INTERNATIONAL SEVEN JOURNAL
OF MULTIDISCIPLINARY
ISSN: 2764-9547

INNOVATIVE FOOTWEAR DESIGN FOR AUTISTIC INDIVIDUALS: MERGING AESTHETICS AND SENSORY NEEDS

https://doi.org/10.56238/isevmjv1n1-015

Receipt of the originals: 03/01/2022 **Acceptance for publication:** 25/01/2022

Jammylly Fonseca Silva

ABSTRACT

The integration of repetitive visual patterns and geometric shapes in footwear design for autistic individuals presents an innovative approach that transcends mere aesthetics. This strategy aims to address the sensory and emotional needs of users, highlighting the importance of visual stimuli in promoting focus and mental organization—key elements for those facing sensory challenges. Research indicates that emphasizing symmetry and repetition in design can create visually pleasing footwear while also facilitating better concentration. Various studies suggest that the perceptual abilities and visual processing strategies of autistic individuals can be harnessed to foster richer and more effective learning experiences, aiding in the development of essential social and cognitive skills. Furthermore, the selection of comfortable materials and the consideration of ergonomic design are crucial to ensure that the shoes are not only visually appealing but also functional and comfortable for everyday wear. By focusing on these aspects, footwear can serve as more than just a fashion statement; it can become a tool for enhancing the quality of life for autistic individuals. The thoughtful combination of art, comfort, and sensory experience in shoe design promotes inclusion and celebrates the uniqueness of each individual. This approach fosters a deep connection between the user and the product, ultimately contributing to a more supportive and understanding environment for those on the autism spectrum.

Keywords: Footwear Design. Autism Spectrum. Visual Patterns. Sensory Needs. Ergonomic Comfort.

INTERNATIONAL SEVEN JOURNAL
OF MULTIDISCIPLINARY
ISSN: 2764-9547

INTRODUCTION

The design of footwear can significantly benefit from the fascination that many autistic individuals have with repetitive patterns and geometric shapes. By integrating elements such as spirals, mandalas, and puzzle motifs into shoe designs, it is possible to create visually engaging and stimulating products. Utilizing bright colors like red, yellow, and blue can enhance this experience, transforming footwear into artistic expressions that balance aesthetics and practicality.

The primary aim of this approach is to foster concentration and mental organization through repetition and symmetry. Research indicates that well-defined visual patterns can help calm the mind and improve focus, offering an organized mental environment that is particularly advantageous for those with sensory sensitivities. The symmetry and repetition inherent in geometric designs not only capture attention but also establish a sense of order and predictability, creating a safer and more comfortable atmosphere.

In addition to visual appeal, the use of lightweight materials and flexible soles is crucial for ensuring comfort. This consideration is vital, as the sensory experience of the footwear must be as pleasant as its appearance. Merging comfort with an appealing design allows users to express their individuality while catering to their sensory requirements.

Figure 1: Tangram: an ancient puzzle that helps children with autism.

Source: Genial Care.

Ultimately, by harmonizing these elements, footwear design can cultivate an artistic identity that acknowledges the specific needs of autistic individuals, achieving a balance between personal expression and comfort. This innovative strategy transforms each pair of shoes into a functional piece that celebrates uniqueness, promoting a meaningful connection between art, comfort, and sensory experience.

Research conducted by Samson et al. (2012) highlights the enhanced perceptual abilities often displayed by autistic individuals, especially in tasks involving visual search, discrimination, and embedded figure detection. The authors introduce the Enhanced Perceptual Functioning Model, which suggests that this heightened performance in basic perceptual tasks results from a more robust engagement of sensory processing mechanisms in autistic individuals. Through a quantitative meta-analysis of functional imaging studies, they aimed to determine whether autism is linked to increased task-related activity across various visual tasks, focusing on three distinct processing domains: faces, objects, and words. Their findings revealed that autistic individuals exhibited greater activity in the temporal, occipital, and parietal regions compared to their non-autistic peers, with reduced activity in the frontal cortex. These differential activity patterns suggest that autism may involve an enhanced allocation of resources in visual processing areas, linked to underlying differences in neural plasticity and contributing to characteristics such as superior visual skills and hyperlexia.

Further exploration by Marinho, Avejonas, and Rhein (2023) examines the effects of visual neurorehabilitation on children with Autism Spectrum Disorder (ASD), who often face substantial challenges in social interactions, particularly in non-verbal communication and emotional reciprocity. A key focus is the difficulty autistic children encounter in establishing eye contact, which is crucial for developing essential learning skills. Utilizing an online questionnaire based on the Emotional and Functional Development Scale (FEDQ) from the DIR/Floortime model, distributed to parents and professionals since October 15, 2022, the Visual Contact Protocol was implemented with 34 children. Preliminary findings suggest that improving visual contact facilitates enhancements in motor, cognitive, linguistic, emotional, and especially social learning. Observations during speech therapy sessions indicated increased engagement when visual contact was prioritized, highlighting the importance of vision as a foundational sensory experience that enriches a child's understanding of their environment. While further research is necessary, the study implies that providing opportunities for visual

engagement can significantly enhance autistic children's exploration and overall learning experiences.

Ni et al. (2020) investigated visual perspective-taking, an essential skill for understanding how others perceive the world, in autistic children. Previous research had yielded inconsistent findings regarding their abilities in this area, often focusing on the embodied self-rotation strategy more commonly utilized by neurotypical individuals. This study compared 34 autistic children with an equal number of ability-matched neurotypical peers to evaluate the effects of embodied self-rotation and object-based mental rotation strategies on visual perspective-taking performance. Each child completed three tasks: one assessing their baseline abilities and two employing the two rotation strategies. The findings revealed that while autistic children struggled with baseline tasks, they showed significant improvement in perspective-taking performance after learning both strategies, indicating their adaptability to various methods. This suggests that future interventions should incorporate diverse strategies tailored to the unique traits of autistic individuals, ultimately supporting their social cognition development.

Research by Hamilton, Brindley, and Frith (2009) examined level 2 visual perspective-taking, a cognitive task that involves understanding that different people can perceive the same object differently. Anticipating that children with autism might struggle with this task, the study assessed 23 young autistic children, averaging 8 years old, alongside 60 neurotypical children aged 4 to 8 years. Results indicated that autistic children faced significant challenges with visual perspective-taking compared to a mental rotation task, emphasizing a distinct difficulty relative to their peers. Additionally, performance on the level 2 visual perspective-taking task correlated with theory of mind performance, suggesting broader challenges in understanding others' mental states.

Lastly, the research conducted by Soulières et al. (2011) focused on the formation and manipulation of mental images, critical for tackling visuospatial tasks like Wechsler's Block Design, where individuals with autism often outperform their Wechsler IQ scores. The researchers carried out two mental imagery experiments with 23 autistic adolescents and adults, alongside 14 age- and IQ-matched non-autistic participants. Notably, 11 of the autistic participants achieved Block Design scores significantly higher than predicted by their IQ. In Experiment 1, participants imagined a letter within a circle and determined which of two highlighted areas contained a larger portion of that letter.

Experiment 2 involved traditional mental rotation tasks with geometric shapes, hands, and letters. Results showed that autistic individuals demonstrated greater accuracy in forming and comparing mental images than their non-autistic counterparts, suggesting a more developed ability to create and manipulate visual mental representations. The researchers propose mechanisms to explain these advantages, including enhanced perceptual processing and specific strengths in identifying similarities among entities to improve judgment accuracy.

The study by Cooper et al. (2021) explores the connection between repetitive behaviors and thoughts in autistic individuals, recognizing these traits as central to the autism spectrum. The research included 54 autistic participants and 66 non-autistic participants who completed questionnaires on insistence on sameness and obsessive-compulsive behaviors. Following this, participants recorded their thoughts over five days, responding to alarms on their mobile phones. The findings supported the hypothesis that autistic individuals reported more repetitive thoughts than their non-autistic counterparts, although there were no significant differences in the frequency of perseverative, visual, and negative thoughts between the two groups. Additionally, participants who reported more obsessive thoughts exhibited higher levels of repetitive behaviors, particularly in relation to insistence on sameness. However, no direct relationship was found between repetitive thoughts and behaviors in the autistic participants. The data indicate that anxiety-driven cognitions may influence insistence on sameness behaviors, revealing a complex relationship between repetitive cognition and behavior that warrants further investigation.

The integration of repetitive visual patterns and geometric shapes in the design of footwear for autistic individuals demonstrates an innovative approach that goes beyond aesthetics, aiming to meet the sensory and emotional needs of these users. The research highlights that the emphasis on symmetry and repetition can not only provide pleasing visual stimuli but also facilitate focus and mental organization, which are crucial aspects for those facing sensory challenges. The cited studies reinforce the idea that the perceptual abilities and visual processing strategies in autistic individuals can be leveraged to promote a richer and more effective learning experience, helping them develop social and cognitive skills. Moreover, the choice of comfortable materials and attention to ergonomic design are essential to ensure that the footwear not only attracts visually but also offers comfort and functionality. In summary, by creating

footwear that respects and celebrates the individuality of autistic individuals, it is possible to build a deep connection between art, comfort, and sensory experience, promoting inclusion and recognition of each person's uniqueness.

REFERENCES

Cooper, K., Russell, A., Calley, S., Chen, H., Kramer, J., & Verplanken, B. (2021). Cognitive processes in autism: Repetitive thinking in autistic versus non-autistic adults. *Autism*, 26, 849 - 858. https://doi.org/10.1177/13623613211034380.

Hamilton, A., Brindley, R., & Frith, U. (2009). Visual perspective taking impairment in children with autistic spectrum disorder. *Cognition*, 113, 37-44. https://doi.org/10.1016/j.cognition.2009.07.007.

Marinho, D., Avejonas, D., & Rhein, L. (2023). Impacts of visual neurorehabilitation on autistic children. *European Psychiatry*, 66, S331 - S331. https://doi.org/10.1192/j.eurpsy.2023.725.

Ni, P., Xue, L., Cai, J., Wen, M., & He, J. (2020). Improving visual perspective-taking performance in children with autism spectrum conditions: Effects of embodied self-rotation and object-based mental rotation strategies. *Autism*, 25, 125 - 136. https://doi.org/10.1177/1362361320949352.

Samson, F., Mottron, L., Soulières, I., & Zeffiro, T. (2012). Enhanced visual functioning in autism: An ALE meta-analysis. *Human Brain Mapping*, 33. https://doi.org/10.1002/hbm.21307.

Soulières, I., Soulières, I., Zeffiro, T., Girard, M., & Mottron, L. (2011). Enhanced mental image mapping in autism. *Neuropsychologia,* 49, 848-857. https://doi.org/10.1016/j.neuropsychologia.2011.01.027.

PESSOA, E. G. Pavimentos permeáveis uma solução sustentável. Revista Sistemática, *[S. l.]*, v. 14, n. 3, p. 594–599, 2024. DOI: 10.56238/rcsv14n3-012. Disponível em: https://sevenpublicacoes.com.br/RCS/article/view/4992. Acesso em: 23 out. 2024.

Pessoa, E. G. (2024). Análise de tensões e deformações em túnel profundo. *Revista Sistemática*, *14*(3), 576–593. https://doi.org/10.56238/rcsv14n3-011

Ferreira, F. de S., Silva, J. F., Neto, A. J., & Pessoa, E. G. (2024). AVANÇOS NA AUTOMAÇÃO RESIDENCIAL INTELIGENTE POR MEIO DE SISTEMAS DE LÓGICA DIFUSA. *Revista Sistemática*, *14*(5), 1209–1213. https://doi.org/10.56238/rcsv14n5-011