

PAS MEMO

Autism Planning and Design Guidelines 1.0

By Kyle Ezell, AICP CUD; Gala Korniyenko; and Rick Stein, AICP

According to the latest data from the Centers for Disease Control and Prevention's Autism and Developmental Disabilities Monitoring (ADDM) Network, one in 59 children lived with autism in 2014, up from one in 150 in 2000 (Figure 1) (CDC 2018b). Autism's increasing prevalence calls for planners to plan and design the public realm to improve the quality of life for people with autism.

Officially termed *autism spectrum disorder*, autism's "spectrum" denotes a wide range of functional, cognitive, social, and behavioral impacts associated with this disability (NIH NINDS 2017). People with autism want to live fulfilled lives — as does everyone. They deserve to be considered as equal participants in the planning process, and their desires should be represented as strongly and clearly as all others. Planners must be careful that the landscapes that they implement represent the needs of those with autism, too — and planners must plan with them, not for them, to make sure their voices are heard.

This PAS Memo introduces a framework for planning with people with autism and offers an initial set of planning and design guidelines for the public realm that addresses their needs. This work was the culmination of a year-long research process that included adults with autism, parent caregivers of adults with autism, professionals from planning and planning-related fields, experts on autism, and graduate and undergraduate students at The Ohio State University.

The article first describes the issues faced by those with autism and makes connections to ways in which planners can address these issues. It then introduces the research work, explains the Six Feelings Framework for autism planning and design, and offers some examples from the Autism Planning and Design Guidelines 1.0.

Autism and Planning

Autism ([autism spectrum disorder](#), or ASD) is a developmental disorder. Autism is often diagnosed during the first years of life when communication issues, challenges with sensory responses, repetitive behaviors, difficulties with fine motor skills, and challenges in social situations are identified (CDC 2018a).

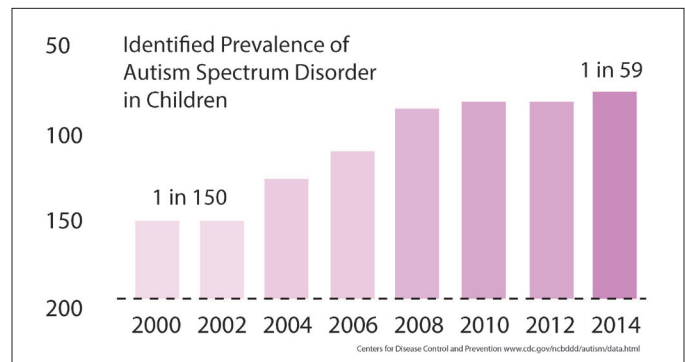


Figure 1. Increase in prevalence of autism among children, 2000–2014 (CDC 2018b)

Symptoms present themselves differently in every individual with autism, and some people require significant daily assistance, while others do not (CDC 2018a).

Cognitive conditions associated with autism include social anxiety, agoraphobia, attention deficit disorder, repetitive behavior, forgetting consequential tasks, depression, and epilepsy, among others (Baum, Stevenson, and Wallace 2015). People with autism experience their environments very differently, so it is important to understand the direct relationship between their general experiences and the scope of planners' work. Consider that:

- People with autism process information differently than "neurotypical" people (those with typical neurological development and no developmental disabilities), which makes them prone to sensory overload associated stress and anxiety (Baron et al. 2006; Merrill n.d.; DuBois et al. 2017). Planners can remedy the built environment's effects on adults with autism and also learn how stress and anxiety caused by overstimulation can be reduced.
- Response to noise (Kanakri et al. 2017) causes many to become distracted and suffer higher rates of sleep problems (Cortesi et al. 2010). Planners can employ zoning and urban design to create more quiet places.

- Sensitivity to light and noise affects many people with autism (Filipe 2017). Planners can propose silent (non-buzzing) streetlights with bulbs that emit softer light to improve their lives.
- People with autism might also have motor impairments (Ming, Brimacombe, and Wagner 2007). Planners can understand and accommodate these challenges in a wide range of infrastructure designs, such as strong buffers between pedestrians and cars.
- Very few adults with autism have a driver's license. Among 703 adults with autism in New Jersey, only 9.3 percent had a driver's license (Deka et al. 2016). Many who have a license use it as an identity card rather than a license to drive. Planners can influence transportation policy to enable people with autism to move more freely around the community.
- Few young adults with autism are employed full time (Pinho 2017). Unemployment is often tied to lack of access to jobs and unreliable or nonexistent transportation policies (Hu 2017). Planners can shape new policies, including more mixed residential-employment land uses.
- Many people with autism have communication challenges and do not enjoy attending meetings. Planners can offer alternative ways to participate in planning processes, such as using online participatory technologies (Afzalan and Muller 2017).
- Parents of children (and adult "children"/dependents) with autism are more prone to mental health issues as a result of responsibilities associated with full-time caregiving (Rejani and Ting 2015). Planners can advocate for targeted housing opportunities for people with autism. They can also propose infrastructure improvements that make it easier for people with autism, which can provide caregiver relief.

While not every person with autism shares the same health conditions and functional challenges, planners should have a general understanding of autism and how it affects many members of our communities, including family and other caregivers. Planners can then consider the impacts of policies and plans on people with autism and become proactive in creating more inclusive places relative to autism.

The "Cliff" and Independence

Children with autism rely on significant federal (Social Security and Medicaid), state, and local programs related to access to transportation, education/life/workforce training, and recreation.

When they reach the age at which they are legally considered adults (usually 18 or 21, depending on state of residence), government funding for these vital programs and services is generally no longer available (Shattuck et al. 2011). This loss of financial support can be described as "falling off the cliff" (Carpenter 2015) because funding ends abruptly, yet many new adults with autism continue to lack the skills for independent living.

Impacts of the "cliff" are wide reaching. It directly affects caregivers, who will likely be required to provide a higher level of care as a result of losing support from governmental funding

and programs (Herrema et al. 2017). It also impacts potential employers who might want to hire adults with autism who suddenly, without transportation funding, have few or no options to get to work (Carr 2017). But the "cliff" most directly impacts adults with autism, including recently transitioned adults who are usually not ready, able, or willing to live alone and provide for themselves as most neurotypical adults are expected to do. For these reasons, planners should begin planning with people with autism by focusing on the pressing needs of adults with autism.

Many adults on the autism spectrum — younger or older — will likely not be expected, be able, or desire to live completely on their own. Only a small percentage of adults with autism currently live or will ever truly live independently (Anderson et al. 2014; Heasley 2013; Seltzer et al. 2004). In this context, "independence" must be carefully understood. It, like autism, involves a spectrum, and directly relates to a person's level of functionality.

A prevailing neurotypical concept of independence should not be assumed for "neurodiverse" populations (Disabled World 2017). Adults with autism should have the option to choose the level of independence they require or need. It is clear, however, that many adults with autism face daily challenges experiencing and navigating the public realm, which is predominantly designed by neurotypical planners with a neurotypical population in mind. Anticipating and accommodating the independence spectrum clearly falls within the planning profession's domain.

Regardless where an adult on the autism spectrum lands or whose definition of independence is used, planners can learn how to modify the public realm to help adults with autism more easily move around their communities; enjoy appropriate, affordable, and safe housing; and access quality recreation. Though planning's scope is usually limited to effective tools such as comprehensive and neighborhood planning and zoning, and while planning cannot solve major funding policy issues associated with becoming an adult with autism, planners can improve our communities in targeted ways so adults with autism can thrive.

The Research Process

Our research attempted to fill a gap between existing knowledge about the needs of adults with autism and the practice of city planning, so that planners can create places where adults with autism can thrive. Dr. Emilio Amigo, a licensed clinical therapist, joined our research team as a focus group facilitator. Amigo had the trust of his clients, who were accustomed to a focus group setting, often discussing lifestyle and built environment issues in sessions. Therefore it made sense for Amigo to facilitate a focus group with 19 adults with autism, supported by students.

A parent caregiver focus group of 23 participants was also convened to help provide a caregiver perspective in identifying any overlooked or undercommunicated needs their adult children face. Word-for-word transcripts of qualitative data (conversations) indicated many challenges and desires in the daily lives of adults with autism.

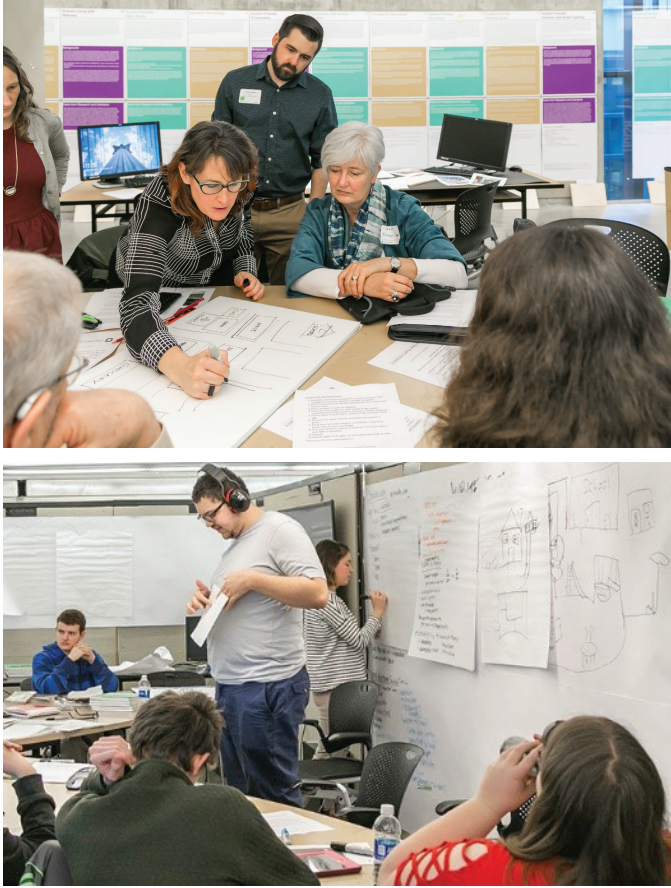


Figure 2 (top). Charrette Day 1: Professionals propose ideas from the focus groups' data. Photo by Philip Arnold; Figure 3 (bottom). Charrette Day 2: Adults with autism sharing ideas for housing and transportation on Day 2 of the charrette. Photo by Philip Arnold.

The focus group data were coded and categorized into 28 infrastructure projects and policy recommendations. These informed a three-day design and policy charrette attended by adults with autism, their parent caregivers, and a team of more than 37 professionals who offered their expertise. The team included planners, neuroscientists, licensed psychologists, special education researchers, public health officials, transportation officials, ADA compliance officials, disability professionals and activists, architects, landscape architects, civil engineers, urban designers, leaders on and off of the autism spectrum, and planning students and professors.

On the first day of the charrette, the professionals began brainstorming ideas for the 28 policies and infrastructure projects supplied by the focus groups (Figure 2). The second day of the charrette featured two workshops with adults with autism and their parent caregivers, who commented and improved on the ideas of the professionals (Figure 3). The last day featured a presentation summarizing the charrette findings. Ohio State planning students then organized the findings to form the Six Feelings Framework (described below) with direct oversight by practicing planners and professors.

The Six Feelings Framework

Our findings from the focus group and charrette process were clear: Planners should plan and design around the feelings that adults with autism want to experience in the public realm. The goal of the proposed guidelines was therefore to help adults with autism feel included in their communities in a built environment where they can thrive.

Six feelings constitute the framework for Autism Planning and Design Guidelines 1.0. These six feelings combine to promote feelings of being included. When an adult with autism is using public spaces or infrastructure, planning and design implementations should make him or her:

- Feel connected – The public realm is easily reached, entered, and leads to destinations.
- Feel free – The public realm offers relative autonomy and the desired spectrum of independence.
- Feel clear – The public realm makes sense and is not confusing.
- Feel private – The public realm offers boundaries and provides retreat.
- Feel safe – The public realm diminishes the risk of being injured.
- Feel calm – The public realm mitigates physical sensory issues associated with autism.

Although these feelings are also desirable for neurotypical people, they are especially crucial with people with autism.

Initially, implementing plans and design guidelines for one group of people such as adults with autism may not seem practical as there are many other constituents who share the public realm. However, as is the case for implementing universal design, planning through the lens of autism can benefit everyone. The Six Feelings Framework helps planners create spaces and infrastructure that are more usable, comfortable, and beneficial to all constituents (but particularly adults with autism) who feel more connection, freedom, clarity, safety, privacy (when needed), calm, and ultimately, inclusion.

When someone is experiencing specific aspects of the public realm, these six feelings can trigger other derivative feelings, conditions, and realizations. A good way to make this clear is to consider the absence of infrastructure — for example, sidewalks, which were covered extensively during the “draw and discuss” charrette day with adults with autism.

Walking on busy streets without sidewalks can bring on feelings of not being able to connect easily to a destination, which can bring on a secondary response such as anxiety. The missing sidewalk can eliminate potential feelings of freedom and leave pedestrians also (secondarily) feeling vulnerable. Not knowing where one is expected to walk diminishes feelings of clarity and can trigger the (secondary) condition of anxiety or panic. Being exposed to oncoming traffic and potentially the property owners of whose land on which one may be trespassing threatens feelings of privacy, which can cause secondary insecurity. Feelings of safety, which are especially critical for adults with autism, are compromised when walking in potential danger, as

this raises fight or flight responses. Walking without a sidewalk on a busy street also diminishes feelings of calm.

During the charrette, the adults with autism were asked to demonstrate how wide a comfortable sidewalk should be. Standing side by side, facilitators helped the participants determine that the width of three average-sized people standing with plenty of room between them is a good standard, expanding the typical standard sidewalk width from four or five feet — the minimums recommended by the American Association of State Highway and Transportation Officials and the Institute of Transportation Engineers (PBIC 2015) — to eight feet for them to feel connected and free.

Clear separation from the streets in the form of low shrubbery or low walls or balustrades were also important to create feelings of clarity (cars are on the street, pedestrians are clearly separated from the cars), feelings of safety (pedestrians are far enough away from the street), and feelings of calm (it's a nice, easy walk). While there are infinite combinations of secondary feelings and responses, focusing on the Six Feelings keeps the planning and design framework simple and understandable.

Applying the 1.0 Guidelines to Planning Practice

As autism is a spectrum, designing with autism in mind offers planners and designers a spectrum of possibilities and remedies. Absent a comprehensive set of published and widely tested standards, planners can begin to simply ask whether planning proposals meet the Six Feelings Framework. Ideally, infrastructure designed with autism in mind will evoke all six feelings. Attempting to achieve this adds more thought to the design process.

Ohio State city and regional planning students translated the Six Feelings Framework into a first interpretation of standards: the Autism Planning and Design Guidelines 1.0. The following sections provide a few examples of their work in applying these guidelines in the planning and design of common facilities and infrastructure.

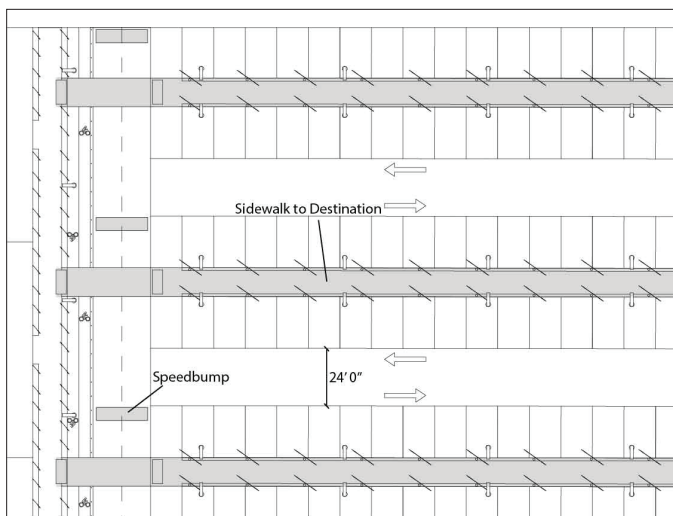


Figure 4. A design for a retail parking lot that integrates the Six Feelings. Courtesy Michelle Williams and Alex Blankenship.

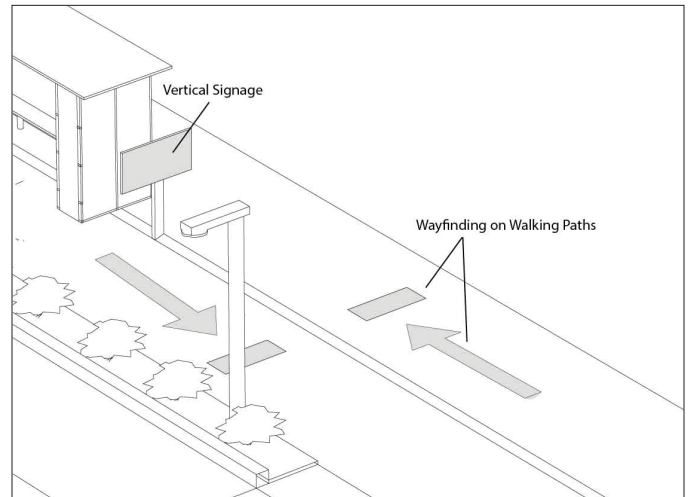


Figure 5. Wayfinding integrated with walking paths. Courtesy Michelle Williams and Aerin Ledbetter.

Parking Lots

An interpretation of a retail parking lot that attempts to integrate the Six Feelings (Figure 4) better connects the rows of parking spots to a destination, in this case, a retail store. This series of sidewalks prevents pedestrians from having to navigate around cars that are moving past and entering or backing from parking spaces, evoking feelings of safety (from dangerous cars) and feelings of being connected (from the parking space to the retail store). Speedbumps force car traffic to slow, further supporting feelings of safety.

Wayfinding implemented directly on the sidewalk (Figure 5) can bring feelings of clarity (pointing to the destination). Parking lots are often chaotic but this design lowers the potential for sensory overload, making people feel calmer (avoiding distracting headlights and people walking from many directions). More orderly walking networks can increase confidence

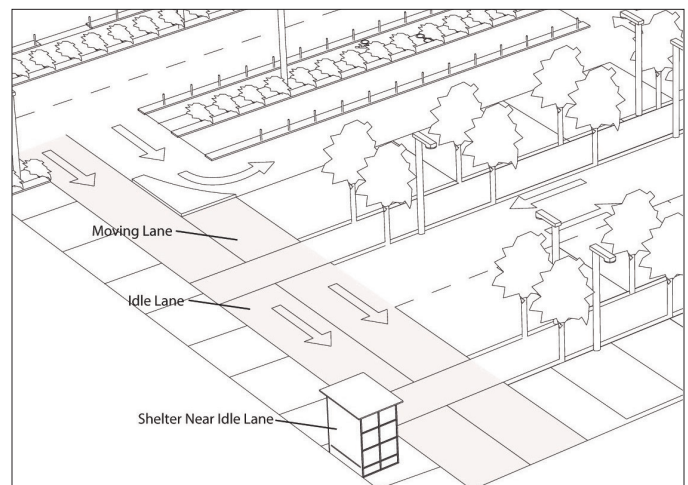


Figure 6. A design for pick-up and drop-off areas that integrates the Six Feelings. Courtesy Alex Blankenship, Michelle Williams, and Michael Kaufman.

for pedestrians with autism, making them feel freer than they would in standard parking lots.

As maximum parking space requirements (versus minimum requirements) are becoming more widely used (Shoup 2017), planners can write codes for parking lots in new developments that would require the same maximum number of spaces and add the new design amenities.

Pick-Up/Drop-Off Areas

Adults with autism often have difficulty navigating through overwhelming or crowded spaces such as city sidewalks and streets (Heffernan 2016). Many adults with autism do not drive and must rely on people offering automobile rides to and from destinations. In an urban context, city blocks have bus stops and on-street parking, but integrating additional designated areas to pick up and drop off passengers (Figure 6, p. 4) could improve quality life for adults with autism and their caregivers (Lubin and Feeley 2016).

Implementing areas for picking passengers up and dropping passengers off can create feelings of clarity (“I know where to go and I know my ride will know where to pick me up”) and feelings of calm (“The person picking me up will also know where to pick me up; now I can relax”). Shelters near the idle lane can offer feelings of safety (during bad weather, for instance) and potentially, feelings of privacy (offering a physical place to escape chaos).

Although pick-up/drop-off areas threaten the removal of some on-street parking spaces, the growth in ridesharing and the anticipation of automated vehicles, which also require pick-up and drop-off areas, may help justify their implementation. Planners can anticipate this need and begin to select the most appropriate locations for pick-up/drop off infrastructure, taking into account easy access to popular destinations, proximity to local landmarks for easy directions, and collaboration with transit agencies to prohibit bus stops within these zones. Planners might also explore sponsorships by private companies and public agencies, which would be permitted to “brand” their sponsored pick-up/drop-off areas.

Housing

A major theme during the focus groups and charrette was the need to find appropriate housing for high-functioning adults with autism.

Duplexes (sometimes called doubles) are structures with two housing units, desirable for caregiver parents who can be a wall away (Figure 7). Duplexes were also popular ideas for encouraging “intentional neighbors” — nonfamily members — who would be willing to mentor or become a caregiver. Accessory dwelling units (ADUs), sometimes referred to as in-law houses or “granny flats,” offer similar opportunities. ADUs can be affordable for renters or offered rent-free for family members. Duplexes and ADUs can bring feelings of freedom (having a house to call one’s own), feelings of privacy and safety (residents with autism can live alone but are still close to available caregivers or mentors), and feelings of calm (if sensory-calming design, materials, and accessories are used in such homes) (Gaines et al. 2016).

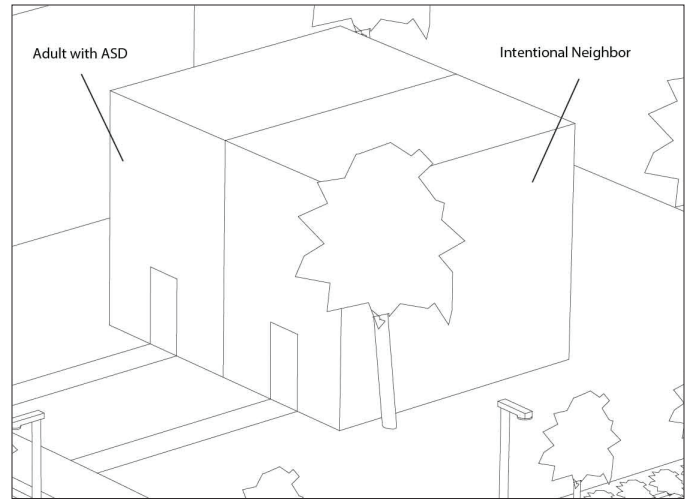


Figure 7. Duplexes can offer independent yet connected housing options for adults with autism. Courtesy Michelle Williams and Jack Hehemann.

Local zoning, and in some cases homeowners’ association rules, determines the viability of duplexes and especially accessory dwelling units. Planners serving communities where codes prohibit these housing options should consider how their regulations impact the potential for helping adults with autism to thrive. Allowing and expanding more options such as duplexes and ADUs (commonly referred to, along with triplexes, courtyard apartments, and live-work units, among others, as “missing middle” housing) can offer more supply and increased options for affordable housing for the entire community (Liebig, Koenig, and Pynoos 2006; Opticos Design 2018).

Soothing Spaces

Also referred to in the focus groups as “don’t bother me zones,” soothing spaces allow an escape from chaos (Figure 8). Similar to meditation rooms in buildings, these outdoor spaces offer

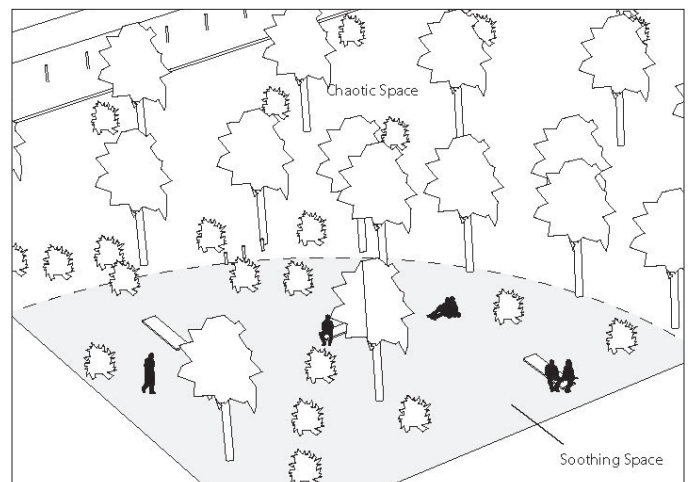


Figure 8. Soothing spaces offer outdoor havens to promote calmness, safety, and clarity. Courtesy Michelle Williams.

areas for users to experience feelings of calm, feelings of privacy, feelings of safety, and feelings of clarity as they are better able to reflect in a safe, soothing environment. When ready, users return to the public, recharged.

Planners can locate available, easily accessible spaces in and around busy areas including streets, campuses (both office and educational), active parks, and anywhere serenity and comfort are normally absent (Davidson and Henderson 2017). Planners can also assist in the branding, wayfinding, and informational design of soothing spaces to clearly indicate their purpose and set expectations for user conduct.

Multi-Use Trails

Multi-use trails were considered by many participants as being too multi-use — in other words, the trails combined walking or running and cycling on the same crowded, roughly 10-foot-wide path. The participants reported high risk for conflicts, with high-speed cyclists on racing bicycles sharing the same space as leisure cyclists and children on training wheels.

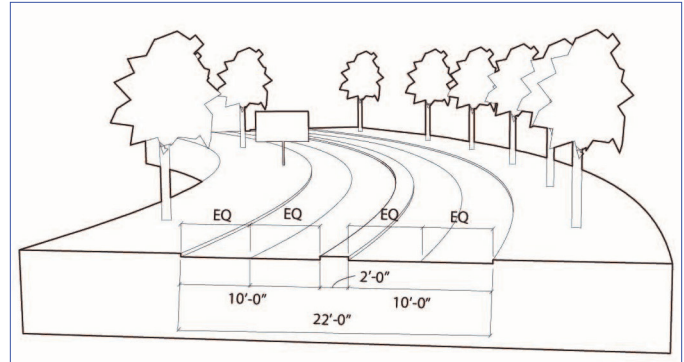


Figure 9. Separating multi-use paths into separate lanes of equal widths for different uses reduces user conflicts. Courtesy Michael Kaufman and Dalton Walker.

Clearly separating multi-use paths into spaces for each use and designing physical barriers to split the direction of movement (Figure 9) will significantly lessen conflict concerns,

Big Ideas for Autism Planning and Design

Along with facility-specific design interventions, compelling policy and program ideas emerged from the research that are more theoretical and large scale, such as transit systems models based on the Six Feelings framework.

Transit networks often resemble a “hub and spoke” system (Figure 10, left). Here, routes start on the outskirts of a city (the spokes) and work toward the middle (the hub), then go back out, creating long, linear lines. While this popular system design may appear to be logical and practical, many areas between the spokes are not easily accessible to transit. Consider the user who lives on the edge of the city, whose workplace is also located on the outskirts and only a few miles away — but not on a transit line. This user will likely experience feelings of not being connected. As is the case in many cities, this rider probably would be required to transfer at “the hub” (usually downtown) before traveling back out of town to get to work, extending a trip far longer than it needed to be.

Shifting to a model that resembles an atom shape (Figure 10, right) would create a series of looping, intersecting, and overlapping routes, increasing opportunities for transfer points and therefore higher connectivity throughout the city. Now riders can more easily travel to nearby or crosstown destinations, feeling free (easy, accessible transit options provide a sense of independence), feeling clear (the transit system is easy to understand and use), and feeling calm.

Another big idea was the “I need assistance” symbol (Figure 11). It was widely noted that sometimes adults with autism become confused when in public. They may need directions to their destination or may be experiencing distress. Similar to the International Symbol of Access (the blue square overlaid with a white stylized image of a person

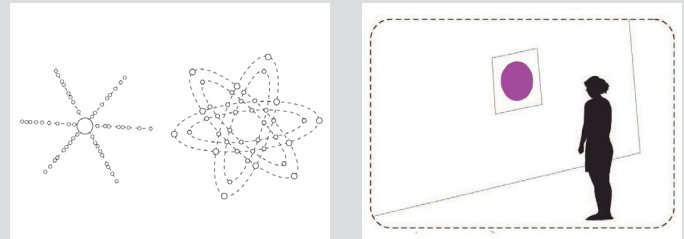


Figure 10 (left). Conventional (left) and Six Feelings-based (right) transit system models. Courtesy Michael Widman and Michael Kaufman; Figure 11 (right). An “I Need Assistance” symbol. Courtesy Kyle Ezell, Michael Kaufman, and Safa Saleh.

in a wheelchair) that signifies barrier-free access, an appropriately scaled magenta dot (magenta was a color liked by adults with autism in the charrette) would be prominently placed on the sides of buildings and in storefront windows to indicate help is inside or nearby. This idea will require major programming design since it involves two remedies for people with autism — information / wayfinding as well as people who are available to help. Providing this help would require significant training for the people inside the building with the dot.

This program may be outside of a planner’s expertise and abilities, but planners should be a part of the conversation. Planners can certainly assist in wayfinding — under or near the dot — where people who need assistance can, in the absence of a trained person ready to assist, at least experience feelings of clarity and feelings of calm, seeing useful information that could help them get further help.

boosting feelings of clarity, feelings of safety, feelings of calm, and feelings of freedom.

Greenways and parks planners can establish new policies for right-of-way expectations for wider separated use paths. Planners can work with civil engineers designing specifications that will work best for each built environment context (for example, path width would need to be narrower in more developed areas) (Deka, Feeley, and Lubin 2016). Planners can also work with landscape architects to establish plans for implementing soothing vegetation and benches, shelters, and other infrastructure that would assist the path's Six Feelings implementation.

Conclusion

The Six Feelings Framework was developed as an outcome of the focus groups and charrette at The Ohio State University as described above. It is intended to serve as the basis for a set of planning and design guidelines to help make public infrastructure and facilities not only more inclusive of people with autism but more clear, comfortable, safe, and freeing for everyone in a community.

The culmination of this research project was the development of an initial set of planning and design standards: the [Autism Planning and Design Guidelines 1.0](#), some examples of which have been shared in this article.

While we believe that this work has the potential to improve lives of adults with autism, there were significant limitations in the creation of these guidelines.

Most obviously, time was a factor, as this study comprised an academic year. Almost everyone involved was based in Columbus, Ohio, and the concerns, views, and experiences of our Ohio research participants may not represent the views and experiences of the rest of the U.S. and the world. Finally, although city planners, planning professors, and our professional advisory group, [Autism Living](#), were directly involved in continuous reviews of students' work, the planning and design framework that emerged from our research was not directly tested by professional planners.

Professional planners are encouraged to refine this work and engage in further study from this starting point. Test the Six Feelings Framework in your communities. Consider how to improve new plans, zoning codes, and planning proposals. We hope that our initial ideas in this toolkit are challenged and improved on by planners and professionals in allied fields such as architects, landscape architects, civil engineers, ADA coordinators, and public health professionals. We also hope that real estate developers will embrace these ideas and include the Six Feelings Framework in their proposals.

Planners care about the people in our communities. We can help people with autism find ways to make their lives better and thrive. This is just a start.

About the Authors

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Rick Stein, AICP, is a trustee of Autism Living, a Columbus, Ohio nonprofit whose mission is to create communities in where young adults challenged by autism, 55-plus generation, and diverse neighbors form cohesive, intergenerational neighborhoods of mutual support — sometimes referred to as "intentional neighboring." Stein is also owner of Urban Decision Group, a Columbus planning firm, and an administrator of the American Planning Association's Planning for Underserved Populations Interest Group. He is also the father of a son with autism. www.urbandesigngroup.com

For a full list of the many people who contributed to this body of work, visit [here](#).

References

- Afzalan, Nader, and Brian Muller. 2018. "Online Participatory Technologies: Opportunities and Challenges for Enriching Participatory Planning." *Journal of the American Planning Association* 84(2).
- Anderson, K.A., P.T. Shattuck, B.P. Cooper, A.M. Roux, and M. Wagner. 2014. "Prevalence and Correlates of Postsecondary Residential Status Among Young Adults with an Autism Spectrum Disorder." *Autism: the International Journal of Research and Practice* 18(5): 562–70. Available at www.ncbi.nlm.nih.gov/pmc/articles/PMC4006316/.
- Baron, M. Grace, June Groden, Gerald Groden, and Lewis Paeff Lipsitt. 2016. *Stress and Coping in Autism*. New York: Oxford University Press.
- Baum, Sarah H., Ryan A. Stevenson, and Mark T. Wallace. 2015. "Behavioral, Perceptual, and Neural Alterations in Sensory and Multisensory Function in Autism Spectrum Disorder." *Progress in Neurobiology* 134: 140–60. Available at www.ncbi.nlm.nih.gov/pubmed/26455789.

- Carpenter, Siri. 2015. "Disconnected: Adults with Autism Are Left Alone to Navigate a Jarring World." *Science News* 187 (4). Available at <https://onlinelibrary.wiley.com/doi/abs/10.1002/scin.2015.187004017>.
- Carr, Sarah. 2017. "The Tricky Path to Employment Is Trickier When You're Autistic." *Slate Moneybox*, September 22. Available at www.slate.com/articles/business/moneybox/2017/09/how_autism_complicates_the_path_to_employment.html.
- Centers for Disease Control and Prevention (CDC). 2018a. "Autism Spectrum Disorder (ASD): Data and Statistics." Available at www.cdc.gov/ncbddd/autism/data.html.
- Centers for Disease Control and Prevention (CDC). 2018b. "Autism Spectrum Disorder (ASD): Signs and Symptoms." Available at www.cdc.gov/ncbddd/autism/signs.html.
- Cortesi, Flavia, Flavia Giannotti, Anna Ivanenko, and Kyle Johnson. 2010. "Sleep in Children with Autistic Spectrum Disorder." *Sleep Medicine* 11(7): 659–64. Available at www.science-direct.com/science/article/pii/S1389945710001759.
- Davidson, Joyce, and L. Victoria Henderson. 2017. "The Sensory City: Autism, Design and Care." In *Care and Design: Bodies, Buildings, Cities*, edited by Charlotte Bates, Robert Imrie, and Kim Kullman, pp. 74-94. Available at www.wiley.com/en-us/Care+and+Design%3A+Bodies%2C+Buildings%2C+Cities-p-9781119053491.
- Deka, Devajyoti, Cecilia Feeley, and Andrea Lubin. 2016. "Travel Patterns, Needs, and Barriers of Adults with Autism Spectrum Disorder Report from a Survey." *Transportation Research Record* 2542: 9–16. Available at <http://docs.trb.org/prp/16-1649.pdf>.
- Disabled World. 2017. "Neurodiversity: Definition and Information." Available at www.disabled-world.com/disability/awareness/neurodiversity/.
- DuBois, Denise, Erin Lymer, Barbara Gibson, Pushpal Desarkar, and Emily Nalder. 2017. "Assessing Sensory Processing Dysfunction in Adults and Adolescents with Autism Spectrum Disorder: A Scoping Review." *Brain Sciences* 7(12): 108. Available at www.ncbi.nlm.nih.gov/pubmed/28825635.
- Filipe, Carlos Nunes. 2017. "Psychiatric and Neurological Problems in Adults with Autism Spectrum Disorders." In *Autism Spectrum Disorders in Adults*, edited by Bernardo Barahona Corréa and Rutger-Jan van der Gaag, 203–218. New York: Springer. Available at <http://public.eblib.com/choice/publicfullrecord.aspx?p=4841635>.
- Gaines, Kristi, Angela Bourne, Michelle Pearson, and Mesha Kleibrink. 2016. *Designing for Autism Spectrum Disorders*. New York: Routledge.
- Heasley, Shaun. 2013. "Few Young Adults with Autism Living Independently." *Disability Scoop*, September 3. Available at www.disabilityscoop.com/2013/09/03/few-autism-independently/18647/.
- Heffernan, Diarmuid. 2016. *Sensory Issues for Adults with Autism Spectrum Disorder*. Jessica Kingsley Publishers. Available at <http://public.eblib.com/choice/publicfullrecord.aspx?p=4357391>.
- Herrema, Renske, Deborah Garland, Malcolm Osborne, Mark Freeston, Emma Honey, and Jacqui Rodgers. 2017. "Mental Wellbeing of Family Members of Autistic Adults." *Journal of Autism and Developmental Disorders* 47(11): 3589–99. Available at www.ncbi.nlm.nih.gov/pmc/articles/PMC5633644/.
- Hu, Lingqian. 2017. "Job Accessibility and Employment Outcomes: Which Income Groups Benefit the Most?" *Transportation* 44(6): 1421–43. Available at <https://link.springer.com/article/10.1007/s11116-016-9708-4>.
- Kanakri, Shireen M., Mardelle Shepley, James W. Varni, and Louis G. Tassinary. 2017. "Noise and Autism Spectrum Disorder in Children: An Exploratory Survey." *Research in Developmental Disabilities* 63: 85–94. Available at www.ncbi.nlm.nih.gov/pubmed/28254162.
- Liebig, Phoebe, Teresa Koenig, and Jon Pynoos. 2006. "Zoning, Accessory Dwelling Units, and Family Caregiving: Issues, Trends, and Recommendations." *Journal of Aging & Social Policy* 18 (3/4): 155–72. Available at <https://www.ncbi.nlm.nih.gov/pubmed/17135101>.
- Lubin, Andrea, and Cecilia Feeley. 2016. "Transportation Issues of Adults on the Autism Spectrum Findings from Focus Group Discussions." *Transportation Research Record* 2542: 1–8. Available at <http://docs.trb.org/prp/16-0527.pdf>.
- Merrill, Anna. n.d. "Anxiety and Autism Spectrum Disorders." Indiana Resource Center for Autism, Indiana University Bloomington. Available at www.iidc.indiana.edu/pages/anxiety-and-autism-spectrum-disorders.
- Ming, Xue, Michael Brimacombe, and George C. Wagner. 2007. "Prevalence of Motor Impairment in Autism Spectrum Disorders." *Brain and Development* 29(9): 565–70. Available at [www.brainanddevelopment.com/article/S0387-7604\(07\)00089-7/pdf](http://www.brainanddevelopment.com/article/S0387-7604(07)00089-7/pdf).
- National Institutes of Health National Institute of Neurological Disorders and Stroke (NIH NINDS). 2017. "Autism Spectrum Disorder Fact Sheet." Available at www.ninds.nih.gov/Disorders/Patient-Caregiver-Education/Fact-Sheets/Autism-Spectrum-Disorder-Fact-Sheet.

Opticos Design. 2018. "What is Missing Middle Housing?" Available at <http://missingmiddlehousing.com/about/>.

Pedestrian and Bicycle Information Center (PBIC). 2015. "Sidewalks." In *Safe Routes to School Online Guide*. Available at <http://guide.saferoutesinfo.org/engineering/sidewalks.cfm>.

Pinho, Sandra. 2017. "Adult Outcomes and Supported Employment Strategies." In *Autism Spectrum Disorders in Adults*, edited by Bernardo Barahona Corrêa and Rutger-Jan van der Gaag, pp. 219–33. New York: Springer. Available at <http://public.eblib.com/choice/publicfullrecord.aspx?p=4841635>.

Rejani, T. G., and Mary Ting. 2015. "Depression and Anxiety among Parents with Autistic Children." *Journal of Psychosocial Research* 10(2): 385–91.

Seltzer, Marsha Mailick, Paul Shattuck, Leonardo Abbeduto, and Jan S. Greenderg. 2004. "Trajectory of Development in Adolescents and Adults with Autism." *Mental Retardation and Developmental Disabilities Research Reviews* 10:234–47. Available at www2.waisman.wisc.edu/family//pubs/popstudies/2004%20Seltzer%20Shattuck%20Trajectory%20of%20Development.pdf.

Shattuck, Paul T., Mary Wagner, Sarah Narendorf, Paul Sterzing, and Melissa Hensley. 2011. "Post-High School Service Use Among Young Adults with an Autism Spectrum Disorder." *Archives of Pediatrics & Adolescent Medicine* 165(2): 141–6. Available at https://uh-ir.tdl.org/uh-ir/bitstream/handle/10657/3037/Narendorf_2011_PostHighSchool.pdf?sequence=1&isAllowed=y.

Shoup, Donald. 2017. *The High Cost of Free Parking: Updated Edition*. Routledge. Available at www.taylorfrancis.com/books/9781351179782.

Additional Resources

Amigo Family Counseling, LLC. (Research partner.) Available at <http://amigofamilycounseling.com>.

Autism Living. Available at www.autismliving.org/our-team/.

Barahona Corrêa, Bernardo, and Rutger-Jan van der Gaag. 2017. *Autism Spectrum Disorders in Adults*. New York: Springer. Available at www.springer.com/us/book/9783319427119.

Chalfant, Anne M. 2011. *Managing Anxiety in People with Autism: A Treatment Guide for Parents, Teachers, and Mental Health Professionals*. Bethesda, Md.: Woodbine House. Available at www.amazon.com/Managing-Anxiety-People-Autism-Professionals/dp/1606130048.

International Transport Forum & Organization for Economic Co-operation and Development. 2009. *Cognitive Impairment, Mental Health and Transport: Design with Everyone in Mind*. Paris: OECD/ITF. Available at www.itf-oecd.org/sites/default/files/docs/09cognitive.pdf.

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