touch and textiles are interconnected, ensuring that the design incorporates targeted pressure on the textile. The different variables from all three categories are used as a guide to select and tinker with textiles in the next chapter.

Research Through Design

This chapter demonstrates the research-through-design approach that was utilized in this exploratory study. Building upon the conceptual framework discussed in the previous chapter, we explore the various aspects of textiles that could enhance the incorporation of self-touch in our daily lives.

5.1 Research Question

5.2 Prototype - Series 1

5.2.1 Prototype Testing

5.2.2 Participants

5.2.3 Layout & Set up

5.2.4 Procedure

5.2.5 Data Collection & Analysis

5.2.5 Results

5.2.6 Conclusion

5.3 Iteration of Prototype Series 1 - Prototype Series 2

5.3.1 Prototype Building

5.3.2 Discussion and Analysis

5.3.3 Result

5.3.4 Conclusion

5.1 Research Question

In this section, our main research objective is to investigate **how textiles can enhance and guide self-touch**. Our literature review and the development of taxonomies have revealed that textiles play a crucial role in our experience of self-touch. Additionally, as mentioned before, recent research (Spille et al., 2021) highlights the importance of shifting self-touch away from the face (sFST) and towards other body parts. This shift is essential for reducing the transmission of infections through facial contact. The focus is on relocating self-touch actions (sFST) to the hands

and arms, which are the second most frequently touched body parts. We aim to utilize textiles, which are the third most frequently touched surface, to facilitate this shift. To address this question, we developed a series of prototypes that emphasized on stroking, pressing, and rubbing motions. The tinkering with material specifically examines the **variables of velocity and direction** within these interactions, aiming to understand how textiles can effectively guide and enhance the experience of self-touch.

5.2 Prototype Series 1

The goal of this prototype series was to investigate how variables such as **softness, thickness, and texture influence the velocity and direction of self-touch**. Through the user research workshop, it was consistently found that softness significantly enhanced self-touch experiences for all participants. Consequently, I chose cotton which is mostly used for baby products due to its softness, durability, easy handling, and ability to withstand frequent washing and wear. The surface of the fabric is smooth with fine texture (Lateral Dimension (width) ~200um) of the cotton fibres. The softness was kept as a constant variable of textile experience. To ensure consistency and control over the visual sensory stimulation, I decided to use a light blue color (image 9) for all prototypes of textile variations. This choice was made because previous research has demonstrated that visual appearance can have an impact on the tactile experience. In this series the other two variables of thickness and texture are manipulated (see table 4).



Image 9: Soft cotton used for building series 1

Material Variable	Prototype Variable
Softness	Fixed
Thickness	Thick - Thin
Texture	Dense - Light
Colour	Fixed

Table 4: Variables of the textiles

In the development of the prototype, a variety of textile construction techniques were employed to explore different textures, thicknesses, and structural properties. This was my first experience using a sewing machine extensively, which required a process of trial and error. Through this iterative approach, I experimented with several techniques, including folding, pleating, tucking, quilting, and embroidery. Each technique provided unique characteristics and contributed to the overall design (image 10) and functionality of the prototype.

Folding: Folding fabric involved creating sharp creases or gentle bends that can add volume, and structure.

Pleating: Pleating involved folding fabric into a series of even, accordion-like creases. Through experimentation, I discovered how the size and spacing of pleats affect the flexibility and drape of the material. Adjusting these variables allowed me to create dynamic patterns and control the thickness of the textile.



Image 10: Different textures created using different techniques

Tucking: Tucking is similar to pleating but typically involved sewing folds into place to create raised ridges on the fabric surface. By varying the width and frequency of the tucks, I could direct the velocity of movement.

Quilting: Quilting involved stitching multiple layers of fabric together, with a layer of padding in of sponge in between, to create a textured surface and increase the thickness of the textile.

Embroidery: Embroidery involved decorating fabric with thread to create intricate designs and patterns. I experimented with this technique to add intricate details which could direct the movement of the hand.

Throughout this process, each technique offered insights into how different methods can be combined to achieve desired effects in textile design. The hands-on experience with these techniques

not only enhanced my skills with the sewing machine but also deepened my understanding of textile construction. Now, before developing these prototypes, it was essential to refine the definitions of three distinct motions of self-touch, focused on this series to guide our design approach:

Stroking: This involves gently moving the hand along a surface with smooth and fluid motions.

Rubbing: This motion requires applying pressure with repeated back-and-forth or circular motions, often more vigorous and involving friction.

Pressing: Pressing involves applying force or pressure onto a surface or object.

These refined definitions provided clarity in addressing each motion through the design as shown in the table 5.

Type of Motion (Self-Touch)	Prototype	Direction of Motion	Technique Used
Stroking (Prototype s.A)		 Bidirectional (Back and Forth)	Folding and tucking
Stroking (Prototype s.B)		 Bidirectional (Back and Forth)	Folding and paneling
Stroking (Prototype s.C)		 Unidirectional (Forward)	Folding and tucking
Rubbing (Prototype r.A)		 Freeflowing (repetitive motions)	Pletting
Rubbing (Prototype r.B)		 Freeflowing (repetitive motions)	Pletting
Rubbing (Prototype r.C)		 Circular Motions	Embroidery

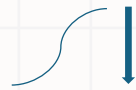
Pressing
(Prototype p.A)



Panelling

Bidirectional motion
Unidirectional compression

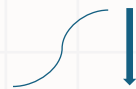
Pressing
(Prototype p.B)



Basic sewing

Freeflowing motion
Unidirectional compression

Pressing
(Prototype p.C)



Quilting

Freeflowing motion
Unidirectional compression

Table 5: Prototype series 1 showcasing the construction details

The design of these textiles was inspired by a benchmarking study of innovative works like Healing Imprint, Kozie, and quilts by Haptic Labs. These projects demonstrated how texture can guide movement and affect how people interact with textiles. By examining these designs, I learned that texture and the speed of interaction (velocity) are closely connected. Moreover, I used the taxonomy of self-touch in relation to textiles developed earlier in the project. It categorized

textiles by density and motion and self-touch by direction, velocity and duration. By combining these variables, I was able to generate ideas for prototype building and my concept. For example: very dense texture + stroking = Linear designs that encourage forward and backward movement -guiding the velocity and duration. Lightly dense texture + rubbing = Fluid and varied interactions - guiding the velocity and duration.

5.2.1 Prototype Testing

All nine prototypes were tested in a semi-structured setup to understand how the texture, thickness, and softness of the textile influence participants to engage in self-touch.

5.2.2 Participants

Two university students were recruited for the study through word of mouth, comprising one male and one female of the same nationality.

5.2.3 Layout & Set up

The testing session lasted for 30 minutes. The session was recorded using both video and audio for additional observation and analysis. The participants were seated next to each other with the prototypes placed on the table in front of them.

5.2.4 Procedure

Introductory Task: The session started with an introduction that outlined the purpose of the study. This was followed by a brief discussion about self-touch and the three specific motions of self-touch: rubbing, stroking, and pressing. After the discussion, the participants were asked to freely explore all nine prototypes placed in front of them. The goal was to ensure that they interacted with each prototype before delving into its relationship with self-touch. Throughout this exploration phase, they were encouraged

to think aloud and express their thoughts and feelings about the textile.

Task 2: The participants were asked to choose a prototype that encourages them to engage in self-touch through the motion of stroking, rubbing, or pressing.

5.2.5 Data Collection & Analysis

The data collection for the focus group discussion was conducted by using audio recordings of semi-structured questions. This approach enabled flexible and in-depth conversations while ensuring consistency in the topics discussed. Participants were encouraged to freely share their thoughts, which provided rich qualitative data for analysis.

After the data was collected, it was analyzed using card sorting and categorization techniques. Card sorting and mapping method were used to organize the data into themes or categories based on the participants responses. This method was helpful in identifying patterns and gaining key insights from the discussions. The analysis process included collaborative discussions with the supervisory committee, where the key categories were examined and refined.

5.2.6 Results

The key findings are as follows:

Multipurpose Functionality: Participants appreciated prototypes that allowed them to perform multiple actions simultaneously, such as stroking and applying pressure. Participant 1 said, "this suits the best, as it supports stoking and pressing."

Influence of Texture: The density and the tactility of the texture on the fabric influenced participants choices and encouraged them to engage with the prototype. Participant 2 remarked, "It is soft and the patterns has a different feeling everywhere." Specific texture qualities as listed in table 6 and shown in image 11 detail out the textyre propetries and the way it impacted the interaction.

Proximity to Hands: Participants always positioned the prototypes on their arms, emphasizing that hand-arm self-touch is one of the most frequent types of self-touch.

Preference for Skin-to-Skin Touch: Participants preferred direct skin-to-skin touch over interacting with textiles. This preference underscores the comforting and reassuring nature of direct touch . Participant 1 said,"I would really like to touch my skin while pressing specially when I

have body pain."

Integration into Daily Life: Textures that were subtle and could be easily integrated into daily life were preferred. Participants favored fabrics that felt natural indicating a desire for a seamless incorporation into their routines. Participant 1 said, "The hidden texture makes it easier for me to incooperate it with my clothing."

Texture Property	Insight
Distance between patterns	Guides the area in contact.
Arrangement of the texture	Directs the hand movement.
Size of texture	Guides the speed of interaction.

Table 6: Texture property identified from the testing.

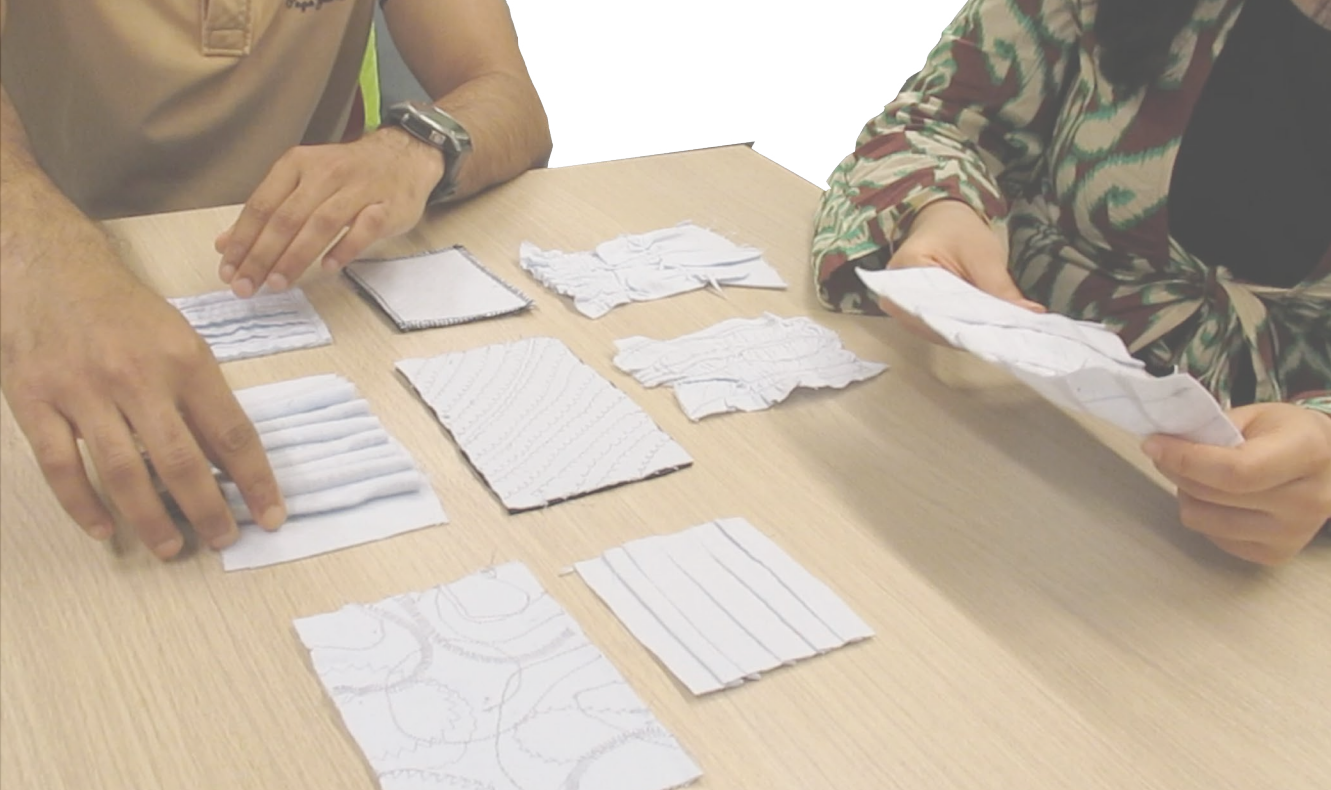


Image 11: Distance between the pattern (1), Arrangement of the texture (2), Size of the texture (3).

5.2.7 Conclusion

During this testing session, we discovered that texture and its various dimensions (listed above) are the main factor that encourages participants to engage with the textile followed by the softness of the textile, while thickness did not appear to affect participant perceptions. It was also observed that participants engaged in various types of self-touch at the same time, highlighting the importance of incorporating a range of approaches in textile design. Encouraging skin-to-skin contact emerged as a key element in enhancing self-touch for the participants.

5.3 Iteration of Prototype Series 1 – Prototype Series 2

After reviewing the results of the prototype testing mentioned earlier, I decided to reassess the initial research question, which is how textiles can enhance and guide self-touch. The focus group discussion of prototype series 1 revealed that self-touch does not have the same impact without direct skin-to-skin contact, which blurs the line between mediated and unmediated self-touch as defined in the taxonomy. This finding is particularly intriguing, and I believe it may be due to the presence of nerve receptors known as CT afferents on the skin. These receptors are responsible for transmitting information about pleasant sensations through gentle stroking and have been linked to the processing of affective social touch in the brain (Case et al., 2021). When these nerve endings are covered by textile, the effects of self-touch might be altered. Phenomenologists as seen in the literature review have also highlighted this duality of self-touch.

The design of this series of prototypes is based on Series 1. The aim was to create areas or openings in the prototypes by physically cutting out parts of the design and by introducing elements which are associated with the skin. The most common element is hair, which was used as an inspiration to use threads. This approach allowed me to retain the mechanisms of the first series while enabling direct skin-to-skin touch. In this case, the variable of surface area (from the tax-

onomy) played an important role in the design process, as the amount of contact area between the textile and the skin had to be balanced to enhance skin-skin self-touch through textile. As a result the research question was changed to:

- How can we use textiles to encourage and facilitate self-touch?
- How can textile enhance skin-to-skin self-touch to provide individuals with a means of managing their emotions?

To address these questions through the design of the prototype, the cotton fabric from the previous series along with scrap materials were used allowing for rapid prototyping.

5.3.1 Prototype Building

In prototype series 1, we established that softness and texture (table 7) play a crucial role in promoting and facilitating self-touch. Now, this set of prototypes look into enhancing skin-to-skin touch through the motions of stroking, rubbing, and pressure.

5.3.2 Data Collection & Analysis

In this series, data was collected through an open discussion with the supervisory committee. During this discussion, a set of prototypes was tested and discussed, with a particular focus on

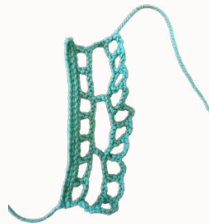
Type of Motion (Self-Touch)	Prototype	Combination of Textiles (Technique used)	Type of self-touch
Prototype J		The base is made from a mesh, which is then layered with textured soft cotton to create contrast.	Stroking and rubbing
Prototype K		A combination of very thin soft thread and soft cotton is used to create a natural feeling when touching your hair, promoting skin-to-skin contact.	Stroking
Prototype L		A variation of the above prototype explores how just hair can facilitate self-touch.	Stroking
Prototype M		Crochet is used to create a textile with ample gaps, providing exposure to the skin.	Stroking and Rubbing
Prototype O		The textile is enclosed and filled with a movable form that adjusts based on the contact area and pressure applied, bringing you closer to your skin in response to the pressure.	Pressing
Prototype P		Vertical and horizontal strands of soft cotton are created and placed with space between them. The cotton is folded to guide the motion of touch.	Stroking

Table 7: Series 2 construction details.

the various variables of the textiles. The data was collected by taking notes and did not require a theoretical analysis, as the key takeaways were identified through the discussion and testing.

5.3.3 Result

Out of the 6 prototypes, elements from two prototypes (K & P) distinctively aligned to the research questions. The elements are:

Gaps between fabric: The spaces between the fabric create a contrast in skin texture that is inviting and pleasing to touch. There is something unique about lightly touching the skin through the textile.

Thread in the gaps: The presence of thread on the skin feels very natural and allows for a free-flowing sensation.

5.3.4 Conclusion

This series of testing allowed us to identify key variables that improve skin-to-skin contact and promote self-touch. These variables include texture, softness, and the contrast between soft and rough materials. Based on these insights, the final design is created in the following chapter. The final design focuses on the motion of stroking as the primary form of self-touch, excluding rubbing and pressing as these actions were less frequently observed in the studies. Stroking was identified by the participants as the most commonly take

action. Moreover, given the time constraints, it was deemed to be the most suitable choice for further investigation.



Design Direction

In this chapter, a design goal and material experience vision are formed to direct the development of the final design that effectively responds to the research questions.

6.1 Design Goal

6.1.1 Design Challenge

6.1.2 Material Experience Vision

6.2 Prototype - Series 3

6.2.1 Prototype Testing

6.2.2 Participants

6.2.3 Layout & Set up

6.2.4 Procedure

6.2.5 Data Collection & Analysis

6.2.5 Results

6.2.6 Conclusion

6.1 Design Goal

My design goal is to encourage people to engage in skin-to-skin self-touch for emotional support in overwhelming situations.

6.1.1 Design Challenge

The main challenge (figure 12) in addressing the **design goals is balancing the mediated and unmediated self-touch**. The design goal exists in the space between these two aspects. Another challenge is to make **self-touch an intentional action causing a behavior change**, while also making the prototype comfortable for the participant.

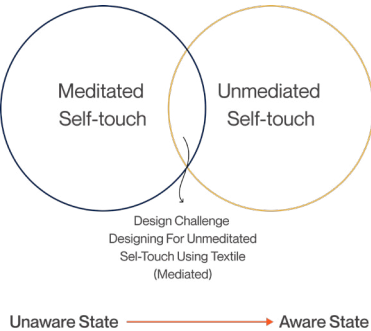


Figure 12: Design Challenges

6.1.2 Material Experience Vision

Much like a painter experimenting with a diverse palette of colors on a blank canvas, the unpredictable nature of different textures introduces a spectrum of sensations to our sense of touch. Each unique texture acts as a brushstroke, inviting us to explore and appreciate the intricate details of the canvas—our skin. The prototype encourages a deeper exploration, reflection, and connection, akin to how a painter immerses themselves in the relationship with their canvas—the prototype invites you to immerse yourself in a relationship with yourself.

6.2 Prototype -Series 3

For this series of prototypes, I chose an organic textile made from a blend of bamboo and cotton. The initial fabric was soft but lacked enough contrast with the skin's softness. The bamboo-cotton blend, however, provides the perfect amount of texture to create this contrast while maintaining softness. Additionally, bamboo is a more sustainable option, as its production typically requires fewer or no pesticides compared to cotton. It is wrinkle-free and durable, which makes it easy to fold and enhances its usability and longevity. This fabric is authentic and natural, perfectly complementing the act of self-touch through its texture, softness, and color. In addition, a cotton thread was used in the creation of the final design. This thread is exceptionally soft, resulting in a natural and smooth flow, further enhancing the tactile experience.



Image 12: Bamboo cotton used for prototype series 3

Here, we focused on incorporating the previously identified variables of textiles in the prototypes. These variables include the direction of folds on the fabric, the contrast between soft and rough materials (the distance between the textiles), and the type of texture (with threads ranging from dense to light). To simplify the study, we kept the variables of the direction and breadth of the textile fixed, and only manipulated the variables of distance and type of texture. The table illustrates these variations.

In developing these prototypes, I utilized pleating and folding techniques to construct each band. The process involved pleating and folding one side of the fabric before sewing it together to achieve the desired texture and structure (image 13 & table 8) Each band was designed to have a thickness of 1.5 to 2 cm to provide the necessary support and feel. To ensure adaptability to various hand sizes and enhance comfort, velcro was used as the fastening mechanism. This allowed for easy adjustment of tightness and looseness. Additionally, threads were attached to the bands using masking tape, which allowed for easy replacement if the threads became damaged. Once the individual bands were prepared, they were aligned and stitched together along the sides to form a cohesive unit.



Image 13: Construction detail for prototype series 3

Prototype	Direction	Breath	Distance	Type of texture
A.1	Uni- Direction Fixed	3cm Fixed	1cm	Dense
B.1	Uni- Direction Fixed	3cm Fixed	1cm	None
C.1	Uni- Direction Fixed	3cm Fixed	1cm	Light
A.2	Uni- Direction Fixed	3cm Fixed	2cm	Dense

B.2	Uni- Direction Fixed	3cm Fixed	2cm	None
C.2	Uni- Direction Fixed	3cm Fixed	2cm	Light
A.3	Uni- Direction Fixed	3cm Fixed	3cm	Dense
B.3	Uni- Direction Fixed	3cm Fixed	3cm	None
C.3	Uni- Direction Fixed	3cm Fixed	3cm	Light

Table 8: Construction detail for prototype series 3

6.2.1 Prototype Testing

The goal of this session was to explore how textiles can be designed to encourage and facilitate self-touch, enhancing skin-to-skin self-touch as a means of coping. The main focus was on the stroking motion as concluded from the previous studies. All 9 prototypes were tested and the process for exploring each prototype was the same.

6.2.1 Participants

A diverse group of five university students was recruited through a whatsapp message, ensuring an equal number of males and females and different nationalities.

6.2.2 Layout & Setup



Image 14: Layout and setup

The prototype testing was conducted over two days. On day 1, there were 2 participants, and on day 2, there were 3 participants. Each session lasted for 45 minutes and was recorded through video and audio for further observation and analysis. The testing room was set up (image 14) with a table in the center. The participants sat across from the researcher, with a pair of headphones placed in front of the participant.

6.2.3 Procedure

Preparation (5mins)

Participants were first asked to take a moment to consider the type of self-touch they typically engage in, specifically in terms of a stroking motion. They were asked to recall the sensation and movement of their hands on their body.

Instructions (2mins)

Participants were given instructions for the activity they would be participating in. During the activity the participants would be asked to close their eyes and wear headphones while the researcher attached a prototype to their hand. The prototypes will be attached in a fixed order*. Once the prototype was attached, the researcher would play an audio**. Participants could then begin interacting with the prototype using slow and deliberate motions. After the audio ended, the researcher would remove the prototype and

participants could open their eyes. Following each prototype testing, participants would be asked a few questions. This process would be repeated for all nine prototypes.

Activity (3mins)

The participant were asked to wear the headphones and once the audio played they started interacting with the prototype.

Questions (5mins)

After the participant had interacted with one prototype the following questions were asked. How does it make you feel? Explain why you feel this way. (1-5, 1 being strong disagree and 5 being strongly agree)

On a scale of 1-5, does it encourage you to touch yourself?

On a scale of 1-5, does it enhance your sensation of self-touch?

Activity (3mins) - Questions (5mins)

The same structure was followed for all the remaining 8 prototypes post which a set of closing questions were asked in order to understand how the variables impacted their experience.

Closing questions (5mins)

Did you notice any difference between the prototypes?

Which 2 do you like the most and why?

6.2.4 Data Collection & Analysis

The data collection for this session employed a mixed-method approach, combining both qualitative (Appendix E) and quantitative data. Structured questions were audio-recorded, and these recordings were analyzed to extract both types of data. This approach facilitated flexible and in-depth conversations while maintaining consistency in the topics discussed. Participants were encouraged to share their thoughts freely, resulting in rich qualitative data. Meanwhile, the System Usability Scale (SUS) scores provided a basis for quantitative analysis. Once the data was collected, it was analyzed using card sorting and categorization techniques. The card sorting and mapping methods were employed to organize the data into themes or categories based on participants responses. This approach helped identify patterns and derive key insights from the discussions. For quantitative analysis, the SUS scores from two specific questions were recorded in an excel spreadsheet (Appendix F). The scores were organized by prototype number, and the mean score for each prototype was calculated by summing all participant responses and dividing by the total number of participants (five in total). This analysis was performed for all nine prototypes. The resulting data was then plotted using scatter function from MATLAB 2021a (Appendix G) to visually represent the findings.

*Prototype A followed by C and B. This order sensitized the participants towards the density of threads on the prototype.

** Audio 1, was described in series 1 of prototype testing was used.

6.2.5 Result

Table 9 illustrates the results from each prototype.

	Prototype	Key Insights
A.1		- It felt natural and soft. - Allows forward and backward motion because of the folds in the fabric.
B.1		- Reminded participant 3 of a slide because of the folds in the fabric and the motion of the hand on the arm. - Provides contrast to the skin which is a unique feeling to experience. - The size of gaps in made it easier for the participant to engage with it.
C.1		- Allows use of multiple finger tips, horizontally. - The fingers fit in the gap between the textile, motivating the participant to hold herself. - The participant felt like they are touching themselves more because of the stucture of the prototype.
A.2		- The length of the thread directed the contact area of the motion of the hand on the arm -Stroking backwards (opposite the direction of the threads) made participants uncomfortable and brought distress. - Brought in feeling of petting a cat.

B.2		- All the participants, felt the prototype to be similar to the others. - One of the participants used the textile as a band to fidget with it.
C.2		- The thread made participants more aware of their own hair. - The thread allows for a motion of plucking, which the participants fidget with.
A.3		- Gave a feeling of being fluffy and soft. - The participants were playing with the hair, trying to figure out where there is no hair. - The last section of the prototype made a participants hand "flow" on the arm.
B.3		- The prototype brought a feeling of boredom for a participant . - The longer hair, engaged the participants for longer period of time.
C.3		- The thread was confused as their own hair.

Table 9: Testing of prototype series 3.

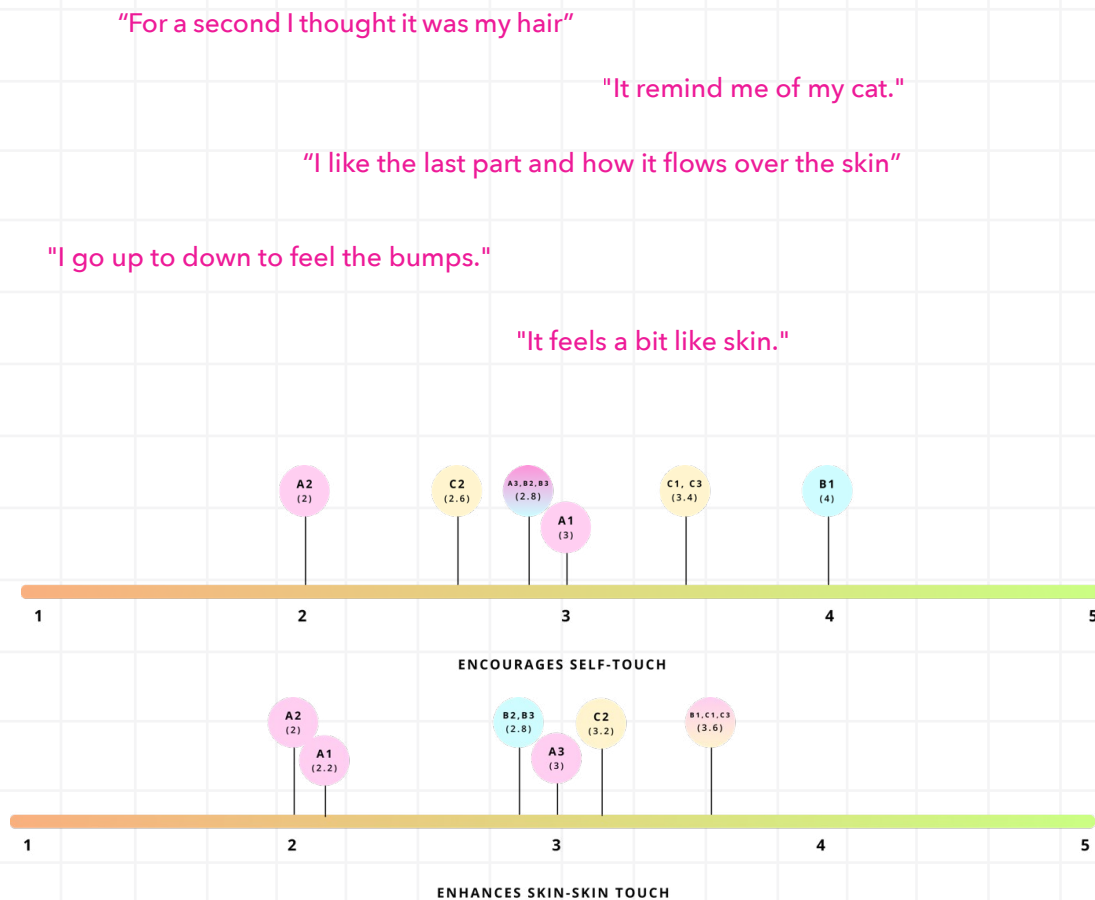
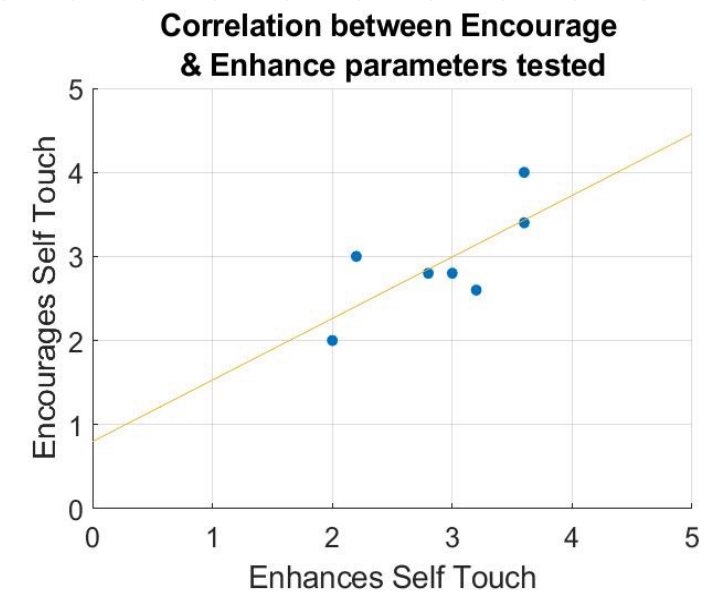


Figure 13: SUS score for enhancing and encouraging self-touch.

This study shows that prototypes B1, C1, and C3 not only received the highest scores on the SUS scale, but they were also the designs that users preferred the most (figure 13). The spacing of 1 cm between the fabric strands allowed for comfortable horizontal use of multiple fingertips along with vertical stroking. Participants also indicated a preference for lower thread density over higher density. When comparing the SUS scores

for two specific questions, it was observed that there is a direct correlation between the scores for both properties: enhancement and encouragement of skin-to-skin touch. For instance, B1 received high scores on both questions. This emphasizes that encouraging and enhancing skin-to-skin touch are closely linked; increasing one property automatically improves the other as shown in the graph 1.



Graph 1: Correlation between encouraging and enhancing parameters

6.2.6 Conclusion

Feedback from participants highlighted several key aspects of the prototypes, as shown in Table 7. The folds in the fabric facilitated forward motion, making interactions feel natural. Additionally, the design allowed for comfortable horizontal use of multiple fingertips, with the gaps between the textile strands encouraging participants to stroke horizontally. The length of the threads also guided the contact area, directing the motion of the hand on the arm.

These three key features of the prototypes—natural interaction, horizontal stroking, and guided motion—enhanced the participants' skin-to-skin

self-touch experience, evoking nostalgia and adding an emotional dimension to the interaction. Moreover, a direct correlation was found between the scores for enhancement and encouragement of skin-to-skin touch, indicating that improving one property also enhances the other.

By the end of the study, all participants were able to distinguish the variations among the prototypes, underscoring the influence of textile variables on the sensation of self-touch. These insights are used in the next chapter to develop the final design concept.

Final Design

This chapter outlines the development of the final design concept, derived from insights throughout our research. We explore the inspiration and naming of the product, detail the construction techniques, and evaluate the design's effectiveness in answering our research questions. Each section provides a focused discussion on the significant aspects that shaped the artifact illustrating the scenarios of use.

7.1 Key Insights

7.2 Inspiration

7.3 Construction

7.4 Evaluation

7.5 Scenarios of Use

7.6 Sail

7.1 Key Insights

This section provides a summary of the key insights (table 9) gained from the prototype series 3. These are used in the development of the final design.

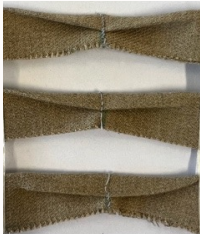
Element of the Prototype	Insights (Performative level)	Emotions Evoked	Associated with meanings or memories (Interpretive level)
	Texture & Structure: The folds in the fabric enabled smooth forward motion.	Joyful	 
	The spacing between the two strands of fabric facilitated the horizontal use of multiple fingertips.	Satisfaction	
	Texture & Softness: The density of threads invoked nostalgia and evoked diverse emotions while also guiding the area of contact.	Playful	 

Table 9: Key insights used to build the final design.

Furthermore, in order to achieve a comfortable fit, the prototype had to be positioned on the participant's hands in such a way that the fabric strands would not shift when they interacted with it. However, it was important to avoid making the prototype too tight, as this could result in an uncomfortable experience.

7.2 Inspiration

The name **"Sail"** encapsulates the essence of the inspiration behind this final design referred to as a research artifact. It symbolizes the vast, fluid journey of navigating through the ocean of our body and emotions. The act of sailing conveys a sense of movement and exploration, perfectly mirroring the tactile and emotional experiences intended by the design.

The primary inspiration for "Sail" emerged from the folding and panelling technique used in textile manipulation. This technique enabled the creation of directional folds in the fabric, echoing the dynamic motion of ocean waves. The careful design of the width and structure of these tucks was intended to evoke the rhythmic movement of waves, symbolizing the gentle passage of our hands through the textile medium.

Further, the texture of skin and its relationship with hair inspired the threads used. This aspect highlights the contrasting presence of hair between male and female participants, bringing attention to societal beauty standards imposed on our bodies. By incorporating hair into the design, "Sail" embraces the natural state of our bodies, promoting self-acceptance and challenging conventional beauty norms.

7.3 Construction

The construction of the final design closely resembled that of prototype series 3, with modifications to three key elements:

- The Attachment Mechanism
- The Directionality of the Fabric Folds
- The Fabric Color

Attachment Mechanism: The original prototype used Velcro for attachment, but it was found to be uncomfortable and rough on the skin. To improve comfort and adaptability to different hand sizes, a new attachment method using nylon and elastic was developed. Nylon was chosen for its stretchability and durability. A tube-like structure was created from the nylon, into which elastic was inserted. This structure was then attached to the bands, forming a flexible and resilient attachment reminiscent of scrunchy bands.

The three bands were connected using a plastic tube, which provided the necessary stability and rigidity for the design, ensuring that the bands stayed aligned and maintained their form during use.

Directionality of Fabric Folds: The initial exploration of bidirectionality in the textile involved creating folds in two directions to allow contin-

uous motion in both directions. However, testing revealed that folds in the opposite direction hindered the smooth forward movement of the hand. This bidirectional folding disrupted the natural stroking motion, which is meant to encourage the hand to move after each stroke. Consequently, the fold direction was adjusted to maintain the intended stroking motion.

Fabric Color: To add an element of personalization, I experimented with dyeing the fabric using natural pigments from beetroot, turmeric, and coffee. The fabric was first soaked in vinegar water to enhance color absorption. Simultaneously, beetroot and turmeric were boiled separately in water. Once cooled, the fabric was immersed in these solutions and left overnight. However, the resulting pigmentation was very light, so it was not incorporated into the final design.

Learnings from this series of material construction of final design gave rise to 3 variations of the design as shown in table 10.



Design	Versions
	Version 1 2 bands, longer thread: In this version, the focus is to increase the contact area through the medium of threads and increase the contrast between the skin and the textile by having two bands.
	Version 2 3 bands, shorter threads: Similar to the first version, over here the length of the thread has been reduced as a way to increase contrast and increasing the contact area by having 3 bands.
	Version 3 3 bands, shorter threads: Similar to the first version, over here the length of the thread has been reduced as a way to increase contrast and increasing the contact area by having 3 bands.

Table 10: Three versions of the final design

The three versions of the design, also provide the opportunity to customize and personalize the experience according to the individuals need. For example, version 2 and 3 can be combined and worn together as shown in image 15.



Image 15: Two versions of the final design worn together

The interaction of the final design is demonstrated in this [video link!](#)

7.4 Evaluation

The evaluation of the final design was conducted as a reflective process rather than a traditional product evaluation. This approach stemmed from the realization that the final design serves more as a research artefact than a consumer product. As illustrated in the taxonomy of self-touch, the design has multiple potential applications depending on the context.

The mechanisms and techniques used in the design can be applied to a wide range of products, from clothing to accessories. Developing it into a specific product would have limited its potential and versatility. Moreover, this artefact can inspire other designers to further develop and implement the idea in various forms.

Currently, the artefact aims to encourage and enhance self-touch, providing individuals with support in overwhelming public situations. It serves as a catalyst for discussion and exploration of self-touch, inviting others to consider its role in our life and our relationship with our body.

Procedure

Three participants were recruited for the final reflection session through word of mouth. The session was conducted over a single day, with each participant engaging for 15 minutes.

To begin, participants were introduced to the

project and given a brief overview of its aims and the nature of the research artifact. They were then asked to wear headphones and listen to the same audio used in previous prototype sessions for 60 seconds. This initial audio experience was designed to allow participants to focus on their feelings and emotional reactions without any interaction with the design.

After listening to the audio, participants selected a research artifact of their choice to wear. The same audio was played again, but this time participants were encouraged to interact with the design while listening. They were asked to keep their eyes closed to heighten their tactile and auditory experience. Upon completion of the audio, they opened their eyes and reflected on the experience.

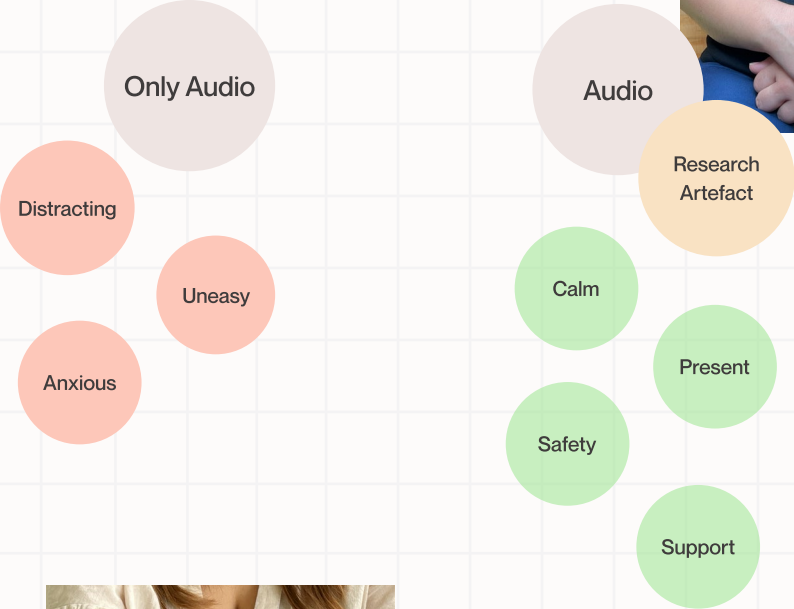
Participants were then left alone for 10 minutes to answer the following questions, which aimed to capture their emotional and physical interactions with the design

- :
- Did the audio evoke any emotions for you?
 - What happened when you started interacting with the design? Describe your interaction.
 - Did your emotions change by interacting with the design? If yes, then how?
 - What effect did the design have on you?
 - What are your thoughts about the design?

Reflection

Question	P1	P2	P3
Did the audio evoke any emotions for you?	"None, because I have a lot on my mind."	"I was trying to understand what people are saying and what is happening. Made me distracted and felt like I am in a crowded restaurant, anxiously waiting for someone to arrive."	"yes, the audio gave me an uneasy feeling, it felt like I was in a dream, lost. I could see people but people could not see me."
What happened when you started interacting with the design? Describe your interaction.	"I was way less distracted as compared to before."	"I felt like I was taken away from chaos, I did come back to the same feeling but with less intensity."	"I felt like I was not in the crowded space anymore, the audio gave a sense of melody and rythm to touch the touch."
Did your emotions change by interacting with the design? If yes, then how?	"Emotions did not have a significant shift, but there was a noticeable change in how distracted I was."	"Yes, I felt like a bubble was created around me that protected me from the chaos."	"During the interaction, my emotion did not change much."
What effect did the design have on you?	"There was suddenly something more to explore, which brought my attention towards it. "	"Made me calmer, lowered my concentration on other's	"I wanted to explore the product by my touch. It made me curious and led me towards my arm and I started touching my arm with my fingers."
What are your thoughts about the design?	"I would like to have this on my clothing, just to fidget with."	"Its easy to wear, easy to carry and nice that it is not very noticable."	"I liked that I could feel different surfaces and textures with my different fingers at the same time. "

Table 11: Reflection upon evaluation of the design



The reflection session supported the aim of the artifact in achieving the design goal. Although the short duration of the session limited the observable impact of the artifact on participants' emotions, many participants reported feeling a sense of calmness and being in the present. This effect helped them engage with the audio without feeling overwhelmed. One participant even said,

"I felt like a bubble was created around me that protected me from the chaos."

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7.5 Scenario of Use

The research artifact is primarily designed to provide support in public settings, where individuals often experience stress and anxiety. For instance, it can be used in situations like going on a first date, attending a job interview, traveling on public transportation, or meeting relatives at family gatherings. In these scenarios and many more, the artifact helps individuals maintain a sense of calm and presence, allowing them to engage more comfortably with their surroundings and interactions.

Although its primary function is to offer reassurance in public contexts, the artifact is also well-suited for use in private settings. It can serve as a medium for mindfulness, helping individuals connect with themselves and focus on the present moment. Whether used for relaxation, reflection, or personal development, the artifact encourages users to explore their thoughts and emotions, fostering a deeper sense of inner peace through self-touch.

Future Application

The research artifact has broad future applications in various interdisciplinary fields, including fashion, healthcare, and self-care industries. In the fashion industry, textile designs focused on self-touch can be used to create garments

that provide emotional and sensory benefits to an individual discreetly. For example, the ISSHO smart denim jacket by Studio Pauline van Dongen demonstrates how clothing can be utilized for well-being.

In healthcare, these textiles can be utilized in therapeutic tools for patients, offering comfort and support by guiding movements of self-touch when they are alone and without external support. Often, patients disconnect from their bodies due to illness, and this concept can help them reconnect with their physical selves. For instance, the self-FI practices discussed in Chapter 1 can be more tangibly realized through textiles.

In the self-care industry, products can be designed to promote mindfulness and emotional well-being through tactile engagement. A common technique to stay present or to alleviate anxiety or panic is to start noticing the things around you, helping you remain grounded in the present moment. This design concept can serve as a support mechanism, helping individuals stay present through self-touch.

These future application highlight the versatility of self-touch as seen in the taxonomy, differentiated through the purpose and the state of awareness.

A scenario of use of the research artefact is demonstrated (Appendix H) in this [video link!](#)

7.6 Sail



Conclusion

In this chapter we conclude the project and discuss recommendations. At the end, I close the project through a self-reflection on this journey.

8.1 Recommendations

8.2 At the End

8.3 Personal Reflection

8.1 Recommendations



For future applications of the design, considering personalisation of the design would be interesting. This could be done by enhancing the visual appeal through color variations allowing users to select from an array of colors that resonate more personally with them, adding a layer of individuality and appeal. Additionally, introducing customizable textures will enable them to choose from a wide range of textile patterns and surfaces, providing comfort and support tailored to their individual preferences, significantly enhancing the personal connection to the artifact.

Moreover, incorporating advanced materials such as smart textiles that can adapt their texture or temperature in response to user interactions would further elevate the sensory experience. These innovative materials have the potential to offer dynamic and adaptable interactions, making the design more versatile and responsive to the users emotional needs. Such advancements could transform the artifact into a more interactive and engaging tool for emotional well-being.

8.2 At the End

This project explores the complex relationship between self-touch, textiles, and well-being, showing how tactile interactions can promote self-awareness and support. We conducted a comprehensive process that included literature review, user research, and iterative prototype development, uncovering valuable insights into how the tactile properties of textiles can enhance self-touch experiences and cultivate a sense of calm and presence. The resulting research artifact we created, designed with a focus on material-driven design principles, serves as a tool for engaging with self-touch in both public and private settings. While initially intended for use in public scenarios like social interactions, the artifact can also proved to be beneficial in private contexts, providing a medium for personal reflection and mindfulness. Feedback from participants highlighted the importance of texture, softness, and material contrast in creating an engaging sensory experience with the artifact. These findings emphasize the significance of variables of material in evoking emotions or creating an experience. Participants reported feeling

calmer and more present during interactions with the artifact, demonstrating its potential to ground and regulate thoughts even in short sessions. Although time constraints limited the long-term assessment of the artifact's emotional impact, the positive feedback suggests that the careful integration of textiles and design can indeed enhance emotional well-being. This study establishes a foundation for further exploration of self-touch and textiles as a tool for well-being, indicating potential applications in various contexts and settings. In conclusion, this project illustrates the power of integrating design, emotion, and sensory experience. By continuing to explore these intersections, designers can create meaningful products or experiences that support emotional health by fostering a deeper connections with ourselves. The insights gained in this project, serve as a starting point for future innovations in the field of emotional design, offering new possibilities for enhancing well-being through the simple yet profound act of self-touch through textiles.





8.3 Personal Reflection

This project provided me the opportunity to explore a topic close to my heart and express myself through design. I've always struggled with projects that lack an artistic element or relatability. This project allowed me to combine a personal experience and design together, serving as a form of introspection and providing a sense of closure.

Taking charge of this project meant wearing many hats: project leader, manager, facilitator, writer, researcher, data analyst, observer, note-taker, student, graphic designer, photographer, and tailor. Through these varied roles, I discovered what I love most about being a designer and what I don't.

Through this project, I uncovered a deep passion for textiles and their applications. I became fascinated by how textiles contribute to well-being, using self-touch as a tangible way to connect with ourselves. The more I delved into this subject, the

more I noticed and appreciated the importance of self-touch in our lives, realizing how essential it is to connect with our bodies in today's world.

This project challenged me in unexpected ways, giving me countless sleepless nights as I struggled to place it. I found myself wondering if it was a product, part of speculative design, critical design, or a research artifact. Engaging with fellow designers and exploring these categories helped me learn how to position my work and articulate the reasoning behind it, which became the most valuable lesson of all.

My two years at TUD have been transformative. I arrived in a country and university I knew little about, and it has become a place I now call home. This experience reshaped my perspective on design and reinforced its power to address complex issues while keeping people at the core. Studying at TUD has been an incredible journey, and this project is the perfect conclusion to it.

References

1. Adam, H., & Galinsky, A. D. (2012). Enclothed cognition. *Journal of Experimental Social Psychology*, 48(4), 918-925. <https://doi.org/10.1016/j.jesp.2012.02.008>
2. Anke Jakob & Lesley Collier (2017) Sensory Design for Dementia Care - The Benefits of Textiles, *Journal of Textile Design Research and Practice*, 5:2, 232-250, DOI: 10.1080/20511787.2018.1449078
3. Argyle, M., Cook, M., & Cramer, D. (1994). Gaze and mutual gaze. *British Journal of Psychiatry*, 165(6), 848-850. <https://doi.org/10.1017/s0007125000073980>
4. Arnett, J. J., Žukauskienė, R., & Sugimura, K. (2014). The new life stage of emerging adulthood at ages 18-29 years: implications for mental health. *The Lancet. Psychiatry*, 1(7), 569-576. [https://doi.org/10.1016/S2215-0366\(14\)00080-7](https://doi.org/10.1016/S2215-0366(14)00080-7)
5. Auerbach, R. P., Mortier, P., Bruffaerts, R., Alonso, J., Benjet, C., Cuijpers, P., Demyttenaere, K., Ebert, D. D., Green, J. G., Hasking, P., Murray, E., Nock, M. K., Pinder-Amaker, S., Sampson, N. A., Stein, D. J., Vilagut, G., Zaslavsky, A. M., & Kessler, R. C. (2018). WHO World Mental Health Surveys International College Student Project: Prevalence and distribution of mental disorders. *Journal of Abnormal Psychology*, 127(7), 623-638. <https://doi.org/10.1037/abn0000362>
6. Axisa, Fabrice & Schmitt, Pierre & Gehin, Claudine & Delhomme, Georges & McAdams, Eric & Dittmar, André. (2005). Flexible Technologies and Smart Clothing for Citizen Medicine, Home Healthcare, and Disease Prevention. *IEEE transactions on information technology in biomedicine* : a publication of the IEEE Engineering in Medicine and Biology Society. 9. 325-36. 10.1109/TITB.2005.854505.
7. Barroso, F., & Feld, J. K. (1986). Self-touching and attentional processes: The role of task difficulty, selection stage, and sex differences. *Journal of Nonverbal Behavior*, 10, 51-64.
8. Barroso, F., & Feld, J. K. (1986). Self-touching and attentional processes: The role of task difficulty, selection stage, and sex differences. *Journal of Nonverbal Behavior*, 10, 51-64.
9. Basis principes | The Feldenkrais Method. (n.d.). <https://www.feldenkraisbelgium.be/nl/basis-principes-0>
10. Bays PM, Flanagan JR, Wolpert DM (2006) Attenuation of self-generated tactile sensations is predictive, not postdictive. *PLoS Biol* 4:e28.
11. Blakemore S-J, Wolpert D, Frith C (2000) Why can't you tickle yourself? *Neuroreport* 11:R11-R16
12. Camera, S., & Karana, E. (2018). Experiential Characterization of Materials: toward a toolkit. *Proceedings of DRS*. <https://doi.org/10.21606/drs.2018.508>
13. Cascio, C. J., Moore, D., & McGlone, F. (2019). Social touch and human development. *Developmental Cognitive Neuroscience*, 35, 5-11. <https://doi.org/10.1016/j.dcn.2018.04.009>
14. Case, L. K., Liljencrantz, J., McCall, M. V., Bradson, M., Necaise, A., Tubbs, J., Olausson, H., Wang, B., & Bushnell, M. C. (2021). Pleasant deep pressure: expanding the social touch hypothesis. *Neuroscience*, 464, 3-11. <https://doi.org/10.1016/j.neuroscience.2020.07.050>
15. Chandler, D., & Munday, R. (2020). *A Dictionary of Media and Communication*.
16. Cobb, K., & Lapolla, K. (2019). Wearing Well-Being: Co-Creative and Textile-Based approaches to enhancing palliative care. *Journal of Textile Design Research and Practice*, 8(3), 313-334. <https://doi.org/10.1080/20511787.2019.1633898>
17. Constants across cultures in the face and emotion. (1987, October 1). ResearchGate. https://www.researchgate.net/publication/17640481_Constants_across_cultures_in_the_face_and_emotion
18. Coulter, J. (2023b). Feeling Well: Using the augmented touch of E-Textiles to embody emotion and environment as a "Self-Health" intervention for female student wellbeing. *Journal of Textile Design, Research and Practice*, 11(1-2), 81-110. <https://doi.org/10.1080/20511787.2023.2242165>
19. Darian Leader. (2016). *HANDS : what we do with them - and why*

20. Davis, F. (2017). FELT: Communicating Emotion through a Shape Changing Textile Wall Panel. In InTech eBooks. <https://doi.org/10.5772/intechopen.70032>
21. Dhong, C., Miller, R., Root, N. B., Gupta, S., Kayser, L. V., Carpenter, C. W., Loh, K. J., Ramachandran, V. S., & Lipomi, D. J. (2019). Role of indentation depth and contact area on human perception of softness for haptic interfaces. *Science Advances*, 5(8). <https://doi.org/10.1126/sciadv.aaw8845>
22. Dijkerman, H. C., & De Haan, E. H. F. (2007). Somatosensory processes subserving perception and action. *Behavioral and Brain Sciences*, 30(2), 189-201. <https://doi.org/10.1017/s0140525x07001392>
23. Dittmann, A. T., & Llewellyn, L. G. (1968). Relationship between vocalizations and head nods as listener responses. *Journal of Personality and Social Psychology*, 9(1), 79-84. <https://doi.org/10.1037/h0025722>
24. Docherty, M. and Thornicroft, G. 2015. "Specialist Mental Health Services in England in 2014: Overview of Funding, Access and Levels of Care," *International Journal of Mental Health Systems*, 9: 1-8
25. Dreisoerner, A., Junker, N. M., Schlotz, W., Heimrich, J., Bloemeke, S., Ditzen, B., & Van Dick, R. (2021). Self-soothing touch and being hugged reduce cortisol responses to stress: A randomized controlled trial on stress, physical touch, and social identity. *Comprehensive Psychoneuroendocrinology*, 8, 100091. <https://doi.org/10.1016/j.cpnec.2021.100091>
26. Ekman, P., & Friesen, W. V. (1969). The repertoire of nonverbal behavior: categories, origins, usage, and coding. *Semiotica*, 1(1), 49-98. <https://doi.org/10.1515/semi.1969.1.1.49>
27. Emma Fera (2022) Opinion: The Psychological Benefits of fashion. <https://tartan.gordon.edu/the-psychological-benefits-of-fashion/>
28. Field, T. (2014). Touch. In *The MIT Press eBooks*. <https://doi.org/10.7551/mitpress/9959.001.0001>

29. Foo, E. W., Dunne, L. E., & Holschuh, B. (2021). User Expectations and Mental Models for Communicating Emotions through Compressive & Warm Affective Garment Actuation. *Interact. Mob.Wearable Ubiquitous Technol.* 5, 1, Article 10. ACM. <https://doi.org/10.1145/3448097>
30. Freedman, N., & Hoffman, S. P. (1967). Kinetic Behavior in Altered Clinical States: Approach to Objective Analysis of Motor Behavior during Clinical Interviews. *Perceptual and Motor Skills*, 24(2), 527-539. <https://doi.org/10.2466/pms.1967.24.2.527>
31. Fulkerson, Matthew (2024, May 6). Touch (Stanford Encyclopedia of Philosophy) <https://plato.stanford.edu/entries/touch/#BacTer>
32. Gençer, E. (2018). Perception-Action theory. In *Springer eBooks* (pp. 1-7). https://doi.org/10.1007/978-3-319-47829-6_591-1
33. Goffman, E. *Behavior in Public Places*. Free Press, New 2nd edition. Holt, Rinehart & Winston, New York, 1975.
34. Goldberg, S. & Rosenthal, R. Self-touching behavior in the job interview: Antecedents and consequences. *J. Nonverbal Behav.* 10, 65-80. <https://doi.org/10.1007/BF00987206> (1986).
35. Gonca Özçelik Kayseri, Nilgün Özgül and Gamze Süpüren Mengüç (2012). Sensorial Comfort of Textile Materials, Woven Fabrics, Prof. Han-Yong Jeon (Ed.), ISBN: 978-953-51-0607-4, InTech, Available from: <http://www.intechopen.com/books/woven-fabrics/sensorial-comfort-of-textile-materials>.
36. Grunwald, M., Weiss, T., Mueller, S. & Rall, L. EEG changes caused by spontaneous facial self-touch may represent emotion regulating processes and working memory maintenance. *Brain Res.* 1557, 111-126. <https://doi.org/10.1016/j.brainres.2014.02.002> (2014).
37. Hallak, R. (2023, May 21). How Women's Clothing Reflects Society - Gizia Casamoda. Gizia Casamoda. <https://giziacasamoda.com/how-womens-clothing-reflects-society/>
38. Harrigan, J. A., Kues, J. R., Steffen, J. J., & Rosenthal, R. (1987b). Self-Touching and impressions of others. *Personality & Social Psychology Bulletin*, 13(4), 497-512. <https://doi.org/10.1177/0146165287313449>

[org/10.1177/0146167287134007](https://doi.org/10.1177/0146167287134007)

39. Harrigan, J. A. (1985). Self-touching as an indicator of underlying affect and language processes. *Social Science & Medicine*, 20(11), 1161-1168. [https://doi.org/10.1016/0277-9536\(85\)90193-5](https://doi.org/10.1016/0277-9536(85)90193-5)
40. Harrigan, J. L., Grunwald, M., Martin, S., & Mueller, S. M. (2022). The suppression of spontaneous face touch and resulting consequences on memory performance of high and low self-touching individuals. *Scientific Reports*, 12(1). <https://doi.org/10.1038/s41598-022-12044-4>
41. Hoffmann, M. (2017, January 1). The role of self-touch experience in the formation of the self. https://www.academia.edu/86016923/The_role_of_self_touch_experience_in_the_formation_of_the_self
42. Höök, K. (2018). *Designing with the body: Somaesthetic interaction design*. MIT Press
a. https://www.researchgate.net/publication/245541932_Sensorial_Properties_of_Materials_for_Creating_Expressive_Meanings
43. Jamie Morgan (2017), Womb with a view: Sensory development in utero | Your Pregnancy Matters | UT Southwestern Medical Center. (n.d). <https://utswmed.org/medblog/sensory-development-utero/>
44. Janet Coulter (2023) Feeling Well: Using the Augmented Touch of E- Textiles to Embody Emotion and Environment as a "Self-Health" Intervention for Female Student Wellbeing, *Journal of Textile Design Research and Practice*, 11:1-2, 81-110, DOI: 10.1080/20511787.2023.2242165
45. Jenkins, B. A., & Lumpkin, E. A. (2017). Developing a sense of touch. *Development*, 144(22), 4078-4090. <https://doi.org/10.1242/dev.120402>
46. Johnson, C. (2024, January 18). Foundationalism: Can we know anything for certain? *The Collector*. <https://www.thecollector.com/foundationalism-can-we-know-anything-philosophy/>
47. Karana, E., Barati, B., Rognoli, V., & Zeeuw van der Laan, A. 2015 Aug 30. Material Driven

Design (MDD): A Method to Design for Material Experiences. *International Journal of Design* [Online] 9:2. <https://www.ijdesign.org/index.php/IJDesign/article/view/1965>

48. Sensorial Properties of materials for creating Expressive Meanings (2013, July 1). ResearchGate. https://www.researchgate.net/publication/245541932_Sensorial_Properties_of_Materials_for_Creating_Expressive_Meanings
49. Kawabata, S. (1980). *The Standardization and Analysis of Hand Evaluation*, Second Edition, The Hand Evaluation and Standardization Committee The Textile Machinery Society
50. Knöfler, T. & Imhof, M. Does sexual orientation have an impact on nonverbal behavior in interpersonal communication?. *J. Nonverbal Behav.* 31, 189-204. <https://doi.org/10.1007/s10919-007-0032-8> (2007).
51. Kronrod, A., & Ackerman, J. M. (2019). I'm so touched! Self-touch increases attitude extremity via self-focused attention. *Acta Psychologica*, 195, 12-21. <https://doi.org/10.1016/j.actpsy.2019.02.005>
52. Lane, J. A. (2015). Counseling Emerging Adults in Transition: Practical Applications of Attachment and Social Support research. *the Professional Counselor*, 5(1), 15-27. <https://doi.org/10.15241/jal.5.1.15>
53. Lewis, C. (2009). Trick or treatment? Alternative medicine on trial. *Acupuncture in Medicine*, 27(1), 39. <https://doi.org/10.1136/aim.2008.000117>
54. Lindeman, R., Desmet, P.M., & Filippi, M. (2023) Wearing Black when feeling Blue: An exploration of the relationship between clothing and mood. In *Proceedings of IASDR 2023: Life-Changing Design*, 9-13 October, Milan, Italy. <https://doi.org/10.21606/iasdr.2023.502>
55. Matteo, E.K. and You, D. 2012. "Reducing Mental Illness Stigma in the Classroom," *Teaching of Psychology*, 39(2): 121-124.
56. May-Hobbs, M. (2024, March 22). What is Embodiment? Maurice Merleau-Ponty's Philosophy

of the Body. TheCollector. <https://www.thecollector.com/embodiment-merleau-ponty-philosophy-of-body/>

57. McCloud, T. and Bann, D. 2019. "Financial Stress and Mental Health among Higher Education Students in the UK up to 2018: Rapid Review of Evidence," *Journal of Epidemiology and Community Health*, 73(10): 977-984.

58. Merleau-Ponty, M. (2002). *Phenomenology of perception*. In Routledge eBooks. <https://doi.org/10.4324/9780203994610>

59. Merleau-Ponty, M. 1968. *The Visible and the Invisible* (Trans. Lingis, A.). Evanston: Northwestern University Press.

60. Morse, N., Lackoi, K. and Chatterjee, H. 2016. "Museums Learning and Wellbeing," *Journal of Education in Museums*, 37: 3-13.

61. Mueller, S. M., Martin, S. & Grunwald, M. Self-touch: Contact durations and point of touch of spontaneous facial self-touches differ depending on cognitive and emotional load. *PloS One* 14, e0213677. <https://doi.org/10.1371/journal.pone.0213677> (2019).

62. Nicas, M. & Best, D. A study quantifying the hand-to-face contact rate and its potential application to predicting respiratory tract infection. *J. Occup. Environ. Hyg.* 5, 347-352. <https://doi.org/10.1080/15459620802003896> (2008).

63. Parisi, S. (2024). Design for serene textile experiences: A toolkit. *Proceedings of DRS*. <https://doi.org/10.21606/drs.2024.1012>

64. Pereira, F.S., Bevilacqua, G.G., Coimbra, D.R. and Andrade, A. 2020. *University Mental Health Survey 2020*. London: The Insight Network and Dig-In. [https://assets.website-files.com/602d05d13b303dec233e5ce3/60305923a557c3641f1a7808_Mental%20Health%20Report%202019%20\(2020\).pdf](https://assets.website-files.com/602d05d13b303dec233e5ce3/60305923a557c3641f1a7808_Mental%20Health%20Report%202019%20(2020).pdf)

65. Petreca, B., Bianchi-Berthouze, N., Baurley, S., Watkins, P. and Atkinson, D. 2013. An Embodi-

ment Perspective of Affective Touch Behaviour in Experiencing Digital Textiles. Paper presented at the Affective Computing and Intelligent Interaction (ACII), 2013 Humaine Association Conference, pp. 770-775.

66. Petreca, B., Bianchi-Berthouze, N., Baurley, S., Watkins, P. and Atkinson, D. 2013. An Embodiment Perspective of Affective Touch Behaviour in Experiencing Digital Textiles. Paper presented at the Affective Computing and Intelligent Interaction (ACII), 2013 Humaine Association Conference, pp. 770-775.

67. Price, S., Bianchi-Berthouze, N., Jewitt, C., Yiannoutsou, N., Fotopoulou, K., Dajic, S., Virdee, J., Zhao, Y., Atkinson, D., & Brudy, F. (2022). The Making of Meaning through Dyadic Haptic Affective

68. Ramkissoon, H., Weiler, B. and Smith, L.D.G. 2012. "Place Attachment and Pro-Environmental Behaviour in National Parks: The Development of a Conceptual Framework," *Journal of Sustainable Tourism*, 20(2): 257-276

69. Schefflen, A. E. (1965). Quasi-Courtship behavior in psychotherapy†. *Psychiatry*, 28(3), 245-257. <https://doi.org/10.1080/00332747.1965.11023433>

70. Schneegans, S., & Schöner, G. (2008). Dynamic Field Theory as a framework for understanding embodied cognition. In Elsevier eBooks (pp. 241-271). <https://doi.org/10.1016/b978-0-08-046616-3.00013-x>

71. Seth AK, Suzuki K, Critchley HD (2012) An interoceptive predictive coding model of conscious presence. *Front Psychol* 2:395.

72. Shusterman, R. (1999). Somaesthetics: a disciplinary proposal. *The Journal of Aesthetics and Art Criticism*/the *Journal of Aesthetics and Art Criticism*, 57(3), 299. <https://doi.org/10.2307/432196>

73. Sonneveld, M. H. (2007). *Aesthetics of tactual experience: About the body language of objects*. [Dissertation (TU Delft), Delft University of Technology]

74. Spille, J. L., Grunwald, M., Martin, S. & Mueller, S. M. Stop touching your face! A systematic review of triggers, characteristics, regulatory functions and neuro-physiology of facial self touch. *Neurosci. Biobehav. Rev.* 128, 102-116. <https://doi.org/10.1016/j.neubiorev.2021.05.030> (2021).
75. Stalker, D., & Glymour, C. N. (1985). Examining holistic medicine.
76. Stephens, A., Cheston, R. and Gleeson, K. 2013. "An Exploration into the Relationships People with Dementia Have with Physical Objects: An Ethnographic Study," *Dementia* (London, England), 12(6): 697-712.
77. Streeck, J. (2020). Self-Touch as Sociality. *Social Interaction. Video-Based Studies of Human Sociality*, 3(2). <https://doi.org/10.7146/si.v3i2.120854>
78. Stylios, G. K., & Chen, M. (2016). Psychotextiles and their interaction with the human brain. In V. Koncar (Ed.), *SMART textiles and their application* (1st ed.). Woodhead Publishing Ltd. Textiles to Embody Emotion and Environment as a "Self-Health" Intervention for Female Student Wellbeing, *Journal of Textile Design Research and Practice*, 11:1-2, 81-110, DOI: [10.1080/20511787.2023.2242165](https://doi.org/10.1080/20511787.2023.2242165)
79. Thompson, M., Pawson, C., Delfino, A., Saunders, A. and Parker, H. 2022. "Student Mental Health in Higher Education: The Contextual Influence of "Cuts, Competition and Comparison," *British Journal of Educational Psychology*, 92(2): 367-393.
80. Thorley, C. 2017. Not by Degrees: Improving Student Mental Health in the UK's Universities. London: IPPR.
81. Zeng, F., Wang, G., Qiao, J., Wang, Q., Wu, M., Zeng, X., & Hong, X. (2024). Modeling the relationship between fabric textures and the evoked emotions through different sensory perceptions. *Journal of Engineered Fibers and Fabrics*, 19. <https://doi.org/10.1177/15589250241248761>
82. Zhang, N., Jia, W., Wang, P., King, M., Chan, P., & Li, Y. (2020). Most self-touches are with the nondominant hand. *Scientific Reports*, 10(1). <https://doi.org/10.1038/s41598-020-67521-5>

Appendix

Please note that the appendix is exported into another pdf.

A

Observation Study Analysis: Card Sorting and Mapping

B

Consent Form

C

Understanding of Self-Touch and Interpretation in Social vs Private Setting
Actions Noticed During the Conversation

D

Qualities of Textile Enhancing Self-Touch Experience
Affective and Performatic Level

E

Qualitative Analysis

F

Excel Sheet with Data

G

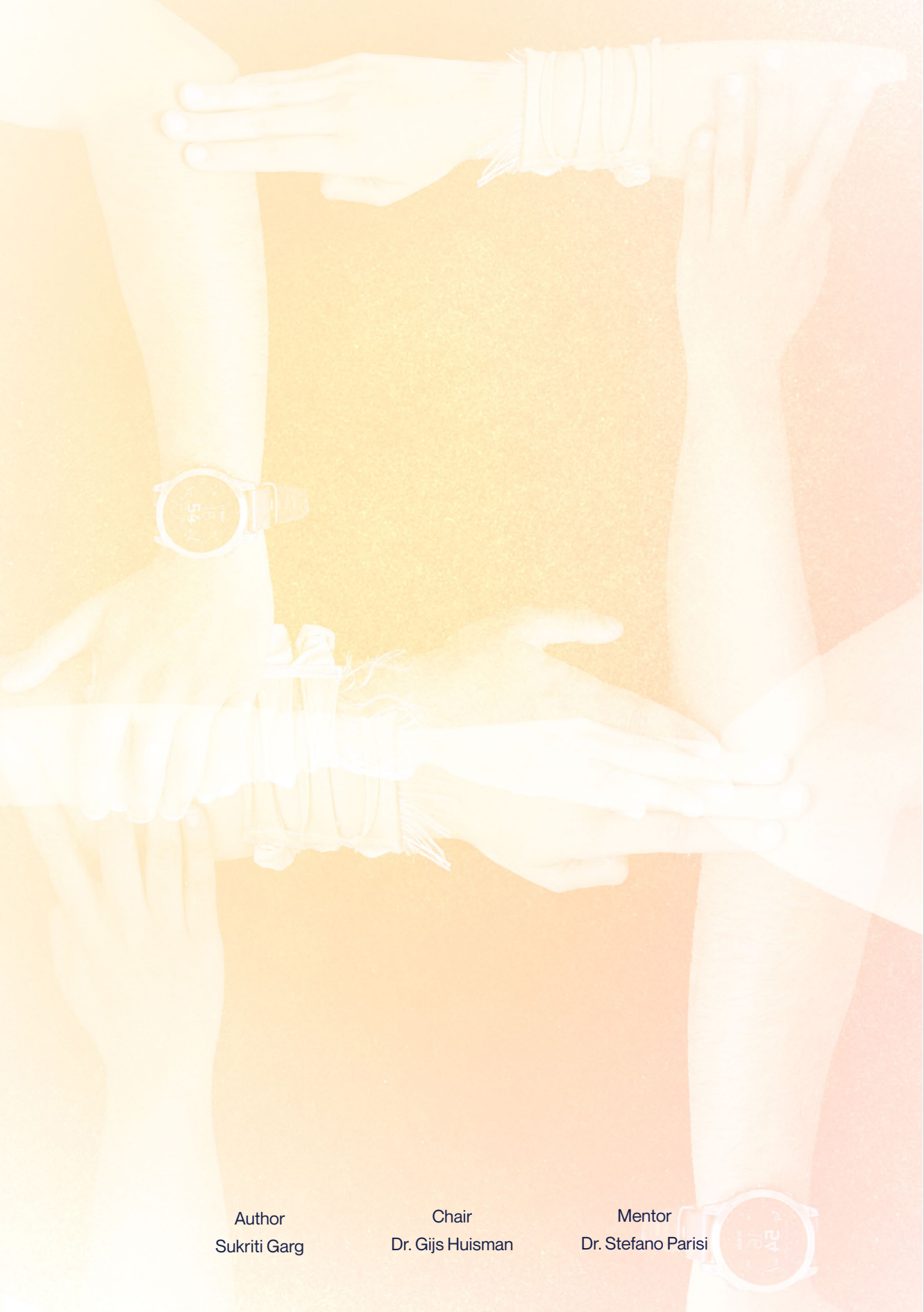
MATLAB Scatter Graph Code

H

Video Ideation and Storyboarding

I

Approved Project Brief



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