PARS: A New Way of Expressing Your Community's Stance

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ABSTRACT

Expressing your stance and making yourself heard as a community requires power and solidarity. Seeking a new medium through which communities can express themselves, we designed PARS: an inflatable responsive wearable that makes individuals feel powerful and connected by making use of physical occupation of space. It incites power in the user by claiming space in the horizontal reach around the body. As PARS is a non-commercial design for communities to adopt the concept of using space for expression, it is customizable and accessible. Through shared effort, it fosters solidarity within the community. In this pictorial, we introduce this concept, the literature it's based on, the process of the key design decisions, and the core values. We conclude with reflections on the use of the wearable in the societal context, the acknowledgment of its limitations, and suggestions for addressing these limitations for further development.

Keywords

Wearable; Powerful; Accessible; Responsive; Solidarity; Expressive; Inflatable

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1. INTRODUCTION

Throughout this project, our goal was to follow an exploratory design process that is focused on making as a means of testing and improving the concept. While creating our design brief, we selected the following three topics that we were passionate about;

- Shape changing materials
- Re-using natural and wasted materials
- Expressive knitting for communication

As a result of a wide range of experimentation and its evaluation, we decided to design a performance wearable that would enable the members of a community to express themselves by making them feel more powerful and connected to each other.

Our end product, PARS, is an inflatable responsive wearable that makes individuals feel powerful and connected by making use of physical occupation of space. In this pictorial, we would like to introduce our concept and our process through the 4 core values of PARS: powerful, accessible, responsive, and solidarity.

Figure 1: PARS Final Design

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2. RESEARCH

2.1 Laban's Movement Analysis
Laban's theory of movement examines the relationship between the four categories of movement: Body, Space, Shape, and Effort.

Space describes where the movement goes in space, such as the directions up/down; or forward/back.
Shape describes how the body sculpts itself in space, such as rising/sinking, or spreading/enclosing.
Effort describes a person's attitude towards the dynamic movement, such as sudden/sustained, or light/strong.
In the scope of this project, the emphasis was heavily on the space element, which is defined in 3 different dimensions:

- Vertical Dimension (up-down)
- Horizontal Dimension (side-side)
- Sagittal Dimension (front-back)

Humans are the most familiar with a dynamic occupation of space in the sagittal and vertical dimensions due to the simple, everyday acts like walking and sitting. The horizontal dimension is the most static dimension of space occupation; as the expansion and contraction in this dimension is not being supported by human physiology. This alienation and the usage of its effects in PARS are further explained in the Power chapter of this paper.

Laban's theory of "Space Harmony" suggests that moving in specific directions in Space naturally affines with specific Efforts and Shape components. For instance, reaching upwards (in space) often lengthens the torso, which takes one into rising (a Shape component) and supports lightness (an Effort component), while downward flexion (in Space) may shorten the torso with sinking (a Shape component), and facilitates strength (an Effort component). Each row in the table below shows a set of affinities [11].

Table 1 Affinities between Space, Shape and Effort [7]

Space	Shape	Effort
Upwards	Rise	Light
Downwards	Sink	Strong
Side across	Enclose	Direct
Side open	Spread	Indirect/flexible
Backward	Retreat	Sudden
Forward	Advance	Sustain

Due to the increased self-consciousness caused by the alien occupation of space in the horizontal dimension, the side-open affinity has been centralized in the development of PARS. As a contrasting element to provide a dynamic flow in the designed movement, the sinking shape affinity has been the secondary point of focus. How these affinities were implemented in the wearable will be further explained in the Power chapter.

2.2 198 Methods of nonviolent action
Albert Einstein Institution, which promotes the advancement of freedom through non-violent action, has established a list consisting of 198 methods ranging from boycotts to the use of drama. Considering the goal of providing a new medium of expression through a wearable, the following 2 methods have been chosen and incorporated in PARS;

1. Displayed Communications (Banners, Posters, etc.)

    Writing is the most commonly used method of displayed communication. As an alternative method, PARS uses an indirect communication tool of displaying shape, size, and colour. This provides a striking medium of display that focuses on the emotions and is independent of the content of the communication.

2. Displays of Colours and Symbols (Flags etc.)

    Instead of having the color and the symbol carried as an additional object, such as a flag or a banner, PARS creates a more intimate use of color and symbol by making the demonstrators themselves an element of the sea of color and having the silhouette of the individual as the symbol itself.

2.3 PussyHats Project
The PussyHat Project is a social movement focused on raising awareness about women's issues and advancing human rights by promoting dialogue and innovation through the arts, education, and intellectual discourse. The project has an open source website that enables the members of the community to download the knitting instructions. PussyHat project has created a bridge between the marchers and the creators of the feminist community, and had a considerable impact on the solidarity of the community [3].

The two key aspects that made the PussyHats successful was how it enabled demonstrators to make a strong, unifying visual statement; and its simplicity. The mediatic value of the hats were highly significant as it became one of the most widely known marches in the world. Also, the fact that it was a simple rectangular pattern enabled people from all skill levels to easily join the movement. These are both qualities considered and implemented in PARS, with a heavier weight on the photographic value. The multiple variants of the wearable can be found in more detail in the Accessibility chapter.

3. DESIGN APPROACH

3.1 Methods

3.1.1 Dance Choreography
As PARS, intended to find an non-verbal way through which people can express themselves, the focus was bodily movement, and therefore design choreography was employed as a method. The users were engaged in the design process physically, and creatively. The observation of their movement while wearing the wearable informed PARS.
Employing this principle, the processes of certain design projects also inspired the development of PARS. For example, "The Light Arrays", has shown that extending the body outward paradoxically extends attention inward, resulting in an intense and in-habitual focus on internal physical and emotional states. Such heightened

awareness has created a desire to share the idiosyncratic nature of the experience [11]. As this desire of shared experience, inward attention, and awareness of the emotional state were all sought by PARS, the extension of the body was considered while making the design decisions [8].

Design choreography has been employed both in terms of first-person perspective (Appendix C p. 12-13, 25) and also with the external users of the improvisation team of the TU/e (Appendix C p. 53-55). While the first-person perspective gave a basis to build upon, the movement analysis of the session with the improvisation team has shaped the final design decisions of the wearable. The outcome of these tests will be further discussed in the remainder of the paper.

3.1.2 First-Person Perspective
Defined by Oscar Tomica, the first-person perspective is involving the designer's own experiences in the design process. As PARS was developed in a group of 4 designers with different backgrounds, employing first-person perspective offered great insights and shaped the project. This was especially important as the project was designed during the COVID-19 pandemic, causing restrictions in frequent user testing.
Moreover, the first-person perspective involves intuition and drives intrinsic motivation [6]. Therefore, in every design decision that constituted PARS, the intuition of the group was highly valued. These decisions were later tested and substantiated by external user tests and literature. This also kept the motivation high within the group.

3.1.3 Hands-On Approach
PARS was developed with an hands on approach. The ideation phase of different iterations usually started with sketching to communicate the vision within the group (Appendix C p. 14-20, 40-46). However, the main development happened while producing the garment. Often, there was a gap between the envisioned and the

Figure 2: Trashbag low-fi prototype

Figure 3: First-Person Perspective of trying on different prototypes

to be a customizable DIY concept, these differences that produced garment. However, as the design was thought are caused by the material properties, the cost, and complexity were embraced.

As a wearable design, PARS needed continuous feedback on how it made the wearer feel, both in terms of comfort and the desired values such as power. The sketches often felt short in providing this insight, as the potential users were only able to "imagine" how they

"would" feel. Therefore, regardless of the fidelity of the garment, PARS was tested with wearable prototypes in each iteration. In the decision points where the variety was more important, rapid prototypes were preferred, such as the trash bag PARS alternatives used in the improvisation session. For gathering feedback on key details, such as the midterm and the final demo day, high-end, refined prototypes were prepared.

3.1.4 User Testing

Throughout the design process, various user tests have been done, which shaped the final design of PARS. In this section the most important user tests will shortly be discussed.

The user test which gave the most insight was the session held with the improvisation dancers. In this user test, 11 improvisation dancers were observed for an hour and a half. During this session, the dancers first started warming up. After that 7 dancers were asked to choose one of the prototypes to put on while improvising (Appendix C p. 53-56). During the session, the dancers were asked to follow dance instructions such as following a leader and battling against each other. After each assignment questions were asked to the dancers with and without a wearable about how they felt and how the garment made them feel. A lot of the dancers wearing a wearable were more aware of their surroundings and the space they occupied, this also had to do with the fact that they were afraid to break the wearables. After they were confirmed that breaking the garments was okay, the dancers began to move more freely. It was quickly observed that some of the garments were really uncomfortable to wear. This had to do with the garment moving and turning when a dancer moved. The dancers that wore a wearable all felt like they were part of something bigger, which made them feel more powerful and confident. Whereas the dancers that weren't wearing a wearable felt overruled by the wearers. Another useful insight was that the users didn't like that the prototypes were readily inflated and couldn't deflate, since they were afraid of the garment popping.
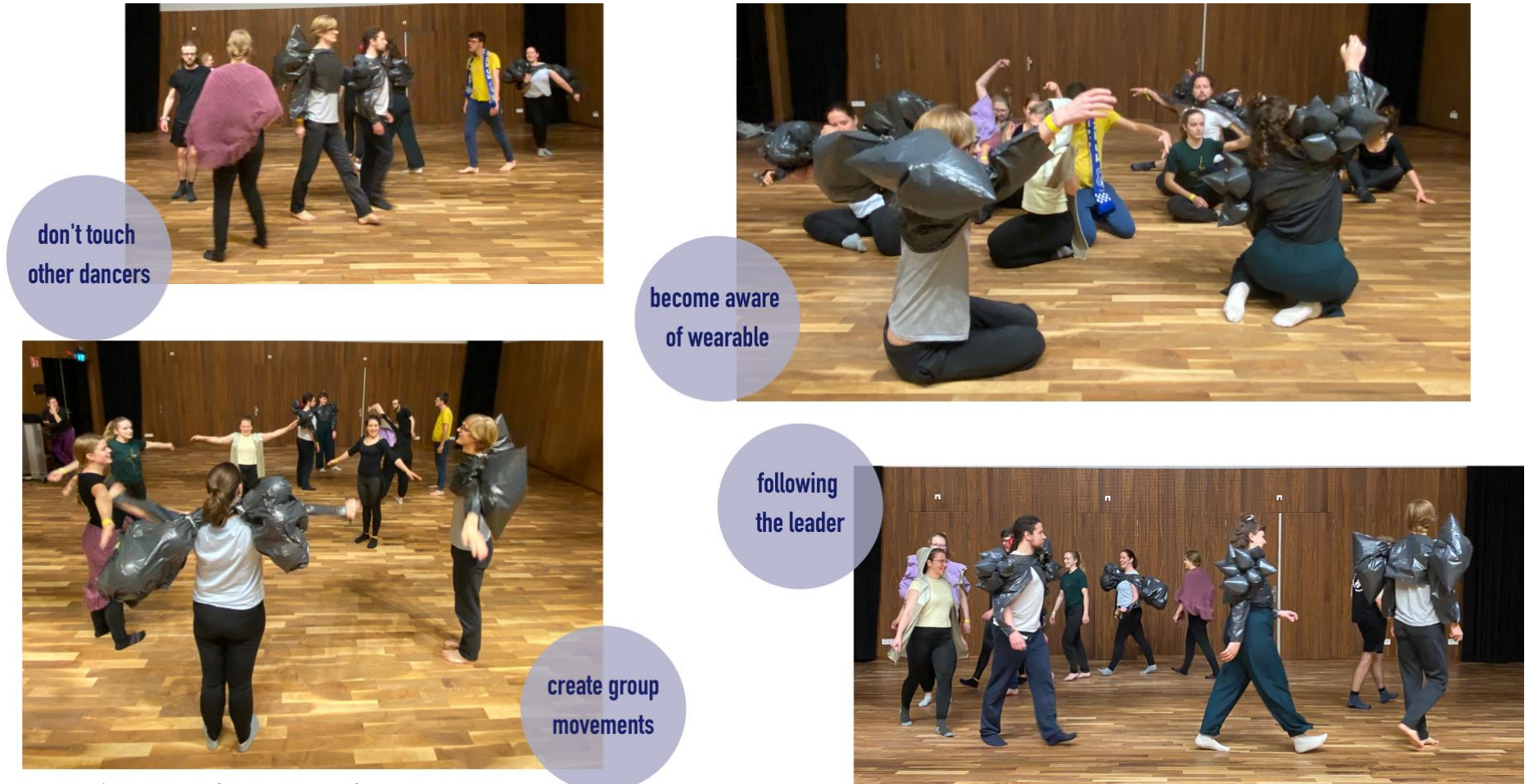
don't touch other dancers

become aware of wearable

following the leader

create group movements

Figure 4: User test with improvisation class

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3.2 Pars core values

PARS is built upon 4 core values: Powerful, Accessibility, Responsiveness, and Solidarity. It incites power in the user by claiming space in the horizontal reach around the body. As it is a non-commercial design for communities to adopt the concept of using space for expression, it is highly customizable and accessible. It responds to the user's physical effort and translates it to an expressive performance; which also creates a deeper connection within the community and fosters solidarity. These values have been selected based on in-depth research on the history and sociological effect of demonstrations as well as the collected user feedback. Throughout the project, these values kept the design grounded by providing a structure to base the decisions upon. Therefore, the details of PARS and the core design decisions will be explained in further detail following the structure of the same values.

3.2.1 Powerful

Based on Laban's Movement Analysis, PARS makes the performer feel powerful. The wearable causes a dynamic flow of motion between the open and the closed states of the wearable. The relation between the open posture of the body and the feeling of power was discovered during the in-group improvisation session early in the process. While the improvisation instructor was giving tasks to feel strong, the common response was to adopt an open posture and occupy more space in various dimensions. In contrast, when the tasks were related to feelings of being in danger or sadness, bodies were closing off and becoming smaller. Following this pattern, various prototypes were prepared and tested to improve upon this effect.

In the open state, PARS follows the side open space occupation affinity of LMA. As mentioned previously, compared to the vertical and sagittal dimensions, the horizontal occupation of space is foreign to humans. Combined with the effect of internal reflection caused by outward extension of the body [8], PARS causes the demonstrator to be highly conscious of their physical and emotional status. It occupies space sideways using the inflatable spikes placed around the shoulders. This has been selected to be the most suitable location to extend horizontally as human physiology offers an extra space around the neck that is still considered within the borders of one's body due to the wide construction of the shoulders. Moreover, the historical place of shoulder pads used in ancient military uniforms creates a subconscious connection to the power that is being disassociated from violence due to the soft materials of PARS. Another element that makes this location the most suitable is its location in the peripheral vision. As the wearable is lightweight, the wearer does not feel the difference in their size when the inflatables were not visible. Thus, even though they are still perceived to be bigger and stronger by the outsiders, it does not provide the wearer with a feeling of power. Similarly, when the occupation of space was in the direct vision of the wearer, and therefore fully observable, it is perceived to be separate from the body, lacking the perception of extension in the shape of the wearer's own body. These were common feedback of the midterm demo day and the improvisation session. When reflecting upon the feeling of power, the visitors opened opening their postures, and pointing to the area around the shoulders; similarly, when the prototypes were tested by the improvisation team, it was noted that the contrast between the lightweight and the big size made them conscious of their body and their place in the crowd, which resulted in increased confidence and feeling of power.

When it comes to the closed state, the sinking shape of the body is intended to be followed by a build-up of strong effort, to inflate the wearable again with the elevating emotions. This dynamic flow makes the user feel powerful; resulting in a stronger stance in the community.

3.2.2 Accessible

Accessibility is an important aspect of PARS as its goal is to connect people that share the same values without any restrictions. Therefore, PARS is not a commercial fashion piece; it is a concept for communities to express themselves through the occupation of space.
In the first half of the iterations, the focus has been on working with knitwear (Appendix C p. 6-9). However, after the midterm demo day it was realized that the knitting techniques were not adding value to PARS and

Figure 5: PARS Inflated Back View

Figure 6: PARS Inflated Front View

was taking away in terms of accessibility. The function of going from "small to big" was easier to implement in a non-knitted garment and hereby also more accessible. Furthermore, the outdoor conditions found to be more challenging with a knitted garment, while the time-consuming aspect of knitting a relatively big garment was also not considerate

.Even though the knitting element was taken out, the core value of creating a community is still considered in the final design through different means. This will be discussed in the section on solidarity.
The decision not to use electronics was intentional since electronics significantly increase the monetary and effort costs of the production and maintenance of the garment, meaning a drastic decrease in the accessibility.
Moreover, unlike previous iterations (Appendix C p. 47-48), the final concept is a body-size-friendly design, allowing everyone to wear it and contributing to accessibility.

Through this exploratory design process, interviews with activists were conducted, which raised several concerns. The key concern was the design becoming a high-end exclusive product that would disable people from joining the community if they wouldn't have the

Figure 7: Accessiblity alternative

Figure 8: Group solidarity

resources to purchase the wearable. This is addressed in multiple ways. Different communities might adapt and customize the DIY design by selecting their own colour and material. The only requirement is for the fabric to be airtight or semi-airtight,this might mean a parachutefabric, an umbrella, a re-used windbreaker, or even plastic bags.

The fidelity of the garment can change depending on the time and money the user is willing to invest. While some members of the community have louder, well-refined models, like the statement piece created in the scope of this project, others might join the community with simple, already inflated spikes, balloons, or even only with the use of colour [5].

To ensure accessibility, a sewing pattern with accompanying DIY instructions was created (Appendix D and Appendix E). The DIY instructions also suggest alternative solutions on how to create the garment. For example, when not having access to a welding machine the adhesive double-sided fabric glue can be used as an alternative to making the spikes of the garment.

Hereby PARS can also be owned by a specific group in an activism event as a statement piece where the rest can follow along, such as The Red Rebels, just to name an example.

3.2.3 Solidarity
PARS fosters solidarity within communities by creating an intangible connection. The first-person perspective showed that physically attaching people to each other restricts movement (Appendix C p.12). PARS makes users feel connected by creating a common effort and a shared look. Getting bigger and occupying space makes the wearer more aware of your surroundings, according to the user test done with improvisation dancers and Laban's Theory [8]. While the dancers were performing with the low-fi prototypes, they noticed that they were more consciously thinking about their movements in order to be mindful of the people around them (Appendix C p. 53-56). Thus, it was concluded that getting bigger around the shoulders and opening up the posture of the wearer fosters solidarity by making individuals more aware of the people around them and their own position in the group. This increases the solidarity and creates an intangible bond between the members.

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Wearing the same color also creates solidarity within the group. This is similar to the Pussyhat Project, where everyone wore the color pink and created a 'sea of pink' during the [3]. ''I feel like I'm part of something bigger than myself'' is what one of the improv dancers said during the user test. By wearing the same outfit as other group members, it increased the sense of belonging among the group.

With PARS, the dark yet bright, strong, and non-binary color purple was chosen because it represents independence and a sign of merging the mundane with the innovative. Besides, purple creates a harmonious balance of awareness and peace [7]. This reinforces the concept of expressing yourself in an innovative and peaceful way and stimulating other people. However, each community can choose its own color which also makes the concept of PARS accessible for different situations and purposes, as mentioned previously in the accessibility chapter.

The DIY aspect of PARS also creates more connections within the group. Participants can make their wearables together or support another member if they cannot attend the march, performance, etc. In this way, they still become an active part of the community.

In terms of the selected inflation method, users indicated that they feel connected to other people when they make the same collective movement or sounds, like dancing or singing (Appendix C p.33). PARS creates this collective movement by requiring wearers to manually inflate their wearables themselves. This shared effort to inflate the wearable makes people feel more connected.

Communication language
Since PARS is an interactive and responsive wearable, it can also be used as a communication tool. By controlling the inflation of the spikes the wearers can communicate to each other, but also to outsiders. Below it will be discussed how wearers can communicate with PARS. The garment has different stages; deflated, pumping, fully inflated, and deflating; which can all be interpreted in different ways. If the spikes of the wearable are fully deflated, you show that you are calm. Meanwhile, you still show that you are part of the community and make a stance. If you want to be louder, you can start pumping. The pumping itself resembles the fact that you are willing to put in the effort, in order to create change. Pumping together and helping others pump up their spikes, shows that you support them in their journey of creating change.

Helping others can also be done by people that are not wearing the garment, in order to support the message of the community through the wearers. When you are done pumping and the spikes are fully inflated you communicate that your feelings are highly elevated. You are in the most powerful position and you can fully communicate your stance to others. To outsiders, you will be seen as very strong and extravagant, while for the community of the performers you can be seen as an example to follow.

When you deflate your spikes, you show others that your feelings aren't elevated anymore, while still proceeding to communicate your stance in a calmer way. The deflating of spikes can also be done by other people, by hugging you or touching you on the shoulder. Being hugged or touched by another member of your community indirectly tells you that it is okay to feel strong emotions regarding your stance, but perhaps your feelings have been elevated for long enough and it is time to calm down. Hugging each other to calm down also creates a feeling of being heard and creates a connection between huggers.

Figure 9: Deflating the wearable

Figure 10: Different stages of inflation

3.2.4 Responsive

PARS is an interactive, responsive wearable that translates the physical effort and collaboration of a community into a salient performance piece. It serves as a communication tool within the community by indicating the emotional status of the members. As striking medium of expression, it conveys the community's heightened emotional status to the rest oof society. The wearer has the ability to inflate and deflate the garment at the desired times through a pump and valve system. The wearable illustrates different emotions and expressions in various situations. The communication language of the wearable will be elaborated on later in this paper.

Control is completely given to the wearer by using a simple pump mechanism and not adding other electronic components. This design choice was made to avoid having a foreign translator between the user and the wearable. Now the mechanism is primitive and only takes power and instructions from the user themselves, which creates a more direct communication and the relationship between the user and the wearable [9]. The mechanism consists of a hand-sized inflatable bulb with a built-in valve to let the air out. A tube is attached to this that leads to a 3D printed splitter. This splitter ensures that the main tube transfers the air into 7 tubes that each lead to one of the spikes on the shoulder. This system is found on both shoulders. So the wearer is holding a pump in each hand.

The wearable needs time and effort to inflate. By using the small hand pumps it will take around 24 minutes to inflate all the spikes fully (Appendix A). This duration is chosen because it is a metaphor for creating a change in society. Change takes time and constant effort, but in the long term, it does transform society. The wearable reminds the user of this long term effect and requirement for patience.

In addition to responding to physical input by pumping, the wearable also responds to media elements such as

Figure 11: Mechanism inside the wearable

photography. The reflective material attached to the seams of the spikes makes the garment stand out even more by lighting up. In addition to attracting attention, the reflective material also provides extra reinforcement to the spikes.

Figure 12: Reflective seams

Figure 13: Inflating the wearable

4. MATERIALS

As mentioned earlier, there has been a focus shift from knitwear to inflatables as the latter better plays along with the performance of occupying space. For this, research was done on which material would be the most appropriate to use, which can be found in Appendix C workbook p. 6-9, 21, 24 & 30.
In conclusion, the following material requirements have been decided upon (see Table 2)

All requirements are measured with importance from 1-5, where 5 indicates most important and 1 the least important. These requirements stem from,user tests with the improvisation group (Appendix C p. 53-56) and first-person experiences. In addition, there are also technical requirements related to the realization of expansion.

It has been chosen that the material could advantageously be semi-airtight instead of airtight. This counteracts the concerns of popping raised during the user test. If the wearer pumps too much air into it, or if external pressure is applied, for instance, in case of a crowded gathering such as a protest, the wearable will slowly let the extra air out.

Throughout the process, simple garbage bags were used to test different concepts (Appendix C p. 49-52). This worked well in terms of air tightness, but not all

requirements were met, which eliminated the possibility to be used in the final product. However, it is a good alternative in terms of accessibility.

When it comes to non-stiffness, it was important that when releasing the air out of the garment, the spikes shall lie down on the shoulder, and do not keep their inflated form to encourage responsiveness (Appendix C p. 58). The textile welding machine was used in exploration and production. Hereby not only the textiles' compatibility towards the welding machine was tested, but also the airtightness and the stiffness were examined (Appendix C p. 60).
Based on the material exploration a simple parachute fabric fulfilled most of the requirements. The fabric is lightweight and compatible with different weather conditions, which makes the design adoptable for different communities around the world. In addition, a parachute fabric is semi-airtight which was investigated through various materials tests, such as welding compatibility.

It was chosen to include reflective stripes, to set accents and thus contribute to the garment's photographic value; creating a higher impact in the media. Additionally, the reflective stripes ensure that the welding seams, that are exposed to the most pressure, remain intact.

Table 2 Material requirements

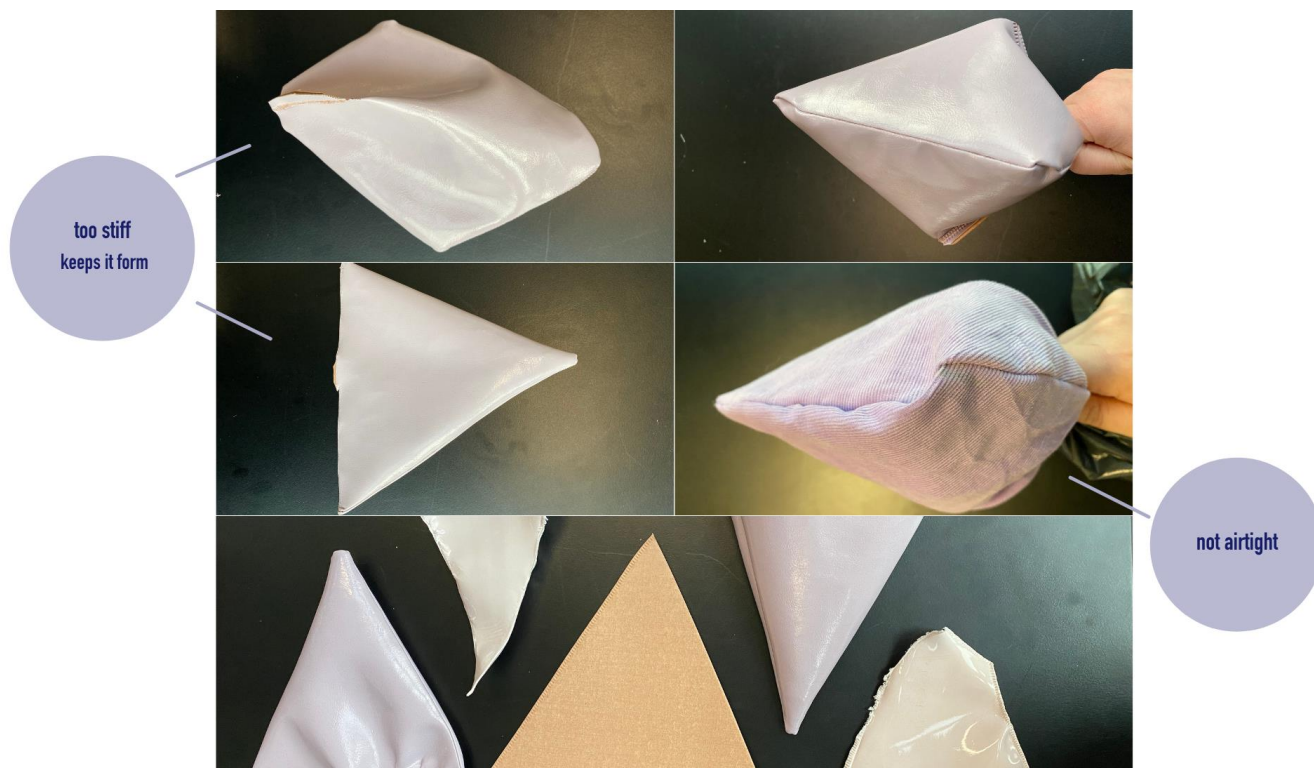| Material requirements	Measurement	Needs	Importance
Airtight/semi-airtight	Testing	Technical need - responsive	5
Comfortable to wear	User testing	User need	5
Light-weighted	Kg pr. meter	User need	4
Accessible	Price	User need	4
Non-stiffness	Testing	Technical need - responsive	5
Possible to weld (textile welding machine)	Testing	Closely associated with airtight/semi-airtight	2

too stiff keeps it form

not airtight

Figure 14: Material exploration

comfortable to wear

reflective stripes

semi-airtight material

light weight

material deforms easily

Figure 15: Final material

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5. FINAL USER EVALUATION

When the wearable was fully produced another user test was held where many people tried on the garment. The participants were asked to fill in a questionnaire, regarding how they felt, if they would wear this to a demonstration and if they had any recommendations. This questionnaire gave us valuable insight on how people felt wearing PARS as well as the probability of the design being adopted by society. The participants were asked if they had ever been to a demonstration, to see if this had an impact on the given feedback.

To the question of how they felt wearing the garment, the people that haven't been to a protest felt more stupid, whereas the people that have been to a protest felt more confident. However, when the participants had to rank how powerful and confident they felt on a scale from 1 to 10 there wasn't a noticeable difference between the two groups, which was surprising. Another contradicting result was that the group that had never been to a demonstration scored higher on the scale of 1 to 10, to the question if they would wear the wearable to a demonstration if they were the only one wearing it. Whereas the group that had been to a demonstration scored higher on the scale of 1 to 10, to the question if they would wear the wearable to a demonstration if there were more people wearing it. This probably has to do with the fact that people who have been to demonstrations understand the feeling of solidarity and the responsibility of being the focus of the group relatively better.

Regarding the material, most participants found the fabric thin and fragile. There were also some concerns regarding the washability of the garment, which will be further discussed in the discussion chapter. Generally, the participants were positive about the wearable and gave some good recommendations, regarding making the garment easier to move in and more breathable (Appendix B).

6. BUSINESS ASPECT

PARS is a non-commercial design for communities to adopt the concept of using space and physical output for expression. The concept is highly customizable and accessible.

PARS is a movement that aims to gain its prominence through social media, such as Instagram. By posting pictures and using hashtags, the goal is to create more publicity and thus reach the target group: any community who wants to express themselves in a non-violent manner. This use of Social Media strengthens the acceptance of the concept in society and makes it mainstream. PARS' Instagram account can be found under the name 'project.pars' (Appendix F).

One of the value propositions of PARS is that it is a unique design and a new way of expressing yourself. In addition, users can use this concept to develop an identity as a group. By sharing manuals, patterns, and components of the wearable online as an open resource (Appendix D & E), it is possible for people to make their own garments at home and become part of the community. They can choose what material to use as long as it is partially airtight. Think of old raincoats or umbrellas, but also garbage bags, for example. This do-it-yourself aspect of PARS allows users to adopt the design while still being able to personalize it.

The key partners of PARS are its users/communities who post pictures and hashtags to promote the concept without even realizing it. In addition, in the future, an agreement could be made with companies that have old parachutes, sail, or kite fabrics. These materials are decommissioned over time because they are no longer safe to use but at the same time, the material still has a long lifespan for other purposes [4]. This material can easily replace the used fabric because it is airtight. By reusing and recycling the decommissioned fabric, a sustainable solution can be created to replace the current

wearable while helping other companies with their leftover fabric.

By keeping PARS as a movement that groups can adopt and customize, rather than a company that produces garments, it is possible to maintain PARS as a non-profit social design. The concerns regarding sustainability and open-source structure will be further addressed in the discussion.
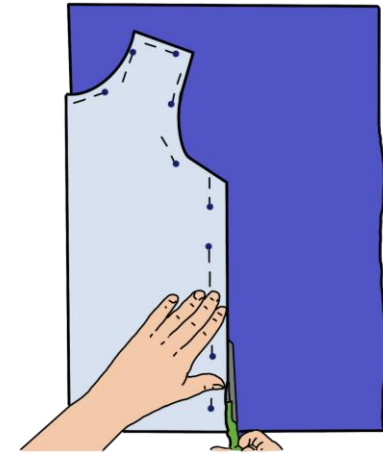

Figure 16: Section of the open source manual

7. DISCUSSION

A strong focus was laid on the materials used for the wearable. Since the wearable needs to be accessible we wanted to use materials and techniques that made it easy to make the wearable at home. However due to time limitations that is something we would need to dive deeper into (see accessible). With this time limitation also came that the material used to make the wearable is new fabric bought in a local store. In an optimal situation old sail, parachute, or kite fabric would be used, received from related companies (see business aspect). Another concern regarding the fabric would be its durability. The parachute fabric is chosen because it is semi airtight, which was a must for the wearable. However, it isn't the most durable, which is also why

some parts were reinforced with extra reflective stripes. In future work, finding a more durable fabric with the same key aspects could improve the wearable.

After all, the increased durability of the wearable also increases sustainability. Another concern about the wearable would be its washability, a concern that was raised during the final user test. Looking into how the garment can stay clean after usage, in order to use it more than once, is definitely something that future work needs to look into. This could be done by using disinfecting wipes, for example.

One major limitation of our project was brought up to us during the final presentation: the fact that the product can be used for the expression of undesirable goals. Since our design did not focus on promoting a certain idea or stance, there is a chance that it could be misused. Our main idea is that the wearable would be made in different colours and shapes, depending on the community and its stance. By managing and promoting our wearable as a new way of expression through social media platforms, we could be able to target certain communities. However, as long as the wearable and the DIY instructions are open sources, the complete prevention of the misuse of the wearable is not possible. That is why we say PARS is designed to offer a new way of expression and is not a commercial brand. A final recommendation would be to look into sharing adapters to pump up each other's wearable. This would in the end lead to a feeling of more solidarity as well as making the inflating more fun and faster. This would create a bigger connection between the community since they need to work together and help each other in order to inflate the wearable. This would also be an opportunity to include members in the performance that don't have the wearable themselves.

8. CONCLUSION

We started the design process with our 3 main interests: using senses to express emotions via wearables; re-using natural & wasted material, and shape-changing materials. Throughout our process, we explored these 3 main interests and searched for a way of connecting these interests together in one project. By exploring different materials, designs and theories; we decided upon the goal of designing a new medium through which communities can express themselves. Based on our four values that kept the project grounded; powerful, accessible, responsive, and solidarity; we decided to create a conceptual inflatable wearable that makes individuals feel powerful and connected by making use of physical occupation of space.

Throughout our process, we used the first-person perspective of the four authors, as well as different user tests. Since the notions of powerful, accessible, responsive, and solidarity can be interpreted in various different ways; the diversity in participants' input can be considered a strength. The hands-on approach, combined with the literature, yielded interesting explorations and resulted in a holistic design. The simple system and the key decision of not incorporating electronics have made the design unique. The group dynamics were motivating due to the investment of each member and the resulting trust. The collected feedback from design professionals showed that there is a need for improvement in the business and sustainability aspects of the design; which were mostly caused by time restrictions and can be improved in further iterations. The user evaluations show that we have reached our goal of implementing the core values in PARS and successfully designed a new way of expression through an inflatable wearable.

9. GROUP DYNAMICS

At the beginning of the project, we did not have a concrete theme we liked to work on. This has been both good, but also challenging. The challenging part was that we first had to find common interests in step with getting to know each other. However, we turned out to be a well-functioning group. This is not only due to good communication and similar ambitions, but also because there have been joint contributions both when it comes to the preparation of tasks, but also in relation to trusting each other. It has been shown that we are not only a well-functioning group but also a real team who brought out the best in each other. In addition, we had a lot of fun throughout the project, which also ensured that we could keep our motivation up.

Looking at the process we have been through a lot of iterations. This has been good; however, it has also led us to have challenges with making decisions. Our main struggle has been making decisions and judging design choices too quickly. This has been due to two things. Our main mistake was to analyse while being in the process of making. Hereby we became unsure instead of trusting the process. This was solved by separating the making and the analysing from each other. Another challenge we had especially at the beginning of the process was hypothesizing instead of starting the making process; which was also solved by pushing each other to directly get hands-on and trust the process. However, we have been good at seeking help in the form of supervisor meetings to get on track again. The meetings not only helped us to find focus again but also increased our confidence about our project. All in all, the group dynamics have been incredibly good. We have been good at supporting each other throughout the process by motivating each other and talking positively about the project.

10. ACKNOWLEDGEMENT

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APPENDIX

Appendix A (calculations)
Calculation of inflating time of the wearable:

It will take 30 sec to inflate 1 small spike → 30 pumps with full pump
And 1 min 30 sec to inflate 1 big spike → 110 pumps with full pump
Since the one tube connected to the pump is divided into six tubes that go to the different spikes, the inflation speed decreases by 6. So when you want to pump the wearable fully it will take 4 min x 6 = 24 minutes.

Volume:
- +- 200-250 ml (water) in a small spike
- +- 800-1000 ml (water) in a big spike
- 50 ml (water) in the pump

Appendix B (results user tests)
https://documentcloud.adobe.com/link/track?uri=urn:aaid:scds:US:cf3a4426-9bf7-4060-b640-ed68ee29fff8_

Appendix C (workbook)
https://documentcloud.adobe.com/link/track?uri=urn:aaid:scds:US:8f03196e-ec55-4fcc-858e-d4d57a9a96dd_

Appendix D (manual)
https://documentcloud.adobe.com/link/track?uri=urn:aaid:scds:US:6e849d05-3e75-441f-866d-26fc57cb1fe4

Appendix E (sewing pattern)
https://documentcloud.adobe.com/link/track?uri=urn:aaid:scds:US:aec94c20-047a-4f1e-9b3a-17adadda54b4

Appendix F (social media)
PARS (@project.pars) • Instagram photos and videos