MY CLOTHING IS ME: Embracing ADHD in Traditional Qatari Apparel

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Children diagnosed with Attention Deficit Hyperactive Disorder (ADHD) are often secluded from society, as the condition is perceived to be a defect. These children constantly fidget, move, lose track of time, and forget to complete tasks, leading them to struggle within existing social environments. Additionally, in Qatar there is a need to educate society about ADHD.

This research explores wearable solutions that alter behaviors through physical interactions and sensory engagements. In response to the challenges faced by ADHD, Qatari traditional attire has been customized to support children with time management, and communication between child, parent, and society. Additionally, these wearables challenge Qatari perspectives surrounding existing health conditions in Qatar.

Design outcomes consist of clothing elements, driven and shaped by the experiences of ADHD children, their physical behavior, their senses like touch, smell and sight. It addresses the daily conduct of the ADHD child, and the relationship of the child and parent. By challenging existing norms and analyzing the Qatari traditional clothing (the Thobe, the Abaya and the Prayer Bead), design outcomes have been realized by experimenting and playing with materials, prototyping and 3D printing on fabric. Existing functions of appars, pockets, beads, cuffs and technical construction of the outfit have been redesigned and reconstructed.

Key terms: ADHD, Task Oriented, Thobe, Abaya, Prayer Beads, Pulls, Zippers, color codes, sequin, Thermoplastic polyurethane TPU, Polyactic Acid.
Sitting in his classroom, Yousef, began looking for items around him to fiddle with. His teacher, on the other end, has been attempting to grab his attention for the past 10 minutes, but Yousef was eager to find the next best item to get hold of. He is hyperactive and energetic; sitting still and paying attention is very difficult. There is a need for him to fidget to release excess energy, in order to be present and focused in his surroundings.

Over the years, it has been noticed that Attention Deficit Hyperactive Disorder is one of the fastest growing health conditions in children. In a study conducted in Qatar on the prevalence of ADHD, parents were given forms to complete about their child's conduct and behavior to assess if the child has symptoms of ADHD. According to the study "parents were very defensive, and either refused to complete the checklist or stated that 'there is nothing wrong with my child' marking every item as 'never'."

If one goes beyond the preconceived notions of ADHD, it is remarkable to note the uniqueness of these individuals. Their brain functions in such a way that it produces specific traits and behaviors, which appear abnormal or exhausting for people around them. Children with the condition are often hyperactive, and have excess energy that needs to be released through behaviors like fidgeting, running around, or constantly moving when expected to sit. Those with the condition are said to have unique qualities implying that they possess superpowers, like the ability to be hyper focused, or being highly sensitive to their surroundings. Not all kinds of ADHD are harmful, yet if one is diagnosed at an early stage, there is a greater chance to control certain behaviors and traits that may arise due to their unique personality. In a normal school setting, these children appear abnormal, which can lead to them being shunned or even dismissed.

PROBLEM

In Qatar, it is socially unacceptable to discuss others' mental or physical health publicly, and dialogues regarding any health condition, including ADHD, are limited. It is a cultural norm for people to patiently and secretly endure challenges, and therefore dialogue is needed to increase awareness about ADHD, the behavioral traits associated with this condition, and the need to support these individuals. How can design be used to create solutions that help them handle their condition in their respective surroundings, and at the same time, empower them? In general, design solutions related to ADHD are limited internationally and almost non-existent in Qatar.

JUSTIFICATION AND DELIMITATIONS

The intention of this thesis is to explore design solutions focusing on ADHD by observing behavioral traits of children aged 7 to 12, such as fidgeting. It does not, however, aim to produce design solutions that are scientifically or medically proven to help those diagnosed with ADHD. Religious connotations or beliefs are not challenged or questioned here. Debates on the accuracy of the diagnosis of ADHD exist, however this thesis does not intend to encourage the diagnosis of ADHD. Although there exist few formal presentations on how to deal with ADHD in some Qatari institutes, it is my intention to explore, using design as a means to address this condition, empower these unique personalities, and perhaps assist in creating a society where ADHD diagnosed individuals are accepted and acknowledged by the rest of the community.
EXCESSIVE ENERGY OF ADHD

Hyperactivity, impulsivity and inattention are the main symptoms that distinguish a child with ADHD from others.

“Individuals with ADHD may have high degrees of energy, focus, creativity, passion, exuberance, and multitasking ability. This energy is sometimes reported by successful people to be the source of their work ethic, and the superior performances they are driven to achieve.”

“These superior skills they possess often make them fidgety, unable to stay still, zoned out and restless. “ADHD has also been termed a performance problem. Children who have ADHD are often unable to plan or finish a specific task within a set time frame.”

They are usually given defined daily schedules that help them to keep track of the tasks to be accomplished. Another noticeable trait is their high energy levels, which they need ways to channel. This channeling of energy can often take the form of fidgeting, an inability to sit still, and a constant need to feel something with their fingertips.

SENSORY EXPERIENCE

The Touch System of our body allows us to use our body skin and fingertips to feel our surroundings. Since childhood, it is through touch that we gain our trust with parents and others. We gain an understanding of the differences between soft and hard, cold and hot, smooth and rigid, wet and dry and the like. It is through the combination of senses that we connect and understand our surroundings. Hypersensitive ADHD diagnosed children are often overly sensitive to touch and have a strong tactile sense.

“A child who is over sensitive to touch and quickly feels threatened by it can restore balance by jumping, by throwing himself or herself at something soft, by playing sport, by becoming very active.”

This excess energy and sensitivity is what leads to their fidgety behavior.

ADHD’S IN THEIR RESPECTIVE ENVIRONMENTS

ADHD children behave differently in various environments. At school, ADHD students demonstrate difficulty in following rules or completing tasks. They sometimes disrupt their classroom and perform poorly in academics. It is found that they have academic difficulties, leading to increased dropout rates and lower rates of passing. Due to their hyperactive character, they are often expelled or suspended from their schools. At home, parents need to provide schedules and keep track of the completion of tasks by the child. Specific relaxation time and work/study time are allocated for the children to keep them engaged and focused on task completion.
DÉAMBULATIONS BY FRÉDÉRIQUE BREUILLÉ

Designed and composed by Frédérique Breuillé (Figure 1), a French stylist, graphic and textile designer, Deambulations is a floor carpet made out of various textiles and textures that reciprocate various sensations when walked on. The designer intends to explore the relationship between body and the experience felt from interacting with textures and different materials that provide the feeling of softness, roughness, hardness, and smoothness. Each texture or material is intended to spark different memories, emotions and associations when the user walks on it. From my observation, I assume that some materials might also catalyze visual sensations. For example; something may look hard, but is actually soft when touched.

ADHD individuals are highly sensitive to touch. Their hands or fingers are desperately seeking to fiddle and fidget with items around them. Things that have textures, or that provide opportunities to channel their energy and keep them focused, can help them function in settings that require them to carry out tasks without disturbing others. Deambulations is a good example of understanding the human body’s relationship with materials and textures. Our human mind and body directly familiarize itself with the surrounding through our senses.

SQUIZITS BY YANKO DESIGN

A common trait of ADHD children is excessive fidgeting with their hands. The Squizits (Figure 2) come as a kit with eight different blocks with varied textures and functions, allowing the user to choose and change their fidget toy when preferred. The kit consists of blocks made out of silicon, silicone buttons, zippers, and beads designed to facilitate the action of pressing, fidgeting, untangling knots, grinding in circular motion, all of which involve the sense of touch, sound and the various hand movements. This activity can help channel the excessive energy of ADHD children, so they can stay focused on given tasks.

TACTILITY BY JESSICA BUNNELL

Designed by Jessica Bunnell, Tactility (Figure 3) is a set of fabrics that cater to children with ADHD and their fidgeting behavior. These textiles were created using silicon and cotton fabric. In addition, she explored the various ways of production like knitting, 3D printing, embroidery and padding. Touch is a powerful sense; tactile stimulation increases attention span and the capability to remember information.

Tactility are a set of soft fabrics that have textures that are uneven but soft and padded, giving the feel of comfort and calmness, and inviting interaction between ADHD individual and the fabric, which in-turn helps in channeling their excessive energy onto these designed fabrics.

SOFT HAPTIC TOYS, AUTISM SPECTRUM DISORDER (ASD) CREATED.

This article on soft haptic toys, informs how haptic and sensory experiences produced from soft toys benefit children with Autism Spectrum Disorder (ASD). The study also explores the relationship of children with ASD with things (mainly soft toys) created by themselves. Children with ASD and ADHD are often highly creative individuals with a strong sense of touch, smell and feel. The article addresses the benefits of finding creative ways of engaging ASD. Focusing on safe, tactile/haptic providing soft toys, the caregivers used strengths of the children with ASD to create soft toys that engaged the children in the process of making. This in-turn created a personal relationship between the soft toy and the child, allowing the toys to calm them during stressful times.

From this we learn utilizing the strengths of those with ADHD can empower them. Through creative thinking and making, customized design systems provides the ADHD child/person the opportunity to make their own customized tool, which gives them the freedom of expression and engage them in a positive way.
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Based on my background research and precedent studies, the following are key themes explored to reach final outcomes:

BEHAVIOR (PHYSICAL MOVEMENT AND DAILY ROUTINES):

A common behavioral trait of ADHD children is excessive fidgeting with their hands, where they are eager to fidget with something, which is necessary to maintain their focus. In his book, Spark, John Ratey, M.D., shows that physical activity — even something as small as fidgeting by the hands — increases levels of the neurotransmitters dopamine and norepinephrine in the way ADHD medications do. Both chemicals play a key role in sharpening focus and increasing attention.11

Fidgeting is an unconscious behavior one does to focus on a specific task. It was proven that physical movement had a direct correlation to better cognitive performance.12 By interviewing an ADHD child, I learned that he liked the idea of zipping and unzipping zippers. Another remedy that the family follows for this child, is keeping him on track to carry out his daily tasks, which they do by creating a to-do list that he duly follows.

UNDERSTANDING HUMAN MIND AND BODY SENSES:

Each ADHD condition and behavior varies from person to person. One ADHD diagnosed child (11 years old) interviewed mentioned he would prefer pockets with sequined fabric inside them. When asked why sequins should be placed inside the pocket, while no one could view the color change, he replied “It is not about what we see, but how it feels.” The same child also mentioned that he likes to lick his fingertips, since they felt dry. A mother of an ADHD girl, mentioned that her daughter loves clothing that has thumb support. She also indicated that sequin changing pillows are her daughter’s favorite.

Although behaviors related to ADHD can be learned from existing research, time teaches that each ADHD behavior is either similar or different between individuals, which makes each case study unique.

INVESTIGATION

QATARI PERSPECTIVE ON ADHD:

Although ADHD is an existing condition in Qatar, it is not fully understood by the society. When I visited a pediatrician, who has been dealing with ADHD for 15 years, she mentioned it is uncommon to find parents that admit their child has ADHD, assuming that all children are naturally expected to be hyper and active. ADHD doctors confirmed that every movement or behavior should not be mistaken as ADHD, yet they recognized ADHD as a unique condition. It is diagnosed after months of observation within the school and home environments.

She emphasized the importance of educating Qatari society about ADHD. Recognizing it an early age is better than dealing with major problems at an older age. She stressed that those with ADHD must practice physical exercise as it is necessary for them to release excess energy.

QATARI PERSPECTIVE ON ADHD:

A

In his book, Spark, John Ratey, M.D., shows that physical activity — even something as small as fidgeting by the hands — increases levels of the neurotransmitters dopamine and norepinephrine in the way ADHD medications do. Both chemicals play a key role in sharpening focus and increasing attention.
PRELIMINARY EXPLORATIONS

The following investigation processes involved a series of one-week projects:

1. Felt fabric with flower inserts (Figure 4)
   - Smells like lavender, jasmine, holy basil and others, helps to relax ADHD individuals. Felted with flowers as inserts, felt fabric was created, leading to creating fabric that contained relaxing scent. In Qatar, Bhukoor, or smelling good, is a cultural norm and a necessity.

2. Concealed pearl bead felt into fashion clothing detail: Pockets (Figure 5)
   - The traditional outfit in Qatar is the thobe and abaya. Pockets on the thobe are of two types: side pockets and front-chest pocket. A layer of fabric concealed with a moving bead, was formed into a thobe pocket. This was designed to allow the ADHD child to secretly fidget with it.

3. Transforming To-Do List of ADHD child into clothing (Figure 6)
   - I was introduced to an ADHD child’s daily routine chart. This chart is created by his parents to keep track of his daily activities. Figure 6 shows the daily routine chart, where the child has to shift a magnet from left to right once he completes his task. The family then rewards him.

4. Zipper pulls to indicate task (Figure 7)
   - The zipper was further examined and redesigned by replacing the zipper pulls with custom made pulls, which could facilitate fidgeting and tactile experience, using 3d printed forms with various patterns that produce various feelings when touched. Some pulls were 3D printed and further inserted with fabrics and textiles, like sequins, padded leather, felt and silky rope, that provided varied sensations when touched. Each pull can be designed to depict a specific task.

5. Clothing that change silhouette (Figure 8)
   - The task-oriented detail in the previous experimentation, is enlarged to distort the existing construction of the T-shirt. This change in silhouette implies changing something existing to something different and more interesting, which indirectly implies empowering those with ADHD.

6. Patterned Beads (Figure 9)
   - The prayer bead strand is one of the main accessories used by Qataris. Mis baha (prayer beads also known as, Sib ha) is a common accessory, functioning similar to rosary beads. People use it in various ways, and within the Arabic culture we have children imitating adults by simply carrying it. Some people carry it to show their high status. Some people use it to simulate the praying behavior by simply moving fingers over the beads. Another common behavior is that people tend to wrap the prayer beads over their fingers in a specific manner; they generally use the thumb to rub against the beads, while the remaining beads are wrapped around the rest of the fingers.

The final outcomes resulted in customized prayer beads, customized zipper pulls, customized abayas and thobes for children aged 7 and above.
Fig. 10: 3D printed experimentation of beads with various functions.

OUTCOME 1: CUSTOMIZED BEADS
Construction: The expected total beads for a Mis bah are 100. The medium sized Mis bah typically has 33 beads separated by a special bead, then followed by 33 beads and so on. The shorter ones come in as 11 beads followed by a special bead and so on. (Refer to illustrations on the right)

Modification in relation to ADHD:

PATTERNED BEADS

Tactile experience is felt when the surface consists of different textures, tactile forms, or patterns. Initially three beads where designed by analyzing how the fingers would be guided along the paths. They were designed to provide tactile as well as visual experience. The other beads tested, had surfaces with in-cuts to visually attract the user to interact with it (Figure 11 & 12).

ROLLER BEADS

Roller beads are inspired from fidget spinners used for relaxation to support ADHD, as well as from understanding peoples’ behavior with the Mis Baha. In reflexology, it is also found that the index finger is the pressure point to relax the mind.
The technical construction of the beads focuses on the direction the rollers/rings move as well as the textures of the surface, as shown in the figure 12.

Each bead was prototyped using 3D Ultimaker 3. Oversized beads were first prototyped, to understand the function of the bead, which was later decreased in size suitable to string them as prayer beads. Materials used were:

- Polylactic acid or polylactide (PLA)
- Grey Light-weight Resin
- Thermoplastic polyurethane (TPU)

Figure 14, shows three beads prototyped in PLA. Figure 15, shows beads with rings size variation in PLA and Resin. Figure 16, shows beads prototyped in TPU, understanding feasibility and flexibility. There are limited sizes that beads in TPU can be printed using the Ultimaker 3+, due to which the TPU beads are not the final outcomes for this thesis exploration. Perhaps it is an exploration for the future, where printing delicate details in TPU can be practiced. Shapeways, a manufacturing company in the Netherlands has recently introduced TPU as the new material for production. Figure 17, shows beads with rollers tested in PLA and Resin. Printing on the Formlab is advantageous as it allows the printing of intricate moving parts. These beads were then produced by Shapeways, in Versatile Black plastic. The resulting texture, feel and movement has a very soothing effect when played with. Figure 18 provides a macro shot of the Versatile Black bead.
OUTCOME 1: CUSTOMIZED BEADS

Fig. 18: Beads laser printed in Versatile Black Plastic through Shapeways.
OUTCOME 1: CUSTOMIZED BEADS

SYSTEM OF CONSTRUCTION AND USAGE:

The image below shows how our finger segments work as a tool for counting, which I transformed into a strand of prayer beads.

I then deconstructed existing prayer bead structure by observing an already existing prayer bead strand (Figure 19). Here you can see 11 prayer beads are separated by another small bead. This strand is to be used as \((11 + 11 + 11) \times 3 + 1 = 100\).

Fig. 19: Existing strand of Misbah
However, questioning its structure, I created a strand that has 10 normal beads and the 11th as the unique one. This would allow the user to keep track of the 11th without the need for an extra bead. The strand I created currently has 33 beads, which are to be repeated 3 times and the last 1 is the 100th. This strand removes the need to use separator beads. Each 11th bead in this strand works as the bead for fidgeting as well keeping the count. The tassel section of the bead is constructed with a stainless-steel connector to allow the bead to rotate around, which is another fidgeting tool involving movement (Figure 20 & 21).
The second strand of beads has the 11th bead as the roller bead. Two of the roller beads are made of grey resin while the third is made out of black versatile plastic. Amongst the two grey resin beads, one is textured while the other is plain. The 100th bead is textured PLA. All three beads provide different tactile experiences, involving movement for the one who fidgets, at the same time helping in keeping the count (Figure 22 & 23). However, resin printed beads could be replaced with other materials in the future, since they are prone to collecting dust.
The initial experimentation of zipper pulls was modified to find better ways of facilitating fidgeting and reminding of tasks, as inserting fabric appeared difficult to fully produce and function. This was done by prototyping zipper pulls by 3D printing in PLA. The basic rectangle shape was redesigned with textures and patterns. The idea is to design pulls to remind the wearer about certain tasks, through tactile experience felt through sharp, soft and edgy textures.
Three of the sketched illustrations were prototyped by 3D printing in PLA, taking into consideration their size and feasibility. Because children’s fingers are small, the initial size of pulls attempted was 1 and 1.5 inches, which were not successful using the Ultimaker 3+ printers. This led to experimenting with resin in the Formlabs printer, and although the 1 inch pulls were tested, the textures weren’t fully formed, which led to experimenting with 2 inches as the ultimate size.

Another solution is that essential oils are therapeutic for ADHD children – namely lavender, holy basil, and jasmine. Zipper pulls with wooden inserts (that can be dipped in essential oils) were designed. The wooden inserts were hand-carved using a Dremel tool to provide some texture and feel.

One of the locals in Qatar mentioned that her daughter preferred traditional Arabic smells like the Bhukoor. These inserts were tested on zipper pulls that were produced in PLA, resin and TPU, out of which resin was the most successful and durable. (Figures 25-27.C.)
Then, three other prototyped pulls, having movement as their main feature facilitating fidgeting, were printed in resin due to the intricate detail of the moving parts (Figure 27).

One of the resin printed pulls was repainted with acrylic paint and coated with nail beads to give it some texture. In addition, two beads that could be pulled were attached (Figure 28 and 29).

These were sent to Shapeways, since the resin became prone to attracting dust, leaving the pulls with an uncomfortable feel as well restricting the mobile parts (Figure 30 and 31).

Qatar has shortage of the right materials and high-end production. Acquiring the right zipper was not possible, while the earlier mentioned zipper pulls were in production. The existing zipper pulls varied in sizes, function and color, and the initial idea was to connect the designed pulls to existing zipper runner.

In figure 33, the black version of the second zipper is unavailable in Qatar, hence a circular zipper along with customized ADHD pulls were redesigned for the final zipper. The wooden inserts were laser cut with patterns that indicate specific tasks to the child. Patterns that represented specific tasks were taken from the web.

The child or family will ultimately have the opportunity to customize the zipper pulls by adding their own perfume. When these pulls are fidgeted with, the perfume is transferred onto fingertips, leaving the wearer surrounded with relaxing scent.

In future, perhaps an app can be developed that allows the child to design their own inserts, based on personal preferences.
Fig. 36: The different kinds of pulls designed based on the various concepts in Versatile Black Plastic, to fit existing structure. Note: Patterns for the laser cut wooden inserts, were taken from google images that provided a visual reference to the tasks related.

Fig. 37: Various textures and patterns as a result of wood that could be used with personal choice of scent.

Note: Patterns for the laser cut wooden inserts, were taken from google images that provided a visual reference to the tasks related.
Fig. 38: Zipper pull attached on existing separating zipper structure.
**ABAYA 1: SEQUIN INSPIRED, TACTILE EXPERIENCE, SECRETLY FIDGET**

The traditional outfit in Qatar for the female is the abaya, a black cloak-like dress that covers the whole body along with a scarf, worn especially in public places. Children are taught to practice wearing it from a very young age, so it becomes part of their dressing style when they become adults.

Every ADHD child has specific preferences as to what they like when it comes to preferred textures. One of the textures that both male and female children mentioned was the sequin fabric. They responded to the satisfaction received from flipping and rubbing their fingers against the sequin fabric.

For this abaya, the sequin fabric is deliberately added, as an element for fidgeting. As Figures 39 to 44 show, the inner lining of the sleeve cuff is lined with the sequin fabric, providing a secretive way for fidgeting. Also, instead of using embellished fabrics as an exterior adornment for clothing, the sequin fabric is used inside the abaya sleeve. Three types of sequin fabrics were experimented with to understand the feel.

The white sequin fabric provides a rough feel, the gold sequin provides tactile satisfaction but is visually loud, while the black provides tactile satisfaction and is almost invisible.
Fig. 43 & 44: Abaya with sequin fabric black and detail
ABAYA 2: BEADED ABAYA FIDGETING EXPOSED BUT SUBTLE.

For this abaya, the main design feature is embellishment with previously designed beads. Beads are normally used for beautification purposes, but these beads, for the ADHD child, is used as a means to fidget. They are made out of 3D printed PLA, but finished in black paint to match with the abaya and the trend of keeping the abaya black in color.

Figures 45–48 show the three beads as textured and the fourth bead as the roller bead. All were produced in the university’s fablab using PLA and the Ultimaker 3+.
Fig. 49 & 50: Abaya with fidgeting exposed but subtle
ABAYA: TASK ORIENTED, PARENT-CHILD COMMUNICATION

The idea of making a to-do list into a T-shirt, was transformed into sleeves of the abaya. They are reconstructed with invisible zippers, each zipper indicating one task. When opened, the colored fabric underneath would indicate completion of task. The color Orange was chosen as it stands for the universal color of awareness for ADHD, which is celebrated in the month of October.

The invisible zipper was successful in hiding the colored fabric, but for daily usage, constant opening and closing would damage it. The zipper, opened from the wrist of the sleeve up to the shoulder, is difficult for the child. Consequently, it is replaced with separating zippers that extends from the shoulder until the wrist.

After reflecting, the design decision was to make it a little quieter and subtle where only the child and parents knew what task was done and in which order. To make this possible, each segment was numbered from one to six (as three zippers is the maximum number of zippers per sleeve), by using embellishment.

Embroidery, sequin and beadwork are common embellishment techniques used on abayas in Qatar. Each segment was hand-embroidered with sequins, the first segment visually indicates first task, the second indicates second task and so on. Another abaya was designed using embroidery as the detail for indication. The minimum size of each embroidered circle was 1cm. It felt too loud but was successful in indicating the numbering. Another attempted pattern of embroidery was using polka dots (a well-known fashion fabric pattern), and all three were reflected upon to see which worked visually and was most aesthetically satisfying.

The sequin detail was visually appealing but was not readable from a distance, the outlined circular embroidery was visually appealing and readable but too loud. The polka-dot embroidery was visually appealing, readable and worked best. Each polka-dot pattern was manipulated to indicate numbering. All these abayas were locally hand embroidered and produced by local abaya tailors. Figures 51 to 98, show the process and trials.
OUTCOME 3: ABAYAS

Fig. 54 & 55: Sequins hand stitched with each segment indicating numbering.

Fig. 56 & 57: Segments embroidered with embroidery thread, 1cm circle pattern and the detail view.
Fig. 58 & 59: Abaya with polka-dotted embroidery
ABAYA 4: TASK ORIENTED, COLOR CODING, AND VARIATION IN CONSTRUCTION.

One of the feedbacks received from having the whole sleeve in zippers, is that the sleeves gained weight. According to research, weighted jackets exist to calm the ADHD child, but in this instance, the weight is on the sleeve. While attending a workshop with an occupational therapist, I learned that the weight is applied on the shoulders between the neck and the arm-hole. The only available length of separating zippers is 15 inches in Qatar, which resulted in stitching the zippers, starting at the arm-hole. To avoid an uneven weight distribution, these zippers were shortened, facilitating the same function and communication, but decreasing the weight of the sleeves, leading to three layers. Figure 59 & 60 show color coding concept, while figure 61 and 62 show embroidered polka-dotted layered sleeves.
Fig. 61 & 62: Abaya showing layering with polka-dotted embroidery.
Male members of the Qatari society wear the thobe, an ankle length tunic, that conforms to local design construction standards. Thobes in Qatar are always white, except during the winter season when they are worn in dark or beige colors. To facilitate fidgeting for the male child, one of the challenges was to do it discreetly while wearing a thobe. Exploration began by adding white embroidered patterns on the sleeves, which provides texture for the child to fidget with. Straight lines and angular patterns were embroidered. It varied from intricate to simple patterns. Placements on different areas of the sleeve were analyzed—mainly on both sides on the sleeve, on the central fold, and on the inner part facing the body. All the thobes were locally produced by the local tailors. (Figures 643 and 64)
Fig. 63 & 64: Thobe with embroidered pattern for fidgeting.
Using my internship at Qatar Business Incubation Centre (QBIC) Fablab, I explored a material called Thermoplastic Polyurethane (TPU), by 3D printing the material onto various fabrics like polyester, dentelle, felt and chiffon. One of the benefits of TPU is its flexibility and ability to stick on fabric seamlessly. In this experimentation, subtle changes were made to the thobe cuffs by 3D printing TPU directly onto fabric. The finish resulted in a neat, glossy, flexible soothing outcome. Simple straight lines were first 3D printed, that gave a soothing visual satisfaction as well as calming tactile experience. It was further re-patterned using angular edges as shown in figures 65 and 66.

**THOBE 2: 3D PRINTED TPU ON FABRIC**

Detail: TPU 3D printed thobe sleeve
Fig. 65 & 66: 3D printed TPU on Thobe cuff
THOBES: EXTERNAL FIDGETING

For this thobe, fidgeting is facilitated by the string of beads that are attached to the pocket. This is an extension of the pearl in pocket experimentation. The string of beads is designed to allow the child to pass each bead through the ring, while it may appear as though the child is imitating adults and fidgeting with prayer beads.
THOBE: TASK ORIENTED THOBE, COLOR CODED & TPU 3D PRINTED FABRIC.

Each flap is color coded on one side, while the other side remains white. The color reminds the child what task is to be done and once he does it, he buttons up the flap to indicate the completion, which can be acknowledged by the parent. At the same time, if the task to be done is forgotten, there is a possibility that people around him may point out what colors are yet to be completed. Color coding is a method used by ADHD individuals to be organized and keep track of time. Since this thobe is for a child, the question of designing a colored thobe for this specific need, is left open for dialogue.

THOBE 5: TASK ORIENTED, COLOR TURNED WHITE

The unbuttoned flaps are colorful reminders that can be buttoned up to turn into white, implying returning the garment into its standard white color, giving the child the freedom to continue with the rest of their day.

OUTCOME 3: THOBES

OUTCOME 3: THOBES

Fig. 70: Task oriented flaps from color to white
THOBES & TASK ORIENTED THOBES USING TPU

For this thobe, the flap is redesigned using TPU as the material. Due to its flexible nature, and the ability to custom design them, these flaps vary in texture, where each texture will remind the child of a task or the order in which the task has to be done. Different textures and patterns that indicate numbers, were prototyped. Unlike the color-coded flaps, these are white in color. The number of buttons on the thobe were also increased from 3 to 6.

OUTCOME 3: THOBES

Fig. 71: Task-oriented TPU textured and numbered flaps
The portion of the inner side of the sleeve has a 3D printed pattern inspired by how Velcro functions as well as indicates honor status on military uniforms. The TPU 3D printed pattern has parts that can be attached and detached. The aim is to allow the child to fidget with the TPU parts in his pocket while simultaneously reminding him of the task, and then adding it onto the sleeve pattern, on completion of the task.

**OUTCOME 3: THOBES**

Fig. 72: Connecting TPU parts 3D printed on sleeves.
MY CLOTHING IS ME: Embracing ADHD in Traditional Qatari Apparel

exhibited at Virginia Commonwealth University School of the Arts in Qatar, Doha, Qatar

May 4th - 18th 2019
Behaviors related to ADHD were investigated by contacting experts in the field of medicine. Background research was carried out based on the books published about ADHD as well as through accessing web-based information. Families that shared their experiences, revealed the issues they face daily. By designing wearables that can easily be reached and used within one’s surrounding, they help to keep track of time, remind of the tasks to be done, provide ways to fidget or relax either secretly or openly, thereby giving the child a freedom of expression and control of their conduct.

This thesis was a huge learning curve that expanded my knowledge about design and its impact. Working with this health condition provided me an insight into what ADHD is, thereby raising my awareness. We often ignore discreet textures, patterns, and visual applications that exist within our environment, which affect the human mind and body. It is also informs why nature exists in its own form around us, for us. It also informs us of the relationship between our senses, and their response to design, as well as how design responds to our senses. Designing the task-oriented abaya and thobe opened paths to making clothing as a tool for communication within Qatari society and our environment. We understand why different people have their preferred choice of clothing and choice of patterns or details.

The outcomes were just a morsel of a larger field of exploration. Since every ADHD individual is unique, each behavior can be explored and translated into design outcomes that ease the conduct of the ADHD individual, including family members and care-takers. Future paths could involve designing uniforms for children, wearables, or tools that teachers and instructors can use to help individuals with ADHD.

The sense of touch can be further explored by understanding the level of hypersensitivity or vibrations that each ADHD individual feels. There are many behaviors that were unexplored during this thesis study, like the licking of the fingertips, using a thumb pull on the sleeve end, or even exploring zippers on a male outfit.

Culturally, the Qatari attire can be further deconstructed and carefully studied (both male and female) to determine, in depth, the impact of their clothing on self and identity. Different materials can be worked with, that may better serve the condition than these current explorations. For example, prayer beads could be made from silicone or flexible materials that allow functions like fidgeting, pressing or pulling. Each bead could be replaced with materials that are driven by the society we live in, or through bio materials that are eco-friendly and fall under the zero-waste economy. TPU was a material not yet introduced in our university’s fablab, but after learning about my experiments, the lab is using it now.

The potential of thesis can vary to become more impactful and innovative through collaborations and interdisciplinary approaches. Future paths could assess the effectiveness of the design outcomes. As stated earlier, the two years of study was a roller-coaster ride of information, investigation, fun and making things happen.
All images, illustrations and graphical content are created and belong to the author, unless otherwise stated.

Figure 1: Deambulations. Image downloaded from http://cargocollective.com/frederiquebreuille/Design-d-interieur-Deambulations

Figure 2: Squizits. Image downloaded from http://www.yankodesign.com/2011/03/29/squizits/

Figure 3: Tactility. Image downloaded from http://exposure2017.massey.ac.nz/students/textiles/jessica-bunnel/


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