

Design and Development of Sensory-Adaptive Clothing for Invisible Disabilities

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Abstract — Invisible disabilities such as sensory processing differences, autism spectrum conditions, chronic pain, and certain neurological disorders often affect the way individuals experience clothing. For many people, conventional garments can create discomfort due to rough textures, tight fits, seams, tags, and difficult closures. Sensory-adaptive clothing addresses these concerns by focusing on comfort, ease of dressing, reduced irritation, and improved mobility. This study explores the design and development of sensory-adaptive menswear intended for individuals with invisible disabilities. The research draws on literature related to sensory processing, adaptive apparel, and textile comfort, and incorporates survey-based user insights from the project presentation. Findings indicate a strong preference for soft natural fabrics, loose silhouettes, and accessible fastening systems. Based on these findings, three conceptual menswear designs were developed emphasizing functionality, comfort, and dignity in everyday wear. The study concludes that sensory-adaptive clothing can significantly enhance independence, confidence, and daily well-being for people with invisible disabilities

I. INTRODUCTION

Clothing is more than protection; it directly affects comfort, identity, confidence, and participation in daily life. For people living with invisible disabilities, clothing can become a source of distress rather than ease. Invisible disabilities are conditions not immediately apparent to others but that may affect sensory processing, cognition, mobility, or pain tolerance. These may include autism spectrum disorder, sensory processing disorder, fibromyalgia, ADHD, chronic pain

disorders, and other neurological or developmental conditions.

Many individuals with invisible disabilities experience tactile sensitivity. Rough fabrics, restrictive fits, seams, labels, and temperature discomfort can trigger irritation, anxiety, and sensory overload. Conventional fashion often overlooks these needs. Sensory-adaptive clothing seeks to bridge this gap by prioritizing softness, seamlessness, flexibility, and ease of dressing. Recent research emphasizes that adaptive clothing should balance function, appearance, comfort, and accessibility rather than focusing only on medical utility MDPI +1.

The present project, Design and Development of Sensory-Adaptive Clothing for Disabled Men, focuses on creating adaptive menswear that improves comfort, mobility, and confidence while responding to sensory sensitivities identified through user-centered investigation.

II. REVIEW OF LITERATURE

3.1 Sensory Processing and Clothing Comfort:

Sensory processing refers to how individuals interpret sensory input such as touch, pressure, temperature, and texture. For people with sensory sensitivities, garments with rough surfaces, tight pressure, or poorly placed seams can cause discomfort and distress. Studies indicate that tactile comfort significantly influences emotional regulation, participation in daily activities, and general well-being. Clothing that minimizes sensory triggers supports calmer sensory experiences and improved functioning.

3.2 Sensory-Friendly Fabrics

Fabric selection is one of the most important components in sensory-adaptive clothing. Natural fibers such as cotton, bamboo, and modal are widely preferred because they are breathable, lightweight, soft, and less irritating to the skin. Stretchable and smooth-surfaced materials further reduce friction and pressure while allowing easier movement. Research consistently notes that textiles with soft hand feel, low seam bulk, and minimal surface roughness improve sensory comfort.

3.3 Adaptive Clothing Design Features

Adaptive clothing focuses on accessibility, independence, and usability. Common features include:

- Flat seams
- Tag-free labels
- elastic waistbands
- Magnetic closures
- Velcro fastenings
- Flexible silhouettes

These features reduce dressing effort and minimize tactile discomfort. Contemporary adaptive design research highlights that accessible clothing should not appear clinical but should maintain dignity, identity, and everyday aesthetic appeal.

3.4 Comfort and Mobility

Comfort and mobility are interdependent in adaptive clothing. Restrictive clothing can interfere with daily movement and independence. Loose, well-fitted garments made from stretchable materials improve mobility and reduce physical stress. Sensory-adaptive clothing therefore contributes not only to physical comfort but also to confidence and social participation.

III. SURVEY FINDING AND ANALYSIS

A user survey involving 31 respondents was conducted to understand fabric preferences, sensory discomfort, and adaptive design requirements.

5.1 Sensory Discomfort in Regular Clothing

- 64.52% reported consistent discomfort while wearing regular clothing.
- 19.35% experienced discomfort occasionally.

This suggests that clothing discomfort is a major issue among users with sensory sensitivity.

5.2 Major Sources of Irritation:

- 54.84% identified rough fabric as the main irritant.
- 22.58% identified tight clothing.
- 6.45% identified tags and seams.
- The findings clearly indicate tactile texture as the dominant factor affecting comfort.

5.3 Fabric Preferences

- 54.84% preferred cotton.
- 22.58% preferred bamboo.
- These results confirm the preference for soft, breathable natural fiber.

5.4 Preferred Closures

- 41.94% preferred Velcro closures.
- 38.71% preferred magnetic buttons.
- Accessible fastening systems were strongly favored over conventional closures.

5.5 Preferred Garment Fit

- 67.74% preferred a loose fit.
- This supports the role of non-restrictive silhouettes in adaptive clothing design.

5.6 Perceived Benefit of Sensory-Adaptive Clothing

- 74.19% believed sensory-adaptive clothing would improve comfort and mobility.
- This validates the practical relevance of the project.



Fig no. 1 Finalized concept sketches

- loose and flexible silhouettes
- minimal seam construction
- tag-free internal finishing
- easy-touch closures such as Velcro and magnetic buttons
- mobility-oriented pattern shaping

The designs aimed to merge comfort, usability, and contemporary menswear aesthetics rather than producing garments with overtly medical appearances.



Fig no. 2 concept sketches

V. RESULT AND DISCUSSION

The findings demonstrate that sensory discomfort is often caused by ordinary clothing elements that are usually ignored in mainstream apparel design. Rough textures, tight fit, and poorly designed closures create daily barriers for people with invisible disabilities.

This study also highlights an important shift in adaptive fashion: users do not seek only function, but also dignity, independence, and social confidence. Sensory-adaptive clothing should therefore be understood not merely as assistive clothing but as inclusive fashion design.

The project survey aligns closely with broader textile research, which emphasizes soft fabrics, seamless construction, and accessible fastening systems as central to comfort and usability.



Fig no. 3 concept sketches

IV. DESIGN AND DEVELOPMENT

Based on literature review and survey insights, three sensory-adaptive menswear concepts were developed.

- Key design features included:
- soft breathable fabric selection

VI. CONCLUSION

This study explored the development of sensory-adaptive clothing for individuals with invisible disabilities, with a specific focus on disabled men. The research established that sensory discomfort from conventional garments is common and often linked to rough fabric, tight silhouettes, seams, and inaccessible closures.

Survey findings confirmed strong user preference for cotton and bamboo fabrics, loose silhouettes,

and accessible fastening systems such as Velcro and magnetic buttons. Based on these findings, sensory-adaptive garment concepts were developed that prioritize comfort, ease of dressing, and improved mobility.

The study concludes that sensory-adaptive clothing has strong potential to improve daily independence, comfort, confidence, and overall quality of life for people with invisible disabilities. It also reinforces the importance of integrating inclusive design thinking into contemporary fashion practice.

VII. REFERENCES

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