

## CATEGORY: POPULATIONS/PROGRAMS

### Autism Spectrum Disorder Populations & Programs

“Autism or autism spectrum disorder (ASD), refers to a range of conditions characterized by challenges with repetitive behavior, social skills, verbal and non-verbal communication and how the brain processes environmental information (Autismspeaks, n.d.). Research has determined that there are subtypes influenced by genetic and environmental factors. ‘Each person with autism has a distinct set of strengths and challenges...[impacting how they] learn, think and problem-solve’. ‘In 2013, the American Psychiatric Association merged four distinct autism diagnoses into one umbrella diagnosis of autism spectrum disorder (ASD). They included autistic disorder, childhood disintegrative disorder, pervasive developmental disorder-not otherwise specified (PDD-NOS) and Asperger syndrome” (Fleming, 2022).

Some people with autism *may* feel, understand or process senses (touch, taste, smell, see and hear) more or less than other people. Their responses *may* be different from others.

Recent research on autism spectrum disorder has been investigating connections between mutations in genes (Laviv, 2021), altered gut microbiota-changes in bacterial composition & fungal community (Krajmalnik-Brown, 2021), cerebellar differences in the brain (Brandenburg, 2021), immune dysfunction & inflammation as contributors to neurodevelopmental deficits observed in people with ASD (Bozzi, 2021), along with atypical visual attention/eye morphology/ocular function of people with ASD (Troiani & Dicrisicio, 2020), & the role of environmental factors in ASD (Chauhan, 2020).

Exposure to nature, gardens, gardening, horticultural therapy and other plant-based interventions can address behavior, sensory integration, socialization & lower physical activity levels for people with autism spectrum disorder (Jachyra et al., 2020; Potvin et al., 2013; Polfuss et al., 2016). These types of programs are able to manage safety issues (elopement, risky behavior, appropriate staff: participant ratio, safe physical settings) while providing individualized, meaningful activities across functioning levels for this population. Sensory gardens continue to be important for individuals with autism, providing appropriate sensory stimulation, access to green space, and the broader community. Garden & nature access including design specifications to make access better for people with neurodevelopment & intellectual disabilities continue to improve and be part of the conversation (ASLA, 2022). “Specifically designed playgrounds with a mix of spaces that provide opportunity for physical challenge, structured and imaginative play, and solitary observation can help facilitate positive peer interactions in autistic children” (ASLA, 2022a). Use of school gardens for activities, health interventions, applied behavioral analyses (ABA), & behavior intervention plans (BIP) continue to improve health strategies (Fleming, 2024). More information is available on prevalence of anxiety disorders and light sensitivity by people with an autism spectrum disorder.

**For related resources refer to category: Populations/Horticulture Programs in Specific Settings – Mental Health.**

#### Key Organizations

Most of these national organizations have local chapters.

[Asperger/Autism Network](#)

[Association for Science in Autism Treatment](#)

[Autism Research Institute](#)  
[Autism Self Advocacy Network](#)  
[Autismspeaks](#)  
[Autism Society of America](#)  
[Dan Marino Foundation](#) (Fort Lauderdale, FL)  
[National Autism Association](#) (NAA)  
[Simons Foundation Autism Research Initiative](#) (SFARI)

### **Books, journals & epublications on autism & horticulture programs**

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders*, Fifth Edition. American Psychiatric Association.

[Autism](#) journal.

Autism.org. (2022). [ARI-Funded research studies 2021](#).

Etherington, N. (2016). *Gardening for children with autism spectrum disorder and special educational needs: Engaging with nature to combat anxiety, promote sensory integration and build social skills*. Jessica Kingsley Publisher.

ELEMY. (2021). [8 autism organizations worth joining or supporting](#) (with references listing autism organizations). ELEMY.

Gaines, K., Bourne, A., Pearson, M., & Kleibrink, M. (2016). *Designing for autism spectrum disorders*. Routledge. (Ch. Connections to the Outdoors).

[Junior Master Gardener curricula](#).

[Journal of Autism and Developmental Disabilities](#).

[Research in Autism Spectrum Disorders](#).

[S.843 - Combatting Autism Act of 2006](#).

### **Research & articles on autism & horticulture programs**

Recently published selected research & articles:

American Society of Landscape Architects. (2022a). Professional practice Children: Autism spectrum disorders.

American Society of Landscape Architects. (2022b). Professional practice universal design.

Anas, M.M. (2023). Therapeutic garden, its effect in the treatment of children with autism spectrum disorder (ASD). *AIP Conference Proceedings*.

Autism Nova Scotia. (2022). What is autism?

Bal, E., Harden, E., Lamb, D., Vaughan-Van Hecke, A. et al. (2010). Emotion recognition in children with autism spectrum disorders: Relations to eye gaze and autonomic state. *Journal of Autism and Developmental Disabilities*, 40, 358-370.

Barakat, H. A.-E.-R., Bakr, A., & El-Sayad, Z. (2019). Nature as a healer for autistic children. *Alexandria Engineering Journal*, 58(1), 353-366.

Battista, N. (2021). Cross-talk between food-borne *Lactiplantibacillus* (Lpb.) *plantarum* and the endocannabinoid system towards autism spectrum disorder. *Autism Research Institute*.

Beela, GK., & Thankappan, H. (2021). Horticultural therapy program in Kerala improves the emotional intelligence of school going children with autism spectrum disorder. *ISHS Acta Horticulturae 1330: XV International People Plant Symposium and II International Symposium on Horticultural Therapies: The Role of Horticulture in Human Well-being and Social Development*.

Chang, YY., & Chang, CY. (2010). The benefits of outdoor activities for children with autism. *16<sup>th</sup> International Symposium on Society and Resource Management*.

Coury, DL., Murray, DS., Fedele, A. et al. (2020). The Autism Treatment Network: Bringing best

- practices to all children with autism. *American Academy of Pediatrics*, 145(Supplement 1).
- Endicott, K., & Higbee, T.S. (2007). Contriving motivating operations to evoke mands for information in preschoolers with autism. *Research in Autism Spectrum Disorders*, 1(3), 210–217.
- Epstein, SF., & Lord, C. (2024). [What is applied behavior analysis?](#) Child Mind Institute.
- Fernelius, CL. (2017). Evidence-based practices for the design of inclusive playgrounds that support peer interactions among children with all abilities. Master's thesis, *Utah State University. All Graduate Theses and Dissertations*. 6809.
- Fields, J. (2019). Autism spectrum disorder case study: Parker picks produce. In Haller, Kennedy and Capra (Eds.), *The profession and practice of horticultural therapy*. CRC Press, 222-223.
- Fleming, L. (2024). [Social emotional learning](#). *Cultivate*, 4(2).
- Fleming, L. (2022). Autism tool kits. *Digging In*, 8(3), 12.
- Flick, KM. (2012). The application of a horticultural therapy program for preschool children with autism spectrum disorder. *Journal of Therapeutic Horticulture*, 22(1), 38-45.
- Ford, A. (2018). Opening the door outside for students with autism spectrum disorder through inclusive experiential education. *Carolina Digital Repository*.
- Friedman, S. (2023). *Nature, autism, and COVID: Exploring perceptions of nature's relationship with wellbeing in diverse groups* (Doctoral dissertation, University of Cambridge).
- Gabaldo, M. (2019). Exhibit 7.1 Perspective and technique: Sensory processing. In Haller, Kennedy and Capra (Eds.) *The profession and practice of horticultural therapy*. CRC Press, 148-149.
- Galicia Mejía, R., Hernández Rubio, E., & Ruiz Escareño, J.A. (2023, July). Therapy oriented garden monitoring system gardening for autistic children. In *International Conference on Human-Computer Interaction*, 292-297.
- Gregor, S., Bruni, N., Grkinic, P. et al. (2018). Parents' perspectives of physical activity participation among Canadian adolescents with autism spectrum disorder. *Research in Autism Spectrum Disorders*, 48(1), 53-62.
- Hellendoorn, A., Wijnroks, L., van Daalen, E. et al. (2015). Motor functioning, exploration, visuospatial cognition and language development in preschool children with autism. *Research in Developmental Disabilities*, 39, 32–42.
- Hickey, MA. (2016). Horticultural therapy intervention for children with autism spectrum disorder: Creation and delivery of a manual for group treatment. Dissertation *Alliant International University*.
- Hodges, H., Fealko, C., & Soares, N. (2020). Autism spectrum disorder: Definition, epidemiology, causes, and clinical evaluation. *Translational Pediatrics*, 9(Suppl 1), Article Suppl 1.
- Jachyra, P., Renwick, R., Gladstone, B. et al. (2020). Physical activity participation among adolescents with autism spectrum disorder. *Autism*, 25(3), 1-14.
- Khosravi, A., Khalili, A., & Nayyeri Fallah, S. (2021). Spatial qualities supporting treatment process of children with autism disorder. *Armanshahr Architecture & Urban Development*, 14(34), 101-114.
- Lee, GS., Yun, SY., Choi, HS., & Choi, BJ. (2018). Effects of color stimuli application in horticultural therapy on the changes in challenging behaviors of the developmentally disabled. *J. People Plant Environ.*, 21(4), 263-269. (this article includes autism)
- Li, D., Larsen, L., Yang, Y. et al. (2019). Exposure to nature for children with autism spectrum disorder: Benefits, caveats, and barriers. *Health & Place*, 55, 71-79.
- Lipscomb, M., & Stewart, A. (2014). Analysis of therapeutic gardens for children with autism spectrum disorders. *Perkins + Will Research Journal*, 6(2), 41-56, 2014.
- McAllister, K., McBeth, A., & Galway, N. (2022). Autism spectrum condition and the built environment. *Cities & Health*, 6(6), 1164-1178.
- Mosconi, M., Wang, Z., Schmitt, L. et al. (2015). The role of cerebellar circuitry alterations in the pathophysiology of autism spectrum disorders. *Frontiers in Neuroscience*, 9.

- Okechukwu, P., Aniakor, U., Barnaby, J. et al. (2023). Exploring the use of architectural elements to promote wellbeing via social interaction in centers for autistic children. *Int J of Innovative Environmental Studies Research*, 11(4).
- Oh, Y.-A., Lee, A.-Y., An, K.J., & Park, S.-A. (2020). Horticultural therapy program for improving emotional well-being of elementary school students: An observational study. *Integrative Medicine Research*, 9(1), 37–41.
- Priya, SV. (2022). [Gardening therapy for children with autism](#). Autispark.
- Ramshini, M., Hasanzadeh, S., Ali Afroz, G., & Razini, HH. (2018). The effect of family-centered nature therapy on children with autism spectrum disorder. *Journal of Rehabilitation*, 19(2), 150-159.
- Sachs, N., & Vincenta, T. (2022). Outdoor environments for children with autism and special needs. *Implications*, 9 (1), 1-8.
- Scartazzi, A., Mancini, ML., Proietti, S. et al. (2021). Caring for local biodiversity in a healing garden: Therapeutic benefits in young subjects with autism. *Urban Forestry & Urban Greening*, 47.
- Schofield, J., Scott, C., Spikins, P., & Wright, B. (2020). Autism spectrum condition and the built environment: New perspectives on place attachment and cultural heritage. *The Historic Environment: Policy & Practice*, 1-28.
- Seo, JH., Sungkajun, A., & Suh, J. (2015). Touchology: Towards interactive plant design for children with autism and older adults in senior housing. [CHI EA '15: Proceedings of the 33rd Annual ACM Conference Extended Abstracts on Human Factors in Computing Systems](#), 893–898.
- Shannon, CA., Olsen, LL., Hole, R., & Rush, KL. (2021). “There’s nothing here”: Perspectives from rural parents promoting safe active recreation for children living with autism spectrum disorders. *Research in Developmental Disabilities*, 115.
- Torquati, B., Stefani, G., Massini, G. et al. (2019). Social farming and work inclusion initiatives for adults with autism spectrum disorders: A pilot study. *NJAS-Wageningen Journal of Life Sciences*, 88, 10-20.
- Van der Valk, V. (2022). Gardening as meditation for youth with autism spectrum disorder: Program design guidelines for recreational therapy. *California State University Sacramento ProQuest Dissertations Publishing*.
- Wagenfeld, A. (2021). [The remarkable ways sensory gardens can help people with autism](#). *Autism Parenting Magazine*.
- Yuill, N., Strieth, S., Roake, C. et al. (2007). Brief report: Designing a playground for children with autistic spectrum disorders—effects on playful peer interactions. *J Autism Dev Disord*. 37(6), 1192-6.
- Yusop, Siti Zunaida, Mohd Hanafi Mohd Yassin, & Mohd Mokhtar, Tahar.(2020). Sensory garden approach to increase autism students’ learning focus in primary schools. *International Conference on Special Education In South East Asia Region 10th Series 2020*. Redwhite Press.
- Zablotsky, B., Bradshaw, C. P., & Stuart, E. A. (2013). The association between mental health, stress, and coping supports in mothers of children with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 43(6), 1380–1393.

### **Examples of autism focused horticulture programs**

Adult Autism Center’s agriculture program teaches new skills, caring for plants outdoors & in greenhouse while promoting involvement in the Utah community.

<https://adultautismcenter.org/programs/agriculture-program-for-adults-with-autism/>

Bittersweet Farms in Whitehouse, OH is a farm-based program for adults with autism.

<https://www.bittersweetfarms.org/>

Bucks County Audubon Society at Honey Hollow's healing garden was specifically designed to support the needs of adults with autism & intellectual disabilities, to be used by clients of nearby Peaceful Living facility.

<https://www.bcas.org/event/healing-garden-ribbon-cutting-ceremony/>

Denver Botanic Gardens hosts [therapeutic horticulture sessions with a sensory processing](#) focus including Sensory Adventures, Summer Low Sensory Mornings, & Sensory Processing & Autism Resource Kits.

Deveraux Advanced Behavioral Health New Jersey offers a vocational program teaching plant skills for adults with autism & developmental disabilities.

<https://www.youtube.com/watch?v=IUiQw1XQxGk>

Dominion School for Autism participates in the vocational program at Lewis Ginter Botanical Garden, Richmond VA, where students volunteering at the garden supplementing their career and work experiences.

<https://www.lewisginter.org/students-create-wildlife-tree/>

Fairchild Tropical Botanic Garden, Miami FL offers Plants and People Horticultural Therapy Program for children with autism spectrum disorder & their families.

<https://fairchildgarden.org/group-programs/>

Johnson, C. (2014 January 14th). Horticultural therapy has proven benefits for individuals with autism, Chicago Botanic Gardens.

<https://my.chicagobotanic.org/tag/horticultural-therapy/page/3/>

Legacy Farms offers individuals on the autism spectrum opportunities to garden.

<https://www.legacyfarmsvirginia.org/seedsofhope/2015/10/14/gardening-and-autism-a-match-made-in-heaven>

Naples Botanical Garden hosts free Sensory-Friendly Saturdays throughout the year, certified as an Autism-Friendly venue through the Center for Autism & Related Disabilities (CARD) at the University of south Florida.

<https://www.naplesgarden.org/calendar/sensory-friendly-saturdays/>

The Huntington Library, Art Museum, & Botanical Gardens takes autism awareness seriously by recognizing sensory stimulation & providing experiences in the Children's Garden, knowing quiet places are important.

<https://www.huntington.org/verso/2017/03/autism-awareness-huntington>

The Sensory Garden at the Els Center for Excellence (school) in Jupiter, FL is a 13,000 sq. ft. garden designed specifically for children with autism to play, socialize, & learn, with nooks called Places Away for calming spaces and more.

<https://www.elsforautism.org/the-els-center-of-excellence/sensory-arts-garden/>

### **Videos, websites & webinars on autism & horticulture programs**

6 Tips for Gardening with Kids with Autism free downloadable digital book from Special Learning House offers ideas like visual schedule, plants not seeds, watering tips and journaling.

<https://www.speciallearninghouse.com/6-tips-to-make-gardening-with-children-with-autism-easy-fun/>

Denver Botanic Gardens' sensory processing and autism resource kits available to visitors.

<https://www.botanicgardens.org/blog/sensory-processing-and-autism-resource-kits-now-available>

*Designing Garden Space for Youth with Autism Spectrum Disorder* presented by Kids Gardening covers important points when gardening or designing outdoor spaces.

<https://kidsgardening.org/resources/designing-a-school-garden-youth-with-autism-spectrum-disorder/>

*Evidence-based Practices for Autism* website from the National Professional Development Center on Autism Spectrum Disorder identifies best practices, models & resources.

<https://autismpdc.fpg.unc.edu/evidence-based-practices>

*Garden Therapy/Autism Awareness/Spring Vegetable Harvest* video shows kids, some with autism, gardening & connecting with food.

<https://www.youtube.com/watch?v=Y9uEZCEbA-U>

*Horticultural Therapy for Autism* short video identifies benefits of this therapeutic modality.

[https://www.youtube.com/watch?v=JJT\\_6CDBvEE](https://www.youtube.com/watch?v=JJT_6CDBvEE)

*Therapeutic Horticulture Activities Database (THAD)* suggests activities for people living with autism spectrum disorder & other populations (blueberry activities, field trip to community garden).

<https://hort.ifas.ufl.edu/therapeutic-horticulture-activities-database/>

*The National Autistic Society – Gardens and Health* video shows importance of their public garden, which supports volunteering, plantings & connecting with nature by people with autism.

<https://www.youtube.com/watch?v=bvMP-XHpqo>

*Top 10 Studies of 2020 on Autism Research*, identified by Autism Speaks, lists important research in areas of diagnosis, health disparities, outcomes for autistic adults, & genetic & biology.

<https://www.autismspeaks.org/science-news/autism-speaks-names-top-10-studies-2020>

*Treatment and Intervention Services for Autism Spectrum Disorder* website from the Centers for Disease Control and Prevention provides an overview of types of treatments, and behavioral, developmental, educational, & social-relational approaches.

<https://www.cdc.gov/ncbddd/autism/treatment.html>

US Botanical Garden offers sensory bags for individuals with autism spectrum disorders to borrow, using its website- accessibility page to identify these services.

<https://www.usbg.gov/accessibility-usbg>

*Wilmot Gardens Therapeutic Horticulture Program for individuals with autism spectrum disorder.*

<https://wilmotgardens.med.ufl.edu/2017/03/13/uf-medical-guild-grant-awarded-to-therapeutic-horticulture-program/>

**Related organizations**

[Autism Treatment Network](#)

[Center for Autism & Related Disabilities at University of South Florida \(CARD\)](#)

[National Clearinghouse on Autism Evidence and Practice \(NCAEP\)](#)

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