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Thinking of the Moving body in motion as the starting point for the fashion design

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ABSTRACT

Blocks and cloths designs are graphic delineation of the human bodies. Although pattern cutting is inherently flexible and adaptable, it consistently opts to create clothing that adheres to the body's fixed, upright position. While the long-standing paradigm has seen several accomplishments, the body's postures during movement are a primary factor in the significant rise in clothing pressure, results in a sensation of inconvenience. The goal of the article to portray of human bodies as an effective shape by constructing a mannequin that integrates all the movements generated by the body in its everyday activities.

This methodology is designed utilizing qualitative methodologies and incorporates techniques such as "self-portraiture, theoretical samples, Body measurement, and General body shape. Later, In order to design a group of models made from special textiles". The blocks exhibited 'distorted' forms that precisely matched the curves and lines of the movement human figure, as reflected by the mannequin. Ultimately, the lady conducted a verification of the concept by wearing the muslin prototypes developed from the drawings. She established that these prototypes demonstrate the same expansion and contraction as the muscles and skin.

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نقطة تحرك الجسم بداية انطلاق تصميم الأزياء

فرات جمال حسن[1]

الملخص:

انماط الزي هي تمثيلات جمالية للجسم. وعلى الرغم من ان هذه الانماط قابلة للتغيير، فقد اختار المصمم والباحث تطبيق نظام خاص لتصميم الازياء اعتمادا على وضعية الجسم ، من خلال الأوضاع التي يتخذها الجسم أثناء الحركة ، وهي من العوامل التي تسبب زيادة ضغط على الازياء بشكل كبير، مما يؤدي إلى الشعور بعدم الراحة. وبالتالي ان الهدف من هذه الدراسة هو تمثيل حركة الجسم كنقطة انطلاق لتصميم الازياء ، بدءًا من تطوير نموذج عرض يحوي جميع حركات الجسم التي تحدث يوميًا.

ولغرض تحقيق هدف البحث ، تم اعتماد تقنيات مستمدة من الواقع ، وأخذ عينات نظرية وكمية، وقياس الجسد بصرياً، فضلا عن متوسط الحجم والشكل. ومن ثم تم إنشاء مجموعة من نماذج مصنوعة من نسيج خاص ، تم تحليلها حاسوبياً ، ودمجه مع ملامح الجسم المتحرك، وتم الاستعانة ايضاً بمجموعة من النساء. للحصول على نتائج جيدة للبحث ، وقد جربن النساء النماذج الاولية المصممة والمصنوعة من مواد تقاوم الضغط والاستعمال المتكرر للملابس ، وبناء على حركة الجسم وانمكاش وتمدد العضلات . وقد حقق النموذج النهائي هدف البحث الاساس.

الكلمات المفتاحية: نقطة تحرك الجسم ، الجسم المتحرك ، اليات التصميم ، تصميم الازياء.

Introduction

Clothing undeniably serves the fashion industry, which is defined as phenomena "whose very essence is change" (Simoes, 2013). A two-dimensional passage between the three-dimensional body and the final piece of clothing, patterns have always been an integral aspect of both subtle and drastic morphological modifications that have been carried out throughout history (Simoes, 2013). Considering that the patterns are representations of the body in these cases, whether the client is recognized and has precise measurements or the consumer is anonymous and wears a standard size.

As stated in the statement, this pattern precisely mimics the area of the body that has to be covered, with plackets, pockets, and waistbands purposefully left out. (Hulme, 1946), particularly in a block pattern—referred to as a "body-pattern" by American tailors (Hassan, 2022)this quality is most pronounced. An outsider would have a hard time making out the figure amidst all the blocks and patterns of clothes. But (Hulme, 1946)proved that the depicted entity—the pattern-maker standing at his drawing board—is present in the process of making garment patterns. He is to cut out his pattern from the flat sheet of paper that lies before him. A set of dimensions is at his side, and he has a clear mental image of the person he is sketching—their gait, posture, and actions—to guide his work.

Despite the fact that the French couturier was referring to design drawings, the author says also hinted that Multiple shapes possess and the ability to own to visually depict how the clothes seem on a live, moving person at any given moment. The body in its static standing

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stance has always been well-suited to patterns. It is evident from Hulme's work that the natural tendency to depict the static body (SB) makes it easier to describe it in length units. Because pattern-making is mechanical, cutters most likely saw the human body to same way of Architectural buildings:

Perpendicular design creates scale representations in all bodies' perspectives in distinct pattern components, such as the front, back, and sleeve of a garment. While it's true that the body's dimensions change as we move, pattern cutters have found ways to get around this by considering the body in motion rather than a static object. In addition, an original method called "ease" has been created (to improve the statistical correlations between the Moving body (MB) and garments, Or to better match the garments to the body)(Simoes, 2013). The concept of wearing ease, which refers to the space between a person's actual body dimensions and the dimensions of an article of clothing, is defined as "the degree to which the garment hangs smoothly and evenly on the body with straight seams, no fabric distortion nor pulling, and no gaping" (Hassan, 2022).Nevertheless, because the garment is affected unevenly in many places that are unconnected to the real ease distribution, the extra space between the body and the clothes might become inadequate when moving (Li et al., 2006). Y Li et al. (2006) found that when the amount of ease decreases when moving, certain parts of the body may experience excessive pressure, which can contribute to both actual and perceived pain.

To optimist the flexibility of the fabric, (A) cut the pattern pieces on the bias., (B) adding gussets or other design elements to increase the garment's surface area at certain points on the body, and (C) selecting fabrics with certain fiber contents, yarn forming techniques, or weaving methods to maximize their elastic behavior, pattern cutters can reduce the garment's negative reaction to movement and make it easier to wear (Branson & Nam, 2007). Still, these processes, whether used alone or in tandem, contribute to the creation of clothing with good fits (Branson & Nam, 2007), and they maintain the contradictory paradigm of SB representation that pattern cutting has embraced. Rather of offering pattern forms that are well-suited to the deformable, practitioners of clothes ultimately depend on fabric qualities.

Research problem:

Fashion design holds a significant role in both public and private spheres, serving as a crucial element that allows individuals to navigate life. It enables one to differentiate between various environments and objects, discern similarities, and draw inspiration from nature. Moreover, fashion design serves as a means of expressing personal attitudes and emotions through two- and three-dimensional artistic forms. Design plays a crucial role in contemporary fashion fabric by harnessing its features and systems to create a strong visual appeal. It strategically places these elements in their appropriate positions to establish a psychological connection with their intended meanings and subject matter. Additionally, the designer's technical treatment of the fabric aligns with their perceptions and methods, resulting in a powerful impact. The recipient's objective is to accomplish the intended purpose and substance of the design. Furthermore, the use of design and their strategic arrangement into distinct categories aids the designer in effectively conveying their concept and selecting harmonious designs combinations in the realm of modern fashion fabric design. The ultimate objective is to achieve successful manufacturing and a desirable end result. To clarify, design is a vital component that is intricately connected to design. Additionally, design serve as a supplementary role in enhancing educational aptitude and comprehension.

The designer's incorporation of human body movements was not solely driven by the desire for visual impact, but rather to stimulate the innate instinct for vision and achieve a balance

between the aesthetic and functional objectives of the product. The utilization of movement as a tool serves to captivate attention and generate interest through the juxtaposition or alignment of contradictory or harmonious elements, as well as the ability to convey or imply ideas. The relationship between the artistic and psychological aspects of design is intricately linked. This connection is determined by the type of relationship and the way design is utilized in the design of modern fashion fabrics. The outcomes of this design relationship have both aesthetic and psychological effects. They contribute to the ambiance of psychological feelings, so eliciting a significant impression and response from the recipient. For both aesthetic and utilitarian reasons. In order to achieve the research objective, we employed methodologies based on real-world scenarios. These strategies involved using theoretical and quantitative samples, as well as visually evaluating the body, average size, and form. Subsequently, a collection of models was fashioned from a unique textile material, which underwent computerized analysis and was integrated with the characteristics of the mobile physique. Additionally, a cohort of women was employed in the process. In order to get favorable outcomes in the research, women have experimented with prototypes that are constructed from durable materials capable of withstanding pressure and prolonged usage, while also taking into account bodily movements, as well as muscle contraction and expansion. The ultimate model successfully attained the fundamental objective of the research.

Research Importance:

The significance of study lies in the positions that the body adopts during movement, which is one of the variables that produce a substantial rise in pressure on clothes, resulting in pain.

1- It helps to display safe fashion design via the positions the body adopts while moving.

2- The possibilities of applying the research results to create modern fashion designs. Alternatively, in the future, produce research and studies that fit inside the expertise.

Research Objective:

The objective of this project is to use body movement as a starting point for fashion design, beginning with the creation of a display model that includes all of the body movements that occur on a daily basis.

Research Limits:

The search is defined as: The researcher created a series of customized fabric models, which were computer-analyzed and integrated with the moving body's characteristics. A group of females was also recruited. To generate good research findings in 2024.

1. Theoretical Framework

1.1. The Guiding Principle

In an article titled "The tall office block artistically considered" published in 1896, American architect Louis Sullivan utilized the phrase "form ever follows function" many times. Sullivan included a "comprehensive formula" that defined form as an intrinsic part of "the inner life, the native quality" of all things, whether they are organic or inorganic, physical or metaphysical. He identified the phrase as "the pervasive law," and he offered a variety of synonyms for form, including shape, design, outward expression, and "or whatever we may choose" as a synonym. The main idea behind his argument was that since everything in nature is clearly distinct from each other, the design of tall office buildings shouldn't be dictated by "any theory, symbol, or fancied logic." Sullivan's (1896) final argument was that every problem has its own solution, which meant that (A) tall office building design should be liberated from mystical, historicist, and naturalistic constraints. (B) architects should

design solutions where form and function are harmonious, just li Sullivan urged architects to stop caring about aesthetics and stop listening to clients so they could "become a medium through which the pre-ordained solutions would find their true expression" after claiming that everything in the universe, both man-made and natural, is the product of a transcending intelligence. The year 2023.

1.2. Originality and Creative Process

In this case the “American architect and design philosopher Christopher Alexander argued against the form follows function theory” (Simoes, 2013) and in favor of starting with preexisting forms to develop new ones. (Michl, 1995). However, Bohm (2006), an American quantum physicist, believes that creating something new from nothing is associated with creative.

Bohm thinking that creative stems from novelty sort of than particular talents. According to Bohm (2015), originality is difficult to define. However, he pointed out that one requirement for being unique is being open to exploring new situations without preconceived notions, even if the ideas one presents are ultimately rejected. This concept is rooted on the belief that originality involves a fundamental desire to discover and produce something completely new that is both harmonious and aesthetically pleasing (Bohm, 2015).

1.3. The Original Image and Theory

Sullivan's first assumption is that the design of patterns should not be based on the idea that patterns are derived from the design of structures. Instead, patterns should be designed with the understanding that they would be used to create clothing that covers the body, which is a flexible and dynamic entity. In light of these conditions, Watkins (1995) described clothing as a personal and portable environment. In accordance with Sullivan's second premise, the solution to accurately representing the body's true expression in pattern cutting can only be derived from the body itself(Watkins, 1985).

In accordance with Watkins' theory, patterns should align with the movements of the body. This is because the body, as a dynamic entity, interacts with the clothing it wears, forming a system that undergoes many alterations. Considering the information presented before, it is necessary to thoroughly analyses the issue of appropriately representing the body without any preconceived ideas, as Bohm pointed out. The concept of the Moving body form was created as a synthesis of all the postures it adopts on a regular basis, inspired by a sudden moment of insight (Bohm, 2015). As is typical with functional clothing, this new body paradigm does not attempt to depict the Positioning the body through the activity it is performing or the posture that is generally taken on a daily basis. Functional clothing is specifically engineered to protect the body. Enhance health and safety, improve job efficiency, or enhance bodily functions. Adopting either of these approaches would rely on a logic that is not suitable for this purpose. However, when it comes to generic clothing made of non-stretch woven fabrics, such as active wear and daywear, it is important to design them in a way that fulfills the wearers' requirements during regular activities. This is similar to how functional clothing is designed to meet the specific needs of sprinters, firemen, as well as astronauts during their moon exploration, 100-meter runs, or firefighting missions.

Garments that are properly fitted in a stationary posture may become poorly fitting when the wearer flexes their arms, legs, or torso, as has been investigated by textile experts since the 1960s (Denton, 1972). It is important to mention that a lot of generic clothing is made from non-stretch woven fabrics, which do not have the same flexibility and comfort as knitted materials. The worries stem from the fact that more and more customers are now favoring clothing that offers enhanced practical performance (Li et al., 2006), as they place a higher importance on the experience of wearing it.

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1.4. How the Moving Body is Understood

Considering that " spend most of our time practicing various activities, such as walking or sitting " (韩燕丽 et al., 2015), it was necessary to develop a complex design mechanism to bring about the desired combination of all body positions, even though every action taken throughout the day involves “the different movements, making it hard to provide and precise list of desirable characteristics for moving clothing design” (Simoes, 2013; 韩燕丽 et al., 2015).

2. Research Procedures:

2.1. The Pictures of the Artist

A mix of methods approaching self-portraiture and theoretical sampling were used to gather three-dimensional data in the initial stage of the search. The woman projected her world for almost 40 hours onto the facet of the one piece dresses makes of a lighting, thick wools felt materials, expressing this as a type of self-portraiture. In their own environments, they carried out their normal routines (Figure 1). Objective rather than subjective, the 3D records produced by these woman's actions over time deviate from the traditional definition of self-portraiture. The wool mix felt experienced a progressive transformation in reactions into the heats, wetness and compression applied into moving body, capturing three-dimensional proof of the recurrent movements.

Figure 1: Hedge trimmers and tennis players who double as self-portraits.

Since the goal of the sampling was "not people per se"(Sandelowski, 1995), but rather the relationship between the moving body and its depiction in pattern cutting, this method is thought of as "resembling" theoretical sampling. As a result, the process sampled ordinary actions, specifically as the siomon says “the reflected image of everyday movements on the snug-fitting felt coveralls”.(Simoes, 2013). Because age, physical condition, and body proportions are among the most critical elements that determine body mobility, range of motion, and postures, Only women between the ages of 19 and 48 who typically wear a size 12 or 11 were included in the study. (Ashdown, 2011). In order to zero in on the essential characteristics of the Moving body in a particular reality, it was necessary to decrease the number of analytic variables. The one-piece coverall design was chosen due to the fact that every movement performed by the body requires coordination of different parts. For instance, in order to squat lift, the hips, knees, and ankles must all extend at the same time (Hassan, 2020). To raise an arm, the skeletal muscles of the torso must counteract the torques generated by the shoulder and arm (Hassan, 2020). And when walking, the torso must alternate between bending and straightening its legs, swinging it.

The Moving body was created using tight-fitting felt coveralls that covered the complete body except as the heads, hands, and feet's. The interplay between the bone, nerve, muscle, and skin, resulted in the emergence of specific characteristics. These include a stooped posture with the buttocks protruding behind the torso, a fore design of the wrists and elbows with growled spaces between the torsos and drape the arm, and a knee protrusion that faces forward or outward, leaving greater room between the drape legs. (Figure 2) illustrates these characteristics.

Figure 2. Prior to and following wear of the coverall, with seams marked.

2.2. The Physical Representation

Upon completion of the reality projection procedure onto the coverall surfaces, it was discovered that, with a few exceptions, the same body areas showed comparable degrees of deformation in the felt one-piece clothing (Figure 3).

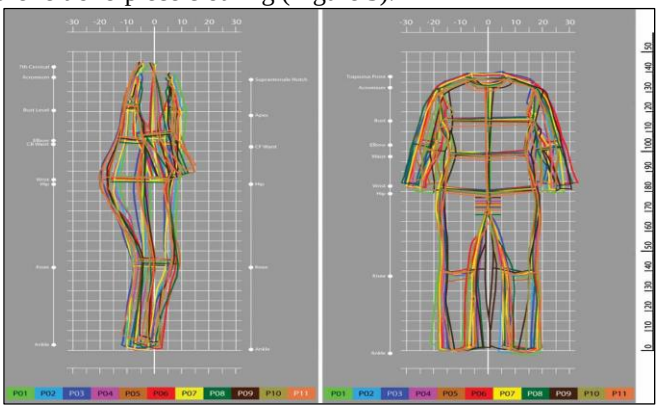

Figure 3: Overlapping self-portrait silhouettes.

The data from Participant was excluded from the next stages because her coverall bottoms ended up overlapping. In the second round of the search The 10 self-portraits that survived were combined to produce a composite portrait of the moving figure. This composite portrait was generated by amalgamating the techniques of visual somatometry. (Gazzuolo et al., 1992) and body shape averaging to create a physical mannequin for making moving patterns in with size 12. The self-portraits were hung from a specially-made hook that allowed the misshapen coveralls to dangle freely. They were photographed from four different angles using Gazzuolo's approach, and the middle shots had their outlines, important axes (12), and angle measurements noted (Figure 4).

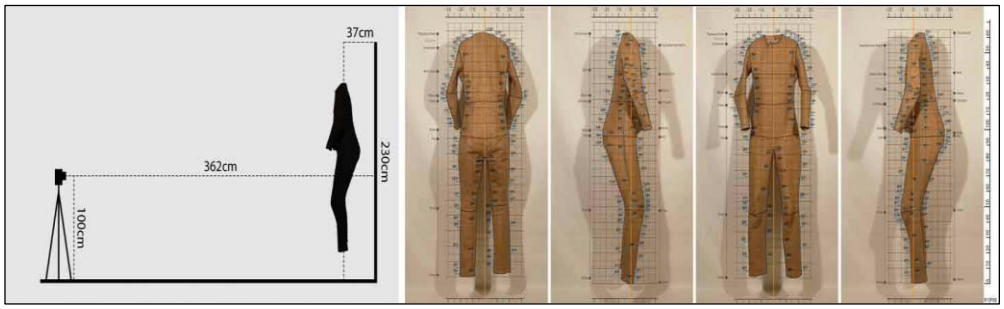

Figure 4: Photographic setup with four views of the self-portrait, emphasizing angles, axes, and characteristics.

In the early of year 1990 (Gazzuolo et al., 1992) No one attempted to utilize the quantitative data to anticipate the dimensions of a collection of patterns or to translate the ensuing graphic data straight to pattern lines. Alternatively, a technique was utilized to generate symmetrical silhouettes and profile views, followed by the generation of median views. These views served as a basis for the building of a mannequin that was subsequently utilized to produce patterns. To make symmetrical models, we first separated each self-portrait's front silhouette and side profiles into upper and lower halves as well as left and right sides. Then, we compared the correlative sections and took the most severely deformed halves, flipped them and adhered them to the opposite side, horizontally (Figure 5).

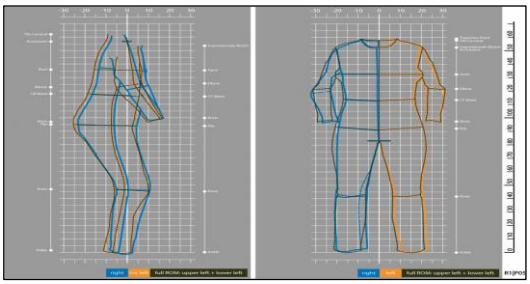

Figure 5 shows the back profile and original and revised front silhouette of self-portrait #05 superimposed.

The option of “unstitching the warped felt coveralls and averaging the pattern pieces separately” was rejected in favors of the more complex method of maintaining the 3D contours of the actual mannequin throughout its creation. This enabled enhanced manipulation of the pattern forms of the generated Moving body blocks. Individuals often exhibit asymmetrical body movements due to factors such as handedness or a preference for crossing one leg over the other. Nevertheless, the depiction of reduced range of motion in One of the most prominent details in self-work does not necessarily imply that an individual actually experiences such limitations. Instead of creating a form with appropriate measurements, we generated one with appropriate levels of distortion by averaging the resulting outlines using Hutchinson and Munden's method, which considers the whole range of motion. This technique was used since it avoids the need to calculate the geometric mean of the women's figures.(Hutchinson & Munden, 1978) generated an average standard block design using successive phases from eight women whose linear measurements matched a standard size 12. Because of this, we did the following: (A) can found compared the ten front and side outlines that matched the best; (B) can found also the rate of shapes between each

pair using a bisecting line; and (C) we continued doing this until there was only one Front dark image and one side shape left (Figure 6). A digital, three-dimensional mannequin was generated from the two-dimensional representation of the composite image.

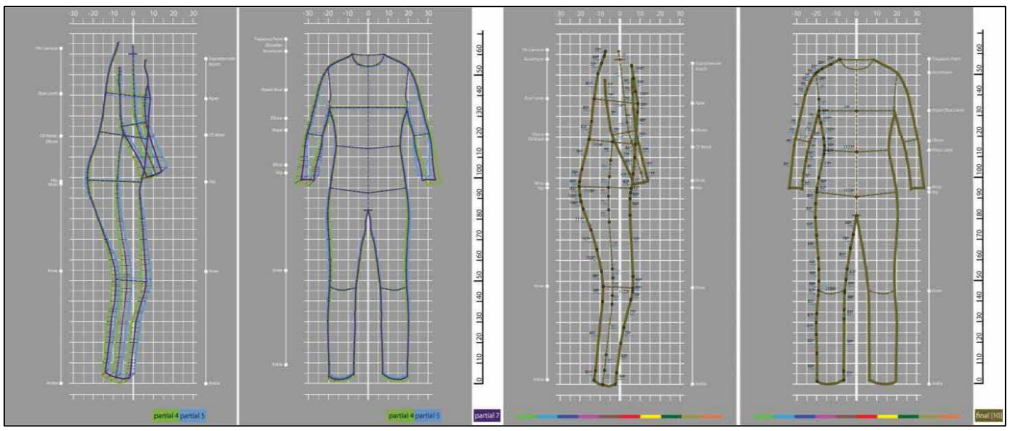

Figure 6: The two-dimensional composite portrait and the average body forms 4 and 5.

The modeling process was commenced via Blender, a software application for generating 3D images. Afterwards, a polygon mesh was created. The model underwent iterative enhancements by manipulating vertices using standard editing tools and the Proportional Edit modifier, while maintaining alignment with the 2D composite picture. Regularly, the models was converted to Waves fronts Objects format and included into Rhino, 3D CAD design software's, to validate this arm dimension, The legs, wrists, and ankles of the physical mannequin were shaped according to the specified dimensions "using a computer controls (CNC) machine". As Figure 7 displays the mannequin, made of high-density Styrofoam, with a black cottons ribbon indicating these significant bodies' characteristics of the composite picture.

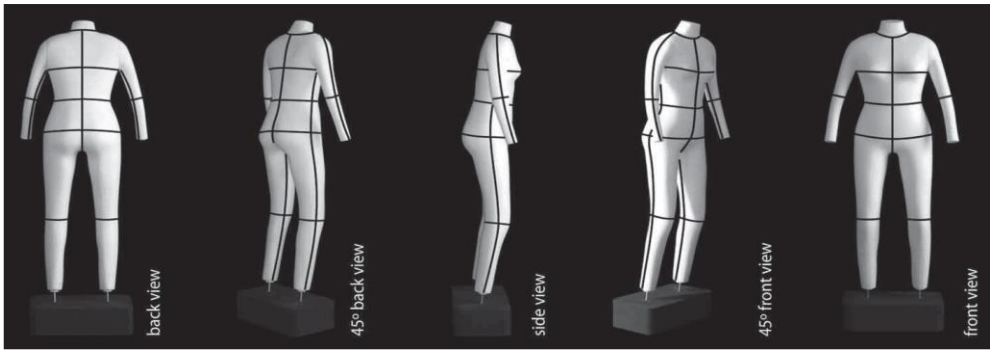

Figure 7: A real mannequin with tape running along its main axis.

2.3. The Patterns of the Moving Blocks

The goal of developing the tangible mannequin was to create the Moving body blocks by draping them. Consequently, the muslin panels' grain lines were affixed to the mannequin's midsection and centers. Using the black cottons ribbon guidelines, then outer borders of the front and back pieces were marked on the muslin panels. Each section was addressed separately. Each pattern piece was transferred to paper after being checked for proper fit on

the mannequin in terms of line, balance, and set. Although the fabric is malleable, shaping it into a three-dimensional shape is more challenging due to the physical mannequin's succession of sharply angled convex and concave surfaces. In order to fix this, we eased the muslin pattern pieces so they would hang properly. Figure 8 shows that there is a significant difference in shape between the block make from physical model (red) and the respective conventional pattern (blue), despite the fact that both sets of blocks are fairly comparable in dimensions (both have been designed to fit size 12).

The curvature of the inseam and side seam line in rear patterns pieces of the trouser block is particularly evident due to their rightward direction from the hip level downwards. This is because these lines are designed to catch the angle shapes of the legs, with the inseam length almost meeting side seam. The sleeve block, formed by reversing the pattern pieces for the draped trousers, presents a noticeable juxtaposition as it accurately portrays the angular contour of the arms. The frontal lines have a pronounced curvature, particularly at the elbow, whereas the posterior lines are straight and originate at the level of the armpit, extending downwards. The mannequin-based block's torso closely adheres to the traditional shapes pattern. However, the front a pattern shapes has been elongated, causing it into slant downward and into the right. Additionally, the lower end of the waist dart divides into two points. On contrast, most all the lines on the back shapes piece are inclined forwards the left. Figure 8 displays the traditionalist prototype, while the as the Figure 8 above demonstrates how the arrangement of the moving bodies blocks in muslin enhanced the perceived appearance of a cohesive body throughout its motion.

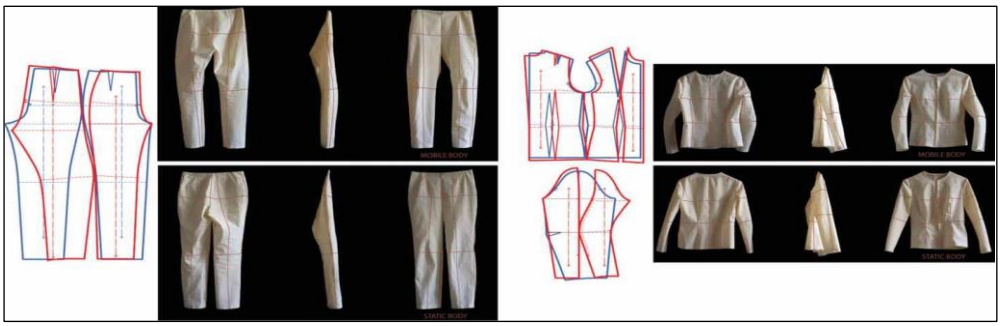

Figure 8: Prototypes and patterns of mobile static bodies.

2.4. The Garbed Body's Point of View

Last but not least, we checked to see whether the moveable pattern blocks improved action comfort by giving us "a greater degree of freedom of movement without undue pressure or friction on the skin" (Yaseen, 2023). In a battery of wear tests, the women ranging in age from 19 to 41 and typically wearing a size 12 were evaluated, along with two sets of prototypes. On one day, each set was worn for around 20 minutes. On another day, the same thing happened. Reversing the testing order and not reusing the initial batch of SB and mobile prototypes helped reduce the possibility of bias. All of the prototypes were topstitched from muslin in the same way to reduce the possibility of bias; this made it harder for the participants to tell which clothes were the moving body prototypes and which were the regular ones.

The Result:

Following the completion of the same generic tasks as in the initial phase of the project, which were used to create the physical mannequin, the participants reported that the moving

body prototypes appeared to 'expand and shrink' in response to the skin and muscles. Specifically, they found the prototypes to be 76% easier to control in outdoor actions compared to 19%, 96% easier in indoor actions compared to 4%, and 83% easier in extreme body positions compared to 13%. Moving body block designs were also found to be the most form-and fit-friendly based on the collected data on the wearing experience.
Subject 4 expressed a positive opinion about the appearance of the sleeved tops on her body. Subject 1, however, found the prototype to be excessively tight around the armhole, revealing her lower back and abdomen when she moved her arms. On the other hand, subjects 3, 5, and 6 found the top to facilitate easy movement of their arms and upper body. Subject 3 specifically noted the curved sleeve of the top provided greater freedom of movement compared to the prototype's straight sleeves. As Figures No.2, No.5, and No.6 unanimously report experiencing the promised comfort as soon as they wore the prototypes of the moving body. Remaining still provided them with increased solace.

The Conclusions:

The objective of precise depiction, in contrast to fixed depiction, is to perceive the body as the fundamental element of the design procedure, an entity that can be altered and repositioned. The objective of designing general mobile clothing is to ensure their practicality as garments, encompassing all the body's various positions during the day. Given the varying sizes of different body parts as we move, it is necessary to use qualitative procedures instead of quantitative ones to achieve this combination. An approach to creating physical mannequins for pattern layout in wearable clothes involves use the human body to offer its own three-dimensional data. These patterns demonstrate a quality that is also present in traditional pattern cutting, namely the pre-established partition into segments. The seams of the garment clearly demarcate the moving body into distinct sections: front and back, as well as top and bottom. Nevertheless, what distinguish them are their "distorted" outlines, which provide a representation of the body in motion through the fabric, resulting in the perception of a better fit and enhanced comfort during movement. Although the moving body interpretation originated from a specific group within the target market, it has potential. Mannequins, which have been proven to be beneficial for constructing mobile block patterns, may be customized to cater to different targets market by extensively increase the range of activities and peoples groups investigated. Another factor to consider is assessing the potential of mobile block patterns for future pattern development. This involves applying the fundamental principles of flat pattern cutting, such as surface by slitting and distributing, pivoting, and transferring darts. The objective is to create models for everyday style garment. We are now examining the potential usefulness of these blocks for less inflexible designs in light of the introduction of design flexibility.

The underlying concept of the engineered moveable block patterns has resemblance to Levi Strauss's Engineered Jeans, a fashion trend characterized by twisted seams that was introduced in 1999 and eventually discontinued after almost a decade.

Movements of the body while walking, biking, driving, and skating were also the basis of Europe (Hussein, 2022). the Ireland and authors, said that the lack of popularity of this brand was due to its being "too avant-garde for Levi's typical customer, while also failing to attract other potential customers." (Ireland et al., 2006). A very promising population consists of elite athletes, notwithstanding the reluctance of generic garment buyers to "abandon their aesthetic perspectives" (to paraphrase Sullivan). The main objective of the project was to create a technique for non-stretch weaving that can be used in everyday situations. However, this method also has significant potential for influencing the design of knitted sportswear. For instance, physical models could be constructed to illustrate the symmetrical movements in cycling or the asymmetrical motions in pitching.

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