INVISIBLE FASHION

REIMAGINING FASHION DESIGN AND EXPERIENCE BEYOND VISUAL APPEARANCE

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Abstract

As fashion and design researchers, we have embraced a human-centered design approach that emphasizes the relationship between people and objects as functional tools. Yet, fashion goes beyond utility; it embodies frivolity, playfulness, and social communication, often conveyed implicitly through garments. This article envisions a future where our engagement with fashion transcends mere appearance, highlighting research involving fashion designers collaborating with blind individuals to understand their relationship with clothing. Using ethnographic studies and qualitative interviews, the research examined how non-visual senses influence garment selection and wear. Designers emphasized tactile, auditory, and olfactory experiences to create "invisible" textiles and garments, challenging the conventional emphasis on visual aesthetics in fashion. This initiative encouraged designers to move beyond functional or trendy solutions toward meaningful interactions embracing diversity. Findings revealed that fashion enjoyment, decision-making, and emotional connections can be redefined beyond aesthetics to promote sustainability, shareability, engagement, and equality. Invisible fashion is designed for those often excluded from traditional human-centered design. While not fully realized as post-humanism or more-than-humanism, this approach suggests a new fashion paradigm valuing all senses equally and fostering positive experiences for humans and nonhumans alike.

Keywords: *Human-centered design, Invisible fashion, Five senses, Design for human and nonhuman*

"SEEING" THE NEW PARADIGMS OF FASHION

The field of fashion and design research has long been anchored in the principles of human-centered design, which emphasizes the relationship between people and objects as functional tools. This approach, as highlighted by Giaccardi & Redström (2020) and Norman (2013), prioritizes usability and the practical interaction between humans and their environment. Human-centered design is fundamentally about creating solutions that are tailored to the needs and behaviors of users, ensuring that products are not only functional but also intuitive and accessible.

However, fashion as a discipline extends beyond mere utility. It embodies elements of frivolousness, evanescence, and playfulness, as noted by Fletcher (2015). These characteristics highlight fashion's role in expressing creativity and individuality. Unlike purely functional objects, fashion items, alongside their function of protection and comfort, often serve as a medium for personal expression and social commentary. Clothes can convey messages about the wearer's social status, affiliations with particular social groups or desire to stand out from the crowd, adherence to certain values, and personal beliefs (Manzini, 2022; Vaccaro et al., 2016).

Such a communicative aspect is often implicit, but even if the messages may not be overtly stated, they are embedded in the visual language of clothing, like the choice of fabric, color,

and style. Sight is the sense we use and prioritize to evaluate, transmit, and experience fashion. This makes the visual elements powerful and critical to fashion's significance, as they serve as the primary medium through which designers communicate their creative visions and people interpret and engage with clothing.

Color, texture, silhouette, and pattern impact consumer behavior and preferences so much that many brands prioritize a merchandiser's approach in building collections, based on which visual features data reveal as the most appreciated by the public.

Moreover, the concept of "visual" does not only concern the product. Still, it concerns communication: the visual representation of fashion is integral to branding strategies, as the effective use of visual elements can enhance brand recognition and loyalty by establishing a distinctive identity that resonates with target audiences (Kumar & Singh, 2020). This is particularly relevant in the digital age, where visual content dominates social media platforms and influences purchasing decisions. Studies have shown that consumers are more likely to engage with brands that utilize compelling visual narratives in their marketing efforts (Eckman, Damhorst, & Kadolph, 1990).

We see visual elements today serving a market-oriented approach to the fashion system, nurturing the sector's inherent focus on economic growth, which necessitates continuous expansion as a structural requirement. This growth increases resource depletion, waste generation, pollution, and social inequalities. It means, as Fletcher (2022) states, that ironically, as the sector improves its performance in some areas, its negative consequences on people and the planet often intensify.

Samuel Alexander's (2016) and Tim Jackson's (2009) perspectives explain how the future well-being of both people and the planet hinges on the design of a post-growth economy, as a means to achieve sustainability and prosper "as human beings within the ecological limits of a finite planet" (Jackson 2009, p. 1). In relation to fashion, Fletcher (2018) highlights the need for a new set of values, a purposeful distribution of power and existence, new economic models, and shifts in fashion culture. In their writings, Fletcher and Tham (Fletcher, 2022; Fletcher & Tham, 2019) envision a redefined purpose for the fashion system where the industry will "occupy a less dominant role in our textile and clothing lives and livelihoods" (Fletcher, 2022, p. 130).

With the above-stated premises, the possible actions to pursue the intended change are broad and not easy to define. Moving from the current relevance of the visual element as the first focus of the article, the research presented questions if a different hierarchy may be possible: when we approach a future of new paradigms and new ways of acting, can we overturn the "supremacy of sight"? Or, rather, can we envision a condition in which fashion is experienced in new ways? Is there a future where our interaction with fashion is defined by values and meanings beyond appearance?

To start to argue in this direction, the article explores research in which fashion designers collaborated with blind people to understand their relationship with fashion. Using ethnography and qualitative interviews, fashion has been studied from the perspective of people who perceive, select, and wear their clothes in any way other than seeing them. Before an audience that values more than just shapes and colors, designers prioritized other senses to design textiles and garments conceived as "invisible", challenging the traditional reliance on vision to convey fashion's messages.

The research, started as an investigation of an existing situation – even though not extensively explored before – generated findings that have the potential to be transferred in a different, future, imagined context, to suggest solutions for the new paradigms of fashion.

METHODOLOGY

PHASE ONE

The research in its first stage combined an ethnographic approach with surveys and semi-structured qualitative interviews.

R esearchers worked with a group of 48 students attending the Final Synthesis Studio in Knitwear Design and the Fondazione Istituto dei Ciechi (the Milanese Foundation and Institute of blind people) to relate with 15 blind and visually impaired people.

Designers and researchers have been observing blind people living in their clothes in real-life situations to understand their behaviors, needs, interactions with clothes, and potential challenges. Most important was for designers to be exposed to a new perspective and think outside traditional frameworks, to generate solutions that

would be relevant and respectful to such a user group.

The focus was on lived experiences of fashion as opposed to industry narratives, with the aim to identify meaningful acts of engagement and connection of individuals with their fashion choices.

To collect data on the observed group, a survey was prepared and sent to 45 blind and visually impaired people in contact with Fondazione Istituto dei Ciechi. The survey contained quantitative questions to frame the composition of the observed cluster and qualitative questions to investigate themes like color perception, other senses, material perception, drivers in fashion choices, self-esteem, personal taste, comfort, and aesthetic perception.

Here is the list of the qualitative questions, prepared by researchers with designers:

- How do you perceive colors, and how much does color influence your choice of a garment? Do you think of colors with emotional significance?
- To what extent and in what way do other senses, apart from sight, come into play when choosing garments to purchase?
- What characteristics do you always consider when selecting a piece of clothing?
- In what ways and to what extent do clothes play a role in building your self-esteem and self-perception?
- What is your favorite garment and why?
- What value does aesthetic beauty have, if any, and how do you perceive it?
- What influences your personal taste in fashion choices? (For example, music, art, advertising, the people around you, etc.)
- When choosing a piece of clothing, is it more important how it is presented by a brand (storytelling) or its level of comfort and functionality?
- Which accessories do you avoid in order not to complicate your daily activities?
- Do you find that certain materials, sounds, or smells produced by a garment or accessory are a positive stimulating element or do they cause discomfort? If possible, try to describe them.
- How important is the structural simplicity of a garment to you?
- How important is the stylistic originality of a garment to you?
- To what extent does the physical sensation you perceive in a garment transform into an emotional one, and how much do you seek this type of stimulation in clothing?

Among the 45 surveyed people, 3 were then interviewed by the class with semi-structured questions, to deepen the results of the survey.

PHASE TWO

The second stage started from the methods in use at the School of Design of Politecnico di Milano to develop a design process for knitwear, where the 48 students, working in teams of 4 to 5 people, learned the theoretical and technical notions of knitting and the design process by doing them.

The codified process, made of three pillars (Theoretical Knowledge, Practical Activities, and Design Process) (Motta, 2019), was hacked in some parts to make designers privilege other senses rather than sight. Here is a list of the research actions put in place to guide students along the journey:

- *Materials* (Pillar 1 - Theoretical Knowledge): one of the classes was delivered with the eyes closed, just listening to the voice of the teacher and touching samples of materials. Only at the end of the class were students allowed to look at the materials, to add information to what they first perceived with touch and hearing.
- *Hand Knitting* (Pillar 2: Practical Activities): once students had learnt the basics, they were encouraged to practice with eyes closed, to better perceive the movement of yarn and needles, to improve the rhythm, and to work on the evenness of the stitches to anticipate the final regularity of the fabric.
- *Finishings* (Pillar 2: Practical Activities): washing and final treatments on knitted textiles were experimented and results were checked with hands rather than with the eyes.
- *Target Profiling* (Pillar 3 - Design Process): this module coincided with Phase One of the research, useful for researchers to set up the project and for designers to frame their public and its needs.
- *Mood and Concept* (Pillar 3 - Design Process): inspiration was found with closed eyes. Some groups visited museums, and experienced art with no eyes; some went for a walk in the woods, listening to the sounds and the smells, and some focused on dreams, questioning our subconsciousness.

- *Research on Yarns, Textures, and Colors* (Pillar 3 - Design Process) *and Stitches and Structure Development* (Pillar 3 - Design Process): designers were encouraged to feel materials, structures, and stitches with other senses. Touch, sound, and smell were privileged during project reviews, with the samples examined by researchers with closed eyes at first. Colors were still considered, due to their importance underlined in some answers received by both blind and visually impaired people.

The results of such process were nine capsule collections of knitted fabrics and garments, all designed in detail and prototyped.

PHASE THREE

The third stage was the final evaluation with blind and visually impaired people. At the completion of the project, researchers and designers presented their collections to the involved people at Fondazione Istituto dei Ciechi. People were invited to touch the fabric collections, to wear garments and interact with them, and to give their feedback.

INVISIBLE FASHION: RESEARCH DEVELOPMENT AND RESULTS

PERCEIVING THROUGH THE BODY: RESEARCH FOR THE PROJECT

We are surrounded by images, sounds, smells, and messages of all kinds that impact our sensory perception. To perceive, or better yet, to *wahrnehmen*, implies taking something as true, or more precisely, für wahr nehmen: and to put it in the words of Merleau-Ponty, it means "to believe in a world" (Pinotti, 2022, p. 12). We know the world and space through our bodies in the interplay of our senses (Fiorani, 2021): sight, touch, hearing, and smell; thus, it is not only what we see but also what we touch; it is a world of sounds, fragrances, and odors.

The experience with the Fondazione Istituto dei Ciechi has highlighted how the ability to perceive and recognize a product is completely different when one or more senses other than sight are activated.

The preliminary research activity (Phase One) for the project involved meetings with some patients from the Fondazione Istituto dei Ciechi who were observed in their daily environment and responded to interviews and questionnaires. The aim was to understand their purchasing motivations, as well as to bring out the qualitative aspects of the interviewees' choices in fashion and their interests about a fabric or a garment through their experiences. Aesthetics, beauty, self-esteem, as well as colors, sensations, and recognizability, have been the keywords upon which the questions were based to understand the most intimate motivations and to approach a perceptual reality in which memory and the recollection of visual sensations are integral parts of product choices. "*Aesthetic beauty has its value even if I do not perceive it with sight; I can always have it described to me, and whether I like it or not, this description evokes images in my mind. These images are then associated with emotions. Thus, it is an important value because when something is beautiful, people often stop to compliment it, which boosts one's self-esteem and self-perception.* [1]"

From the questionnaires shared with some visually impaired people, it emerges that the quality of a fabric is perceived by them in a completely different way than by those who see normally: "*The smell of the fabric and the noise produced when touching or moving it are important, but not as much as the tactile sensation—what my hands perceive when touching the garment or what sensation it transmits to my skin when I wear it.* [2]"

This aspect of effective multisensory experience applied to a project has led to a design approach that starts from elements beyond just aesthetic-visual qualities. The perception of images reverberates on the perception of the real world; touch, defined by Diderot as "the most philosophical of the senses" (Pinotti, 2022, p.8), has been the sense most explored by students so that end-users could perceive what had been designed. For this shift in design methodology, interactions with visually impaired people were fundamental, and their insights ensured that the design was guided by novel aspects: garments are often said to be interpreted from a broader observational perspective, and, especially from a distance, observers can perceive visual sensations from what they see. In this case, however, only through close contact with the product can users understand what sensations

1 Interview conducted on February 16, 2024, with a male patient aged between 25 and 35 years, residing in Reggio Emilia, who lost his sight in 2014 at the age of 21 due to complications from a rare autoimmune disease.

2 Interview conducted on December 10, 2023, with a female patient aged between 35 and 50 years, residing in Busto Arsizio (VA), affected by congenital blindness.

are being conveyed:

"*Touch plays a crucial role because it gives me a sense of the quality of the fabric and also the type of visual effect it might have since touching it creates a mental image.* [3]"

In this context, designing a fabric that must be recognized by all its other characteristics except for sight presents an intriguing challenge for the designer. The body that will wear it is placed at the center of reflection; indeed, the body is the cognitive instrument of reality in all its articulations. The skin has eyes; it is the boundary line or the first interface of our body with the world and space; it is the place of exchanges and contact (Fiorani, 2020).

Furthermore, during interviews conducted by students directly with some people from the Fondazione Istituto dei Ciechi, it emerges that everything normally avoided—such as rustling sounds, noises, and friction—is actually a way to perceive but even more so to make oneself present to others.

"*If they are pleasant, they are a positive stimulus; otherwise, they are a nuisance. For example, I like the rustling sound of a dress, but not if it is too loud. Similarly, I enjoy the smell of skin, but not if it is too strong*[4]."

The goal of the interviews was to try to immerse oneself in a distant reality, to modify one's way of experiencing a project, where feeling is that necessary condition defined by the imaginary (Fiorani, 2020) that determines the relationship with reality by symbolizing it and giving it content.

DESIGNING WITH OTHER SENSES: DEVELOPMENT AND PRODUCT

The project in collaboration with the Fondazione Istituto dei Ciechi was carried out in partnership with Arman Avetikyan, a designer from Froy, who trained at the Politecnico di Milano and is now the Creative Director of the SCA Group. Together with the faculty of the Final Synthesis Laboratory in Knit Design, he led the development of the project based on the stimuli and results obtained through observation and interviews. The attention of the researchers/teachers and designers/students focused on responses that addressed comfort and functionality but, above all, novel aspects that were distant from visual concerns: "*For me, beauty is harmony, something that makes me feel good. What is beautiful is what feels pleasant to touch, hear, and smell.*[5]"

It was a different way of seeing problems that led to the ability and willingness to imagine a new human, ethical, and social dimension of the project, much more interesting and relevant compared to the usual way of designing fashion. Three-dimensionality and sound as tools for recognition, yarns and colors visible only up close and not to everyone, and smell as an element of memory and recollection represented a mix of innovative design tools in the research for the project that primarily focused on the surface of the product. Additionally, an interesting aspect of the research was the generation of initial mood images using Artificial Intelligence; some student groups used AI to generate images that could then determine three-dimensional surfaces to be recreated later during knitting with knitting machines. The yarns represented the keystone of the project: a search for yarns that included both natural and synthetic fibers so that the surfaces and structures of the knit could enhance, through touch, the sensations intended to be conveyed. Small accessories like sequins or metal studs, as well as a simple carding of natural yarn, further characterized the fabrics, making them rough, metallic, sonorous, and padded (Fig. 01).

If for Merleau-Ponty, through vision we touch the sun and the stars (Fiorani, 2020), for this project it is the hand that allows us to "make visible" a surface, activating two different levels of knowledge in visually impaired users: memory, for those who retain a recollection of fabrics and colors before losing their sight; and imagination, for those who have been blind since birth and have experienced colors and textile surfaces through others and their narratives, yet pay great attention to them.

"*I cannot see myself, but I can intuit from those I meet whether I have dressed well or not. The eye wants its share; I take it into account when matching garments as much as possible*[6]."

3 Interview conducted on February 16, 2024, with a male patient aged between 25 and 35 years, residing in Reggio Emilia, who lost his sight in 2014 at the age of 21 due to complications from a rare autoimmune disease.

4 Interview conducted on December 10, 2023, with a female patient aged between 35 and 50 years, residing in Busto Arsizio (VA), affected by congenital blindness.

5 Ibid.

6 Ibid.

Fig. 01

At the end of the design process, 9 knitwear collections composed of knitted textiles and prototyped garments were presented at the Fondazione Istituto dei Ciechi, allowing students to interact with their target audience. Touching and trying on the garments to understand what they were "seeing" was a very emotional moment and, at the same time, one of great reflection; if it is true that creative processes (Fiorani, 2021) are characterized by flexibility, which involves considering multiple solutions to a problem, then, in this case, we can affirm that the developed fabrics belong more to that category of formlessness to be manipulated, while fashion, an infinite flow of change socially determined (Molotch, 2003), remains in the background (Fig. 02, Fig.03, Fig. 04).

TOWARDS FUTURE RECONSIDERATIONS OF FASHION

The findings revealed that the pleasure of fashion, the reasons for our choices, and the emotional bond we create with garments can be reinterpreted beyond aesthetics to seek new values that promote sustainability, shareability, engagement, and equality.

This experiment prompted designers to consider a future where they are not just tasked with providing useful, technical solutions or in-trend styles for an overcrowded market but also with fostering meaningful interactions that embrace diversity (Giaccardi & Redström, 2020). Starting from the focus on blind and visually impaired people, the experiment stimulates the exploration of design and fashion as a process where the whole research and the outcomes depend on how designers deal with the diversity that always arises from the complex situations and interactions we are increasingly facing in current times. The opportunity for designers is to overcome the mere creation of a garment and start a redefinition of the interaction with fashion values and significance, questioning also who the subject of such interaction is, when we start to consider non-human, post-human, more than human creatures in our future landscape.

Invisible fashion is designed with and for humans who have been frequently excluded from the very center of human-centered design. While not yet an act of post-humanism or more-than-humanism (Latour, 1991; Haraway, 2016; Forlano, 2017), this represents a rare reconsideration of

Fig. 02

Fig. 03

Fig. 04

fashion, for once experienced through taste, smell, touch, and sound—an approach unfamiliar to many humans but magnificently mastered by other creatures, such as plants and animals.

Putting attention to such experiments before broadening perspectives is a crucial step to ensure emerging design practices, including those that may eventually decenter the human, support equality and justice for both humans and nonhumans (Forlano, 2017). Even more so, it is a way to explore a new kind of fashion that, designed for a context where all senses are equally important, could prosper and be experienced in an unprecedented, positive way by any human or nonhuman entity.

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CAPTIONS

[Fig. 01] Students presenting their moodboards, material boards and fabrcs at Fondazione Istituto dei Ciechi. Picture from the authors.

[Fig. 02] Blind and visually impaired people are trying on some garments and giving their feedback to designers. Picture from the authors.

[Fig. 03] Blind and visually impaired people are trying on some garments and giving their feedback to designers. Picture from the authors.

[Fig. 04] Blind and visually impaired people are trying on some garments and giving their feedback to designers. Picture from the authors.

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