AUTISM PLANNING AND DESIGN GUIDELINES 1.0

Attempt 1.0 August 2017 - December 2018

THE OHIO STATE UNIVERSITY CITY AND REGIONAL PLANNING STUDENTS





ATTEMPT 1.0 AUGUST 2017 - DECEMBER 2018

THE OHIO STATE UNIVERSITY KNOWLTON SCHOOL OF ARCHITECTURE AUTISM LIVING

Supported By:

KNOWLTON SCHOOL OF ARCHITECTURE CITY AND REGIONAL PLANNING PROGRAM

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i. SUMMARY AUTISM PLANNING AND DESIGN GUIDELINES 1.0

THE SIX FEELINGS FRAMEWORK

Our research culminated in the creation of a planning and design strategy: The Six Feelings Framework. These six feelings combine to promote feelings of being included. When considering their needs, planning and design implementations in the public realm (in a public space or when using infrastructure) should make adults with autism:

- 1. *Feel connected* because they are easily reached, entered, and/or lead to destinations.
- 2. *Feel free* because they offer relative autonomy and the desired spectrum of independence.
- 3. *Feel clear* because they make sense and do not confuse.
- 4. *Feel private* because they offer boundaries and provides retreat.
- 5. Feel safe because they diminish the risk of being injured.
- 6. *Feel calm* because they mitigate physical sensory issues associated with autism.

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

Understanding that it may not seem useful to plan for one group of people, 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 connected, free, clear safe, private (when needed), calm, and ultimately, included.

PURPOSE

Adults with autism have particular needs that most city planners haven't yet considered, even as autism has become increasingly prevalent in our society. Autism Spectrum Disorder (ASD) affects millions in the United States, including families and friends of people with ASD.

Many adults with autism "fall off the cliff," as they age out of childhood support programs while continuing to lack the skills for independent living. This abrupt life change affects adults with autism and significantly impacts their caregivers. We do not assume that independence, a culturally-prescriptive concept, is what adults with high-functioning autism want or need. It is clear, however, that many of adults with autism and their families face daily challenges concerning housing, transportation, and the overall built environment, all of which are major topics that fall within the planning profession's domain.

Adults with autism are more prone to stress, anxiety, and sensory overload as a result of intense cognitive processing of sound stimuli. They suffer from higher rates of sleep problems related to these auditory issues. Light intensity and noise were shown to disproportionately adversely affect the learning of children with autism. There are other psychological issues associated with the disorder: social anxiety, agoraphobia, attention deficits, obsessive behaviors, forgetting consequential tasks, and depression.

Our research provides a planning and design framework backed up by research that can create effective policies for professionals who are interested in improving the built environment so adults with autism can thrive.

GOAL

To create environments where adults with autism can thrive. The typology will vary (local scale project, mixed-development or redevelopment, neighborhood, transit system, and others), but this goal remains the same. Creating environments where autistic adults can thrive depends on improving the knowledge and tools for city and regional planners to make this happen.

BACKGROUND

In Summer, 2016, several board members from Autism Living, a Columbus, Ohio 501c3 non-profit corporation, met with Professor of Practice Kyle Ezell to plan a City and Regional Planning study on planning for autistic adults. During Autumn 2017 and Spring 2018 terms, graduate and undergraduate students in City and Regional Planning Junior Studio, City and Regional Planning Senior Studio, and City and Regional Planning Graduate Planning Innovations Workshop investigated the everyday needs of high-functioning adults with autism and whether or how professional planners, policymakers, and designers can improve their lives. Students then passed a training course for the ethical treatment of human subjects in research from Ohio State's Institutional Review Board, designed a focus group to encourage input from adults with autism and their caregiver parents, planned and implemented a design and policy charrette with professionals in mental health, neuroscience, architecture, planning, engineering, landscape architecture, public health and other allied fields. The students then designed infrastructure and program ideas to produce this final deliverable planning toolkit publication. [See the Appendix for more details on the academic process.]

SCOPE

Our research employed a semester-long review of the literature, two focus groups (adults with autism and parents of adults with autism) and a design and policy charrette over an academic year.

While we believe that our work contributes to the planning profession, there were significant limitations to creating this planning practice toolkit. Most obviously, time was a factor as this study comprised an academic year. 33 graduate and undergraduate students, 37 professionals in allied fields, 30 adults with autism, and 23 parents of adults with autism worked on this project and almost everyone involved was based in Columbus, Ohio. Concerns, views, and experiences of our Ohio subjects may not represent the views and experiences of the rest of the U.S. and the world. Planners who wish to involve adults with autism in their public involvement processes may not have access to a professional psychologist and his/her team. Additionally, as people with ASD fall on a spectrum, only the opinions of high-functioning adults with autism are represented in our findings. Finally, though city planners, planning professors, and our professional advisory group (Autism Living) were directly involved in continuous reviews, the planning and design framework that emerged from our research was tested/designed by students—not planning professionals. Professional planners, landscape architects, civil engineers and urban designers are encouraged to refine the work provided in this document. We hope that our initial ideas in this toolkit are challenged and improved upon by professionals in allied fields.

TESTING

Students interpreted the Six Feelings Framework and redesigned common infrastructure and provided ideas, some in specific geographies. This is a first attempt.

AUTISM PLANNING AND DESIGN STANDARDS "1.0"

Professional planners are encouraged to refine this work and engage in further study from our start. Challenge and improve these ideas. <u>See more about this invitation to improve and expand this study in the July/August 2018 American Planning Association Planning Advisory Service Memo.</u>

RECOMMENDATIONS

WE RECOMMEND THAT:

- City and regional planners activity accommodates people with autism in their public involvement process.
- City and regional planners implement autism standards building on this 1.0 attempt into their zoning and design guidelines, and consider policy changes.
- Professionals in affiliated fields who have concern over the public realm test, retest, and improve the ideas in this toolkit.
- Civil engineers retrofit infrastructure around the Six Feelings Framework.
- Real estate developers who are designing master planned communities consider the Six Feelings Framework in their plans.
- For more information on what we learned about public participation for people with autism see the October 2018 edition of *Planning*.

ii. CONTRIBUTORS AUTISM PLANNING AND DESIGN GUIDELINES 1.0

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23 parents of adults with autism, 19 adults with autism (Names of participants were required to be kept confidential per IRB.)

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COMMON INFRASTRUCTURE

COMMON INFRASTRUCTURE

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- F. Modified ADA Parking Space
- G. Crosswalks
- H. Lights
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- J. Tiny Homes
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one COMMON INFRASTRUCTURE

A. BUS RIDES

(feeling connected, feeling safe, feeling private, feeling clear, feeling free)

FROM THE RESEARCH

Bus route and announcements as buses approach a stop will alleviate stress for adults with autism. Indicating a bus route and direction for passengers boarding the bus will reassure passengers that they are getting on the correct bus and will be traveling in the correct direction. Implementing a visual sign on the outside of the bus that clearly indicates the route and direction of the bus will provide clarity for transit users. Providing seats close to the front and near the bus driver is important to make it easier for adults with ASD to ask for assistance. ASD adults are often highly sensitive to bright lights, so the interior light design should be soft.

GUIDELINES

Each bus exterior shall be clearly identify its route and indicate which direction the bus will be traveling. Buses shall announce the bus route and direction.

There shall be a visual and auditory alert for passengers to be aware of a stop.

Buses shall utilize the "I Need Assistance Symbol" on the exterior and interior in compliance with the Bus Checklist guideline.

Buses shall have seating near the front of the bus wider than 17'0", not including armrests. Buses shall be outfitted with maps that update in real time located at the front and the middle.

Maps shall reference points of interest in a 3-D format. Maps shall show a "you are here" symbol and highlight the upcoming stop.

B. BUS ROUTES

(feeling safe, feeling clear, feeling private, feeling free)

FROM THE RESEARCH

Many adults with autism hesitate to use a bus system due to lack of access and/or ease of travel to final destinations. The majority of bus routes are generally inefficient and require extra travel time away from the intended destination. Many b us route networks resemble a "hub and spoke" system. "Hub and spoke" routes start on the outskirts of a city and work towards the middle of the city then back out, creating long, linear lines. Shifting to a model that resembles an atom shape creates shorter, looping, intersecting, and overlapping routes. These routes can create more potential transfer points, increasing connectivity throughout the city.

GUIDELINES

Bus routes shall be oblong/circular to allow more intersection to provide more coverage to areas/amenities and offer increased transfer opportunities.



one COMMON INFRASTRUCTURE

C. BUS STOPS

(feeling safe, feeling clear, feeling connected, feeling calm, feeling private)



FROM THE RESEARCH

The research indicates that confusion and anxiety associated with transportation can be alleviated by a more humane design for bus stops. Comfort and safety are important.

GUIDELINES

Shelters shall be a minimum of 8' 0" wide and have a maximum depth of between 6'0" and 12'0". Bus stops shall feature shelters and provide adequate, comfortable seating. Bus stops shall be equipped with an interactive digital help and route display board. The interactive help and route display board shall feature a function that indicates that a passenger is waiting on a particular approaching bus. All bus stops shall provide the same amenities for passengers that busier routes or larger bus stations may have.

D. PARKING GARAGES

(feeling safe, feeling clear, feeling private, feeling calm, feeling connected)

FROM THE RESEARCH

Concerns over safety and wayfinding in parking areas including parking garages were prominent. Creating designated clearly-marked walking areas helps to make garages safer for the people walking through it, and safer for the drivers through. Concerns over memory and "drifting off" were shown in the research, so creating a more visual way to remember where the car is parked is important. Adding color to in addition to each parking level number can make it easier to remember. Adding speed bumps and signage to crosswalks creates extra precautions for drivers to create a safer walking environment. Adding sidewalks provides an extra layer of safe space for pedestrians.

GUIDELINES

Parking garages shall have clearly-marked sidewalks along garage walls that direct pedestrians to elevators and stairs.

Crosswalks shall be present on each level of the parking garage with visible directional signage.

There shall be speed bumps on either side of the crosswalk. Each level shall have a color along with a level number.

E. PARKING LOTS

(Feeling safe, feeling clear, feeling private, feeling free)

FROM THE RESEARCH

Concerns about safety and wayfinding in parking lots are widely shared. Creating a color/symbol coded system that shows exactly where cars will be driving and where it is safe to walk will help adults with autism more easily navigate a parking lot. The idea for a circular pick-up/drop-off zone was gleaned from the need for safety and clarity. (See Appendix Page 142.) The minimum of 25'0" radius dimension idea was based on the average length of a car so that a car can be parked along the sidewalk to allow other cars to pass.

GUIDELINES

Parking lots shall connect parking spaces to a destination using sidewalks.

The crosswalk shall further protect pedestrians from automobiles with speed bumps and signs for yielding or stopping.

Parking spaces shall be separated into clearly-identifiable, marked sections.

Wayfinding from the destination shall include visual directions on the sidewalk to parking sections.

If a pick-off/drop-off location is needed, its radius shall be 25'0" minimum.

The width of the street shall be 24'0" divided into 12'0" lanes.

F. MODIFIED ADA PARKING SPACE

(Feeling private, feeling safe, feeling free, feeling clear, feeling connected)

FROM THE RESEARCH

Adults with ASD are prone to sensory overload in crowded spaces. An increase of 2' $0^{\circ} - 3'$ 0° allows for extra room on both the driver and passenger side of the car.

GUIDELINES

Standards for ADA-compliant parking spaces shall be 11' 0" for cars and 13' 0" for vans/trucks.

5' 0" access aisles shall be maintained for both designs.



G. CROSSWALKS

(Feeling safe, feeling calm, feeling private, feeling clear, feeling free)

FROM THE RESEARCH

As crossing streets can be especially stressful for adults with autism, concern for pedestrian safety was widely shared. Ideas for improved standards for crosswalks included a new standard color because color has a major psychological impact on the perception of space. Magenta, used for the "I Need Assistance Symbol," (see page 19) now extends to ASD accessible crosswalks, denoting safety and comfort. The

research indicates that assistive wayfinding including soft directional lighting and implementing an instructive digital voice can also offer comfort, clarity, and safety. The research also suggests that adults with ASD feel more comfortable and less prone to sensory overload when the walking lanes accommodate at least three people comfortably walking side by side.

GUIDELINES

Crosswalks shall be a minimum of 10'0"

Crosswalk color shall be magenta. (Hex Triplet: #FF00FF) Crosswalks shall include assistive wayfinding on the pavement.

Crosswalks shall utilize digital voices to provide instructions and (soft) signaling lights for navigation.



H. LIGHTS

(feeling safe, feeling calm)

FROM THE RESEARCH

Flashing, flickering, and excessively bright lights impact the wellbeing of many adults with autism. The research suggested that purple, blue, or yellow colors are calming for adults with austim. LED or incandescent light bulbs eliminates the flickering or buzzing affect that fluorescent lights possess and provides a more comfortable environment. 1000 lumens are necessary to have full coverage of light throughout the entire outdoor plane.

H. LIGHTS

(feeling safe, feeling calm)

GUIDELINES

LED or incandescent light bulbs shall be a low-noise, low-glare, light yellow color, and be designed in fixtures that properly filter light.

I. I NEED ASSISTANCE SYMBOL

(feeling private, feeling safe, feeling free, feeling clear, feeling connected)



FROM THE RESEARCH

Adults with autism sometimes feel discomfort, anxiety, and/or confusion in (especially unknown) public places. Universally-recognized symbols implemented in public can lessen anxiety, confusion, and stress. Spotting the magenta dot signifies to an adult with autism that someone who is trained/aware of their needs are available to assist them. These dots can also provide assistive printed information in areas where people are not available.

GUIDELINES

The symbol shall be a magenta dot visible from the public right of way.

J. TINY HOMES

(feeling safe, feeling clear, feeling free, feeling private, feeling calm)

FROM THE RESEARCH

For many adults with autism, (much) smaller living space is desirable (and more affordable). While tiny homes have become a trendy concept, they are worth considering. It is quite difficult to integrate tiny homes into high-density development, so an alternative was conceived that could be better incorporated that are similar to micro/studio apartments that are becoming popular in urban areas. A common challenge



is access to transportation. It is recommended that tiny dwellings be no more than a ¹/₄ mile or 5-minute walk from transportation, green space, and medical services for this concept to be most effective. This takes into account limited mobility and the need for quick access in case of emergencies.

GUIDELINES

High-rise building space shall be allocated for "tiny" dwelling units between 300'00" and 400'0" ft².

Space in high-rise buildings shall be allocated for residential use, resembling a hostel with individual living spaces with common areas that provide various functions, including shared kitchens and bathrooms.

Tiny homes in lower density areas can provide affordable housing opportunities.

one COMMON INFRASTRUCTURE

K. MULTI-USE TRAILS

(feeling safe, feeling free, feeling clear, feeling calm)

FROM THE RESEARCH

There is a great need to lessen confusion, anxiety, and stress in the public realm. Wider multi-use trails with separated uses will make it easier for adults with autism because it lessens conflicts and potential collisions.



GUIDELINES

Trails shall be 22'0" wide.

Trails shall be divided into a 10'0" bike lane, 2'0" buffer, and a 10'0" pedestrian lane.

The bike lane shall be divided into two 5'0" sections traveling in opposite directions.

The pedestrian lane shall be divided into two 5'0" sections, one for running, one for walking.

Sections shall be divided using a magenta line.

L. LIVING WITH RETIREES

(feeling safe, feeling free, feeling clear, feeling private, feeling calm)

FROM THE RESEARCH

Living with other individuals increases the feasibility of more independent living for citizens with ASD. A retired person who chooses to assist another person can take many forms including sharing a dwelling unit or living nearby. The research indicated that adults with autsim face significant challenges associated with transportation, so if the "buddy" and the adult with autism do not live together, it is recommended that they live no more than a ¼ mile or 5-minute walk away. Access to transportation and other ASD services should also be within this proximity for a greater sense of privacy, and independence and quick access in case of emergencies.

GUIDELINES

Placement / training / incentive programs shall be established.

M. INTENTIONAL NEIGHBORING

(feeling safe, feeling free, feeling clear, feeling calm, feeling connected)



FROM THE RESEARCH

Intentional neighboring is inviting people to live in a developed community or an integrated network to share their lives. As part of living "intentionally," many neurotypical adults can become mentors/ ambassadors for adults with austism and other vulnerable neighbors.

GUIDELINES

Intentional living communities shall follow the standards set forth in this document.

CONTEXT SPECIFIC

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two **CONTEXT SPECIFIC**



1. DOWNTOWN

- A. SIDEWALKS
- B. STREETS
- C. PARKING LOTS
- D. PICK UP / DROP OFF
- E. WAYFINDING
- F. ACCESSORY DWELLING UNITS
- G. DUPLEX LIVING
- H. INTENTIONAL NEIGHBORING

II. Context-Specific **1. DOWNTOWN**



A. SIDEWALKS

(feeling calm, feeling clear, feeling safe, feeling free, feeling connected)

FROM THE RESEARCH

Crowded sidewalks can cause anxiety for adults with autism. Depending on the physical context, downtown sidewalks can be as wide as 50'0", but standard sidewalks are typically 5'0"-wide. Accommodating three people (instead of two) who can comfortably walk side-by-side can decrease sensory overload caused by over-crowding on standard sidewalks. The resulting sidewalk design includes a marking in the middle



of the sidewalk designating two sections to increase comfort. Research also shows a midbody height barrier between the walkable path and the road would help adults with autism feel less overwhelmed by cars and other activity taking place in the road.

GUIDELINES

Sidewalks shall be 13' 0" wide.

The walking section shall be 8' 0".

There shall be a magenta thermoplastic strip down the center of the walking section.

There shall be a barrier between the walkable path and the road 3'0" high maximum and 1'0" wide maximum.

There shall be a 4'0" wide planting strip between the barrier and the street curb.

B. STREETS

(feeling calm, feeling safe, feeling clear, feeling free, feeling connected)

FROM THE RESEARCH

Many adults with autism have concerns about accessibility. Downtown street design directly impacts their ability to move around. Multi-modal street design on campuses can increase accessibility and safety, especially those who are unable or unwilling to drive. The research shows that narrower travel lanes typically lead to slower traveling speeds which in

turn lowers pedestrian anxiety. Suggested design includes separated bike lanes and (soft) glowin-the-dark green paint to increase visibility, and landscaped buffers which satisfy the Six Feelings Framework that resulted from the research.

GUIDELINES

Streets through downtowns shall be multi-modal in design.

Drive lanes shall be 10'0" wide.

Streets shall include a 5'0" (minimum width) bike lanes traveling in each direction separated by a 2'0"-3'0" wide buffer.

Bike lanes shall be painted green using (soft) glow-in-the-dark paint.





C. PARKING LOTS

(feeling safe, feeling calm, feeling clear, feeling connected)

FROM THE RESEARCH

Downtown parking lots can be challenging for drivers and pedestrians. Creating a color/symbol coded system that shows exactly where cars will be driving and where is safe to walk will help adults with autism navigate a downtown parking lot. The idea for a circular pick-up/drop-off zone was gleaned from the need for safety and clarity. (See Appendix Page 142.) The minimum of 25'0" radius design idea was based on the average length of a car so that a car can be parked along the sidewalk to allow other cars to pass.

GUIDELINES

Parking lots shall connect parking spots to a destination using sidewalks.

The crosswalk shall further protect pedestrians from automobiles with speed bumps and signs for yielding or stopping.

Parking spaces shall be separated into clearly-identifiable, marked sections.

Wayfinding from the destination shall include visual directions on the sidewalk to parking sections.

If a pick-off/drop-off location is needed, its radius shall be 25'0" minimum.

The width of the street shall be 24'0" divided into 12'0" lanes.

D. PICK UP / DROP OFF

(feeling free, feeling safe, feeling clear, feeling calm, feeling connected)

FROM THE RESEARCH

Many adults with autism do not drive to or within downtowns and many rely on others to offer automobile rides to and from destinations. Downtown blocks often have bus stops and on-street parking, but an idea for a designated area for passenger pick up/drop off was gleaned from research. Since adults with autism often have difficulty navigating through overwhelming or crowded spaces, areas for picking passengers



up and dropping passengers off can lessen anxiety. Public-private implementation ideas included companies sponsoring pick up / drop off areas, working with transit agencies to prohibit bus stops in the zones and syncing bus stops to take advantage of limited space, surveying businesses within the proximity of the area for input on the percentage of space that would be appropriate for the area. The suggested design includes selected areas on selected city blocks could be designated pick up /drop off areas.

GUIDELINES

A minimum of 20% of the street front on selected blocks shall be designated for pick-up and drop-off purposes.

E. WAYFINDING

(feeling connected, feeling safe, feeling clear, feeling free)



FROM THE RESEARCH

Adults with autism are prone to becoming overwhelmed when trying to navigate busy areas such as downtown areas. The research expressed a desire for a specially-designed wayfinding system to provide clear directions on the sidewalks.

GUIDELINES

There shall be directions, including directional symbols, place names/destinations/landmarks, and instructional copy on all types of walking infrastructure indicating upcoming roads, nearby attractions, bus stops, and bike lanes.

Vertical signs shall use interactive maps to accompany the sidewalk wayfinding system.

F. ACCESSORY DWELLING UNITS (ADUs)

(feeling private, feeling free, feeling connected)

FROM THE RESEARCH

There was support for accessory dwelling units to enhance the relative autonomy of citizens with highfunctioning autism. Affordability is important. ADUs can increase the local housing supply and provide more affordable housing options. The research also points to a desire for direct control of the sound and temperature of living environments.

GUIDELINES

Interior accessory dwelling units (ADUs) shall be legal in downtown zones.

Downtown ADUs are appropriate in the attic, basement, or other inward facing room of the existing building. Occupants of accessory dwelling units shall have direct access to heating and cooling systems. All new walls, floors, or ceilings constructed to separate units shall comply with sound insulation requirements

for unit separations in new buildings.



II. Context-Specific 1. DOWNTOWN



G. DUPLEX LIVING

(feeling free, feeling private, feeling calm, feeling safe, feeling connected)

FROM THE RESEARCH

Caretaking/mentoring adults with autism is a possibility in duplex homes, matching adults with autism to neurotypical adults. Ideas for programs included "neighbor pairing" where subsidized rent would be available for the caretaker/mentor to incentivize people to take specific training. As adults with autism are sensitive to noise, it was determined that downtown duplex living would work best in top residential units since they are less likely affected by street noise and other residents. Higher units also provide a separation from the outside world giving it a sense of safety, important to adults with autism. Visible access to the road from the safety of home can familiarize the tenant with the streetscape and make them more comfortable with the area.

GUIDELINES

An organized pairing system program shall link adults with autism to veterans who are looking for housing. Soundproof walls shall divide the home into two separate units.

The residential unit shall include a variety of high and low lights outside to allow for the appropriate visibility. Lights must not give off sound.

Native, low maintenance plants shall be incorporated around the building, and will help minimize outdoor sound. Mailboxes shall be located as close together as possible to allow both residents to interact regularly.

H. INTENTIONAL NEIGHBORING

(feeing safe, feeling free, feeling clear, feeling calm, feeling connected)

FROM THE RESEARCH

Downtown intentional neighboring is inviting people to live in a developed community or an integrated network to share their lives. As part of living "intentionally," many neurotypical adults can become mentors/ ambassadors for adults with austism and other vulnerable neighbors.

GUIDELINES

Intentional living communities shall follow the design standards set forth in this document.

two **CONTEXT SPECIFIC**



2. URBAN

- A. SIDEWALKS
- B. STREETS
- C. PARKING LOTS
- D. PICK UP / DROP OFF
- E. WAYFINDING
- F. ACCESSORY DWELLING UNITS
- G. DUPLEX LIVING
- H. INTENTIONAL NEIGHBORING

II. Context-Specific **2. URBAN**



A. SIDEWALKS

(feeling calm, feeling clear, feeling safe, feeling free, feeling connected)

FROM THE RESEARCH

Crowded sidewalks can cause anxiety for adults with autism. Depending on the physical context, sidewalks in urban neighborhoods can be 20+ feet-wide, but standard sidewalks are typically 5'0" wide. Accommodating three people (instead of two) who can comfortably walk side-by-side can decrease sensory overload caused by over-crowding on standard sidewalks. The resulting sidewalk design



includes a marking in the middle of the sidewalk designating two sections to increase comfort. Research also shows a mid-body height barrier between the walkable path and the road would help adults with autism feel less overwhelmed by cars and other activity taking place in the road.

GUIDELINES

Sidewalks shall be 13' 0" wide.

The walking section shall be 8' 0".

There shall be a magenta thermoplastic strip down the center of the walking section.

There shall be a barrier between the walkable path and the road 3'0" high maximum and 1'0" wide maximum.

There shall be a 4'0" wide planting strip between the barrier and the street curb.

B. STREETS

(feeling safe, feeling clear, feeling free, feeling connected)

FROM THE RESEARCH

Many adults with autism have concerns about accessibility. Urban street design directly impacts their ability to move around. Multi-modal street design on campuses can increase accessibility and safety,

especially those who are unable or unwilling to drive. The research shows that narrower travel lanes typically lead to slower traveling speeds which in turn lowers pedestrian anxiety. Suggested design includes separated bike lanes and (soft) glow-inthe-dark green paint which will increase visibility, and landscaped buffers to satisfy the Six Feelings Framework that resulted from the research.

GUIDELINES

Streets shall be multi-modal.

Drive lanes shall be 10'0" wide.

Streets shall include a 5'0" (minimum width) bike lanes traveling in each direction separated by a 2'0"-3'0" wide buffer.

Bike lanes shall be painted green using (soft) glow-inthe-dark paint.





2. URBAN



C. PARKING LOTS

(feeling safe, feeling calm, feeling clear, feeling connected)

FROM THE RESEARCH

Parking lots in urban neighborhoods can be challenging for drivers and pedestrians. Creating a color/ symbol coded system that shows exactly where cars will be driving and where is safe to walk will help adults with autism navigate a downtown parking lot. The idea for a circular pick-up/drop-off zone was gleaned from the need for safety and clarity. (See Appendix Page 142.) The minimum of 25'0" radius design idea was based on the average length of a car so that a car can be parked along the sidewalk to allow other cars to pass.



GUIDELINES

Parking lots shall connect parking spots to a destination using sidewalks.

The crosswalk shall further protect pedestrians from automobiles with speed bumps and signs for yielding or stopping.

Parking spaces shall be separated into clearlyidentifiable, marked sections.

Wayfinding from the destination shall include visual directions on the sidewalk to parking sections.

If a pick-off/drop-off location is needed, its radius shall be 25'0" minimum.

The width of the street shall be 24'0" divided into 12'0" lanes.

D. PICK UP / DROP OFF

(feeling safe, feeling clear, feeling free, feeling connected)

FROM THE RESEARCH

Many adults with autism do not drive to or within urban neighborhoods and many rely on people offering automobile rides to and from destinations. Urban neighborhoods blocks often have bus stops and onstreet parking, but an idea for a designated area for passenger pick up/drop off was gleaned from research. Since adults with autism often have difficulty navigating through overwhelming or crowded spaces,

areas for picking passengers up and dropping passengers off can lessen anxiety. Public-private implementation ideas included companies sponsoring pick up / drop off areas, working with transit agencies to prohibit bus stop in the zones and syncing bus stops to take advantage of limited space, surveying businesses within the proximity of the area for input on the percentage of space that would be appropriate for the area. The suggested design includes selected areas on selected city blocks could be designated pick up /drop off areas.

GUIDELINES

A minimum of 20% of the street front on selected blocks shall be designated for pick-up and drop-off purposes.



E. WAYFINDING

(feeling safe, feeling clear, feeling free, feeling connected)

FROM THE RESEARCH

Adults with autism are prone to becoming overwhelmed when trying to navigate busy areas such as urban neighborhoods. The research expressed a desire for a specially-designed wayfinding system to provide clear directions on the sidewalks.

GUIDELINES

There shall be directions, including directional symbols, place names/destinations/landmarks, and instructional copy on all types of walking infrastructure indicating upcoming roads, nearby attractions, bus stops, and bike lanes.

Vertical signs shall use interactive maps to accompany the sidewalk wayfinding system.

F. ACCESSORY DWELLING UNITS

(feeling safe, feeling private, feeling clear, feeling free, feeling connected)

FROM THE RESEARCH

There was support for accessory dwelling units to enhance the relative autonomy of citizens with highfunctioning autism. Affordability is important. ADUs can increase the local housing supply and provide more affordable housing options. The research also points to a desire for direct control of the sound and temperature of living environments.

F. ACCESSORY DWELLING UNITS

(feeling safe, feeling private, feeling clear, feeling free, feeling connected)

GUIDELINES

Interior accessory dwelling units (ADUs) shall be legal in urban neighborhoods.

Downtown ADUs are appropriate in the attic, basement, or other inward facing room of the existing building. Occupants of accessory dwelling units shall have direct access to heating and cooling systems. All new walls, floors, or ceilings constructed to separate units shall comply with sound insulation requirements for unit separations in new buildings.

G. DUPLEX LIVNG

(feeling safe, feeling clear, feeling free, feeling connected)

FROM THE RESEARCH

Caretaking/mentoring adults with autism is a possibility in duplex homes, matching adults with autism to neurotypical adults. Ideas for programs included "neighbor pairing" where subsidized rent would be available for the caretaker/mentor to incentivize people to take specific training. As adults with autism are sensitive to noise, it was determined that duplex living in urban neighborhoods would work best in top residential units since they are less likely affected by street noise and other residents. Higher units also provide a separation from the outside world giving it a sense of safety, important to adults with autism. Visible access to the road from the safety of home can familiarize the tenant with the streetscape and make them more comfortable with the area.

GUIDELINES

An organized pairing system program shall link adults with autism to retirees and/or veterans who are looking for housing.

Soundproof walls shall divide the home into two separate units.

The residential unit shall include a variety of high and low lights outside to allow for the appropriate visibility. Lights must not give off sound.

H. INTENTIONAL NEIGHBORING

(feeling safe, feeling clear, feeling free, feeling connected)

FROM THE RESEARCH

Intentional neighboring in urban neighborhoods invites people to live in a developed community or an integrated network to share their lives. As part of living "intentionally," many neurotypical adults will become mentors/ambassadors for adults with austism and other vulnerable neighbors.

GUIDELINES

Intentional living communities shall follow the design standards set forth in this document.

two **CONTEXT SPECIFIC**



3. SUBURBAN

- A. STREETS
- B. WAYFINDING
- C. ACCESSORY DWELLING UNITS
- D. DUPLEX LIVING
- E. TINY HOMES

II. Context-Specific 3. SUBURBAN



A. STREETS

(feeling safe, feeling clear, feeling calm, feeling connected)

FROM THE RESEARCH

While suburban streets are not ordinarily multi-modal, a new suburban multimodal street design has the potential to increase accessibility and safety, especially for those unable or unwilling to drive. To provide a feeling of safety and to lessen anxiety, narrower travel lanes can encourage slower automobile



speeds. Separated bike lanes may encourage more adults with autism to become cyclists. Soft glow-in-the-dark green bike lane paint can increase visibility providing more safety and clarity for adults with adults with autism. Landscaped buffers will also increase safety and improve the aesthetics of the streetscape.

GUIDELINES

Streets shall be multimodal. Bike lanes shall be on one side of the street, with one lane traveling in each direction. Bike lanes shall be separated from drive lanes with an 8'0" wide parking lane in between. Automobile lanes shall be no more than 10'0" wide. Bike lanes shall be painted green using (soft) glow-inthe-dark paint.

B. WAYFINDING

(feeling safe, feeling clear, feeling free, feeling connected)

FROM THE RESEARCH

Adults with autism are prone to becoming overwhelmed when attempting to navigate suburban communities. The research expressed a desire for a specially-designed wayfinding system to provide clear directions on the sidewalks and other pedestrian paths.

GUIDELINES

There shall be directions, including directional symbols, place names/destinations/landmarks, and instructional copy on all types of walking infrastructure indicating directions to the various transportation options and nearby attractions.

Vertical signs shall use interactive maps to accompany the sidewalk wayfinding system.

C. ACCESSORY DWELLING UNITS

(feeling safe, feeling clear, feeling free, feeling connected, feeling private)

FROM THE RESEARCH

There was support for accessory dwelling units to enhance the relative autonomy of citizens with high-



functioning autism. Affordability is important. ADUs can increase the local housing supply and provide more affordable housing options. The research also points to a desire for direct control of the sound and temperature of living environments. Suburban communities (with side yards and backyards) are easily suited to accommodate ADUs.

GUIDELINES

There shall be directions, including directional symbols, place names/destinations/landmarks, and instructional copy on all types of walking infrastructure indicating directions to the various transportation options and nearby attractions. Vertical signs shall use interactive maps to

accompany the sidewalk wayfinding system.



D. DUPLEX LIVING

(feeling safe, feeling clear, feeling free, feeling connected, feeling private)

FROM THE RESEARCH

Caretaking/mentoring adults with autism is a possibility in duplex homes, matching adults with autism to neurotypical adults. Ideas for programs included "neighbor pairing" where subsidized rent would be



available for the caretaker/mentor to incentivize people to take specific training. Many suburban communities already accommodate double/ connected residential structures.

GUIDELINES

An organized pairing system program shall link adults with autism to veterans who are looking for housing.

Soundproof walls shall divide the home into two separate units.

Native, low maintenance plants shall be incorporated around the building, and will help minimize outdoor sound.


two **CONTEXT SPECIFIC**



4. MULTIMODAL HUB

A. SIDEWALKSB. WAYFINDINGC. BUS STOPS

II. Context-Specific 4. MULTIMODAL HUB



A. SIDEWALKS

(feeling calm, feeling clear, feeling safe, feeling free, feeling connected)

FROM THE RESEARCH

Transportation hubs connecting buses or trains, automobiles, and bicycles must properly accommodate pedestrians, including adults with autism. While sidewalk dimensions will vary based on geographic context, standard sidewalks can accommodate two-people with a standard width of 5'0". The research shows a sidewalk accommodating three people walking side-by-side comfortably will decrease sensory overload caused by over-crowding. Multimodal hubs will require much wider sidewalk widths. Research shows a strip down the middle of the walkable path designating two sections has the potential to increase



comfort. Research suggests implementing a mid- body height barrier between the walkable path and the road would help adults with autistic feel less overwhelmed by cars and other activity taking place in the road, as well as vegetative buffers.

GUIDELINES

Multimodal standard sidewalk dimensions shall be 13' 0" wide.

The walkable path shall be 8' 0". There shall be a magenta thermoplastic strip down the center of the walkable path. There shall be a barrier between the walkable path and the road 3'0" high maximum and 1'0" wide maximum. There shall be a planting strip between the barrier and the curb 4'0" wide, minimum.

II. Context-Specific 4. MULTIMODAL



B. WAYFINDING

(feeling safe, feeling clear, feeling free, feeling connected)

FROM THE RESEARCH

Adults with autism are prone to becoming overwhelmed when trying to navigate busy areas. Multimodal nodes can be particularly confusing to pedestrians, and especially to adults with autism. The research expressed a desire for a specially-designed wayfinding system to provide clear directions on the sidewalks and other pedestrian paths.

GUIDELINES

There shall be directions, including directional symbols, place names/destinations/landmarks, and instructional copy on all types of walking infrastructure indicating directions to the various transportation options and nearby attractions.

Vertical signs shall use interactive maps to accompany the sidewalk wayfinding system.

C. BUS STOPS

(feeling safe, feeling free, feeling clear, feeling connected, feeling calm)

FROM THE RESEARCH

Multimodal bus stops will likely be particularly crowded and have the potential to cause anxiety and stress. Large bus stop designs are necessary in multimodal hubs to provide ample seating for waiting travelers.

Shelters are especially important for adults with autism. Research indicates that confusion and anxiety associated with transportation may be alleviated by providing a digital help and display board in which passengers can see arrival times, route information, and call for assistance if needed.

GUIDELINES

Bus stops shall be 12'0" to provide maximum space for travelers.

Bus stops shall be covered and provide comfortable seating.

Bus stops shall be equipped with an interactive digital help and route display board.

The interactive help and route display board shall feature a function that indicates that a passenger is waiting on a particular approaching bus.



two **CONTEXT SPECIFIC**



5. RETAIL

- A. SIDEWALKSB. STREETS
- C. PARKING LOTS

II. Context-Specific **5. RETAIL**



A. SIDEWALKS

(feeling calm, feeling safe, feeling clear, feeling connected)

FROM THE RESEARCH

Retail centers and establishments would benefit from wider sidewalks, but sidewalks there often conform to the standard 5'0" width. The research shows a sidewalk accommodating three people walking side by



side comfortably can decrease sensory overload caused by crowding. Research also shows a midbody height barrier between the walkable path and a street or parking lot would help adults with autism feel less overwhelmed by cars in adjacent parking lot or street. This barrier shall be no wider than 2' 0", so as not to hinder or create a hazard.

GUIDELINES

From the front of the retail building to the back of curb shall be 12'0" in width.

The walkable path shall be at least 8' 0" wide. There shall be a barrier 2' 0" wide maximum and 3' 0" tall maximum on either side of the walkable path. This barrier shall be either a bollard or a planter.



B. STREETS

(feeling safe, feeling clear, feeling connected, feeling calm)

FROM THE RESEARCH

Research shows that there are general concerns about accessibility, clarity, and safety on streets. Making all retail streets multi-modal can increase accessibility and safety, especially for adults with autism who do not drive. Narrower travel lanes typically lead to slower speeds which can increase safety and lower

anxiety for pedestrians. Bike lanes can offer other options for travel for adults with autism and a (soft) glow-in-the-dark green paint can increase visibility.

GUIDELINES

Streets traveling through commercial land uses shall be multi-modal.

Directly in front of stores shall be bike lanes in each direction, no less than 4'0" wide, each.

Bike lanes shall be painted a (soft) green using glow-in-the-dark paint and shall be separated by 1'0"- wide white, reflective lines from the drive lanes.

Drive lanes shall be no more than 10'0" wide.



C. PARKING LOTS

(feeling safe, feeling calm, feeling clear, feeling connected)

FROM THE RESEARCH

Parking lots are important in many community's retail establishments and centers, but parking and dropping off passengers in shopping areas can be challenging for adults with autism whether they are driving or being dropped off. Creating a color/symbol coded system that shows exactly where cars will be driving and where is safe to walk will help adults with autism navigate a retail environment. The idea for a circular pick-up/drop-off zone was gleaned from the need for safety and clarity. (See Appendix Page 118.) The minimum of 25'0" radius design idea was based on the average length of a car so that a car can be parked along the sidewalk to allow other cars to pass.

GUIDELINES

Parking lots shall connect parking spots to a destination using sidewalks.

The crosswalk shall further protect pedestrians from automobiles with speed bumps and signs for yielding or stopping.

Parking spaces shall be separated into clearlyidentifiable, marked sections.

Wayfinding from the destination shall include visual directions on the sidewalk to parking sections.

If a pick-off/drop-off location is needed, its radius shall be 25'0" minimum.

The width of the street shall be 24'0" divided into 12'0" lanes.





two **CONTEXT SPECIFIC**



6. CAMPUS

- A. PARKING LOTS
- B. SIDEWALKS
- C. STREETS
- D. WAYFINDING
- E. PICK UP / DROP OFF

II. Context-Specific 6. CAMPUS



A. PARKING LOTS

(feeling safe, feeling calm, feeling clear, feeling connected)

FROM THE RESEARCH

Arriving and leaving educational, office, or medical campuses can be challenging. Concerns about safety and wayfinding in parking lots are widely shared. Creating a color/symbol coded system that shows exactly where cars will be driving and where is safe to walk will help adults with autism navigate a parking lot. The idea for a circular pick-up/drop-off zone was gleaned from the need for safety and clarity. (See Appendix Page 142.) The minimum of 25'0" radius dimension idea was based on the average length of a car so that a car can be parked along the sidewalk to allow other cars to pass.

GUIDELINES

Parking lots shall connect parking spots to a destination using sidewalks.

The crosswalk shall further protect pedestrians from automobiles with speed bumps and signs for yielding or stopping.

Parking spaces shall be separated into clearly-identifiable, marked sections.

Wayfinding from the destination shall include visual directions on the sidewalk to parking sections.

If a pick-off/drop-off location is needed, its radius shall be 25'0" minimum.

The width of the street shall be 24'0" divided into 12'0" lanes.

B. SIDEWALKS

(feeling free, feeling calm, feeling safe, feeling clear, feeling connected)

FROM THE RESEARCH

Pedestrian activity on campuses can often be crowded and frenetic. A new standard for sidewalks that accommodate three people walking comfortably side-by-side will decrease sensory overload caused



by over-crowding. 5'0" is the usual minimum for a 2-person sidewalk. The research determined a mid-body height barrier between the walkable path and the road will assist adults with autism to feel less overwhelmed by nearby cars and other distractions that occur near streets. Adults with autism often have diverse sets of motor impairments and properly-implemented barriers will benefit.

GUIDELINES

From the front of building to the edge of curb the sidewalk shall be 12' 0" in width.

The walking path shall be 8' 0" wide.

There shall be a barrier 2' 0" wide maximum and 3' 0" tall maximum on either side of the walkable path. The barrier shall be either a bollard or a planter.

C. STREETS

(feeling calm, feeling safe, feeling clear, feeling calm, feeling connected)

FROM THE RESEARCH

Adults with autism have concerns about how accessibility and street design directly impacts their ability to move around. Multi-modal street design on campuses can increase accessibility and safety, especially those who are unable or unwilling to drive. The research shows that narrower travel lanes typically lead



to slower traveling speeds which in turn lowers pedestrian anxiety. Suggested design includes separated bike lanes and the (soft) glow-inthe-dark green paint will increase visibility, and landscaped buffers which satisfy the Six Feelings Framework that resulted from the research.

GUIDELINES

Streets through educational institutions shall be multi-modal.

Drive lanes shall be 10'0" wide.

Streets shall include a 5'0" (minimum width) bike lanes traveling in each direction separated by a 2'0"-3'0" wide buffer.

Bike lanes shall be painted green using (soft) glow-in-the-dark paint.

D. WAYFINDING

(feeling safe, feeling clear, feeling free, feeling calm, feeling connected)

FROM THE RESEARCH

Adults with autism are prone to becoming overwhelmed when trying to navigate busy areas such as campuses. The research expressed a desire for a specially-designed wayfinding system to provide clear directions on the sidewalks.

GUIDELINES

There shall be directions, including directional symbols, place names/destinations/landmarks, and instructional copy on all types of walking infrastructure indicating upcoming roads, nearby attractions, bus stops, and bike lanes.

Vertical signs shall use interactive maps to accompany the sidewalk wayfinding system.

E. PICK UP/ DROP OFF LOCATION

(feeling safe, feeling clear, feeling calm, feeling free, feeling connected)

FROM THE RESEARCH

Many adults with autism do not drive, and many rely on people offering automobile rides to schools, work, and medical campuses. A designated area for designated pick up/drop off areas provides easy access and quick/efficient drop off function can benefit passengers and drivers. Since adults with autism often have difficulty navigating through overwhelming or crowded spaces, particularly on campuses, areas for picking passengers up and dropping passengers off can lessen anxiety. The suggested design pushes people who park away from the designated area around a destination which alleviates crowding. Color-coding auto-waiting areas can simplify communication between drivers and passengers.

GUIDELINES

The entrance and exit to the designated parking area shall be clearly separated.

Drivers dropping off or picking up passengers will

be guided toward the building's entrance.

Drivers not picking up or dropping off passengers shall be directed away from the entrance.

The design shall have a moving lane and an idling (temporary waiting) lane.

The idling lane shall be magenta (green and yellow for additional lanes) and located adjacent to the sidewalk for pick-up and drop-off.

Speed bumps must be constructed across both lanes.

A shelter near the idling lane, using the bus stop designs shall also be included.

A separate space/lot shall allow for cars to park out of the way if they will be there for an extended period time.



two **CONTEXT SPECIFIC**



7. PARK ACCESS

- A. SIDEWALKS
- B. STREETS
- C. PARKING LOTS

II. Context-Specific 7. PARK ACCESS

A. SIDEWALKS

(feeling free, feeling calm, feeling clear, feeling connected)

FROM THE RESEARCH

Sidewalks in and around parks must consider the needs of adults with autism. A new standard for sidewalks that accommodate three people walking comfortably side-by-side will decrease sensory overload caused by over-crowding and work well in parks. 5'0" is the usual minimum for a 2-person sidewalk. The research determined a mid-body height barrier between the walkable path and the road will assist adults with



autism to feel less overwhelmed by nearby cars and other distractions that occur near streets. Adults with autism often have diverse sets of motor impairments and properly-implemented barriers will benefit.

GUIDELINES

From the front of building to the edge of curb the sidewalk shall be 12' 0" in width.

The walking path shall be 8' 0" wide.

There shall be a barrier 2' 0" wide maximum and 3' 0" tall maximum on either side of the walkable path.

The barrier shall be either a bollard or a planter.

B. STREETS

(feeling safe, feeling clear, feeling free, feeling connected, feeling calm)

FROM THE RESEARCH

Research shows that there are concerns about independence in travel, navigable, safe, and accessible infrastructure near parks. Making all roads multi-modal in design increases accessibility and safety for all, especially those unable or unwilling to drive. Narrower travel lanes typically lead to slower traveling speeds, which increases safety and lowers anxiety in the pedestrian experience. Separated bike lanes allow for easy travel, and the (soft) glow-in-the-dark green paint will increase visibility at all times of the

day. Landscape buffers increase safety and lower anxiety.

GUIDELINES

Streets traveling through parkland shall be multimodal, accommodating more than automobiles. Drive lanes shall be no more than 10'0" wide. Bike lanes shall be a minimum of 5'0" wide in both directions.

The bike lanes shall be separated from the street by a landscaped buffer at least 3'0" in width. Bike lanes shall accompany adjacent sidewalks that are separated by a 2'0"-wide landscaped buffer. Bike lanes shall be painted with (soft) glow-in-thedark green paint.



II. Context-Specific 7. PARK ACCESS



C. PARKING LOTS

(feeling safe, feeling clear, feeling free, feeling connected, feeling calm)

FROM THE RESEARCH

Parking and dropping off passengers in parks can be challenging for adults with autism whether they are driving or being dropped off. Creating a color/symbol coded system that shows exactly where cars will be driving and where is safe to walk will help adults with autism navigate a downtown parking lot. The idea for a circular pick-up/drop-off zone was gleaned from the need for safety and clarity. (See Appendix Page

142.) The minimum of 25'0" radius design idea was based on the average length of a car so that a car can be parked along the sidewalk to allow other cars to pass.

GUIDELINES

Parking lots shall connect parking spots to a destination using sidewalks.

The crosswalk shall further protect pedestrians from automobiles with speed bumps and signs for yielding or stopping.

Parking spaces shall be separated into clearly-identifiable, marked sections.

Wayfinding from the destination shall include visual directions on the sidewalk to parking sections.

If a pick-off/drop-off location is needed, its radius shall be 25'0" minimum.

The width of the street shall be 24'0" divided into 12'0" lanes.



APPENDIX

AUTISM PLANNING AND DESIGN GUIDELINES 1.0

Attempt 1.0 August 2017 - June 2018

THE OHIO STATE UNIVERSITY CITY AND REGIONAL PLANNING STUDENTS

three **APPENDIX**

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III. Appendix 1. RESEARCH PROTOCOL

I. Objectives

People with autism have particular needs that most professionals (such as city planners who plan and design communities) haven't yet considered, even as autism has become increasingly prevalent in our society. Autism Spectrum Disorder (ASD) affects millions in the United States, including families and friends of people with ASD. Community planners can learn to improve the lives of people with autism by first understanding Autism Spectrum Disorder and why education about ASD is needed to properly serve their needs. This research seeks to broaden required public participation to understand the needs of adults with high-functioning Autism Spectrum Disorder. Our research is specific to city planning and fills a gap between community building and urban design and the rich literature and research found in public health (especially mental health), psychology, and special education.

This research seeks to discover how and what kinds of new planning ideas and tools can create quality living environments for adults with autism.

Beyond existing literature, this research will employ focus groups. Focus group questions for individuals with high-functioning ASD (we will refer to high-functioning ASD as "autism" from this point forward with the understanding that the research is based on meeting the needs of high-functioning adults with autism). We will determine what kind of community they want to live in and how planners can help them thrive in the public realm. The research will also include a design charrette to help discover day-to-day living experiences of adults with autism. Beyond the focus group study, we will examine existing planning tools such as zoning codes, methods such as design guidelines, and civic (and private) infrastructure that might better serve adults with autism.

Our main research question is how adults with autism can inform planners about the issue of inclusive built environments.

II. Background and Rationale

City planners are professionals who attempt to comprehensively shape the built environment. Through a variety of tools, the most central of which is the legally-binding zoning ordinance, planners control where and what kinds of buildings will be built, where nature will be preserved, and what transportation systems will be used. City planning is a vast and multi-disciplinary field.

The 1960s witnessed the beginning of a sustained pushback against what many citizens viewed as heavy-handed urban planning interventions, which had often impacted the most vulnerable segments of the population. Jane Jacobs led a grassroots fight against Robert Moses, a transportation planner who sought to demolish New York City's thenimpoverished SoHo neighborhood to build a freeway. ¹ Thousands of low income citizens of St. Louis, MO, were evicted via eminent domain and relocated into the Pruitt-Igoe public housing towers in 1954. The project failed dramatically and the buildings were demolished less than 20 years later.² These landmark events marked a broader turn in the profession towards greater inclusion of all members of the public, preferably as early on in the planning process as possible. A branch of the field, advocacy planning, is focused on proactively bringing marginalized groups (often defined in racial, cultural, and economic terms) into the process.³ The universal design movement of the 1980s, led by architect Ronald Mace, aimed at better accommodating people with mobility impairments and/or people with disabilities (especially the mobility-, hearing-, and vision-impaired) and led to the Americans with Disabilities Act of 1990 and an expansion of the Fair Housing Act of 1968 to include the disabled.⁴

It is in this tradition that we seek, through our focus group and design charrette research, to better understand how young adults with autism spectrum disorder (ASD) experience the built environment in order to inform the planning profession. Our preliminary discussions with Dr. Emilio Amigo, clinical psychologist at Amigo Family Counseling, LLC, have indicated that many adults with autism "fall off the cliff," as they age out of childhood support programs while continuing to lack the skills for independent living.⁵⁶ Of adults with autism between the age of 21 to 25, less than 17% have ever lived independently.⁷ Only 16% of young adults with autism are employed full-time, according to research by the National Autistic

¹ Jacobs, J. (1961). The Death and Life of Great American Cities (1st ed.). New York: Random House.

² Goetz, E. G. (2013). New Deal Ruins: Race, Economic Justice, and Public Housing Policy. New York: Cornell University Press.

³ Checkoway, B. (1994). Paul Davidoff and Advocacy Planning in Retrospect. Journal of the American Planning Association. 60(2), 139-143.

⁴ Preiser, W. F., & Smith, Korydon H. (2011). (2nd ed.). Universal Design Handbook. New York: McGraw-Hill.

⁵ Amigo Family Counseling, LLC. (2017). Home page. http://amigofamilycounseling.com.

⁶ Amigo, Dr. Emilio. (2017, October 17). Office meeting with Professor Kyle Ezell.

⁷ Anderson, K. A. (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), 562-570.

Society of Wales.⁸ Automobile drivers with ASD report lower driving abilities and more accidents and citations.⁹ Research has shown that the parents of children with autism are more prone to mental health issues as a result of caregiving and the burdens that entails.¹⁰ Parents report significant unmet needs¹¹, and the caregiving burden is associated with a pessimistic outlook in mothers.¹² We do not assume that independence, a culturally-prescriptive concept, is what adults with high-functioning autism want or need. A preliminary investigation from the literature makes it clear, however, that many of them and their families' daily challenges concern housing, transportation, and the general built environment, all of which are major topics that fall within the urban planning domain. Our research may allow us to formulate recommendations for use by planning professionals, elected officials, real estate developers, and others who wish to better accommodate adults with autism.

The following challenges may not all be present in all individuals with autism, but they indicate the scope of what must be considered when making planning decisions. Studies show that people with autism are more prone to stress¹³, anxiety, and sensory overload.¹⁴ This overload is thought to be rooted, in part, in a more intense cognitive processing of sound stimuli.¹⁵ Individuals with autism suffer from higher rates of sleep problems, related to these auditory issues.¹⁶ Light intensity and noise were shown to disproportionately adversely affect the learning of children with autism.¹⁷ There is a host of other psychological issues associated with the disorder: social anxiety, agoraphobia, attention deficits, obsessive behaviors, forgetting consequential tasks, and depression.¹⁸

Our questioning may allow us to obtain useful qualitative information regarding, for example, when, where, and how the built environment serves as a provoking nuisance to adults with autism. Our role as planners is to translate and extend such principles into planning policy and offer necessary remedies where possible.

There is a century-long precedent of sensory nuisances providing legal and practical justification for zoning restrictions, e.g. requiring that a noisy factory locate hundreds of yards from any residential buildings.¹⁹ This precedent,

11 Brown, H., Ouellette-Kuntz, H., Hunter, D., Kelley, E., Cobigo, V., & Lam, M. (2011). Beyond an Autism Diagnosis: Children's Functional Independence and Parents' Unmet Needs. Journal of Autism & Developmental Disorders, 41(10), 1291-1302. doi:10.1007/s10803-010-1148-y.

⁸ Lever, M. (2016). Too Much Information: The Autism Employment Gap (Rep.). National Autistic Society.

⁹ Daly, B. P. (2014). Driving Behaviors in Adults with Autism Spectrum Disorders. Journal of Autism and Developmental Disorders, 44(12), 3119-3128.

¹⁰ T. G., R., & Ting, M. (2015). Depression and Anxiety among Parents with Autistic Children. Journal Of Psychosocial Research, 10(2), 385-391.

¹² Ling-Yi, L. (2011). Factors Associated with Caregiving Burden and Maternal Pessimism in Mothers of Adolescents with an Autism Spectrum Disorder in Taiwan. Occupational Therapy International, 18(2), 96-105. doi:10.1002/oti.305.

¹³ Kanakri, S. M., Shepley, M., Varni, J. W., & Tassinary, L. G. (2017). Noise and Autism Spectrum Disorder in Children: An Exploratory Survey. Research In Developmental Disabilities, 6385-94. doi:10.1016/j.ridd.2017.02.004.

¹⁴ Remington, A., & Fairnie, J. (2017). A Sound Advantage: Increased Auditory Capacity in Autism. Cognition, 166459-465. doi:10.1016/j.cognition.2017.04.002.

¹⁵ Remington, A., & Fairnie, J. (2017). A Sound Advantage: Increased Auditory Capacity in Autism. Cognition, 166459-465. doi:10.1016/j.cognition.2017.04.002.

¹⁶ Richdale, A. L., & Schreck, K. A. (January 01, 2009). Sleep Problems in Autism Spectrum Disorders: Prevalence, Nature, & Possible Biopsychosocial Aetiologies. Sleep Medicine Reviews, 13(6), 403-411.

¹⁷ Menzinger, B., & Jackson, R. (2009). The Effect of Light Intensity and Noise on the Classroom Behavior of Pupils with Asperger Syndrome. Support for Learning, 24(4).

¹⁸ Simonoff, E., Pickles, A., Charman, T., Chandler, S., Loucas, T., & Baird, G. (2008). Psychiatric Disorders in Children with Autism Spectrum Disorders: Prevalence, Comorbidity, and Associated Factors in a Population-derived Sample. Journal of the American Academy of Child & Adolescent Psychiatry, 47(8), 921-929.

¹⁹ Hadacheck v. Sebastian (December 20, 1915).

especially when taken with the "reasonable accommodation" requirement of the 1973 Rehabilitation Act²⁰, points towards the potential drafting of best-practices guidelines for the accommodation of those bearing an atypical sensory sensitivity.

There is an emerging discipline of "therapeutic" environmental design, though it rarely focuses on adults with autism.²¹ Dementia patients who spent time in traditional Japanese gardens exhibited reduced heart rates, improved short- and long-term memory recall, and improved behavioral symptoms. ²² We have to carefully consider, however, the extent to which the results of research about other mental impairments carry applicability to autism. The disorder brings with it some memory impairments, for example, but these are known to differ in nature from impairment in those with medial temporal lobe epilepsy disorder.²³ Research has shown that bus stops without sidewalks or unfamiliar stops are stressful to the visually impaired, but blindness differs from the visual sensory issues that can attend autism.²⁴

While there is virtually no direct city planning research on the public participation process and tools planners use in the practices that is specific to people with autism, there is ASD-specific work regarding landmarks and individual structures. For instance, permanent landmarks have been found to help adults with the disorder orient themselves.²⁵ Architects and interior designers have proposed guidelines for designing homes for those with autism.^{26,27} Our role as planners is to translate and extend such principles into city planning policy and practice.

Zoning is the legal mechanism through which land use decisions and community design ideas are implemented. Autism-standard design practices can be made to be compatible with local zoning codes if more is known about the needs of adults with autism. Zoning can, on the one hand, encourage best practices and help a community establish its form and function. For example, the usual suburban home exists within a legally-prescribed geographic one specific to "single-family residential" buildings. It may be illegal to provide alternative housing arrangements that would be more desirable for those with autism if they are deemed prohibited land uses as written and codified in a community zoning code and/or prohibited with the laws of homeowners' associations. Group homes have been found to produce favorable outcomes for adults with autism as well as for those with other developmental disabilities.²⁸ There is a fraught history of group homes in many a

²⁰ Light, J. S. (2001). Separate but Equal? Reasonable Accommodation in the Information Age. Journal of the American Planning Association, 73(3).

²¹ Williams, A. (2007). Therapeutic Landscapes. Farnham, UK: Ashgate Publishing.

²² Goto, S. (2017). The Power of Traditional Design Techniques: The Effects of Viewing a Japanese Garden on Individuals with Cognitive Impairment. Health Environments Research & Design Journal, 10(4), 74-85.

 ²³ Renner, P., Klinger, L. G., & Klinger, M. R. (2000). Implicit and Explicit Memory in Autism: Is Autism an Amnesic Disorder?. Journal Of Autism & Developmental Disorders, 30(1), 3.
 24 Crudden, A., Cmar, J. L., & McDonnall, M. C. (2017). Stress Associated with Transportation: A Survey of Persons with Visual Impairments. Journal Of Visual Impairment & Blindness, 111(3), 219-230.

²⁵ Castell, Lindsay Maurice. (2017). The Influence of Building Features on Wayfinding by Adults with Intellectual Disability: Towards Achieving More Inclusive Building Design. Degree of Doctor of Philosophy Thesis. Science and Mathematics Education Centre at the School of Education at Curtin University.

²⁶ Brand, A., & Gheerawo, R. (2010). Living in the Community: Housing Design for Adults with Autism. London: Helen Hamlyn Centre.

²⁷ Kanakri, S. M., Shepley, M., Varni, J. W., & Tassinary, L. G. (2017). Noise and Autism Spectrum Disorder in Children: An Exploratory Survey. Research In Developmental Disabilities, 6385-94. doi:10.1016/j.ridd.2017.02.004.

²⁸ Felce, D., Perry, J., Lowe, K., & Jones, E. (2011). The Impact of Autism or Severe Challenging Behaviour on Lifestyle Outcome in Community Housing. Journal Of Applied Research In Intellectual Disabilities, 24(2), 95-104.

community's zoning framework that fall into a land use category distinct from "single-family residential," where proposals for new group homes are denied within single-family residential areas. ²⁹ The experience of aging populations who face many of the same issues as adults with autism in terms of reduced functional independence, is instructive. Microhousing, defined as apartments with square footage as low as 200 feet, and accessory dwelling units have increased the supply of affordable housing where implemented.³⁰ They can enable a middle ground whereby those needing care can be in proximity to care while still gaining a measure of independence.³¹ Studies show that zoning is a current barrier preventing wider implementation of such units.³² In addition to prescribing what housing types may exist where, local zoning policy heavily influences the traffic volumes and amount of green space that will occur in an area. One study demonstrated that occupants of neighborhoods with lower automobile "burdens" and higher concentrations of open green space experienced less stress and reported higher levels of good health.³³

In the field of planning, a robust public participation process is essential, for reasons both ethical (note the 20th century abuses cited above) and practical (the more citizens involved, the better the information collected). There is reason to believe the standard practice of the public meeting may be somewhat exclusionary of adults with autism. Given the neuroatypicality of our research subjects, we have relied on literature to form infer ways that might improve the quality of their involvement.

Our review has shown that participation improves with an early introduction of meeting materials to everyone, regardless of disability, and by allowing someone who knows the person well to help mediate the interview.^{34,35} Adults with autism with an understanding of the content in an upcoming public meeting are more responsive, confident, and able to participate in a public setting. Additionally, the involvement of parents in the participatory process further enhances the quality of the research through the addition of other perspectives on the issues³⁶. Contributing factors here include securing transportation arrangements and improved motivation. A focus group study conducted by Cumbria County in the United Kingdom found that phrasing proposals and issues in a literal way can remove confusion in the communication process for many with autism³⁷.

²⁹ Allen, M. (2002). Why Not in Our Back Yard? Planning Commissioners Journal. 45. 1-2.

³⁰ Cobb, Rodney L. and Dvorak, Scott. (2000). Accessory Dwelling Units: Model State Act and Local Ordinance. Public Planning Institute. Washington, DC: AARP.

³¹ Liebig, P. S., Koenig, T., & Pynoos, J. (2006). Zoning, Accessory Dwelling Units, and Family Caregiving: Issues, Trends, and Recommendations. Journal Of Aging & Social Policy, 18(34), 155-172. doi:10.1300/J031v18n03_11.

³² Infranca, J. (2014). Housing Changing Households: Regulatory Challenges for Micro-units and Accessory Dwelling Units. Stanford Law & Policy Review, 25(1), 53-90.

³³ Song, Y., Gee, G. C., Fan, Y., & Takeuchi, D. T. (2007). Do Physical Neighborhood Characteristics Matter in Predicting Traffic Stress and Health Outcomes? Transportation Research: Part F, 10(2), 164-176. doi:10.1016/j.trf.2006.09.001.

³⁴ Crown, Nancy. (2014). Interviewing People with Autism. Dart Center for Journalism and Trauma. Retrieved from https://dartcenter.org/content/interviewing-people-with-autism-developmental-disability.

³⁵ Hire Autism: The Sandy Lankler Jobs Portal. (2018). Interviewing Your Applicant With Autism.

https://hireautism.org/resource-center/interviewing-your-applicant-with-autism.

 ³⁶ Pellicano, E., Dinsmore, A., & Charman, T. (2014). What Should Autism Research Focus Upon? Community Views and Priorities from the United Kingdom. Autism, 18(7), 756-770.
 37 Cumbria County Council. (2012). Focus Groups for Adults on the Autistic Spectrum and their Families and Carers. Cumbria, UK: Cumbria County Council.

We anticipate gaining a granular and intimate perspective of how young adults with autism view their built environment. Our questioning will avoid planning terminology such as "zoning," "accessory dwelling unit," and "transit corridor." It will broadly deal with subjects like the respondents' living arrangements, where they travel on an average day, their ambitions, and their daily frustrations. Only later, in the analysis phase, will we determine the planning relevance, if any, of the responses.

Focus groups and design charrettes are known for eliciting qualitative and personal responses. Planners often deal with the birds-eye view, analyzing a region's demographics and finances, constructing maps, and other general key aspects. The troubled histories of Robert Moses, Pruitt Igoe, and others demonstrate a hard-won truth in the field: a plan is fatally incomplete without an intimate understanding of how affected residents actually live and what they aspirations actually are. Today's planning practice already affects adults with autism. We hope to better understand how the planning practice can be enhanced to better serve them.

One of the two main diagnostic criteria for autism spectrum disorder is the presence of "persistent deficits in social communication and social interaction across multiple contexts."³⁸ This presents a unique and serious challenge in conducting a focus group, a format that involves the eliciting of private viewpoints in a group context. There is a risk of the interview process failing, due to one or more participants becoming anxious or otherwise non-cooperative. The interview will be conducted by Dr. Emilio Amigo, an aforementioned clinical specialist in austim. He will be speaking with a group of young adults with which he has a longstanding professional relationship, in his context as a group therapy leader at Amigo Family Counseling. The interviewes have a prior familiarity with each other. All individuals involved in the process of researching and framing the focus group questions have completed CITI Human Research Subject Certification, although they will not interact with the subjects themselves. This includes training on the precautions that must be taken when interviewing or otherwise studying vulnerable human subjects.

There is research indicating that those with autism perform better in novel social situations, such as our proposed focus group, if they have been briefed in detail beforehand ("pre-taught") about what to anticipate.³⁹ We have been in continuous communication with Dr. Amigo, and have instructed him on how he might brief the subjects. He will bring his own clinical expertise and personal understanding of each unique test subject to bear in how he ultimately chooses to conduct both this briefing process and the interview itself.

³⁸ American Psychiatric Association. (2013). Diagnostic and Statistical Manual of Mental Disorders (5th ed.). Washington, DC: American Psychiatric Association.

³⁹ Greenwald, A. E., Williams, W. L., & Seniuk, H. A. (2014). Decreasing Supermarket Tantrums by Increasing Shopping Tasks: Advantages of Pre-Teaching. Journal Of Positive Behavior Interventions, 16(1), 56-59. doi:10.1177/1098300713482976.

III. Procedures

A. Research Design

Process Summary

Focus Groups

The objective of the focus group process is to fill the gap between existing knowledge of the needs of adults with autism and the practice of city planning. We will do this by creating scenarios representing common challenges or situations in the daily lives of adults with autism. Dr. Emilio Amigo will facilitate and guide the focus group using our process design.

Focus Group 1

To determine the struggles or challenges related to city planning faced by people on the autism spectrum:

A focus group made up of Dr. Amigo's longstanding clients who are young adults with ASD (all age 18 and older) will answer his questions.

General topics will be provided to Dr. Amigo that will prompt the focus group participants to describe their daily activities in the community.

Topic areas such as transportation, housing, work/school, and recreation will be discussed. Photos of these topics will be provided to stimulate discussion.

Dr. Amigio is a licensed clinical therapist and a facilitator who has earned the trust of his clients, who are accustomed to the focus group setting. Dr. Amigo's clients visit in groups for years.

Qualitative data will either be recorded by a contracted stenographer. No personal identifiers will be collected, and their privacy will be protected, even though this material is not sensitive.

Dr. Amigo will focus on any challenges that the participants face in their everyday life within the aforementioned categories.

Because Dr. Amigo is a licensed clinical psychologist he will make sure that his patients will be comfortable and not harmed in any way.

Focus Group 2

To determine the struggles or challenges related to city planning faced by people on the autism spectrum from the perspective of parents of adults with autism (critical for completing the adults with autism subject perspectives):

A focus group made up of Dr. Amigo's longstanding parents of his clients who are young adults with ASD (all age 18 and older) will answer his questions by a CITI-trained/approved facilitator.

General topics will be provided to the CITI trained/approved facilitator that will prompt the parents focus group participants to describe the daily activities of their adult children in their communities.

Topic areas such as transportation, housing, work/school, and recreation will be discussed. Photos of these topics will be provided to stimulate discussion.

Qualitative data will either be recorded on an audio recording device. No personal identifiers will be collected, and their privacy will be protected, even though this material is not sensitive.

[These focus groups were be held on January 18, 2018.]

Planning and Design Charrette

Qualitative data from the two focus groups will inform a three-day long charrette-style public participation session to collect further information from participants about the preferences of adults on the Autism Spectrum and their parents that will help planners and designers create better communities. [A charrette is a planning and architecture term for a meeting intended to create a collaborative atmosphere for a variety of stakeholders who come together to plan for a future vision.] This charrette will be managed and constructed by a Graduate Level Workshop Course (Ohio State's Knowlton School's CRPLAN 6010 Planning Innovations) and a Junior Planning Studio (CRPLAN 4900). Participants will include multidisciplinary experts from the fields of public health, counseling, architecture, civil engineering, city and regional planners, landscape architects, OSU planners and designers, volunteers, parents of adults with autism, and community leaders (among other possibilities). [The charrette was held in Knowlton Hall at The Ohio State University on February 21-23.]

B. Sample

FOCUS GROUPS:

The recruitment process will be conducted through Autism Living, a Columbus, Ohio 501c3 non-profit corporation. Autism Living is the agency that is working with students in a City and Regional Planning studio course. Autism Living is an organization made up of parents of adults with autism. Dr. Emilio Amigo is the licensed clinical therapist whose young adult clients are some of the parents in Autism Living. Recruiting for this focus group corresponds with the natural client-doctor relationship. Nineteen adults with autism and twenty-three parents participated. Investigators obtained verbal consent from the adults with autism focus group and from the parent's focus group. Dr. Amigo asked the participants to follow up with further thoughts or comments related to the focus group discussion. Dr. Amigo will collect this information for us to make sure there are no personal identifiers before sending on the information to investigators.

CHARRETTE:

Clients of Dr. Amigo identified for the charrette will be those who participated in the focus groups. Other appropriate participants will be identified by Autism Living, the advisory organization to the graduate workshop and the undergraduate studio. The Knowlton School of Architecture have established connections with policy makers, infrastructure designers, land use experts, development site planners, and zoning professionals who agreed to participate in the policy, ideas, and design activities. Faculty at Knowlton School have contacts at the Nisonger Center whose focus is mental health and developmental disabilities counselors who will also participate, and Knowlton School faculty have connections to Counseling Education in the College of Human Ecology. Parents of the adults with austim from the focus groups will also be invited through Dr. Amigo.

C. Measurement / Instrumentation

This study attempts to gather the information about the challenges adults with autism experience in the built environment. Through examining the everyday living experiences of people with autism we will explore the phenomena of accessibility of community environments for adults with autism. Focus groups are the primary tool for this research, asking adults with autism to identify transportation, housing, urban environment, and city infrastructure challenges and how they understand the position of adults with disabilities within in relation to city planning outcomes in housing, transportation and recreation all of which influence infrastructure design. Questions are crafted to avoid invoking measurement effect or desirability effects, asking only for respondents to volunteer information about their experiences.

Names will not be recorded. Identifying information will be masked or deleted. Transcripts in the focus groups will be deleted once qualitative data are collected and checked for accuracy. All data will be kept on password protected computers or stored in locked file cabinets in the PI's office. The PI will scrutinize all transcripts and notes to insure that all identifying information is removed. There are no more than minimal risks.

CHARRETTE

Professionals from a wide variety of related disciplines, adults with autism, and parents of adults with autism will take the ideas from the focus groups and create infrastructure designs, planning policies, and new ideas gleaned from the data. This information will be used to provide a framework for the planning/urban design profession.

Before focus groups and the charrette are conducted, all participants will be notified of their ability to withdraw from the study without repercussion. All participants will be informed of the need to verify consent to participate in the research study. Consent verification will be performed before the focus group is conducted. All focus groups will be recorded or a stenographer will be used to maintain accuracy in data gathering. When a stenographer is used, students will make notes for context that would otherwise be lost without audio or video. All subjects will be notified of the recording or dictation before the focus group is conducted. All participants will be informed that focus groups are projected to last around two hours before the focus group is conducted. If, during the research period, focus groups are observed to last for a significantly longer or shorter duration, participants will be notified of more accurate projections in the focus groups' duration.

RISKS

While there are no anticipated circumstances where confidentiality would need to be broken, there are always risks involved in focus groups such as the one we are proposing. (For instance, a client of Dr. Amigo's may decide to put her/himself or others in danger somehow or otherwise break the law during the focus group period. This would be highly improbable, but possible. Confidentiality may also be broken if the participants choose to talk about the focus group content after it is finished.

D. Internal Validity

Focus group processes were crafted to avoid invoking measurement effects of desirability effects, asking only for respondents to volunteer information about their own experience. Additionally, the focus group format allows a drift into interpretive results. This further reduces risks of speculation and false interpretation on the part of the researchers.

E. Data Analysis

This study is concerned with descriptive accounts that provide data on the daily activities of transportation, housing, recreation, and work/education reported in the participants of the focus group and design ideas from the charrette. The results will be evaluated in order to find out how city planners can improve communities through changes in

public participation processes, zoning laws, and other tools that professional planners use. The analysis will start from the transcripts of the focus groups and design ideas from the charrette, then the initial themes and ideas will be identified in order to organize the data. These themes will be grouped into a conceptual framework (transportation, housing, recreation, work/education) and grouped under a smaller number of subcategories.

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three **APPENDIX**

FOCUS GROUP

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III. Appendix

2. FOCUS GROUP EXPLANATORY NARRATIVE

The first step in collecting ideas from adults with autism and their parents, was hosting two focus groups which discussed planning related issues for adults with autism. The goal of the focus group was to get an idea of what areas concern and matter to adults with autism and their parents. These discussion groups were led by Dr. Emilio Amigo, Kyle Ezell, Rick Stein and Gala Korniyenko. Participants were adults with autism in one focus group and their parents in another focus group. Adults with autism and their parents were split into two groups so that the answers of either group would not influence the other (i.e. parents directing their children's answers).

Participants were selected through association with a local psychologist. Rick Stein is a representative for Autism Living (the client of this research) and had connections with Dr. Amigo Family Counseling. The participants of the focus groups are volunteers from Dr. Amigo's clientele who desired to share their ideas and opinions. For convenience and comfort, the focus groups were held at Dr. Amigo's office.

To begin each focus group, the consent agreement was read aloud to the entire participant group. Each participant verbally agreed to the conditions of participation. It was made sure that participants understood what they were participating in before beginning the focus groups.

Each focus group was presented with three general planning categories (transportation, housing, and recreation) for which to discuss. General and specific questions were asked regarding each of these topics to stimulate conversation amongst the participants.

The focus group with the parents of adults with autism was recorded and later transcribed. The focus group of the adults with autism was transcribed by a stenographer. The reason for this difference was confidentiality concerns with the adults with autism and a potential unwillingness to discuss ideas if their name would be associated with it. So, the focus group for adults with autism was completely anonymous.

In the focus group with adults with autism, each general topic was discussed one at a time. Dr. Amigo lead the discussion because he had an established relationship with the participants. To begin discussion, Dr. Amigo asked broad questions within one of the three main panning categories chosen before the focus group. Depending on responses, Dr. Amigo and Gala Korniyenko asked more specific questions to help steer conversation to remain on topic.

Roughly a week after the focus groups were completed, copies of the transcript were sent to Professor Ezell and analyzed by the students in his undergraduate and graduate level classes.

TO BE READ ALOUD BY RICK STEIN – VERBAL CONSENT FOR PARTICIPATION IN FOCUS GROUP FOR PARENTS OF ASD ADULTS

Welcome!

You are invited to tell city planners how they can improve your lives by building better places. The benefits of this research will provide useful information that will contribute to the city planning profession for adults on the ASD spectrum. Your answers will be recorded to create a transcript. No names will appear on the transcript.

If you agree to participate in this study, you will several questions. I encourage you to bring up other issues if you think there is something I have missed. Some of our questions have to do with how you and your adult children move around town, what kind of house they might prefer, how they play, work, and study.

Because of the open-endedness of the focus-group, the length depends in part on your answers. Based on past experience, I would anticipate that it would take up to 2 hours. Of course, you may end your participation at any point (or speak for longer if you like).

Confidentiality

As mentioned, your answers will be recorded and a transcript of your responses will be created. Your name will not appear anywhere on the transcript. Until the completion of the study, only one file that links names to pseudonyms or numbers, but this will be kept on a separate computer or in a separate location from the transcripts themselves. Quotes your interview in future writings will be treated in manner that makes it impossible to identify you. The transcripts will be retained 5 years (this is a federal requirement) or until the completion of the research, whichever is longer. While we ask other group participants to keep the discussion in the group confidential, we cannot guarantee this.

Your participation is voluntary. If you don't want to participate, it won't impact your current or future relationship with the Ohio State University, or have any other consequence. There will be no penalty or loss of benefits to which you are otherwise entitled. Even if you agree to participate, you can stop the interview at any time, and you can, of course, also decline to discuss a particular issue or answer a particular question.

Potential Risks:

The risks may be no greater than those encountered in daily life, but no study is entirely without risks. At minimum, there could be a risk of participant breaching confidentiality even though they will be asked to keep the discussion in the group confidential. Again, while we do not anticipate any circumstances where confidentiality would need to be broken, there are always risks involved in focus groups such as the one we are proposing. Please be responsible, respectful of others, and do not discuss the conversation conducted in this focus group. Do not mention names to ensure confidentiality and privacy.

Contacts and Questions

If you have any additional questions concerning this research or your participation in it, or you feel you have been harmed as a result of participation, please feel free to contact Jonathan Ezell at <u>ezell.5@osu.edu</u>. For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251. 12

TO BE READ ALOUD BY DR. AMIGO (FOCUS GROUP 1) – VERBAL CONSENT FOR PARTICIPATION IN FOCUS GROUP FOR ASD ADULTS

Hello,

You are invited to tell city planners how they can improve your lives by building better places. The benefits of this research will provide useful information that will contribute to the city planning profession for adults on the ASD spectrum. Your answers will be recorded by a professional stenographer who will create a transcript of your responses. No names will appear on the transcript.

If you agree to participate in this study, you will several questions. I encourage you to bring up other issues if you think there is something I have missed. Some of our questions have to do with how you move around town, what kind of house you prefer, how you play, work, and study.

Because of the open-endedness of the focus-group, the length depends in part on your answers. Based on past experience, I would anticipate that it would take up to 2 hours. Of course, you may end your participation at any point (or speak for longer if you like).

Confidentiality

As mentioned, your answers will be recorded by a professional stenographer who will create a transcript of your responses. Your name will not appear anywhere on the transcript. Until the completion of the study, only one file that links names to pseudonyms or numbers, but this will be kept on a separate computer or in a separate location from the transcripts themselves. Quotes your interview in future writings will be treated in manner that makes it impossible to identify you. The transcripts will be retained 5 years (this is a federal requirement) or until the completion of the research, whichever is longer. While we ask other group participants to keep the discussion in the group confidential, we cannot guarantee this.

Your participation is voluntary. If you don't want to participate, it won't impact your current or future relationship with the Ohio State University, or have any other consequence. There will be no penalty or loss of benefits to which you are otherwise entitled. Even if you agree to participate, you can stop the interview at any time, and you can, of course, also decline to discuss a particular issue or answer a particular question.

Potential Risks:

The risks may be no greater than those encountered in daily life, but no study is entirely without risks. At minimum, there could be a risk of participant breaching confidentiality even though they will be asked to keep the discussion in the group confidential. Again, while we do not anticipate any circumstances where confidentiality would need to be broken, there are always risks involved in focus groups such as the one we are proposing. Please be responsible, respectful of others, and do not discuss the conversation conducted in this focus group. Do not mention names to ensure confidentiality and privacy.

Contacts and Questions

If you have any additional questions concerning this research or your participation in it, or you feel you have been harmed as a result of participation, please feel free to contact Jonathan Ezell at <u>ezell.5@osu.edu</u>. For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.12

Verbal Consent Script – Charrette- All Participants

Hello,

Today you are invited to envision how policy and design can improve autistic adult's lives by making better places where they can thrive. Your ideas will be used to create a toolkit for professionals who are concerned with making communities better places.

Confidentiality

By participating in this charrette, you consent to being photographed. Please understand that Knowlton Hall is a public building filled with students, faculty, staff and visitors who may be taking photos of the event. The Knowlton School of Architecture also would like to take official photographs of this event to publish on the School's webpage, in presentations, and in our published toolkit book or in any other media format. Please note that your name will not be published with the images.

In addition, it is possible that your ideas may be used in future publications and presentations. Any of your quotes in any future writings will be treated in manner that makes it impossible to identify you. During this event, you will also be creating drawings, written ideas, charts, and other visual material from your teams. This material will be stored for 5 years or until the completion of the research and subsequent published toolkit book, whichever is longer.

Your participation is voluntary. At any time you decide not to participate in this event it won't impact your current or future relationship with the Ohio State University, Knowlton School, or have any other consequence. There will be no penalty or loss of benefits to which you are otherwise entitled. Even if you agree to participate, you can leave at any time, and you can, of course, also decline to discuss a particular issue or answer a particular question.

Potential Risks:

The risks associated with your participation in this charrette may be no greater than those encountered in daily life, but no event is entirely without risks. Please be careful for any slick floors (sometimes students and faculty spill their drinks or don't dry their hands properly while in the restroom). Also, Knowlton Hall has steep, winding staircases so please be careful if you use them. I strongly recommend using the elevator until you understand the building. As we are in a building filled with designers, please watch out for sharp objects such as cutting utensils. Just be careful and let's all have fun!

Contacts and Questions

If you have any additional questions concerning this design charrette event or your participation in it, or you feel you have been harmed as a result of participation, please feel free to contact Jonathan Ezell at <u>ezell.5@osu.edu</u>. For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.12
Appendix
3. FOCUS GROUP PRESENTATION

A Day In The Life

Transportation

Transportation



Car



Taxi - Ride Share



Bus



Multi-Use Path

Bicycles

Sidewalk

Recreation

Recreation



Recreational Fields



Gym



Gardening



Neighborhood Park



Courts



Hiking - Outdoors

Housing

Housing



Condominiums



Single Family- Ranch



Duplex



Single Family- 2 Story



Apartment Complex



Communal Living

III. Appendix 4. FOCUS GROUP FINDINGS

Focus group findings

The focus group conversation was broadly divided into three topics; Housing, Recreation, and Transportation, with the latter being the most extensively discussed area. A coding system was used to filter out keywords from the conversation, which allowed the planners/researchers to identify distinct challenges and recommendations by The Adults with Autism. The referencing system uses the page numbers of the transcript, followed by the relevant line numbers. Example: (8,25) (9,15); [8 is the page number and 25 is the line number].

Transportation

The first section dealt with different modes of transit such as cars, buses, cabs, bikes as well as pedestrian connectivity. While most of The Adults preferred not to drive, a couple did have driving licenses or temporary IDs.¹ The most common reasons cited for this unwillingness to drive included a fear of driving, issues with spatial perception, anxiety, and fear of getting lost.² Many also found it emotionally and physically draining to navigate through the traffic due to confusing signage and overwhelming traffic rules.³ It was eventually determined that although most of The Adults would someday like to drive, current peer and parental pressure wasn't helping the situation.⁴

How then do The Adults prefer to move around the City/Neighborhood? In most cases, either the parents/siblings or the service providers of The Adults would be responsible for pick-ups and drop-offs.⁵ Apart from this, many also preferred taking the bus over driving. However, most of The Adults did not find this mode of transportation very pleasing. Most of them felt that public buses were very cramped/crowded and found the journeys to be very hectic, stressful, and highly uncomfortable.⁶ In addition to that, new bus routes and stop announcements were very confusing to some, while others felt that transfers were very tedious.⁷ Biking to nearby places was considered as an alternative by some, but many felt it was inconvenient for longer distances due to lack of bike lanes.⁸

Many of The Adults recommended there should be more bus stops near amenities and the outer areas of the City should be accessible by public transit as well.⁹ Some even suggested that the interiors of the buses be modified to make them more comfortable, in addition to increasing the frequency of the buses. It was also noticed that most of The Adults felt at ease when they had complete knowledge of their whereabouts, such as familiar landmarks, friendly/known drivers, clear wayfinding signs, and safe walkable streets.¹⁰ Grid-iron street layouts were generally easier to navigate.¹¹

Recreation

When the conversation moved to recreational/public spaces, the most prominent concerns seemed to be the ease of access to nearby amenities and the general reluctance to venture into public spaces due to fear of sensory overloads. Some went on to add that they wouldn't want to go anywhere that isn't essential to their daily routine.¹² Some of the public places most frequented by The Adults were libraries, grocery stores, laundromats, playgrounds, movies, and clinics.¹³ Most felt that the outdoors were noisy places, and it would be nice to have quiet places or 'Don't bother me' zones for de-stressing.¹⁴

Most of The Adults present seemed to agree on the fact that controlled environments, such as a linear or a circular

- 3 (8, 25) (9,3) (17, 19) (18,12) (19, 25) (20;10) (21,15)
- 4 (11,16) 5 (21,19) (22,9) (22,15) (23,6)
- 6 (27,17-21) (28,5)
- 7 (29,4) (29,11)
- 8 (57,1) (57,4) (59,2)
- 9 (44,19-25) 10 (45,15) (46,2
- 10(45,15) (46,20) (47, 2-5) (47,11) (48,8)11(75,18) (76,6)
- 11 (75,18) (12 (38,20)
- 13 (39,23) (40,4) (40,13) (45,2)
- 14 (106,7-19) (115,25) (116,7) (121,17)

¹ (8, 25) (9,3)

^{2 (10, 9-11) (11,6) (17,9) (19,17)}

walking path with clear wayfinding, would help them feel safe and comfortable outside their homes.¹⁵ Some also insisted that better Wi Fi connectivity would make them feel secure in public spaces. Others suggested more bike paths, shaded areas, adult playgrounds, gym facilities within walking distances, and pet friendly spaces.¹⁶

Housing

Most of The Adults in the focus group lived with their parents, siblings, friends, or roommates. While living with friends or siblings was easy and comfortable, continued residence with parents was considered socially limiting.¹⁷ Some felt it wasn't always easy to get along with their parents, while others thought that they could be intrusive at times. Some of The Adults also felt that parents often had high expectations and didn't really understand what The Adults were going through.¹⁸ Contrary to these opinions a few of The Adults felt extremely comfortable in their parents' home and would not like to leave.¹⁹

On living with roommates, most of The Adults would prefer someone who is easy to get along with and who understands their needs.²⁰ While living alone was an option they would like to explore, most of The Adults felt they would still require some assistance with access to amenities, and financial/organizational skills.²¹ Many also felt that living alone would come with a lot of managerial responsibilities, which they would like to avoid.²² In such a scenario, assisted living seemed to be good option to help the Adults transition into their independence. Many of The Adults also suggested that amenities such as laundry, recycling, trash, mail, and part/full time care-givers should be easily accessible in any type of independent living situation.²³

In addition to these suggestions, some of The Adults also mentioned that they would prefer smaller apartments or communal living, which offered a balance of social life, retreat, and assistance. Pet-friendly living units were preferred.²⁴ Some of the other challenges included underemployment²⁵, where The Adults felt that they did not have equal job opportunities as compared to neurotypicals.

- 16 (103,1) (101,19) (102,3) (103,24)
- 17 (75,18) (76,6) 18 (77,14) (80,5-6)
- 18 (77,14) (80,5 19 (80,23)
- 20 (88,23)
- 21 (94,21) (85,1)
- 22 (89,9) (89,13)
- 23 (91,15) (92,5) (88,13) (92,21) (87,23)
- 24 (88,8; 90,6)
- 25 (98,43) (98,18)

^{15 (103,14) (105,3)}

III. Appendix

5. FOCUS GROUP DATA ASSESSMENT

TRANSPORTATION

Driver's Licenses:

- 2 participants have their licenses

Driving Experience:

- "Pretty Scary" due to dealing with repair fees
- Parking on campus is a "big pain"
- One person said they were too nervous to learn at 16 years old

Would you like to drive in the Future?

- 11 people say "yes" they would like to drive in the future

Who drives you?

- Most frequent answer was parents, family, or service providers (providers is not elucidated upon)
- Community apparently falls under "service providers" per what some said in focus group but not sure that's true.
- Falls under service providers?
- Friends included as well
- Two people said Uber.

Obstacles to getting a driver's license:

- Peer pressure to get license
- Spatial issues
- The rules of driving is an obstacle.
- More peer/social pressure (this time from parents, however)
- Driver's instructor prevented a person in the focus group from hitting someone while they were driving
- Road rage

Obstacles to getting a driver's license continued:

- Eye-sight (visual impairment)
- Can likely be recorded as a throwaway comment, but potentially obstacles stem from video games (or other entertainment).
- Crashing of a vehicle (albeit a golf cart not a car)
- Fine motor skills and instructors not good at their job
- Another crash, but an actual car crash
- Turning the car
- Fear in general
- Driving is draining (lack of "endurance").
- The rules of the road and having to envision where one's going
- Lack of a car to practice on as well
- Car noises (any of them)
- Focusing on the lights for the car and what is happening on the car's dashboard
- Another visual impairment
- No incentive to drive. No benefit
- Busy schedule, can't find time to practice

How many ride the bus, and are there any comments on riding the bus?

- Uses a service bus 3 times a week; not COTA
- Riding can be hectic, and "a bit cramped" due to amount of other riders.
- Other people talking makes the person uncomfortable. Other people can be inappropriate as well.
- Uses [unknown university] campus busing
- Another bus rider, this time COTA
- A "little" uncomfortable when riding the bus, but convenience was more an issue and that convenience went away after COTA split up routes
- COTA is good when you need to go downtown, but not so much everywhere else in Columbus.
- Bus routes are not always clear, so a rider may get on the wrong bus or be on the wrong side of the street for their bus.
- Confusion with transferring tickets when getting on wrong bus, resulting in having to pay more adding to stress
- Bus used for vacation (obviously not COTA)
- Buses for vacation, and occasionally COTA for Ohio State football games
- Lack of understanding in how to use the bus
- Went through a training on how to use COTA buses, but has not tried to ride the bus yet
- Routes can be confusing.
- Person's perception is that COTA only services "bad" neighborhoods
- Announcements for locations are inconsistent.

Potential Destinations:

- Grocery store; Shops for things they want/need
- Grocery Store again
- Drug store, for grocery shopping, by way of biking or walking
- 10 in the focus group state they pick out, or buy, their own food at grocery store.
- One participant wants to learn how to drive to explore more places.
- Second participant wants to learn how to drive to explore more places.
- Transportation access/availability boils down to "essential" places for participants.
- Majority of participants react negatively to question about visiting places of faith if they had better transportation access.
- Some participants say they would be more involved in places of faith with better transportation access.
- Recreation activity (card game with their father)
- Library is another place a person in the focus group visits.
- A participant would like to go to a casino (and put earplugs in while there)
- Person in focus group would go to the zoo, a park, or grandad's house if they had easier transportation.
- Special events (Art Festival as they mention below) and movies
- Pool or library
- Movies (with friends does not state how they get there however)

How could [the focus group's] transportation situations be improved?

- Having public transportation close by (where they live)
- Buses in community scene = residential area (clarified below by Professor Ezell)
- At least 3 participants believe having a bus system in their residential areas (neighborhoods a better term?).
- Avoiding downtown altogether when getting to "outer area of town"
- More bus shelters to wait inside
- Vehicle comfortability a must
- Quick transportation as not to be late
- The vehicle (& vehicle's driver) and person(s) being picked up, and making sure they know what time to get picked up/ do the picking up
- Trust is important between the driver and this participant.
- Making sure the driver knows where they are going is important. No guessing about directions.
- Bus numbers changed and are more difficult to distinguish where they are going or which route they are for.
- Cars and other people walking can cause worriment or are distractions.

Walking Hazards:

- Lack of cell-phone can hinder finding one's way around.
- Distance an issue for walking to places.
- Spatial issues when walking to places (especially when one's phone is dead)
- Not related to sub-topic but: support for "easy accessible" public transportation, or more providers to do it
- "Grid-based" plan (sidewalks and streets?) at Miami University makes it easier to navigate

Bike Riding:

- Roughly half of the participants ride a bike.
- Lost interest in
- Rode to the market district
- Gamestop
- One participant rides in the bike lanes (newer additions around Columbus)
- Lack of bike lane an issue
- Places to securely lock up bike is an obstacle.
- Biking would be "more distracting"
- "hindrance for me to ride a bike"

Path/Trails

- Used for School
- Used for fun. And exercise
- Exercise and fun
- Helps discover new places, things, or people.
- "Hiking around" in California, however
- Greenways allow participant to get to places (in this example a house) quicker

Uber/Taxis (Driving Services):

- Recreational purposes
- Used when first option (here parents) is not available; but still for a recreational purpose.
- Uber used again as a backup when first option (here parents) is not available.
- Taxi used to go to church
- Used a taxi to get to work, but was apprehensive to use it due to the price
- Taxis (or taxi-esque services from providers) take "a long time" to pick up participant.
- One participant had to wait an hour and a half for a driving service.

HOUSING

Residence (where you live?)

- House. Lives with brother and brother's friends.
- Lives with parents. Wants to move out.
- Parents have a difficult time adapting to participant's unique situation.
- Wants to move out from parents, but live with other people. "A social thing"
- Live with parents
- Parents ask too many questions.
- Independence would be important.
- Lives at home and does not want to leave.
- Two-story house
- Currently: Two-story apartment with parent

What sort of building would you like to live in?

- Would want to live with people that have "the same issues."
- Small apartment on their own
- Apartment with roommate
- Apartment complex or communal living
- Living with group of people
- A place that allows pets
- A place with bunk-beds
- Condo or townhome, where landscaping, lawn, etc. is taken care of for them
- Caregiver involved as well
- A place that allows service dogs
- Currently in apartment on their own
- Would like to be able to do more things without having to leave the apartment complex (ex: laundry, dropping off recycling)
- Apartment with roommates
- Apartment with reasonable walking distances to amenities
- Duplex, but having roommates is important

RECREATION

Note: This will be predominantly a mix of activities the focus group likes to do, wants to do, or needs to accomplish their recreational needs.

- Exercise
- Biking or playing basketball.
- Being outside more and play basketball.
- Library, park (21-101), mall (24-101)
- Playing video games, need a reliable internet connection.
- Outdoor activities (specifically horse riding)
- Open space (for recreation)
- Adequate parks and paths throughout the year.
- Open space to walk or run.
- Walking path (oval shaped)
- Somewhere to roller blade.
- Gym
- Internet connection. (3x)
- Place inside for smaller toys (like LEGO)
- Area outside for walks.
- Area nearby for available transportation to go to other recreational activities
- Place to walk around, open space.
- Basketball court.
- Place to express anger.
- Adult Playgrounds

What do you do currently that's recreational?

- Basketball (x2)
- Go to the park
- Go for walks.
- Gardening
- Basketball
- Running (3x)
- Walks on trails

three **APPENDIX**

CHARRETTE

6. INTRODUCTION	86
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III. Appendix 6. CHARRETTE EXPLANATORY NARRATIVE

The Hazel Morrow-Jones Charrette, was named for Professor Emerita, Hazel Morrow-Jones, a mentor to many in The Ohio State University City and Regional Planning Program. The charrette was held in the City and Regional Planning Studio in Knowlton Hall, at The Ohio State University. The charrette occurred over a period of three days, February 21-23, 2018. The event was planned and executed by a graduate workshop course (CRPLAN 6010: Innovative City) and an undergraduate junior planning studio (CRPLAN 4900). The goal was that participants' contributions would assist policymakers, city planners, and community designers in improving lives by creating better places for people on the autism spectrum so they can thrive.

Invited participants included multidisciplinary experts from the fields of public health, counseling, architecture, civil engineering, city and regional planners, landscape architects, OSU planners and designers, ASD volunteers, autistic adults, parents of autistic people, and other community leaders.

With data collected from autistic adult and parents of autistic adults focus groups, the charrette suggested 28 design topics related to ideal housing, transportation, and recreation specific to the needs of autistic adults.

The 28 topics were:

- 1. "I Need Assistance" Symbol
- 2. Wayfinding/ Navigation
- 3. Accessory Dwelling Units (ADUs)
- 4. Bus Rides
- 5. Drop-off/Pick-up
- 6. Ride Share
- 7. Living Space Development Checklist
- 8. Duplex Living
- 9. Sidewalks
- 10. Bus Routes
- 11. Multi-use Trails
- 12. Outdoor and Street Lighting
- 13. Parking Space
- 14. Bus Stops

- 15. Therapeutic Recreation
- 16. Walkabiltiy
- 17. Crosswalks
- 18. Assistive Technology
- 19. Bike Racks
- 20. Shared Living with Retirees
- 21. Public Wifi and Outlets
- 22. Tiny Homes
- 23. Proximity to Recreation
- 24. Communal Apartment Complex
- 25. Streets
- 26. Technology
- 27. Soothing spaces
- 28. ADA Policy

The first day of the charrette included participation from the professionals. Each of the 28 topics was presented on large poster along a wall in the studio space that included relevant background information, which created an educational foundation for the professionals about that topic and how it relates to the wants and needs of adults with autism. Throughout the day small groups of professionals chose a topic to brainstorm and design their ideas. Space and materials were provided for the professional participants to discuss, draw, and write about their ideas. Graduate and undergraduate students oversaw and facilitated this process throughout the day, providing insight as needed. As groups concluded their brainstorming on a topic, a student summarized the solutions.

The second day of the charrette was dedicated to adults with autism and parents of adults with autism. Two group sessions were held on day two, comprising of mostly two different groups of participants. The adults with autism and their parents were led in guided discussion by a few facilitators. The facilitators led the group through the topics and solutions proposed by the professionals on the previous day in order to get feedback on their viability and/or effectiveness. There was an open and interactive discussion on each topic; ideas were further expanded on and recorded through drawings and writings on a large paper canvas. Students also took notes of feedback and summarized the findings after the conclusion of each focus group.

The third day of the charrette culminated in the creation and execution of a presentation about the most important initial findings from the previous two days. A top ten list of the findings was presented in the afternoon to students and participants able to attend. The ideas generated by the charrette informed and will continue to inform more refined policies, ideas, and designs that will help autistic adults thrive. Additionally, the ideas were immediately utilized post-charrette by the students to create best practice suggestions of development plans, zoning codes, and design guidelines.

III. Appendix

7. CHARRETTE NOTES

Shared Living with Retirees (20)

Mentioned in this topic: Duplex Living (08) FOR :

- Shared with retirees
 - Dorm-like
 - Shared living spaces
 - Help with care and schedule
 - Helping each other
- Mentor relationship
 - Learning life skills
 - eg, learning to cook from your mentor and then being able to cook for your mentor
 - getting advice from them
- Duplex idea
 - Soundproof wall separates
 - Privacy
 - How about parents on the other side?

AGAINST:

- Apt building with similar-aged adults
- Parents might not be a good idea as it may affect the parents' relationship, cause anxiety.

UNRELATED

• Hotel-like with meals provided

'I need assistance' symbol (01)

- How about a big green dot?, do you think it's a good idea?
 - Maybe use a big yellow dot for caution or I need help
 - QR codes might be helpful
 - Most adults think it's a good idea
- Fears:
 - Afraid of getting lost
 - What does the ADA symbol mean to you?
 - Makes the space accessible
- Type of help the symbol can provide:
 - Directions
 - Money
 - Charging stations
 - Wayfinding
- What if a Starbucks had the symbol? How would it be different from other coffee shops?
 - Better ambience
 - Softer lighting
 - Better sound quality
 - People should be friendly
 - Better understanding of Autism
 - They should be able to redirect the adults to a quiet room
 - Spaced out tables to avoid over-crowding
 - Job opportunities

Safe spaces - "Soothing Spaces" (27)

- Far away, shaded, quiet space in park (away from playgrounds)
- Maybe a rocking chair or a swinging chair like a cocoon
- An overhang type building
- Plexiglas walls should be see through
- Something to reduce the outside noise
- Privacy (like a public bathroom)
- Maybe have a trampoline? See-saw? Or a yoga trapeze?
- Playground equipment for all ages?
- May not be a good idea as adults might not be welcome where kids play

Against:

- With a pod like shelter, we don't want the adults to stick out
- They should blend in
- Don't want the shelter to look like a sad spot

Sidewalks (09)

- Wall separating road from sidewalk
 - Tall enough to recognize ("mid-body")
 - Taller to prevent ____?
 - Use of plants on wall
- Safety rails (in middle of sidewalk)
- Three people wide sidewalk, with some space in between
- Wider if there's a bike path on it
- Directions given on sidewalks to show where people should walk

Bus Stops (14)

- Problems with current bus stops:
 - Lack of sidewalk and/or crosswalk; having to run cross street at light change
 - Uneven terrain at stop
 - Lack of shelters (to provide shade) or benches at the stops
 - No setbacks for many of the stops
 - Signs are not large enough (not including CMax stops)
- Suggestions for future bus stops:
 - Crosswalk buttons near bus stops
 - Bus stops situated at distance from street
 - "Intuitive" bus stop apps
 - Touch screen at bus stops that allow people to click where they need to go to show which bus route they should take (inclusion of voice recognition if person does not know exact location)
- Multiple brochures for different bus routes, organization of route and time may result in missing the bus you're trying to take, chance of no phone available
 - Physical consolidation of bus routes and times into single brochure?

Bus Rides (06)

- Possible solutions for inside (specialty seats would blend in with regular seats):
 - Private seating?
 - Seating close to driver for ease of requesting assistance?
 - Softer seats as seats are "uncomfortable"
- Similar concept to white noise machine for dealing with loud noises on bus (i.e., crying babies)

- Video guides showing how to board and leave buses (precedent: similar guides for boarding and exiting airplanes)
- Problems with traffic outside bus; cars in front of bus forcing it to go slower than what passengers would like
- Friendlier bus drivers? To act as support for those with autism
- Implementation of "I Need Assistance" symbol
- Identification of ASD on COTA pass or bracelet
- Possibility of bus crash may make passengers nervous
- "Should buses have seatbelts?"
- Notification of next stop; to alert passengers who may be distracted
 - Announcement, beeping for alert
 - If wearing headphones? Bright lights
 - Signal sent to phone upon approach of/arrival at stop
- Message (through an app) lets one know to look out window and see where they are
- Confrontational passengers are also problem
 - Training on "crisis intervention"

Bus Routes (10)

- Bus does not go to desired location
- COTA takes forever to get to places; ex: hour-plus trip to spend 15 minutes shopping
 - Busses not on time
- Uber-like tool of going to same/multiple places?

Pick-Up Lot (I.e. drop-off & pick-up lane) (05)

Mentioned in this topic: Parking Spaces (13)

- Example: Like from school
- What it would look like:
 - Indoor (due to adverse weather)
 - Quiet
 - Benches
- 1 space or 2 spaces?
 - If 1 space: wait & pickup in same spot
 - If 2 spaces: wait in spot then call person you're picking up & go get them

Crosswalks (17)

Mentioned in this topic: Parking Spaces (13)

- White paint blends in with other markings; bright/fluorescent yellow instead?
 - Implement reflectors; "retroreflective"
- More bridges over roads, especially really busy ones
 - "Are we making roads too wide?"
 - "Barnes Dance"; all pedestrians cross street at once
 - Underpasses? (Subway-esque)
- Not enough time to cross when walk signal is flashing
- Bothersome sounds from crossing signals; make them nicer, reduce number
 - Voice instead of repetitive beeping
- Crosswalk use training
- Walking in parking lots:
 - Moving between parking spaces to get from point A to point B
- More opportunities to cross roads, hence more mid-intersection crossings
- Rapidly flashing beacons, bright flags to carry across?

Accessory Dwellings (03)

- Importance of living on own
- Camper vs. Tiny House
- Garage conversion to home
 - Living in a more permanent building

Technology (18)

Mentioned in this topic: Public Wifi (21)

- Apps
 - GPS
 - more interactive
 - insides of buildings
 - augmented reality
 - "the virtual reality of Columbus, Ohio"
- Access to the internet
 - Internet cafes
 - Wifi hotspots

Apartments (8)

- Simple designs that include
 - Open concepts (Living room/kitchen)
 - Soft lighting-no fluorescent bulbs
 - Sound-proof walls
 - Recreation room
 - Storage Space
 - Appliances within unit
- Choice of smaller personal room or larger shared living room (with people of similar age)
- Pet Friendly
- Fenced-in recreation areas
- Security system
 - Fingerprint
 - Facial recognition
- Accessibility to amenities
 - Laundry, mailboxes, etc
 - Shared or individual?
 - Computer room/lab
 - Library/ "room where you can read books"
 - "Room for art and music"
- Could be shared amenities or an extra room in the individual apartment for the tenant/ adult with ASD to individualize according to their own personal interests
 - Clear preference for special spaces that cater to personal interests
- Microwave for easy use

2018 Hazel Morrow-Jones Charrette Planning and Design For and With Adults with ASD Adults with ASD and Parents of Adults with ASD Evening Session February 22, 2018

Outdoor/Street Lighting

- Concerns from participants:
 - Vehicle LED headlights too intense
 - Instances where lights suddenly switch on while walking
- Ideas from participants:
 - Enough light to see where you're going and stuff on the ground (i.e., glass shards)
 - Color preference; not too strong a color to be disorienting
 - Less bright LEDs
 - Lights closer together, more consistent

Parking Lots

- Walking maneuverability in parking lot
 - At an angle, to avoid cars and center of street
 - "Making it up as [I] go"
- Problems
 - Danger in navigating parking lots
- Suggested improvements:
 - Better identification of where you are in parking lot/garage; i.e., labeling of rows/spots
 - Grass medians (designated path)
 - Parking spaces closer to buildings; out of need to feel safer in parking lots
 - Coloring parking spaces to alert drivers to use of area
 - Parking spaces large enough for those who are parking-challenged
 - Color-coded posts similar to ADA signs

Pick up lots/Cell phone lot

- Having indoor waiting areas for rides but having complete visibility of the parking/waiting area.
- Separate 'loading area'
- Much like the airport
- Near a bus stop so easy accessibility from ride drop off to bus stop
- Time limit of how long someone will sit and wait for rider/no one is parked and you would have to rotate out if your time exceeds
- Protected waiting space if it is outside
 - Shade/shield from weather elements
 - Almost like a complete bus stop with at least three walls and a ceiling

Symbol/Placard

- Different symbol or use existing (handicapped symbol)?
- Symbol applies to beyond those with ASD; i.e., schizophrenics
- Problem: people yelled at for using handicapped spots while lacking physical handicap
- Parking permit for people with ASD
- Cell phone lot/waiting area like at airport for vehicles to wait for passenger pick-up
- Severity of Disability determines type of placard
- Optional Placard?—concern that it would lead to an association with more extreme versions of autism and those who are on the higher end of the spectrum who still need assistance would be more reluctant to use the placard.

- Difference in symbol between mental and physical disabilities—why not just use the universal handicap symbol?
- A different symbol is preferable to stray away from lumping ASD with all disabilities.
- Controversy between combining symbols and making an "asd only" symbol

Bus Stops:

- Not knowing which bus stop to wait at if there are two separate stops on different sides of the same street
- Information kiosks are very helpful
- Training for public on how to use the bus and how the routes work
- More robust route system
- Traveling to medical appointments that bus routes do not access
 - "Medi-cabs"
 - Uber-health insurance offers vouchers to people that use ride share for medical purposes to pay for uber
 - Flexibility with this amenity
 - Time slots
 - Emergency appointments

Bus Ride Experience:

- Crowding of bus during certain times
 - Having no space for yourself or your items
 - Rightsizing the appropriate bus for certain times of day to fit demand
- Seats
 - Cleanliness is a major issue
 - Being so close to strangers invading personal space
 - Wider seats
 - More spaced out seats
- Being boxed in between the window and the person next to you
- A lot of the information the bus gives on screens gives unnecessary information
 - Give relevant information to the bus ride itself
 - Verbal announcements of the bus stop and points of interest (grocery store, etc.)
- Noise
 - Its difficult to hear the announcement of upcoming stop from back of bus
- Visuals for when bus stop is nearing
- Bus driver number always visible to maximize comfort of who is driving
- An person on the bus to help give information and help to those on the bus who may have questions

Biking

• Bike paths that are safe enough would make people in general want to bike more •

Bike Racks

• Lack of bike racks makes them not want to bike. Being uncertain of if there will be a bike rack

Tiny Houses

- Easier to manage
- Not right for everyone, but a significant sub-group could benefit
- Simple, basic necessities only

Duplex

- Soundproofing is critical
- Supportive relationships with the neighbor is beneficial and preferred (Parent/Guardian)
- Non-family supportive member is crucial to permanence of duplex living situation

Housing

- On site amenities are preferred
 - Laundry
 - Yard or nearby to nature/park
 - Accessible to caretaker or support
- Dorm/hotel living is an attractive idea, but could seem institutional
 - Maid service/on-site support could be beneficial option for many



III. Appendix

8. CHARRETTE POSTERS

- 1. "I Need Assistance" Symbol
- 2. Wayfinding/ Navigation
- 3. Accessory Dwelling Units (ADUs)
- 4. Bus Rides
- 5. Drop-off/Pick-up
- 6. Ride Share
- 7. Living Space Development Checklist
- 8. Duplex Living
- 9. Sidewalks
- 10. Bus Routes
- 11. Multi-use Trails
- 12. Outdoor and Street Lighting
- 13. Parking Space
- 14. Bus Stops

- 15. Therapeutic Recreation
- 16. Walkabiltiy
- 17. Crosswalks
- 18. Assistive Technology
- 19. Bike Racks
- 20. Shared Living with Retirees
- 21. Public Wifi and Outlets
- 22. Tiny Homes
- 23. Proximity to Recreation
- 24. Communal Apartment Complex
- 25. Streets
- 26. Technology
- 27. Soothing spaces
- 28. ADA Policy

Welcome to the 2018 Hazel Morrow-Jones Charrette PLANNING AND DESIGN FOR AND WITH ADULTS WITH ASD



KNOWLTON SCHOOL

"I Need Assistance" Symbol

The research demonstrates a clear need for a universal symbol that can be placed in the public realm where people with autism can find assistance when they need it. Many places can be chaotic. Finding this proposed symbol (for instance, on the exterior of stores, schools, in parks, and many other places and situations) may be helpful in loud, crowded spaces to point people who are experiencing sensory overload to find a quiet space. Wayfinding (including site plan and building plan information) could be located near this symbol to ease anxiety or disorientation. Phone numbers (such as in a park or a bus stop) could be provided or perhaps a help button (maybe in a store or an airport terminal) would be available to call someone for assistance.

Background

Autism-Friendly Wayfinding/Navigation

02

01

Wayfinding and navigation are important design aspects for the built envi-ronment. The research shows that adults with ASD especially rely on the as-sistance of wayfinding and navigation design. Wayfinding and navigation in sistance of waymong and navigation design. This may be in relation to specific sites public places are particularly desired. This may be in relation to specific sites (malls, parks, grocery stores) or finding their way around town. Wayfinding and navigation tools tailored to the needs of adults with ASD will increase the rate of successful travel, execution of necessary and optional activities, and independence; while reducing anxiety, confusion, and becoming lost.

Background

Several concerns regarding navigation/wayfinding were addressed during the focus group of ASD adults. Most, if not all, ASD adults recounted examples of challenges in navigation/wayfind-ing that were representative of a pervasive problem. Some described the difficulty in navigating or creating mental maps of their city or the larger Columbus area due to the extensive curving and twisting of roadways.

sire for more grid shaped street layouts was expressed, because of the relative ease of ng where to go, or how to adjust if a planned route is not accessible (which is generally a nge for ASD adduts).

was enjoyed by about haif of the adults, however, was not preferred as a method of trans tion. Usually, adults preferred waiking. They found that the places they were able to waik re more familiar, mental maps were easier to create, landmarks were more recognizable passive forms of transportation (ex - public busses) where they were riders, made naviga nd wayfinding more difficult, due to unfamiliarity. It was found that ASD adults tend to prefe o ne mode of transportation per trip, because of confusion of mixing and linking modes g independence, that may be desired, as well as optional activities/destinations chosen.

d to be a desire around the city, especially for public transit riders, millar identifiar to know when they needed to get off the bus - if pus's onboard visual or audial cuse were ineflective or confusing a applications for navigation and wayfinding were found to be a Dev trawback, was that often times the user friendliness was not

Facts from Research and Literature

Help Us Conceive

-Shape / general design.

-Text or no text.

-Mounting/display ideas for peak effectiveness. -Any specific ideas for implementation.

-Any foreseeable drawbacks to this idea.

-Any new ideas that may be better that this proposal.

1 Karakri, S. M., Shepley, M., Varni, J. W., & Tassinary, L. G. (2017). Noise and autism spectrum disorder in children: An exploratory su Research in Developmental Disabilities, 6385-94. doi:10.1016/j.ridd.2017.02.004

2 Atkinson, S. (2015). Autism and sensory overload. Learning Disability Practice, 18(7), 15.

3 Bmington, A., & Fairnie, J. (2017). A sound advantage: increased auditory capacity in autism. Cognition, 168459-465. doi:10.1016/j.cognition.2017.04.002

4 Richdale, A. L., & Schreck, K. A. (January 01, 2009). Skep problems in autism spectrum disorders. Prevalence, nature, & possible biopsy-chosocial aetiologies. Skep Medicine Reviews, 13, 6, 403–411.

5 Menzinger, B., & Jackson, R. (2009). The effect of light intensity and noise on the classroom behavior of pupils with Asperger syndrome. Support for Learning, 24(4).

monoft, E., Pickles, A., Charman, T., Chandler, S., Loucas, T., & Bard, G. (2008). Psychiatric disorders in children with autism spectrum dens: prevalence, comorbidity, and associated factors in a population-derived sample. Journal of the American Academy of Child & Ad-ent Physichian; 7 (19), 921-939.

Facts from Research and Literature

The following challenges may not all be present in all ASD individuals, but they indicate the scope of what must be considered when making planning decisions. Studies show that people with ASD are more prone to stress, 'anxiety and sensory overload.' This overload te thought to be rooted, in part, in a more intense cognitive processing of sound stimul.' Indi-viduals with ASD suffer from higher rates of sleep problems, related to these auditory issues Light intensity and noise were shown to disproportionately adversely affect the learning of children with ASD. "There is a host of other psychological issues associated with the disor-der: social anxiety, agraphobia, attention deficits, obsessive behaviors, forgetting conse-quential tasks, depression, and eplipey/ ASD automobile drivers report lower driving abil-ties and more socidents and citations.' Parents report significant unmet needs," and the caregiving burden is associated with a pessimistic outlock in mothers. We do not assume that independence, a culturally-prescriptive concept, is what adults with ASD want or need. A preliminary investigation makes it clear, however, that many of them and her families' data fail within the urban planning domain.

Help Us Conceive

-Technology (phones, watches, apps, etc.) can be incorporated into simpler ayfinding/navigation for adults with autism.

-Street layouts that can be designed to assist in easier navigation/ wayfinding for adults with autism.

-Public buildings and/or residential buildings that can be designed to ease navigation/wayfinding for adults with autism.

-Existing landmarks can be utilized for better wayfinding/navigation for adults with autism and a vision for a new landmarking system designed for the public realm.

-Existing maps, color-coding and sign design to make wayfinding/ navigation easier for adults with autism.

-Multisensory wayfinding/navigation that can be incorporated into the public realm without contributing to overstimulation.

Navigation and wayfinding improvements that can specifically be made to make multimodal transportation trips more possible. -Other ideas related to navigation/wayfinding are we missing. Issues or drawbacks to this idea.

Accessory Dwelling Units (ADUs)

Accessory Dwelling Units (ADUs) otherwise known as "granny flats," in-law suites, detached garages, top-floors, or backyard tiny homes are gaining popularity. The reason for this is because they present solutions to several housing related-issues such as affordability, sustainability, and availability, Some examples of this include reduced energy costs due to smaller size, and increased density to meet the increased housing demand within existing communities. For that reason we believe that some variation of ADUs can be implemented to address the concern of independent living in ASD households in an affordable way. ADUs provide housing alternatives that can create opportunity within this community.

Background

Conversations in the city planning and design world on ways to improve independence for adults with autism have been increasing. The logic seems straightforward—adults who want an additional level of independence can live in the backyard or the basement in self-contained units. They can be close enough to parents or caregivers, but have their own place. The logic also extends to affering increased affordability, though the cost of converting old structures into livable homes or constructing new units are often out of reach for the average family.

Our research suggests that The Parents are generally not enthusiastic about the idea of pro-viding ADUs for their adult children. They consider this more of a quick fix instead of a long-term solution. The Parents suggested that duplexes / double units may offer a better solution, especially if the second unit across the wall from the adult with ASD might enjoy becoming helping neighbors. ADUs were also not as popular to The Parents as intentional living (living with people of mixed ages, artists, ex-military families, and others).

It was noted by one parent that ADUs are illegal in most communities, and even if they w most subdivisions have rules that restrict ADUs, superseding the local zoning laws.

Facts from Research and Literature

Research shows that as these children grow into adulthood, they often are unable to live in dependently. Their indefinite stay at their parents' homes creates a financial burden and causes prolonged stress. Research has also shown that the parents of ASD children are more prone to mental health issues as a result of caregiving and the burdens that entails. Parents report significant unmet needs, and the caregiving burden is associated with a per simistic outlook in mothers. We do not assume that independence, a culturally-prescriptive concept, is what adults with ASD want on need. A preliminary investigation makes it clear, however, that many of them and their families' daily challenges concern housing, franspor-tation, and the general built environment, topics that fall within the urban planning domain. Our research may allow us to formulate recommendations for use by planning professional elected officials, real estate developers, and others who wish to better accommodate those ASD citrens.

Help Us Conceive

-Long-term solutions for ADUs. -Variations on the idea of ADUs in the context of intentional neighbor-ing (as opposed to neighboring near caregivers). -Foreseeable drawbacks to this idea. -Any new ideas that may be better.

1 T. G., R., & Ting, M. (2015). Depression and Anxiety among Parents with Autistic Children, Journal Of Payo 191 Brown, H., Qualitete-Kuntz, H., Hunter, D., Kalley, E., Cobigo, V., & Lam, M. (2011). Beyond an Autism Diagnosis: Children's Fur Sependences and Parenta' Ummel Needs. Journal of Autism & Developmental Disorders, 41(10), 1291-1302. doi:10.1007/b10003-0 SLingh'L. (2011). Factors associated with caregiving burden and maternial possimism in mothers of addrescents with an autism Section in Taiman. Docupational Temps (International Reg), 2010. doi:10.1007/b10003-01. Disorder in Taiman. Docupational Temps (International Reg), 2010. doi:10.1007/b10003-01. 3-010-1148-9

Autism-Friendly Bus Rides

04

03

Persons with ASD are more sensitive to sensory input including noise and crowds. Busses are often crowded and noisy. We suggest that improvements be made to the bus ride to improve the experience of adults with ASD. These improvements could include familiar and ASD-friendly bus drivers, disposable ear plugs, and special seating (such as for those with physical disabilities). In addition to improving the interior of the bus, we suggest that more clear announcements are made on the bus when they announce stops, and clear directions are given throughout the bus experience on what to do and how to do it. These instructions could include how to pay, what to do if you begin feeling overwhelmed, how to select your bus stop, and any other important steps to riding the bus. The Adults and The Parents agreed that bus rides are too noisy, overcrowded, confusing (such as knowing which stop is next and not knowing how to use transfer card), and not knowing when to pull cord for stop. Unfamiliar drivers can also cause anxiety to adults with ASD.

Facts from Research and Literature

Help Us Conceive

-An autism-friendly bus ride.

-Block out noise on the bus.

-An ear plug program and implementation. -Best ways to announce the next stop while on the bus (Audio or visual cues or both? How and where should directions be added on the

-Better and new ideas we haven't conceived. -Drawbacks to this proposal.

Modzishi, M. (2014). Architecture for Autism: Autism ASPECTSS in School Design. International Journal of Architectural Research. 8(1), 149-158.
 Zarwaini, S. M., Shepisyi, M., Varri, J. W., & Tassinany, L. G. (2017). Noise and autism spectrum disorder in children: An exploratory survey. Research to Developmental Databitise, 6286-94. doi:10.1016/j.ndd.2017.02.004 3. Advission. 5, 2015. Autism and servery overhead. Learning Debaliship Paradice. 14(7), 15. 4. Remington, A., & Farina, J. (2017). A bound advertinge: Increased auditory supractly in autism: Cognition. 166459-466. doi:10.1016/j.cog micro.2017.03.002

Autism-Friendly Drop-Off & Pick-up

The Adults want reliable transportation that offers the least amount of frustration and stress. Along with the reliable transportation, The Adults will need reliable locations to be picked-up or dropped-off by car.

Background

The Adults should not have to wait for their transportation to arrive due to confusion with directions or the driver not being able to find parking. The specific pick-up area would provide comfort and reassurance to The Adults, as well as the person(s) picking them up.

The Parents mentioned the need for a specific area to pick up their child from college every day. Currently, that parent was forced to "move along" or circle until they could meet their adult child to pick them up. Some of The Parents discussed airport cell-phone lots as an example that could be used for adults with ASD.

There were in-class discussions on implementing drop off/pickup lanes near major landmarks to lesson confusion and increase familiarity. Cell-phone-style pick up areas could be located anywhere and drivers could drive to a mutally-agreed on location to pick someone up. The pick-up lane would be used specifically for drivers transporting adults with autism. (and others who need this type of transportation assistance).

Autism-Friendly Rides

06

05

The Adults and The Parents feel strongly about having access to reliable forms of transportation for adults with autism. Although not always the preferred form of transportation, rideshare services (Uber, Lyft) and car services (private) are used by adults with autism for important transportation needs when more preferred forms of transportation are unavailable. Transforming the rideshare experience to be more reliable and predictable could increase the level of comfort when using these services, resulting in adults with autism feeling more confident to use them for travel and becoming more connected with their communities.

Background

Is idea for an ASD-friendly rideshare and transportation service experiences arose during class scussion on The Adults' and The Parents' responses. Alternative methods of transportation are scessary due to barriers that adults with autism face in driving, accessing/riding public transortation, lack of proximity (walkability) to resources, and limitations with depending on family/ ends for transportation needs.

Currently, rideshares and transportation services both have significant limitations and are diffiult to use efficiently and comfortably. Rideshares (such as Uber and Lyft) have different drivers ho choose different routes for each trip. This unpredictability is a deterrent to The Adults due to increased anxiety, tack of trust for the driver, and spatial confusion when traveling along an infamiliar route. During conversations about transportation, The Adults shared that they prefer to how the people who are driving them, and that it's difficult to get to know many drivers. ransportation services (often paid for by public or nonprofit agencies) are often unreliable, takna hours to arrive.

"Like the longest I'll wait, that I'm willing to wait, is an hour and a half."

When asked about their experiences. The Adults mentioned that it took long enough for the ar service to arrive that the event they completely missed the event they were trying to attend. some of The Adults were more likely to use the unreliable pick up service than a rideshare such us Uber due to increased predictability and trustworthiness of the company and driver, but the non wait times and undependable service are unfair and limit the ability to plan or get to places and wait set and undependable service are unfair and limit the ability to plan or get to places and the set of the set of the set of the set of the company and driver. But the set of the s

Ithough not currently a preferred option of transportation for adults with autism, ASD-Iriendly deshare and transportation agency services have the potential to increase the freedom and onnecutivy of adults with autism. Combining the characteristic trust and predictability of ageny services with the reliability and convenience of rideshare can begin to help adults with autism ecome more confident to use this option for traveling alone and visiting more destinations, both menity and leasure, within their communities.

Facts from Research and Literature

Pick-up lanes allow separation between continuous traffic and stopped traffic to prevent trafic spillover. Pick-up areas provide familiarity and lesson confusion. This infrastructure would assuage most issues with sensory overload. This overload is thought to be rooted, in part, in more intense cognitive processing of sound stimuli. The Adults indicate that they want assects of their lives (including being picked up) as formalized as possible to prevent frustra-

Help Us Conceive

-Pick-up lanes that can be informally utilized near amenities that do not have pick-up lanes.

- -Structures if any that might be included near well-used pick-up lanes to add a layer of comfort to persons with autism
- -Pick-up lanes designed to lessen sensory overload.
- -Design and systems for pick-up (cell-phone style) area.
- -Any foreseeable drawbacks to this idea.
- -Any new ideas that may be better than this proposal.

1 Remington, A., & Fairnie, J. (2017). A sound advantage: Increased auditory capacity in autism. Cognition, 168459-465. doi:10.1016/j.cogntion.2017.04.002

Facts from Research and Literature

Adults with ASD report lower driving abilities and more accidents and citations.¹ Studies show that people with ASD are more prone to stress², anxiety and sensory overload.

lavigating the physical and social environment can be challenging for people with ASD. ransportation is an issue that impacts all areas of the lives of adults with ASD. * soing deeper into this topic may bring about new information which enables us to devise ew ways in which planners can make available transportation options more ASD-friendly.

Help Us Conceive

-An autism-friendly Uber/Lyft. -Improved scheduled transportation services. -Any foreseeable drawbacks to this idea. -Any new ideas that may better this proposal.

Living Space Development Checklist

07

The research suggests that there has been a continuing push for adults with autism to become more independent and live on their own or with others that are not their parents. One parent said:

My son is 33 who's still living at home has aspirations for being independent and my wife and I think it's possible, but we don't know if it's really possible. Different development designs and living situations such as wider hallways or silent closing cabinets can offer varying accommodations for adults with autism. We can use this information to create a grading scale where living spaces can be ranked based on how accommodating they are to adults with autism. These checklists could be used to help current developments to learn exactly what needs that adults with autism have and improve their living spaces based on those needs.

Autism-Friendly Duplex Living

08

Housing options are a big topic of discussion for everyone when they think about moving away from their parent(s) or guardian(s). The process of mov-ing out, although possibly desired, is much more difficult for adults with ASD. As affordability and availability of housing options becomes more limited for everybody, the challenge has not been made any easier. An effective option for people with ASD may be a duplex home. One half of the house could be occupied by a person who is high on the spectrum and the other side would be used by either a parent or intentional neighbor who could keep an eye on them, yet allow for them to live "alone."

Background

sing opportunities for adults on the spectrum has been a very thought-provoking sub-in studio discussions, and revolve around a common theme—independence. The term is aly defined and thought of differently by all people. The level of independence desired by e is much different than others, and the same is true for adults with ASD. With the depen-elevel fluctuating severely between individuals, duplex housing seemed to be a way to eve full independence yet still have a support system present if the need arises.

Also kind of need a break... and (won't] always be there. So we've thought about the duplex living with our kids being roommatics on one side and having the other half of the duplex be both of ours but one set of parents will be there six months out of the year and the other par-ents be there the other six months out of the year.

This notion brought excitement and sparked conversation with the rest of The Parents. Cost of living and transportation issues seemed to be the main issues, although there were also wor-ries about maintaining daily routines. The idea for ADUs (accessory dwelling units- garages or backyard buildings-turned new homes) for adults with ASD has been a popular topic since the studio began back in the fall, although zoning and other restrictions make it difficult for people to build additional housing space on their property.

Duplex living can allow for a caretaker other property. Duplex living can allow for a caretaker other than the parents to help as well. This could be a family friend, retired neighbor, or even a veteran tooking to positively influence society. Parents could still occupy the other side of the house if they wanted to be close by. Regardless of the neighbor selection, this style of living could revolutionize the Idea of Independence for adults with ASD and anyone who wishes to live alone but may not have the skills to be completely by themselves. A well-implemented duplex housing system for disabled citizens could help de-velop a more community-angaged society that focuses on the well-being of all, not just those who can afford it.

Facts from Research and Literature

Help Us Conceive

-Categories that should be on this checklist. -Incentives for developments that decide they want to be autism-friendly.

Amgo Family Courseling, LLC. (2017). Home page. http://amigodemitycourseling.com. Andereo. K. A. (2014). Prevalence and correlated of postascondary realished atable among young adults with an audism spactnum dis-conduction. (2014). Revealence and correlated of postascondary realished atable among young adults with an audism spactnum dis-conduction. (2014). Revealence and correlated of postascondary realished atable among young adults with an audism spactnum dis-conduction. (2014). Revealence and correlated of postascondary realished atable among young adults with an audism spactnum dis-conduction. (2014). Revealence and correlated of postascondary realished atable among young adults with an audism spactnum dis-conduction. (2014). Revealence and correlated of postascondary realished atable among young adults with an audism spactnum dis-conduction. (2014). Revealence and correlated of postascondary realished atable among young adults with an audism spactnum dis-conduction. (2014). Revealence and correlated of postascondary realished atable atabl

Facts from Research and Literature

Our preliminary discussions with Dr. Emilio Amigo, clinical psychologist at Amigo Family Coun-seing, LLC, have indicated that many with ASD fail off the clift," as they age out of childhood support programs while continuing to lack the skills for independent living. ⁴ Of those aged 21 to 25, only 17% have ever Invel independently. This demonstrates a serious lack of attention to housing options for adults who fail on the spectrum. In addition, only 15% of young adults with ASD are employed full-time, according to research by the National Autistic Society of Wales.³ With a very small percentage of adults with ASD holding a steady moorne, living options be-come even more scarce. A duplex style of home would allow for both the child and parents to be more independent yet still keep access to a support system.

earch has shown that parents of children on the spectrum are more prone to mental health is as a result of care-giving and the stress that comes along with it. * Parents report sig-ant unmet needs, * and the care-giving burden is associated with a pessimistic outlook m res. * For these reasons it is essential to devise a housing strategy that allows for both pa and young adults with ASD to live more independently and most importantly, thrive.

Help Us Conceive

-A plan design (idea) to implement this housing style including location (proximity to services), policy (subsidies, building initiatives, government funding)

-Ideas for a tenant pairing process. (Who might assist the adult with ASD & occupy other side of duplex? (Veterans, retired citizens of the community, family friend, parent/guardian))

-Better ideas.

-Foreseeable drawbacks to this idea.

¹ Ango Family Counseling, LLC. (2017). Home page. http://amigofamilycounseling.com. 2 Anderson, K A. (2014). Prevalence and correlated of postsecondary realisations adults attacts among young adults with an autism spectrum dis-order. Autom. It is metamotinal journal research and practices. 1985; 362-350.
3 Lever, M. (2016). Too Much Information: The Autism Employment Giap (Pegs). National Autistic Society
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Autism-Friendly Sidewalks

Research shows that people with autism are prone to sensory overload from colors, noise, and visual design. Based upon this research, it is obvious that there is a need for a shift in design to produce a more autistic-friendly side-walk. Sidewalks in urban and suburban neighborhoods generally do not take autism into consideration. In rural communities there is a lack of sidewalks. Because of the close proximity of potential sidewalks and high-speed oncoming traffic, a significant barrier between the sidewalk and the road needs to be established. Widening and special markings, modal separation opportunities that keep pedestrians sale, vegetation barriers and green space are opportu-nities for autism-friendly sidewalks. In addition, constructing sidewalks that are neutral in color, implementing planting strips/vegetation to potentially decrease noise pollution, and producing a straightforward and usable design is crucial.

Background

The Parents recognized the importance of walking for transportation and recreational pur-poses. The Parents calimed that they fell safer if their child was walking in a neighborhood where sidewalks were available. The Parents and The Adults also stressed that sidewalks are important for comfortable and confident movement. Especially in unban environments, the Parents expressed they feel that adults with ASD would feel safer, and they would feel better, too, when walking on a sidewalk that is closer to the front of buildings. According to The Par-ents, sidewalks being closer to the building line means more "eyes on the street." This will create an environment where adults with autism and their parents can feel safe walking in, it was mentioned several lines that there are no sidewalks available to those who live in rural communities. It was also mentioned and confirmed that if sidewalks were available neither the autistic adult or the parent would feel comfortable utilizing them. Most sidewalks in a rural community are alongside a road with a relatively high-speed limit. Widening the recommend-ed 4-loot width planting strip will create more space between the driving lane and the side-walk and could help create a noise barrier to reduce earsony overload. The Parents and The Adult mentioned the lack of bike path/anes which forces the adults with ASD to ride their bike accommodate bikes somehow could help pedestrians in the process.

Autism-Friendly Bus Routes

10

09

Due to a low percentage of adults with ASD having driver's licenses, many are limited to public transportation to meet their transportation needs. Shortened ride times would help adults with ASD be able to use public transportation more frequently. Most importantly. The Adults noted the inconvenience of routes going downtown as inconvenient and adding unnecessary time to trips. (Discussion and in-class research show that many cities have a wheel/spoke route system.) Adding more cross-town routes that do not re-quire transfers downtown would make COTA more usable for many adults with ASD. In addition to lessening the number of routes that require trans-ters downtown, an increase in lines that service the resources adults with ASD need to access (including therapy locations, grocery stores, continuing education sites, etc.).

Facts from Research and Literature

"One study demonstrated that occupants of neighborhoods with lower automobile "burdens" and higher concentrations of open green space experienced less stress and reported higher levels of health." Through research, a consensus was made that vegetation and green space actually helped to reduce anxiety and stress.

"The following challenges may not all be present in all ASD individuals, but they indicate the scope of what must be considered when making planning decisions. Studies show that people with ASD are more prone to stress," anwiety and sensory overload." This overload is thought to be rooted, in part, in a more intense cognitive processing of sound stimuli. I indi-viduals with ASD suffer from higher rates of sleep problems, related to these auditory issues 8 Light intensity and noise were shown to disproportionately adversely affect the learning of children with ASD. "There is a host of other psychological issues associated with the disor-der: social anxiety, agoraphobia, attention deficits, obsessive behaviors, forgetting conse-quential tasks, depression, and epilepsy."

Help Us Conceive

-The color, shape, and materials of an autism-friendly sidewalk. -The dimensions of the autism-friendly sidewalk. -The look and dimensions of landscaping and planting strips that accompany the sidewalk.

-What kind of sidewalk to implement in different environments. -Other ideas we missed.

-Issue or problems associated with this idea.

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alen 2017 04.00 Rochtak AL, 45 Schreck, KA, Qlawaray GJ, 2009, Slee oproblema in aufäinis spectram Glorother: Prevalence, nature, & possible bio-sychosocial aetologies. Sleep Medicine Review, 15, 6, 403-411. Menrager, BL, & Buckson, R. (2009). The effect of thigh interview rule note classroom behavior of pupils with Aegregers syndrome. Apport for Learning, 2440. Smooth, E., Prodesan, R. (2009). The effect of thigh interview rule for a single syndrome. Smooth, E., Prodesan, R. (2009). The effect of thigh interview rule for a single syndrome. Smooth E., Prodesan, R. (2009). The effect of thigh interview rule for a single syndrome. Smooth E., Prodesan, R. (2009). The effect of the interview rule for a single syndrome. Smooth E., Prodesand, A., Ohrman, T., Chandler, S., Loudas, T. & Baird, G. (2008). Psychiatric disorders in children with autism spectrum societar: previsione, comobility, and associated factors in a population-derived sample. Journal of the Americain Academy of Child & Ad-Beam Psychiatry (19), 820-800.

Facts from Research and Literature

Help Us Conceive

An Autism-friendly bus routes. An Autism-friendly bus route identifier system. Better ideas we haven't conceived. Drawbacks to this proposal.

Autism-Friendly Multi-use Trails

11

According to our research, there is a need for recreation infrastructure such as multi-use trails that accommodate some of the specific needs of the autistic community. Multi-use trails incorporate cyclists and pedestrians whereas typical trails can be narrow with lots of activity, making users feel crowded and uncomfortable. Without clearly labeled directions, these trails can be hazardous. This can be especially true for individuals with autism. What should be a pleasant and peaceful experience is often a series of conflicts. At a minimum, an autism-friendly multi-use trail has clearly labeled symbols that organizes multi-modal traffic flow without fear of possibly being involved in a collision.

Background

The Parents expressed that their children with autism used biking and waiking as a common recreational activity, as well as a primary mode of independent transportation. Family mem-bers mentioned their concerns regarding the use and safety of current multi-use trails (or lack thereot). There are extra steps taken into consideration for the design of this multi-use trail such as a sense of safety, direction, organization, and clarity. These attributes will assure that this multi-use trail operates as stmoothy and safely as possible with minimal to no confusion on its intended directions and function. A parent said.

... My son will walk a lot of places. And luckily we're close to it and especially he rides his bike everywhere too. Tons of places. He could get himsell arcund town. What has been really helpful is they have put in a lot of sidewalks, umm I don't think you're supposed to be riding on side-walks necessarily but he rides on the sidewalks and I'm grateful for hat...

Autism-Friendly Outdoor and Street Lighting

12

Our research demonstrates a need for calming and aesthetically pleasing autism-friend-Via lighting within public spaces such as parks and along sidewalks and strets. Height-ened visual and audio senses are a common trait amongst those on the spectrum along with extreme sensitivity. The public realm is already a place that is keen to sensory overload which can lead to stress and even emotional turnoil. The Parent's gave insight as to what some of these 'episodes' entail. One parent expressed that certain sensory stimulants such as a baby cry can raise anxiety levels:

His anxiety level goes through the root and at that point he will start becoming verbal and

With something as simple as proper light lixtures, brightness, color, and controlling the flicker and buzzing sound. fluorescent lights have can act as a calming agent for those with ASD or any sensory disorder.

Background

The idea for custom lighting for those on the spectrum stemmed from both The Adults, The Parent's, and in-depth class discussion. The Parents were concerned for their child venturing into the public realm alone and potentially having an emotional breakdown or panic attack due to sensory overload. Seeing that people on the spectrum are very prone to stress and anxiety, it became apparent that something in the public realm needed to act as a calming agent.

In our studio, we reviewed the focus group data and furthered our research and discovered that the lighting and color in a room can heavily affect a person's mood and actions. This is where the idea of autism-friendly publicistreet lights derived. This asset should be implement-ed almost everywhere and will act as a calming agent for not only those on the spectrum, but for all people.

Facts from Research and Literature

Facts from Research and Literature

Help Us Conceive

-Better ideas than this one.

Focus groups are known for eliciting qualitative and personal responses. Planners often deal with the birds-eye view, analyzing a region's demographics and finances, constructing maps etc. The troubled histories of Robent Moses, Pruit Igoe, et al. demonstrate a hard-worn truth in the field: a plan is fatally incomplete without an intimate understanding of how affected res idents actually live and what they asynalions actually are. Today's planning practice already affects those with ASD: we hope to better understand how the practice can be made to bet-ter sense they are made to better understand how the practice can be made to bet-

The Olentangy Trail meets the average dimensions of multi-use paths at roughly 10 ft in width. According to AASHTO Guide for the Development of Bicycle Facilities, (Chapter 5 De sign of Shared-Use Paths), 11-14 feet are recommended in high pedestrian areas.

-The width of an autism-friendly multi-purpose path and why -Additional elements would increase safety and tranquility

-Drawbacks to this idea that aren't currently seen

recording to the openance openance of Energing and nearly recharded nearly reactions. There is a mocopreta pro-
motion of increasing the use of fluorescent lamps and phasing out incandescent lights. However, many diseases
such as Lupus, Migraine, Epilepsy, HIV, Fibromyalgia, Autism and Asperger's Syndrome are all hypersensitive and
aggravated in the presence of compact fluorescent lights. Although phasing out incandescent light bulbs is a more
energy efficient choice, there is little to know consideration for those who fall along the ASD spectrum and oth-
or types of diseases ? Fluxescent lights are particularly povious to autistic individuals. When a fluxescent tube is
connected to main's line voltage the corresponding 50 or 60 HZ code of alternating current causes the codical dis-
comparison of the instrument of the comparison of the instrument of the comparison of the instrument comparison of the instrument of the
Diarge of the formated gas contained of the table. This is due to the fact that the formated gas carried conduct electric-
ity until the voltage is close to its maximum level. This provides a flicker and buzzing effect which most autistic indi-
viduals find disturbing. One way to help this disturbance is the type of light bulb being used and direction in which
the light is being emitted. *One example is suspended horizontal lights that have been equipped with light-emit-
ting diode (LED) lights to provide full-spectrum light guality. The futures are positioned to direct the light up to the
ceiling, thereby allowing light to reflect and be diffused with natural light, which eliminates shadows and place. The
climination of these elements would have a positive impact on how lighting effects these on the execting. This ispe-
emination of these elements would have a positive impact on now lighting allects trose on the spectrum. This type
of light sensitivity is not present in all persons on the spectrum which only widens the scope of what needs to be
planned so that all people with ASD can thrive. 4 This hypersensitivity is complicated by visual stress-producing fac-
tors that overload their visual environment and compromising their eves and brains. By designing a type of street
Each that does not have this constitue affect will have presented with this classing process.

Help Us Conceive

-Autism-friendly lighting design including:

- -Color or colors. -Direction of light rays.
- -Bulb type.
- -Environmental considerations. -Added features to lighting structure.
- -Implementation.
- -Foreseeable drawbacks.
- -New ideas that may be better than this proposal.

19CENIHR, "http://Ljournal.nu/Wp-Content/Uploads/2017/03/a-2017/023.Pdf." Request for an opinion on "Light Sensitivity", 2017, doi:10.10411/ji.2017.023. 2 Casa. M. "Ysaal Sensitivey and Autism." Contical Charvinism, 28 Sept. 2017, controlat/heuvinism.com/2017/0925/visual-sensitivity-and-au

sm/ Gianes, Kriss, Designing for autism spectrum disorders Routledge, 2016. I Munitor, Robin. Tught Genetishiy and Autien. ADHD, SFD and Devisionmental Delays." Epidemic Answers, Epidemic Answers, 19 Apr. Vir « andiumidiamaturg and bible sensitivitie and autima data logid devisiopmental delays).

Autism-Friendly Parking Space

13

People on the autism spectrum have a need for different considerations when it comes to parking spaces. Much of the data gained through The Parent demonstrated that a limited number of autistic people drive, however, those that do all face similar challenges while on the road. These individuals can benefit from changes in policies and the built environment that relieve the stress of driving. In order to help individuals on the autism spectrum, there should be a policy shift to allow those that have any type of handicap that would necessitate a closer proximity to park in handicap spots, whether the disability is physical or mental. There is also data that suggests that those with autism could benefit from wider spaces. This could also be applied to parking spaces to provide more space and alleviate anxiety when parking and entering or exiting the vehicle.

Background

The idea for an autism-friendly parking space arose from conversations regarding other topics and projects. It was not a direct idea in either focus group, but more a derivation from multiple talks.

One topic that led to this local was the discussion surrounding increased stoewak worths. There is research that shows that individuals with ASD require more space to feel controlhable in an atea. This theory could be applied to parking spaces to help cases some of the anxiety that develops for those on the sublem spacing that out of the ... Equive that more space to park and get in and out of their vehicle, decreasing at least some of the potential stress associated with parking. The idea for a wider parking space is one that not only helps those with ASD, but those with all types of disabilities.

Another main topic of discussion during class periods from The Adults and The Parents was the subject of proximity. Whether it was access to transportation choices or access to servicas/accetatorial activities, proximity was important. The Adults mentioned proximity mostly for safety as well as psychological comfort. Adultic adults face issues with anxiety while driving around parking lots looking for open spots. Handleap spots provide guaranteed places to park that are generally located close to entrances and have infrastructure built to accommodate those while disabilities. Laws regarding who can obtain a handleap parking placated vary from state to state but hundleap spots are usually located closes to entrances, allowing for ease of access. Some states allow those with autism/their tamilies to obtain handleap placards out some do not. Unifying these polices of allow for those that are un the autiem spectrum to obtain thandleap placards with minimal extra effort would be very height for people with ASD that drive.

Comparing the data gathered from news discussions and focus groups brough us to the conclusion that there was a need for an autism friendly parking space. From there we have started coming up with ideas as to what that may look like as well as how and where it would be implemented.

Autism-Friendly Bus Stops

14

Riding the bus (or any other form of public transit) begins and ends with a stop. Due to elevated anxiety and sensory sensitivity, the bus stop can turn adults with ASD away from using public transportation. We conceive autism-friendly bus stops and bus stop identification designs, Ideas for bus stop design could begin with weather-friendly construction and technologically in mind. Improving the identification of bus stops should be based on the bus's destination rather than by common street intersections (commonly identified as such) since landmarks are often used as direction and destination indicators for adults with ASD.

Background

Through focus groups and in-class discussion, it was made clear that bus stops locations are not intuilive or convanient often with confusing and unapproachable designs. Going out in public is already an anxiety-inducing experience for many adults with ASD. When adding in the confusion of riding public transit, many adults with ASD may opt for less independence instead of trying to navigate public transit.

Our research suggests that many adults with ASD like to know their surroundings and preplan before arriving at an unfamiliar destination. When arriving at a bus stop very early and in extreme weather many stops are not conducive for this. Identifiable, weather resistant, and technologically-friendly bus stops can help create an autism-friendly space that can lessen arriviety.

Many bus stops should be identified by nearby landmarks. The Parents mentioned their adult childran with ASD sometimes have trouble knowing where to get off the bus, leading to participants riding the bus for hours. The Parents suggested that familiar landmarks are an important for clarity and to lesson confusion, which is why we believe that bus stops might before be indicated by landmarks they are near (le. Main Library, or State House), Another idea could be adding landmarks to the bus route maps, to help adults with ASD know the relation of the stops to different landmarks.

Facts from Research and Literature

ADD advances of these match tower serving actimets and more accelerate and selectors. "We and served transport me focus originate and memory hower for the point of the active acceleration stress and particle controls along to have your personal service them: Movewer, there that do not be face accessed anxiety due to them; so double of them control. For instance, new of the parents on the docal groups along of them and the particle along the docated access to access the particle access to access the parents on the docal groups along of them and the particle along the docated access to access the particle access to access the parents one of the docated groups along of them and the parent of the parents one access to access the parents one of the parent of the parents one of the parents one of the parents one of the parents one of the parent of the parent of the source of the parents one of the parents one of the parents one of the parent of the parent of the parent of the parent of the source of the parent of the parent of the parents one of the parent of the parent

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Since there are an energy through the are as 4.0 the commol of the automotion more, there should be affords to remarking the answry. That goes along with diving content to that they can gain more independence. The assurance of a web endogh, accessible participation and waits more acade were ASD to be common responses arows.

Current ADA internant standards request that research susmable participations must be \$1 web and we accessible space must be \$1 mixed. The space may not be web encaptrior more on the substrategroup to takely and combinately perior to

Help Us Conceive

-Policy to allow for people with ASD to park in handicap parking spaces legally.

-Autism-friendly parking space design that can be wider but not interfere with the flow of traffic in order to create a more accommodating parking space for those with ASD as well as other handicaps. -Any other Ideas beyond ours. -Drawbacks and issues.

1 B. P. Daly. (2014). Driving Behaviors in Adults with Aulism Spectrum Disorders. Journal of Aulism and Developmental Disorders, 44(12) 3110-3128.

2 Accessible Parking. (2017). Retrieved February 14, 2018, from http://adata.org/factsheet/parking

Facts from Research and Literature

"Studies show that people with ASD are more prone to stress, anxiety and sensory overload." $^{\prime\prime}$, $^{\circ}$

Load. "~".
While there is virtually no direct city planning research on the public participation process and tools planners use in the practices that is specific to autistic citizens, there is ASD-specific work being done regarding landmarks and individual attractures. For instance, permanent landmarks have been found to help adults with the disorder orient themselves."

Help Us Conceive

-Autism-friendly bus stop placement decisions. -[Along certain routes? / Along all routes as a system? /Spaced out randomly?

-How?/where to make tie landmarks to bus stops / How to identify

"landmarks" as bus stop identifiers] -Better ideas than what is in this proposal.

-Anything we have overlooked

-Drawbacks to this proposal.

Therapeutic Recreation

15

The research suggests that recreation is an important aspect of the lives of adults with ASD. Preferred recreational activities vary by individual, however, a desire for access to therapeutic recreation exists. All forms of recreation may serve a therapeutic purpose, yet certain activities seem to specifically hold more therapeutic characteristics. Access to therapeutic recreation is expected to be important to build confidence, responsibility, independence, and relieve anxiety.

Background

Walkability with Autism in Mind

16

Adults with autism are often unable to access different services or amenities because they are not within walking distance. Increasing the number of safe, clean, and walkable streets and trails could allow adults with ASD to access a wider variety of services and amenities by foot as opposed to relying on a vehicle or rideshare service. Walkability is something that planners often discuss because people generally enjoy walkable communities; however, creating a walkable community for adults with ASD could be considered even more essential because of the large number adults with ASD who do not drive.

Background

It was clear that many The Adults desired increased waikability and connectivity in their neigh-borhoods. Most of The Adults expressed that they did not drive due to several reasons including: fear, repair fees, anxiety, spatial issues with perception, too many rules and signs, the inability to form montal maps (to name a feW).

Additionally, many of The Adults discussed how they would prefer to walk places as opposed to biking there because most believe biking is not practical for them due to the lack of bike lanes, issues in spatial perception, and perceived safety.

Facts from Research and Literature

Help Us Conceive

-Therapeutic recreation activities that can be incorporated into neighborhood design or public programming. -Therapeutic recreation activities that are easily accessible in the pub-

-Therapeutic recreation activities that can be incorporated into resi-

-Other ideas related to therapeutic recreation are we missing. -Drawbacks and issues to this idea.

Kanakin, S. M., Shepley, M., Yami, J. W., & Tasisniany, L. G. (2017). Noise and autism spectrum disorder in children: An exploratory survey. Research in Diversignmental Disabilities, 6386-94, doi:10.1016/j.0062.007.102.003 (arX), 155. B. Berningtion, A., & Farriera, J. 2017). A nound advantage: Increased autidrox capacity in eatient. Cognition. 160459-465, doi:10.1016/j.cog. relici.2017.04.002 (arX), arXiv:2017.04.002 (arX), arXiv:2017.051. B. Brichales, A. L., & Schneis, K. A. (January 10, 2005). Steep problems in autient spectrum disorders: Prevalence, nature, & possible biopsy-biol. 2017; A. B. Schneis, K. A. (January 10, 2005). Steep problems in autient spectrum disorders: Prevalence, nature, & possible biopsy-biol. School. B. (2005). The effect of light intensely and noise on the classecom behavior of pupits with Appinger syndrome. Support for Lamma, 24(4).

Facts from Research and Literature

The following challenges may not all be present in all ASD individuals, but they indicate the scope of what must be considered when making planning decisions. Studies show that peo-ple with ASD are more prone to stress, anxiety and sensory overload. I Additionally, it's true that Individuals with ASD who are current drivers may experience more difficulties in driving behaviors and engage in more problematic driving behaviors relative to non-ASD drivers.⁹

Help Us Conceive

-Autism-friendly walkable communities. -Infrastructure and policies that can be put in place to create autismfriendly walkable communities. -Any other or better ideas. -Drawbacks and issues.

1 Ablinson, S. (2015), Austism and sensory overload. Learning Disability Practice, 18 (7), 15. 2 Daiv, B.P. Nichols, E.G., Patrick, K.E. et al. J. Autism Dev Disord (2014) 44:3119. https://doi.org/10.1007/s10803-014-2166-y

Autism-Friendly Crosswalks

Our research suggests that safe and reliable crosswalks can benefit all people when accommodating adults on the spectrum. For example, or osswalks could be wider, and more vibrant. The implementation of visible crosswalks will motivate adults on the spectrum to integrate themselves into the public and be outdoors. Crosswalks should be placed near schools, communities, and healthcare facilities to make areas more accessible to adults on the spectrum. They provide comfort and avoid complication that leads to fear and nervousness among adults on the spectrum.

"Walking isn't really an option." - The Parents.

Background

The Adults and The Parents discussed the necessities of providing safe and reliable crosswalks as well as easy-to-understand traffic signs. The Parents stated that the autistic adults tend to have trouble using crossalks due of the lack of instructional signs which can then lead to anxiety and stress within the public realm.

When adults on the spectrum try to use crosswalks to get to destinations such as bus stops, crosswalks are often nonexistent or dangerous. In addition, impediments to accessing crosswalks (if they exist) such as a pole blocking the path of pedestrians who use sidewalks. The Parent discussed how technology is enjoyed by adults with autism, and technology has the potential to improve autism-friendly crosswalks. For instance, one conversation by The Parents included a goal of implementing technology in crosswalks to offer consistency and security.

Creating autism -friendly crosswalks will offer better amenities such as, safety, familiarity cross-

Assistive Technology

18

17

The research acknowledges a desire to incorporate assistive technology into everyday life. As our lives become more hectic and busy, our reliance on technology grows. The city can be a confusing place, especially managing public transit routes and waylinding. All of this can be easier if you have a watch, phone, or glasses to help guide you. An app on any one of these devices can provide a multifude of services including but not limited to, navigating public transit, and providing effective waylinding through augmented reality.

Background

The original idea for this was described by the naterine, one of whom recollected a time at a semicinar where an app was presented that acted as a personal assistant. The app would ask when, where, and how the person wants to arrive at a destination and then provide step by step instructions on how to get there. The app can also serve in emergency situations when the owner of the phone needs to communicate with first responders but has become non-responsive.

The Parents and planners both agreed this idea could bridge the worlds of autistic and neuro-typical individuals. Initially, it was imagined on a phone, a laptop, or an iPad. However, after the idea had been discussed, it was conceived to be on many more platforms such as smart watches, glasses, and goggles, in the refining process, it appeared the app could vary in intensity between a simple reminder on a watch to get off at the next bus stop or as complex as glasses or goggles super imposing objects.

Augmented reality could expand upon the effectiveness of wayfinding, to gain a before understanding of what augmented reality is, one parent covers the description stating... "It overlays reality on top of real life. So you're looking at your phone its using the camera and super imposing things with your real reality... that is augmented reality. It is the melding of the real with the virtual."

Facts from Research and Literature

This overload is thought to be rooted, in part, in a more intense cognitive processing of sound stimuli.¹ Individuals with ASD suffer from higher rates of sleep problems, related to these auditory issues.³ The research indicates that adults on the spectrum are prone to sensory overload, such as a crying baby, and often fear unfamiliar people. It also indicates that autistic adults often follow a daily routine. By implementing a visible and autism- friendby crosswalk into their daily routine will alleviate stress and implement familiarity with public spaces.

In addition, there are many challenges that those with ASD face as they are out door and with the public. A research demonstrate that walking can act as not only exercise, but it is also a therapeutic activity. The following challenges may not all be present in all ASD individuals, but this only expands the scope of what must be considered when making planning decisions that involve those along the spectrum. Studies show that people with ASD are more prone to stress,² anxiety and sensory overload.⁴

Help Us Conceive

-The design of an autism-friendly crosswalk.

-Types of technology that could improve crosswalk-related signage that is autism-friendly.

-Other ideas.

-What we haven't conceived. Issues or problems.

 Bernington, A., & Fairnie, J. (2017). A sound advantage: Increased auditory capacity in autism. Cognition, 166459-465, doi:10.1016/j.cognition.2017.04.002
 Brichalas, A. L., & Schreek, K. A. (January 01, 2009). Seep problems in autism spectrum disorders: Prevalence, nature, & possible biopsychosocial aetiologies. Steep Medicine Review, J. St., 403-411.
 Shanari, S. M., Shappi, M., Yauni, J. Y., & Batanayi, L. G. 2007). Noise and autism spectrum disorder in children: An exploratory survey. Pleasach In Developmental Databilise, 0565 e4, doi:10.1016/j.idd.2017.0204
 Advance, F. G. W.J., Autism and Homoyo evendua. Learning Batalay Fraudes (H07), 15

Facts from Research and Literature

While the app and its uses are still being cullivated, the need to rassistive technology persets. People with ASD can sometimes struggle throughout the built anvironment due to their becularities in perceiving space. There is a host of other psychological issues associated with the disorder is anal anxiety, agoraphobia, attention utificitie, obsessive behaviors, forgetling consequential tasks, depression, and epilepsy? All of which could be mitigated or reduced with sestious technology.

Psychiatric disorders in children with autism spectrum disorders: prevalence, comorbidity, and associated factors in a population-derived sample

Help Us Conceive

-The workings of this wayfinding app idea. -Low tech (downloaded city map that can be used offline) vs hightech? (Reminders on a watch vs augmented reality?) -Best platforms. (Phone vs watch vs glasses) -Other specific recommendations or new ideas. I-mplementation.

1 Simonoff, E., Pickles, A., Charman, T., Chandler, S., Loucas, T. & Baird, G. (2008). Journal of the American Academy of Child & Adolescent Psychiatry. 47(8), 921-929.

Autism-Friendly Bike Racks

Some of The Adults would use a bicycle for transport if given the opportunity, Bicycling produces less worry in an individual with autism than driving a car on their own or even learning how to achieve their learner's permit. However, there are different sets of stressors for bicycling. Lack of bike lanes or cars not sharing the road appropriately can cause frustration and stress, but approaching a destination without an area to adequately park and secure a bicycle will ratchet the stress inside an individual. By placing bike racks in suitable and near known amenities, The Adults would have a new avenue of independence with riding a bicycle to a local park or convenience store.

Background

Bike racks were only mentioned once in the focus group held with The Adults; however, bicy-cles and the yearning for independence in transportation was a theme throughout the focus group. Unlike with riding the bus, using rideshare services, or going through the process of learning how to drive, riding a bicycle takes no more than some help from a family member or friend. Bicycle riding has a low barrier to entry and would be a confidence builder for The Adults as they would be able to travel to destinations on their own – without having to wait around for over an hour.

In regards to bike racks, one of The Adults said: "Well, typically, I mean in the summertime bike lanes and – well, in the summertime, places to lock up a bike is the biggest obstrate." Despite being the only mention of bike racks, it reveals a need for a security.

Bike racks are often signifiers for well-trafficked areas, such as stores, office buildings, parks, and scenic areas – places that The Adults discussed about visiting if they had reliable trans-portation. Yet, bike racks are regularly stewn about cities with little to no planning method aside from a general nearness to amenities. The racks must be installed appropriately and side well for them to be used properly. With properly sided bike racks, the bike racks could easily be used as landmarks for The Adults as well as a security layer.

Shared Living with Retirees

20

19

Adults with ASD can struggle when they reach what is often referred to as "the cliff," "The cliff" represents what happens to an adult with ASD when they reach the age of 18 and stop receiving critical services. Often, many adults struggle to live on their own and would prefer either a roommate or adults strugger to red or rules over a providing a housing option which someone to assist them with services. By providing a housing option which allows adults with ASD to live with retirees, this could not only provide adults with safe and service-enriched housing, but it also could give retirees purpose and a worthwhile way to assist adults with ASD.

Background

It was clear to The Adults that the idea of living independently was a challenge. They expressed a desire to live independently, but fear of living alone and a lack of services often prohibited them from achieving this desire. Many of The Adults demonstrated a desire for a roommate, but wan-ed to be sure that this roommate was kind, instructionary of understanding of their autism. Living with another adult with autism was not necessarily their biggest concern, but rather living with someone who could understand them. Also, the idea of living in a communal residential complex which provides a sense of community and offers services was well received by The Adults.

Sust a roommate in general. Someone who understands me. I mean, just as long as I can get along with them? -Response of an adult with ASD from focus group when asked what kind of roommate he/she would like.

This gave our class the idea to have a shared living situation where adults with ASD lived amongst retirees. We believe that this will not only provide adults with ASD comfort by surrounding them with individuals who are established with more life experience, but also allow retirees to have company and a purpose they may be searching for if they would otherwise be living on their own. This does not necessarily mandate that retirees have roornmates who are adults with ASD (but this could be an option) but housing with people of difference circumstances and life stages is worth exploring further. This could also allow retirees to help with some of the services that adults with ASD are searching for, such as assistance with cooking, laundry, gardening, and finance.

Facts from Research and Literature

Bicycling is an activity that a majority of The Adults know how to utilize. This will not be a new skill for them to have to learn. Exercise is wanted by The Adults and bicycling provides The Adults that activity. There is an emerging discipline of "therapeutic" environmental design, though it rarely focuses on those with ASD. Therefore, bike rack design implemented with "therapeutic" environmental design in mind would be helpful.[®] Bike racks deliver small scale landmarks for The Adults.

Help Us Conceive

-Bike racks that are autism friendly.

-Technological innovations could be included with or within the bike racks.

-Methods to make the bike racks properly utilized. -Methodically-placed bike racks instead of afterthoughts in the built

environment.

-Any foreseeable drawbacks to this idea.

-Any new ideas that may be better than this proposal.

1 http://www.pedbikeinto.org/planning/facilities_bike_bikeparking.ctm 2 Williams, A. (Ed.). (2007). Therapeutic Landscapes. Ashgate Publishi

Facts from Research and Literature

When designing for people with autism, if is essential to understand how they might expe-rience the environment and perceive people and objects in it, as well as what barriers exist. One barrier that planners can aim to overcome is zoning regulations which may ban this type of living arrangement from coming to fruition. It may ligeal to provide atternative housing ar-rangements that would be more desirable for those with ASD if it is deemed as a prohibit-ed land use as written and codified in a community zoning code. Group homes have been found to produce outcomes for autistic adults that are as favorable as those with other devel-opmental disabilities.¹ The environment in which an adult with autism lives can have a pro-found inpact on their health and wellbeing. Providing the right setting can help to enhance motivation, confidence and self-esteem.² Although this type of living arrangement may not be suitable for every adult with autism, it is an idea that should be analyzed further and high-lights some large barriers in which planners have direct influence.

Help Us Conceive

-If the idea of housing for retirees/adults with autism is feasible.

-Challenges associated with this idea.

-The market for this type of housing. -Which ways retirees could provide help and services to adults with

autism neighbors or roommates. -Foreseeable drawbacks to this idea.

-Other ideas that might work better than this proposal.

1 Felos, D., Peny, J., Lowe, K., & Jones, E. (2011). The tropact of Autism or Severe Challenging Behaviour on Lifestyle Outcome in Commit Michael (2011). The tropact of Autism or Severe Challenging Behaviour on Lifestyle Outcome in Commit Michael (2011). The tropact of Autism of Severe Challenging Behaviour on Lifestyle Outcome in Commit Michael (2011). The tropact of Autism of Severe Challenging Behaviour on Lifestyle Outcome in Commit Michael (2011). The tropact of Autism of Severe Challenging Behaviour on Lifestyle Outcome in Commit Michael (2011). The tropact of Autism of Severe Challenging Behaviour on Lifestyle Outcome in Commit Michael (2011). The tropact of Autism of Autism Michael (2011). The tropact of Autism of Severe Challenging Behaviour on Lifestyle Outcome in Commit Michael (2011). The tropact of Autism of Autism Michael (2011). The tropact of Autism of Autism Michael (2011). The tropact of Autism of Autism of Autism Michael (2011). The tropact of Autism of Autism of Autism Michael (2011). The tropact of Autism of Autism of Autism Michael (2011). The tropact of Autism of Autism of Autism of Autism Michael (2011). The tropact of Autism of Autism Michael (2011). The tropact of Autism of Autism of Autism Autism (2011). The tropact of Autism of Autism of Autism (2011). The tropact of Autism of Autism of Autism (2011). The tropact of Autism (2011). The tropact of Autism (2011). The tropact of Autism (2011). The t

Public Wifi and Outlets

21

Research shows that adults with autism depend on the Internet, specifically wi-fi, for general comfort, and reduced anxiety in public spaces. Wi-fi provides access to both navigation resources and recreation opportunities. When traveling alone, reliable navigation systems are vital for adults with ASD due to increased difficulties with spatial perception. Related to this, conveniently located public outlets are helpful for charging devices used for their navigation.

Tiny Homes

22

Independence is one of the biggest challenges facing autistic cilizens as they age out of child services and mature to adulthood. One topic of particular relevance to this is-sue is housing. Living on one's own is a crucial element of independence, and something autistic adults often struggle with. Seeking a quasi-independent compromise, the options are often lacking, and they must continue living with their parents. Luckily a variety of housing possibilities are coming forward, providing a host of options according to their spectrum of needs. One possibility is tiny homes, which are quickly growing in popularity. Tiny homes provide all of the amenities and utilities of single fam-(i) homes but are much smaller. They range from 100 to 400 square feet and lypically have 1 or 2 rooms and a loft. They are also much cheaper to build, are often mobile, and require much less maintenance. Several tiny homes can be placed together in a community near a common area, providing services to residents while also allowing them to have their own complete space. These tiny home collections can provide employment, transportation, community and other assisted care services according to their specific needs, yet still allow them to sustain themselves.

Background

The need for more housing options has been made apparent at various times throughout our research. The most notable theme that was observed from The Parents was the need for a sense of community and integration into society. Autistic citizens need to be able to support themsalves, but they also need a sense of safety and the knowledge that help is available to them when they need it. Tiny homes were only briefly mentioned by The Parents:

You know this is an interesting idea, so she suggests. uh. you know imagine a uh, you know its own development if you will that is nothing but tiny homes with central communal space.

Another housing concern that was discussed by The Parents was cost. A for-profit compa called Lifestyle Communities was mentioned for its lack of affordiability, yet the communal pects and quasi-independence it offered were said to be desirable. Thy homes could of the best of both with relatively low cost and the versatility to provide the desired commun structure.

According to The Parents, one potential obstacle to implementation is zoning codes. The code was not necessarily designed to accommodate the development of tiny homes, and there may be multiple variances or outright amendments of legislation needed to make them viable. Any and all recommendations are welcome in working out these issues. There are many questions yet to be answered pertaining to incorporating tiny homes into existing communities/infra-structure, and zoning ordinances.

Facts from Research and Literature

Help Us Conceive

-Public wi-fi that can make communities more accessible for adults with ASD.

-Effective locations for public charging outlets. Any loreseeable drawbacks to this idea.

-Any new ideas that may better this proposal.

1 Karobiti S. M. Shrajany, M. Varni, J. W. & Talasinary, L. G. (2017). Noise and autom spectrum disorder in children: An expl Netwarch in Developmental Deabitities, 056-94. doi:10.1016/j.indu.2017.02.004 Mitmoso, K. (2015). Autom mandemory overload, Learning Deabity Practice, an(7), 15. Sectionary Sections, constraining, Tradello S. Local, F. J. Baird, G. (2008). Psychiatric disorders in children with automatic automati chiatric disorders in children with autism spectrum

Facts from Research and Literature

Caring for autistic children into adulthood can be a significant burden on parents and is associ-ated with depression and mental health issues produced by stress. This is true for the parents as well as the autistic adults. A living situation where these adults continue to be dependent on their parents is inherently unsustainable because parents will not always be around, and autisti adults are ill prepared for when that day comes.

Help Us Conceive

-Whether tiny homes are a viable idea for affordable housing for adults with autism. -Location for tiny homes. -Any other ideas beyond ours. -Drawbacks and issues.

https://www.autismspeaks.org.blog.2017/64/12cone-three-teens-autism-earns-drivers-iconese
 Anderson, K. A. (2014). Prevalence and consistent of postsecondary-residential status among young adults with an autism spectrum dis-order. Autom: The international yournal createach and practices. 16(6), 562-501.
 Si tever M. (2015). To bettech information: The Autom Employment Gas pRep. J. National Autosic Society.
 4 G. A., & Ting, M. (2015). Detreestion and Ankiege among Patriest size Autom Cellifiers. Include and Ankiege among Patriest size Autom Cellifiers. Include and Cellifiers.

291. 5 Brown, H., Ousliette-Kuntz, H., Hunter, D., Kelley, E., Cobigo, Y., & Lam, M. (2011). Beyond an Autism Disprositi: Children's Functional 8-dependence and Planetra' Unner Needs. Journal of Antam's Developmental Disorders. 41(10). 1291-1302. doi:10.1007/s10805-010-1148-y 6 Ling YL, L. (2011). Reatons associated with caregoring pureling and national planetratism in mothers of adolescents with an autism spectrum disorder in Taewan. Occupational Theory Islamational. 18(2), 96-105. doi:10.1002/s0.305

Proximity to Recreation

23

The Adults mentioned several forms of recreation including swimming pools, the zoo, Dungeons and Dragons games, ouldoor parks and playgrounds, movies, libraries, malls, gyms, and restaurants. However, few had a driver's license, relying mostly upon parents to provide their necessary transportation. For many, public transportation is often overcrowded and confusing to use, and The Adults expressed a preference for walking and biking to get places. For these reasons, planning public recreational facilities of diverse kinds close to residential spaces is important to fulfilling the needs of people with autism. Close proximity to residential areas will also ease users' navigation of public space throughout their community in addition to enhancing the community's overall walkability.

Background

Within planning strategies today, placing residential and recreational areas in close proximity to one another is hardly a new concept. Such design increases the density of urban spaces; a component Jane Jacobs argued was key to enhancing the diversity, vibrancy, and attractiveness of an urban space in her book, The Death and Life of Great American Cities (Jacobs 2011, 261-289). Concentrated, mixed-use development furthers Jacobs' concept of "Eyes on the Street," The necessity of people utilizing streets as places to live and work to the survival of urban spaces. The New Urbanism Movement has sought to put her ideas into practice by designing concentrated, mixed-use developments in towns such as Seaside, Florida. Other examples towns that prided-themselves on highly concentrated urban spaces include Celebration, Florida and Reston, Virginia.

The Adults had several complaints about the bus system, citing overcrowding, high noise levels, and confusing route changes. While shuttle services are available, The Adults consider them generally unreliable. Placing recreational facilities such as pools and libraries close to residential spaces would not only increase people with autism's access to these forms of ententairment, but also increase the overall vibrancy of community spaces. Given the information about the experiences and desires of The Adults, while their needs do not call for a new strategy of city planning attogether, they provide evidence to further bolster the need for more highly concentrated, mixed-use planning of urban spaces.

In addition, planning recreational facilities in close proximity to residential areas will encourage healthier lifestyles not only for adults with autism, but also for other residents by increasing the convenience of walking and biking to get to places as well as reduce air pollutions by decreasing the need for cars. Increasing walkability of urban spaces will also increase the sense of independence many adults with autism want as a decreased need for driving as a means of transportation will decrease the need to ask for parents to provide it. As one parent explained:

You know, I know personally, and I want to avoid making this too personal but personally like, exercise is something that I have to emphasize, you know, we have to get out. We have to do hings. And.. having that in close proximity like a basketball court that they can shoot hoops

Communal Apartment Complex

24

Apartment complexes that offer integrated living for adults with autism could be a viable housing option. This idea includes incorporating units for adults with autism within new and existing developments. One idea included a voluntary roommate service where adults with autism and neurotypical tenants who are educated on the needs of adults with ASD are willing to share an apartment. Such apartments can also make provisions for need-based caretakers, for instance a person to help the adult with monthly expenses or bills. These dwelling units also need to be designed sensitively, with respect to lighting and noise cancellation. Integrated living also implies that such dwelling units should be in close proximity of basic amenities such as corner stores/delis, laundry (ideally in unit), restaurants, pharmacies, libraries, recreational areas and other daily needs and services.

Background

During class discussions, it was realized that many of The Adults who live with their parents on guardians would like to move into an apartment and live independently. However, this move towards independence comes with responsibilities such a taking care of expenses, insurance, grocery needs, and maintenance. Many of The Adults and The Parents expressed concerns regarding this and said they did not feel ready to take on so many responsibilities. Many also expressed that they would like to live with someone who could understand them and their needs.

"Probably either something like a condo or a townhome or something like that, where a lot of the things are done for me, like outside."

"Well, the kind of living structure I want to have in the future is either, well, to be honest, either an apartment complex or probably, what, the communal living." Our goal is to expand the scope of work within the realm of advocacy planning, including people with autism into the process (Checkoway 1994, 139-143). We are also continuing the work of Ronald Mace's Universal Design Movement, expanding accommodations for those with special needs (Preiser and Elaine 0, 2002). Mixing residential and recreational space is a key component of plans that will accommodate the needs of adults with autism. A plan for close proximity of recreational facilities to residential buildings will serve as a foundation for the rest of our design.

Help Us Conceive

-Wide sweeping policies for designing new communities that combine residential and recreation spaces together in an attractive, easy-to-follow format.

-Ideas for retrofitting existing communities with access to recreational opportunities.

-Strategies for different community sizes.

1 Oracioway B. (1994). Paul Davidoff and Advocacy Planning in Retrospect. Journal of "the American Planning Association. 60(2), 139-153. 2-Jacoba, June. (2011). The Death and Life of Greak American Celles, 50th Amiversary Ed. New York Bandom House, Inc. 3 Phence, W.F. & Banze, D. (Eds.). Jobor, Universal Death Planthook. New York. McGraw-Hull

Facts from Research and Literature

Research has inclicated that many adults with autom continue to live with their parents, as here often find it overwhelming to live above and take care of hemselves." It is also clificult to live with commates who are not aware of, or do not understand, the needs of an adult with autism. This may also lead to hesitation by the parents to lat their children live in apartments had are it-seminent to lake care of liver needs.

Help Us Conceive

-Scenarios for a new autism-friendly communal living development. -Retrofit opportunities for existing residential developments. -Preliminary design for building/floor plans. -Other ideas we haven't conceived. -Issues or drawbacks to this proposal.

 Simonoff, E., Pickles, A., Charman, T., Chandler, S., Loucia, T. & Band, G. (2008). Psychiatric decreters in children with substresspectrum disorders: prevalence. comorbidity and associated tactors in a population-derived sample. Journal of the American Academy of Child & Adobserved Psychiatry, 47(8), 297-298.

Autism-Friendly Streets

The research demonstrates a clear need for streets that are safe, walkable and conducive to multimodal transit. Streets can be overwhelming and unsafe for not only those on the spectrum but for all people. This forces many to depend on driving or require assistance in getting around, even when their destination is within walking distance. Streets should be designed in an inclusive manner for people who are unable or unwilling to drive.

Background

The Parents and The Adults mentioned that they want streets that are safe, walkable, and bicycle-friendly. Many parents expressed that streetscapes should be comfartable and conducive to physical activity and social interaction. These parents also mentioned that improvement to bike lanes, sidewalks and general accessibility would enhance the quality of life for both adults on the autism spectrum and their caregivers. The typical streetscape encourages conflict between motorists, bicyclaits, and pedestrinas. When asked how many of the Adults frequently rode their bike, most raised their hands. However, The Parents emphasized their works about safety, and mentioned that they prefer their children ride their bikes on the sidewalk due to this conflict.

The Parents also mentioned how overstimulation in travel affects most adults on the spectrum. Currently, streets are generally designed in a way that creates a harsh and loud environment, unifiendly for pedestrians and bicyclats. For those dealing with overstimulation issues, navigating streets can be an unpleasant and difficult task. This, and conflict involving vehicular traftic can be dengerous. Implementing designs that lesen the impact of noise and light latimulation can greatly improve adults with ASD's ability to be independently mobile.

Secure Spaces in Parks

26

25

The Adults generally react differently than neurotypical park users with sudden changes in the environment, such as unexpected rain or bright sunlight. The Adults suggest that there is a need for safe spaces in parks that address the needs of people with ASD. Adults on the spectrum sometimes feel overwhelmed in a standard playground and expressed a need for temporary shelter/enclosed spaces to feel secure through periods of stress or anxiety.

Background

Recreation is important. Parks and open spaces are places where people go to have fun and urwind. Sometimes parks are crowded with people. Some parks can be loud, too bright, and overly-stimulating. There is a need for adults with autism to know where to go to take time to escape within parks and open spaces. Knowledge gleaned through reading and discussions indicate that there should be clear signage on or close to the structure and be visible from most locations within the recreational space.

The design should provide a warm and inviting space, perhaps bright spaces with plenty of natural light and subdued colors. It should be a quiet place, too.

Facts from Research and Literature

Autism varies in how it affects people. Studies show that people with ASD are more prone to stress', anxiety and sensory overload.³ This overload is thought to be rooted, in part, in a more intense cognitive processing of sound stimulu.³

"We live off of two streets where they just widened all of that and, . . they did nothing for the safety of walking and biking."

Help Us Conceive

-Austim-friendly street cross-sections that incorporates multimodal transportation -Other better ideas. -Drawbacks and issues.

 Kanstell, S. M., Shepley, M., Vami, J. W. & Tassinary, L. G. (2017). Noise and autom spectrum disorder in children: An exploratory survey. Research in Developmental Desaitilities, CBIS-64. doi:10.1016/j.indl.2017.02.004
 Zakinson, S. (2015). Matern and servery overhoad. Learning Deabliny Practices, 18(7), 15.
 Remitigen, A., & Farmia, J. (2017). A sound advertage: Increased auditory expactly in autism. Cognition, 166459-465. doi:10.1016/j.jognion.2017.04.01

Facts from Research and Literature

Our research suggests that many aduits with autism are more likely to be uncomfortable or stressed when exposed to rapidly changing environmental "therefore, plecement is important within this park. Permanent landmarks have been found to help adults with autism orient themselves.

Help Us Conceive

 -A preliminary design for a space/shelter that can accommodate adults with ASD without isolating them from the standard outdoor recreational areas.
 -Other better ideas.

-Issue or problems with this proposal.

Kanakri, S. M., Shepley, M., Vani, J. W., & Tassinary, L. G. (2017). Noise and autism spectrum disorder in children: An exploratory survey. Research to Developmental Disabilities, 6395-94. doi:10.1016/j.mdd.2017.02.004
Soothing Spaces in the Public Realm

27

Public social interaction, as well as public interaction in general, is a notable challenge for people with autism. Though this problem cannot be easily remedied, it is possible to provide a safe and comfortable environment for those individuals in a public setting. These environments, known as "soothing spaces," are individual public spaces designed to provide those with autism the time and space needed to calm down if they feel stressed or uncomfortable in situations involving social interaction or other anxiety-inducing activities in public settings. Soothing spaces would be publicly accessible, yet allow privacy for whomever chooses to use the room at any given moment. These spaces may be located both indoors (single or multiple rooms with provided items one can fidget with if they so choose, and with enough room for pacing) but we are more concerned here about the outdoors (such as small-size park shelters and adult-oriented playground spaces). The ultimate goal of soothing spaces is to allow people with autism to calm themselves in locales where safety and comfortability are not normally provided.

Background

ADA for Autism

28

In 1990 The Americans With Disabilities Act (ADA) became law to ensure that people with disabilities have the same opportunities and rights and non-disabled people. While physical disabilities are extensively covered, surprisingly, there is currently no accommodation in housing or ADA policy to benefit adults with autism.⁴⁸ They have a particular set of needs in the built environment that can be effectively addressed with a few key changes.

"It could be better if I was maybe more independent and for me, in my case, living on my own and have more freedom."

Background

There are requirements in the Fair Housing Act and Americans with Disabilities Act to help people with mobility, age-related mental impairments such as Atzheimer's, hearing, and visu-al impairments. Current policy provides accessible building entrances, accessible common areas, wheelchair turming radius clearance, options for customized appliances, fixtures, and doorknobs, reinforces bathroom walls for grab bars, etc.[®]

"I'm currently in an apartment by myself, but I'd like to be able to do more things without hav-ing to leave the apartment. I mean, 1've got to leave to do laundry. I have to leave to take my recycling to the recycling bin that's prefit far away. I have to drive to one of the city recycling bins, because my a partment doesn't have recycling."

Facts from Research and Literature

Help Us Conceive

The ideal appearance of the space for both indoor and outdoor envi-

Ways to ensure people with ASD have primary use of the space: -How can it be conveyed that the site is for specified use by those with ASD?

-Potential signage? -Any foreseeable drawbacks to the idea.

-Any additions and/or changes that can be made to this proposal

I Karaki S. M., Sheping M., Varri, J. W. & Tarsinary, L. G. (2017). Noise and axism spectrum disorder in children: An exploratory survey Research to Dweltgemental Deablishes, C685-94. doi:10.1016/j.nct.2017.02.004 2. Advinnor. 5, (2017). Asiatem and servery overdoid. Learning Deablinh Practico, 18(7), 15. 3. Remmiguto, A., & Farrie, J. (2017). A sound advantage: Increased auditory capacity in aufam. Cognition, 166459-465. doi:10.1016/j.cog-nion.2017.04.002

2017 (24,022) conft, E., Pickles, A., Charman, T., Chandler, S., Loucas, T., & Baird, G. (2008). Psychiatric disorders in children with autism spectrum ers. prevalence, comorbidity, and associated factors in a population-derived sample. Journal of the American Academy of Child & Ad-int Psychiatry, 47(6), 221-829.

Facts from Research and Literature

Help Us Conceive

-State and/or federal building codes to fit the needs of those on the ASD spectrum.

[For example, given that 1% of the population is on the ASD spectrum, perhaps 1% of dwellings should be ASD-friendly. What would be the most effective route to achieve this? Can it be incorporated into current standards like the ADA and Fair Housing Act?]

cation Disorders, U.S. Department of Health and Hu

K Statistics About Hearing.* National Institute of Deathess and Differ Communication Disorders, U.S. Department of Health and I vices, 80 Dec. 2017, www.ridot.nih.gov/healthystatistics/squick-statistics-hearing. or. 8, 2019. Alterna and sensory ovindoz. Learning Dealaithy Paraton, 14(7), gton, A. & Farrie, J. (2017). Assund adventage: Increased auditory capacity in autism. Cognition, 166458-465. doi:10.1016/j.or 2019.

III. Appendix 9. CHARRETTE PROCESS PHOTOS

























AUTISM PLANNING AND DESIGN GUIDELINES 1.0











III. Appendix 10. CHARRETTE DAY 1 OUTPUT









CHARRETTE_Day 1CommunityScorecard1.jpg



CHARRETTE_Day 1Drop_Off_Housing_Symbol5.jpg

CHARRETTE_Day1Financing_AssistiveTech_LivingScorecard8.jpg



CHARRETTE_Day 1SafeSpace_11.jpg



CHARRETTE_Day 1TinyHomesWayfinding9.jpg



CHARRETTE_Day 1Zoning_safeRouts2.jpg

option 15 Incurocosmopolitanism. com Option) Chang terms / definitions self.com qual? end . Zen garden 1. L connect to 211 ? -> diff. from 'emergency' callpillas "sensory friendly area" / L with walking path 2 - identify a (screen)a ·enclosed(ish) sand boxes escape space 3. "List of phone #s to call L Shown to help Kids W/ASD 4. "Maybe a 'booth' or something Higher functioning - Problem solving So maybe maze like things: w/a person? T werner) (it STICKER available@ info desks "Mental health gym " Ladult playground. point to So someone can uplace to jexcercise prain. assistance from ASD Build in 'brain games' to public space \$ get ned staff. neurodiverse (or muttive is) Spech LTrain info staff Andi-robot NFO "Think Bank" for ppis w/autism at all places calso could have Shared baseline. those in the fringe. icon pages avail. Also used for people in ESL or "experts of the finnge " chaush!

CHARRETTE_Day 1_ASDAssistancePART1_18.jpg

I UDIJO OPTION 15 : Therapeutic Rec. OPTION 1 -> 'en'-'courage' Seoter levels of signs tomake courage How to develop T.R. easily acceptable in the public realm: (+acceptable) to show ppis big the building to go to climbing wall / play grounds Accessability A People on disibility get free class audits? -> little on desk to tell A "SSDE/-Activities that encourage you to staff member type of assistance needed Push the limits Rename: 'Advocacy Recreation ESP Recreation Encouraging Recreation ' evenything I need to know I learned in Kindergarden

CHARRETTE_Day 1_ASDAssistancePart2_19.jpg

Bus Routes Tech tssistive . doesn't take you exactly where you need Time (long) Vales longer Augmented Reality (AR) dirty not on time (onfontation COTA sp. for students? not on time Bus monitor?(not driver, but staff) Bus monitor?(not driver, but staff) - direct , poin-to-point mapping app for phone, glasses, etc La when & where to walk Cross get on/off transit Signage on bus opplaing tow White noise Seat belts? Language & video modeling to the modeling to the on the one tow of the one to t * Mapbox example VR simulation of ASD experiences loud riders Ride (inside) (like crying * like Google, Occulus ·uncomfortable Dabies) LSOFAER ·more spaced out seats - assessment tool to see how ASD In seperate areas people seperience a space/place uprivate stating? Stats identified - Could be for planners, but would be helpful for generic education funderstanding of the environmental challenges of ASD @ front for bus driver training ertification PPUS W/ASD identification of ASD on COTA pass/bracelet? We symbol > "I mediosistance" BLEND IN

CHARRETTE_Day 1_AssistiveTech22.jpg



CHARRETTE_Day1_AssistiveTechnology_Crosswalk4.jpg

Living Space (conit) #7 Living Space -> equal pay for equal X * because income begats opportunity Co- Transitional Housing - serves multiple communities Living Space defined: "the place a person feels most at home," - equal accommodations the population What is safety? * "love me like a princess" org model a place where the chances of being physically, mentally or emotionally harmed is at a - prover concept 75% design / 25% policy; rules - do we even need new buildings - can we use a voucher system - similar to housing choice vouchers ex. Don't impose speed limits, design streets that limit speed CHECKELST CONCEPT_ petsonalited check list w. Universal-nes; apt. manager has formitarity - check comprehensives; "Companishing check list" -> certifications

CHARRETTE_Day 1_AssistiveTechnology_LivingSpace17.jpg

T UOIZDO OPTION 15 : Therapeutic Rec. OPTION 1 corote. -> 'en -' courage' levels of signs tomake courage How to develop T.R. easily acceptable in the public realm: (+acceptable) to show ppis big the building to go to c climbing wall / play grounds Accessability A People on disibility get free class audits? -> little on desk to tell "SSDE/-Activities that encourage you to staff member type of assistance needed Push the limits Rename: 'Advocacy Recreation ESP Recreation Encouraging Recreation " evenything I need to know I learned in Kindergarden

CHARRETTE_Day 1_AssistiveTechnology_therapeutic16.jpg



CHARRETTE_Day 1_Bikerack6.jpg



CHARRETTE_Day 1_Technology_21.jpg

Symbol / Placard FOR PARKING SPOTS "I don't know what to expect" Safe Place available erecreation L physically psychologically · having a different symbol? cor use already exsisting handicap spots? What Recreation do we want how "experience of people getting yelled @ when using handicap spots into physical handicap do we make it better? · parking permit for people sp. w/ASD anxiety enducing > tech failed ba so lost, regulation map not helpful (NS unidentifiable) reducation on what sign means in drivers ed. LOPTIONAL? Stigma? - complex issues! make available to a different symbol preferable to using . Grotta start sumer Sports would Sports be best, those all cell phone lot like airport, to wait @ until someone is ready to be picked up

CHARRETTE_Day 1_pickup20.jpg

III. Appendix 11. CHARRETTE DAY 2 OUTPUT



CHARRETTE_Day 2_AssistanceSymbol2.jpg



CHARRETTE_Day 2_BusStops7.jpg



CHARRETTE_Day 2_Housing6.jpg



CHARRETTE_Day 2_Prakinglots5.jpg

Vouchers for ubers/14 Ft? 4 transportation for Apts. transportation for social events pooled resource w[destination PUBLICTRANSIT (BUS) RIDE EX. more routes? Supply Formand PACKED . Front better uno room to carry stuff · Facing iste cleanliness (not clean) · not boxed in wider seats? PrioN hard to hear closer to bus driver? flkrt stops/destination splakers towards back will list route as , L passing knoger soon speakers towards be Linfo not important (don't need date!) with Landmarks ide Search by name rather tion the bused could be address in w/cell plane place could be address on route imore relevant to bus ride itself light to Hash when stop coming

CHARRETTE_Day 2_Public Transit8.jpg



CHARRETTE_Day 2_Recreation_Rides9.jpg



CHARRETTE_Day 2_SafeSpaceDesign4.jpg

Shared Living Pet-friendly, place WRITE IDEAS . Apt. building w/ similar for walks School aged adults ·Hotel-like w/meals provided · Shared living w/retirees JJJ Clike that you could Harn skills lie cooking) I then do those skills for your mentor L dorm like " shared living space help w/care & schedule " learn advice (life skills) " helping EACHOTHER Duplex "Thick sound proof walls (sound sensitivity) Parents on other side? Bood for parents III that can back away L Mentor " Retiree on otherside 1 11

CHARRETTE_Day 2_SharedLiving3.jpg

"Southing space" "Quiet space" Apartments in park . Storage space ·simple ·open concept (livingroom/Kitchen) 11 · dishwasher (appliances) washer/dryer in Apt. - Shade . "recreation room" (And, music, computer - chair oneoption one near by . 1st floor έ for short - Far away from play ground IF we could do I thing as CP break > daily assistance . Transportation - rockur of swing glider? trampoline see saw . Help to live on own / Guidance on how to succeed thug & swing · AFFORDABLE housing 11 - Sound enclosed · INTERNET (Fast) II ·Recreation (Park) uptexiglass Lgym Favorite I build like a public bathroom - computor room/reading nom video game room Il living room/basement Blend in Lanyour could go

CHARRETTE_Day 2_SoothingSpace11.jpg

outdoor/street lights	Session 2
· enough to see not just where you are going But also if (ie glass) stuff is on the ground (ie glass)	, tolat
·light color preference? Inot too strongly colored > dispretting	
- LED headlights too intense	
· Closer together (consistency Parking Spaces Parking Lots dangerous? A Bigger · trying to avoid cars path » Designated spots · have to make up path » Designated spots c no disignated bath = Navigation Similar to How improve	1.

CHARRETTE_Day 2_StreetLights1.jpg



CHARRETTE_Day 2_indoorParking12.jpg

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	APP that gives notifications when on bus "Transit App" Cross Walks White paint blends in -> brightyellow instead? Leo Bright too (retro reflective) More bridges over roads (ep penar bing ones) too wide under pass? Cross all @ once subway eque . longer time to cross more and . sound of cross walk thing Training Marsto walk to Nicer, not as many	A SINC	CHIAN Valloor Station Serving Chian Serving Chian Serving Chian Serving Chian Serving Chian Serving Serving Chian Serving
4	Novigating Parkinglots -> walkway between parking spaces		

CHARRETTE_Day 2_on_the_bus14.jpg

TV Comerce	R09 J	ACC 200	Pick-up lot like from school indoor?

CHARRETTE_Day 2_sidewalk-size13.jpg

III. Appendix 12. STUDENT SYNTHESIS



III. Appendix

12. STUDENT SYNTHESIS











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Parking Garages

One of the key concerns for parking lots and garages that we learned from the focus groups and charrette were that there was a major need to improve safety, wayfinding, and connection to the location desired. Some solutions that were brought up were having different colors in parking spaces to identify exactly where you should be walking and an easier way to identify what floor or spot you are in. Using these ideas, we can create unique floors of parking garages using different colors. Instead of having floor numbers, creating color levels to help more easily identify what floor you are on, and make the actual spaces and crossing sections the same color so the floor is overwhelmingly one color. If this was included on the stairs as well it could create a way to remember what floor you were parked on by remembering what colors were passed on the way down. Another way that safety can be improved in parking garages would be to make a sidewalk around the interior and exterior walls to prevent people from walking in the way of cars and create a situation where you would have to cross cars just one time if you wanted to get out of the garage.




AUTICAN FRIEDRY CUECKLEST (MARCE STACKE Where THICKWESS, SOMEPTIME (CURF) CORRECT, SOMED (MR) RECAR ROOM FOR PRIMAL ACOUNTERS SOMETE BORROW, DEW 3 PRIMALITZ DIMPARE (SOME) (MR) (CORRECTOR (MR) (CORRECTOR (MR)) (CORRECTOR (MR)) (CORRECTOR (MR)) (CORRECTOR (MR)) (CORRECTOR (MR)) (CORRECTOR (CURR)) (CORRECTOR (CURR)) (CORRECTOR (CORRECTOR)) (CORRECTOR (CORRECTOR)) (CORRECTOR CORRECTOR) (CORRECTOR (CORRECTOR)) (CORRECTOR (CORRECTOR)) (CORRECTOR (CORRECTOR)) (CORRECTOR) (CORRECT . AUTOSAN FERENDLY CHECKLEST AUTISM FIRSTLY (MECHICS) POSLATESS - COCHTON (ME, 1945) - DINET STOCK (CMR) - BIOLIEBORTH (CMR) - TOST FOR FARMENER (CMR) - TOST FOR FARMENER (CMR) - OTHER COCHTON (ME) - OTHER COCHTON (ME) - OTHER COCHTON (ME) - COCHTONS OF COCHTON (FC) - FORTHER OF DAY (MECHICS) - FORTHER OF ON APP - MORE WILLARDER, OTHEN SALESS (CMR) - SERVICE FROM BASED COUNTRY (ME, CMR) - SERVICE FOR COCHTONS (ME, CMR) - SERVICE FOR COMPONENCE . 0 ADDONEUE, CONSE CHURCOUR OPPLETOUENES FOR ENDOYMENT (CUS) TECHNOLOCK FORMOLY (CUS) + SECRETY WERE EVER USE ICHNEL I FAIRE RECOG, FEILER PRENT /CHNEL - Access TO CHIN, + CHAREDE STATIONS PARADIEMS PERVICES THEO SUPERITY - SouthProof WALLS SUPER - Super Countries PROVES - SERVICE ROOM FLAMENTIES NUMBER - FURMERED - ANENDERES + WEFE + TAREF (CONTON BASED SAND? (ME) PARADICUS POLICICS INFO - DEPENDENT - Safter Lyching - Invicence The - Speed at - Derivery - Speed at - CLARTER - Sob Opportunities - OUTDOOR SPACE . 0 . NONE PRESENT TOFAL XI 1 WALL THETCHNESS - Sound Proof Walls OUTSIDE SPACE IXI \square - No altoor space Courcetty - Access to Bis M M + FORNESHERN65 - Felly Fornisted X 1 AMENTEES Gran, Library



AUTISM PLANNING AND DESIGN GUIDELINES 1.0

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GROUP DESIGN mac Parking Spaces/Garages Assistive Tec



























III. Appendix 13. CHARRETTE PRESENTATION





Literature Review

- Graduate and undergraduate students in the 2017 Fall Semester began literature review process
- Students sought information on autism, zoning codes, and cities that had incorporated laws around improving cities for people with autism

Research

- No city planning research on public participation process and tools specific to people with ASD
- There is ASD-specific work being done regarding landmarks and individual structures.
- Autism-friendly design practices can be made to be compatible with local zoning codes

Focus Groups

- Adults with ASD
- Parents of Adults with ASD

Central Topics

- Housing
- Recreation
- Transportation
- 28 sub-topics, including
 - Wayfinding
 - Sidewalks
 - Bus Routes

 - Therapeutic RecreationAssistive TechnologyShared Living with Retirees

Review of Process

Day 1

- City planning and design professionals gave input to improve proposals
- Multi-disciplinary professionals created new ideas through discussion
- Professionals sketched their ideas to better elaborate their improvements
- Students recorded notes for each discussion and began synthesis of newly recorded data

Day 2

- Two separate groups of Adults with ASD provided their opinions on the project proposals
- Discussion about improving project proposals took place as a group
- The Adults produced their ideas for improvements through sketches
- Students recorded notes throughout the group discussions
- Synthesis of Day 1 and Day 2 data began immediately after second session with The Adults





Ten Findings

(in no particular order)



Duplex and/or Mixed Communities with Retirees

Well received

- "Ideal village" includes: 50% individuals or families with autism
 - 50% without autism, and empathetic/informed (retirees, grad students, individuals with desire to serve)
 Mixed income/diverse
 - Partner orgs (Age-friendly Columbus, universities, major employment companies, COTA)

ADU'S & Tiny Homes

Not well received

- The idea did not go over as well with Adults with ASD & their parents as it did with the professionals
- A point of contention among Adults with ASD and their parents
- Not as ideal as duplex or mixed communities



Autism Community Scorecard This is a proposal for a scorecard that communities can use to measure how well they meet the needs of people with autism. INFRASTRUCTURE **ELEMENTS** POLICY Complete Streets **Direct Transportation Options** Funding Crosswalks Diverse Housing [Symbol] Efficient, Ordinances . Wayfinding Livable, and Affordable Political and Social Good Lighting Walkability Capital Proximity to Recreation Safe Zones Education Autism Friendly Businesses Autism-Specific Corporate Partners Public Service Center [Symbol] Social Walkable Routes . Opportunities Digital Connectivity . Public Parks Job Diversity Quality Grocery and Retail

- Many communities now are good in some areas but weak in others and a checklist will bring their weaknesses to their attention.
- Aspects like walkability and digital connectivity are elements that other residents can enjoy as well.

In-Bus Features

- Separate Areas for loud riders versus quieter riders
 - Possible area towards the front in case assistance is needed
 - Literal separation?
- Assistant on the bus to help riders if needed
- Different kinds of alerts to make riders aware of an impending stop
- Use of app with ringer or notification to identify when their bus stop arrives
 - Louder notification or flash of light on the bus to identify when you are at a stop
 - Have ticker say when/what stop is currently at, instead of time
- Wifi on buses

Bus Stops

- Higher visibility of bus stops (landmarks)
- · Paths leading up to the bus stop, landmarks
- Enclosed bus stops
 - Weatherproof
 - Safer
 - Sound dampening
 - Soft lighting for night time
- Consistency of bus stop designs
- Crosswalks close to bus stops, safe distance from the road
 - Easy to get to, in more convenient places
- Touch screen computers at stops for wayfinding
 - Routes
 - Which Bus
 - When
- Buses on demand
- · Landmarks, signage that lead to bus stops
- Stops by name rather than address

Specialized Recreation Room

- Separate designated spaces for specific recreational activities
- Ability to personalize the space
- Incorporated into individual residential living spaces and multifamily common areas
- Small spaces are often preferred by people living with autism
- Example video game room



Soothing Spaces

- Separate quiet spaces --> Allow for more privacy in case of stress
- Can be reserved for different uses
- In public buildings and in parks
- Proposed outdoor design
 - Benches
 - Quiet Fountain
 - Surrounding Vegetation
 - Pet Care Space
 - Check-in System



I Need Assistance Symbol

- Universal symbol used to alert people with ASD to places where they can seek assistance
- Needs to be adaptable for various needs and people (ex: higher and lower functioning)
- Icons for sake of simplicity, easy recognition
- Sticker with symbol at info desks with ASD-specialized staff
- Possible inclusion of connection to 211 operator



Designated Walking Spaces

Parking Lots

- Major challenges presented:
 - Safety
 - Where to walk
- Clear paths to walk on in the parking lot
 - Placing a walking path in between parked car



Crosswalks/Sidewalks

- Wider sidewalks
- Separation from sidewalk to street with a short wall
- Clearer marked crosswalks
 - Longer time to cross
 - · Gentle voice instead of loud beeping



Pick-up/Drop-off

- Similar to an airport/cell phone lot
- Time Limit
- Protection from outside elements
- Attached to building so that people can wait inside and still see the 'pick-up zone'





Assistive Technology

- In-Home-Programmed and on-demand settings to reduce overstimulation
 - Whole home lighting and sound
 - IOS/"Alexa" control
 - Window tinting (transition lenses) and automatic blinds
 - Nest
 - System learns preferences
 - Wearable control (ex apple watch)
- Remote monitoring for caregiver
- Individualized to person
- 24/7 access to remote support
- Non-auditory alarm clock (lights)

Wayfinding

- Apps to connect modes of transportation
- Augmented Reality (AR)
- Mapping app for phone, glasses, etc.
 - When and where to:
 - Walk
 - Cross
 - Get on/off transit

What's Next

- 1. Master planning
- 2. Zoning codes
- 3. Policies and recommendations
 - ADA enhancements
- 4. APA interest group
- 5. Autism Living implementation







Questions?

AUTISM PLANNING AND DESIGN GUIDELINES 1.0

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III. Appendix 14. PLANNING GLOSSARY

ACCESS AISLE - An accessible pedestrian space between elements, in this case parking spaces, that provides clearances appropriate for use of the elements.

ACCESSORY DWELLING UNIT (ADU) – A secondary dwelling on the same grounds as or attached to an existing residential structure.

AFFORDABLE HOUSING – Housing for occupants that pay no more than 30 percent of their income for overall housing costs, including utilities. This is a relative measure that varies per region.

AMERICANS WITH DISABILITIES ACT (ADA) STANDARDS – Design guidelines and regulations for businesses and governments to abide by to provide accessibility throughout developments to those with physical disabilities.

BIKE LANE – Bicyclist specific corridor next to roadways separated by pavement markings.

BIKE RACK – Storage structure for bicycles.

BUFFER – A strip of land designed to separate two use areas from one another. Typically characterized by the presence of trees and shrubs planted for screening purposes.

BUMP-OUT – Used to shorten distances to cross streets and to extend sidewalk into street as a mode of traffic calming.

CENTRAL BUSINESS DISTRICT – The commercial and business center of a city. Synonymous with a city's downtown area, though the two are sometimes separate districts.

COMMUNAL LIVING – A lifestyle where a group of people with similar interests or beliefs live together in one space.

CROSSWALK – Right-of-way that provides access to pedestrians to travel across a thoroughfare.

DESIGN STANDARDS – Set of parameters to be followed in a site or building development.

DOWNTOWN – Colloquialism for a city's central business district or populous urban core.

DUPLEX – A single dwelling unit divided into two apartments, with separate entrances for each household.

DWELLING UNIT – A structure or portion of a structure used for residential purposes by the household that owns the structure.

GREENWAY – Open space conservation area that provides passive recreational opportunities.

HUB AND SPOKE – A model commonly used for various transportation uses that aggregates multiple traffic flows at a single hub node where the high volume aggregated traffic flows from one hub to another hub. All hubs are assumed to be interconnected.

INEED ASSISTANCE SYMBOL – Magenta circle representing that a building, structure or park is autism-friendly and can provide basic help to people with autism. Circle size can vary but must be visible from nearest public right-of-way.

MULTI-MODAL – Applying to multiple, different modes of transportation.

MULTI-USE TRAIL – Path, separated from vehicular traffic, that is used by bicyclists, joggers, pedestrians, and other forms of non-vehicular travelers.

PARK – A public open space often displaying natural landscapes with active or passive recreational uses.

PARKING GARAGE – Structure where vehicles are stored within. Generally, costs money to store vehicle.

PARKING LOT – Designated, open space area for vehicles to be stored.

PICK-UP/DROP-OFF LOCATION – Area near building, structure or park where passengers can be dropped-off and later picked-up by a driver. Pick-up and drop-off locations may be in the same location or differing locations in vicinity.

PLANTING STRIP – The grassy area between the sidewalk and the street. Also known as a "tree lawn."

SETBACK – The minimum required distance between a building front and the street or sidewalk it is accessible from.

SIDEWALK – Walkable path system, typically alongside streets.

SIDEWALK BARRIER – A small wall (no taller than 3') that separates the sidewalk from various thoroughfares.

SIGNAGE – A collective term for public display signs.

SUBURBAN – An outer area of a city, typically characterized by low population density and low- to medium-intensity development patterns.

THERMOPLASTIC - Pliable plastic material.

TINY HOME – A residential structure associated with the tiny house movement. They are typically between 100 and 400 square feet in size, though the structures detailed in this document will be between 300 and 600 square feet.

WALKABLE PATH – A pedestrian-friendly sidewalk or other path suited for the purpose of walking.

WAYFINDING – Knowing where you are in a building or environment, where your desired location is, and how to get there from your present location. Also known as "spatial problem solving".

ZONING - The process of classifying land into areas and districts based on permitted and prohibited uses.
SIX FEELINGS DEFINED

CONNECTED – Indicates spaces that can be easily reached, entered, and used by adults with autism.

FREE – Indicates spaces where adults with autism can act independently without difficulty.

 $\ensuremath{\textbf{CLEAR}}$ – Indicates spaces with elements at ease of being understood by adults with autism.

PRIVATE – Indicates spaces where adults with autism can go if they feel stressed or uncomfortable.

SAFE – Indicates spaces where adults with autism have little to no risk of being injured.

 $\ensuremath{\text{CALM}}$ – Indicates spaces that appeal to physical sensory issues associated with adults with autism.

ENVIRONMENTS

1. DOWNTOWN – Colloquialism for a city's central business district or populous urban core

2. URBAN – Area represented by political boundaries with three or more dwelling units per acre, commercial development, industrial development, and availability of public services.

3. SUBURBAN – An outer area of a city, typically characterized by low population density and low- to medium-intensity development patterns.

4. MULTIMODAL HUB – A place where passengers and cargo transfer from one mode of transportation to another. Includes bus stops, airports, train stations, and rapid transit stations.

5. RETAIL – Physical area where goods and services are purchased and sold.

6. CAMPUS – Adjacent areas making up the grounds of a corporation or university, containing various buildings and structures.

7. PARK – A public open space often displaying natural landscapes with active or passive recreational uses.

AUTISM PLANNING AND DESIGN GUIDELINES 1.0

KNOWLTON SCHOOL OF ARCHITECTURE

CITY AND REGIONAL PLANNING PROGRAM

BOOK CREATED BY:

Alyssa Saltzman

DIAGRAMS CREATED BY:

Michelle Williams Michael Kaufman





GUIDELINES TRIAL -- AUTUMN 2018

August 2018 - December 2018 THE OHIO STATE UNIVERSITY CITY AND REGIONAL PLANNING STUDENTS

GUIDELINES TRIAL, AUTUMN 2018

KNOWLTON SCHOOL OF ARHITECTURE CITY AND REGIONAL PLANNING PROGRAM

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GUIDELINES TRIAL, AUTUMN 2018

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IMPLEMENTATION

OVERVIEW

PURPOSE

Adults diagnosed with Autism Spectrum Disorder (ASD) are predisposed to overstimulation due to the acute neurological processes associated with the disorder. As a result, people with autism experience higher levels of stress from stimulants in the built environment, such as light and sound. The current pedestrian and transportation infrastructure contributes to this stress (Reference: Research Protocol).

In Spring of 2018, researchers at the Knowlton School of Architecture created the Autism Planning and Design Guidelines 1.0 and the Six Feelings Framework to better accommodate adults with autism in cities nationwide. The Guidelines 1.0 prescribes retrofits for pedestrian and transportation infrastructure that directly affect an adult with autism's perception of six key feelings: connectedness, freedom, spacial clarity, privacy, safety, and calm. Specific recommendations include changes to bus stops, parking lots, streets, crosswalks, sidewalks, multi-use trails, pick-up/drop-off areas, and calming spaces.

After the publication of Guidelines 1.0, the researchers added this chapter focusing on the implementation of the recommendations through the use of a focus group on Ohio State's campus. The campus focus group tested four infrastructure elements in Autism Planning and Design Guidelines 1.0. Researchers augmented selected areas of The Ohio State University campus to determine the effects of the design recommendations on adults with autism with regard to their independence and sense of well-being. The framework was then revised as needed.

GOAL

The present research achieved three primary goals. First, researchers at the Knowlton School of Architecture implemented four designs in Autism Planning and Design Guidelines 1.0 to assess the efficacy of its design recommendations for adults with Autism, with regards to the Six Feelings Framework. Adults with autism were invited to experience the four design elements, and the feedback gathered from the campus focus group were used to revise the specific recommendations offered in the Guidelines.

Once the focus group results were analyzed, policy recommendations were devised to inform municipalities across the country on how to plan for adults with Autism. These recommendations contribute to the existing policies associated with the Americans with Disabilities Act and will thereby improve the ease with which people with diverse abilities can maneuver the public environment.

Finally, the campus focus group begins the iterative process for assessing and implementing design elements described in Guidelines 1.0. Planning practitioners are encouraged to test these elements and revise them to accommodate the Adults with Autism in their communities.

PROCESS

THE SIX FEELINGS FRAMEWORK

As mentioned in the summary of these guidelines, The Six Feelings Framework is a means by which the needs of adults with autism can be considered in the design of the public realm. To reiterate, planning and design implementations in the public realm should make adults with autism:

- 1. **Feel connected** because they are easily reached, entered, and/or lead to destinations.
- 2. **Feel free** because they offer relative autonomy and the desired spectrum of independence.
- 3. Feel clear because they make sense and do not confuse.
- 4. **Feel private** because they offer boundaries and provides retreat.
- 5. **Feel safe** because they diminish the risk of being injured.
- 6. **Feel calm** because they mitigate physical sensory issues associated with autism.

The Six Feelings Framework helps planners create spaces and infrastructure that are more usable, comfortable, and beneficial to all constituents, but especially adults with autism. The designs presented in Guidelines 1.0 were a theoretical first-step. Implementation of the autism planning design elements was needed to assess the strengths and shortcoming of the designs. Based on the supporting information gathered and presented in Guidelines 1.0, the design elements tested on The Ohio State University campus were expected to perform better than conventional infrastructure in meeting the needs of adults with autism.

In preparation for the focus group, there was extensive discussion about how to test the designs most effectively. The designs needed to remain true to the Guidelines 1.0 while being feasible for research on an active college campus. This is a common challenge for planners trying to translate policy into practice. To mitigate some of these challenges, planning researchers at Knowlton prepared for the campus implementation and focus group in five concurrent ways: participating in a Team Better Block event at Blackburn Recreation Center, completing online video modules about focus group research methods, developing a hypothesis and accompanying research questions, facilitating several practice focus-group scenarios (i.e. role-playing), and creating useful aids for note taking.

In order to begin preparing for the focus group, the Knowlton School research team participated in an event known as the Blackburn Better Block. During this event, an organization known as Team Better Block used tactical urbanism techniques to activate and improve the park. The research team received permission to incorporate the designs elements from Guidelines 1.0 into the Blackburn Better Block project, thereby providing a means for the researchers to practice tactical urbanism techniques prior to the campus focus group. Versions of the designs that would work for the Blackburn Better Block were developed and implemented. Through this, researchers gained valuable insight into how the designs should be best built out during the actual focus group. In order to prepare for the upcoming focus group, the researchers reviewed various online training courses on how to conduct professional research and take detailed field notes. Following this training, we began preparing to ask questions.

Using the Six Feelings Framework as a guide, a series of research questions were drafted to gauge how focus group participants felt about the implemented designs. It was important to create openended questions that were not "leading," thereby allowing the participants' true thoughts to be captured. The final list of initial questions and response-based, follow-up questions was compiled and can be viewed in Appendix A.

Role playing proved especially helpful when generating the list of potential follow-up questions. One researcher served as a facilitator, while one or two others practiced field notation and two others acted as focus group participants. When the facilitator asked questions, the focus group participants gave indirect answers, as these responses seemed more probable during the actual focus group. This simulation was challenging, however it proved critical for preparing the facilitators to think on their feet and for allowing notetakers to practice recording unanticipated responses.

The practice simulations highlighted the challenge notetakers could face when recording responses for multiple individuals answering rapidly. Therefore, researchers created note sheets which can be viewed in Appendix B. These were intended to streamline the notes and make it easier to decode responses recorded by multiple notetakers. We also developed a method for conducting the focus group and a guide for coding and analyzing field notes. The schedule for the focus group can be viewed in Appendix A.

RESEARCH DESIGN

GUIDELINES AND BUILD OUT

The objective of this study was to test elements of the Autism Planning and Design Guidelines 1.0. These guidelines were developed with feedback from adults with autism, but they have not been tested by adults with autism. This study seeks to collect their feedback on the guidelines, and will be used to inform future iterations and autism planning guidelines.

Four guidelines were tested on the Ohio State University campus:

- o Crosswalks
- o Pick-up/Drop-off Zones
- o Soothing Spaces
- o Multi-use Trails

CROSSWALKS

The Autism Planning and Design Guidelines 1.0 call for wider and easy to navigate crosswalks. Specifically, the guidelines outline the following:

- o Crosswalks shall be a minimum of 10'0"
- O Crosswalk color shall be magenta. (Hex Triplet: #FF00FF)
- O Crosswalks shall include assistive wayfinding on the pavement.
- Crosswalks shall utilize digital voices to provide instructions and (soft) signaling lights for navigation.

The width and color requirements for crosswalks were tested. The digital voices and lights were not feasible to test on Ohio State's campus due to building requirements and rules against permanently altering physical assets of the university. The crosswalks were widened and colored using magenta tape in order to comply with university rules.

PICK-UP & DROP-OFF

Many adults living with autism do not drive and rely on others to transport them to their destinations. Because of this, pick-up and drop-off zones are included in the design guidelines to ease the transportation strain. The guidelines require the following:

• A minimum of 20% of the street front on selected blocks shall be designated for pick-up and drop-off purposes

This concept was tested near Knowlton Hall using magenta tape. The pick-up and drop-off zones were outlined with the tape and labelled using white chalk.

SOOTHING SPACES

Soothing spaces were not specifically outlined in the guidelines, but they were recommended in the charrette. Thus, a design for soothing spaces was tested to determine whether or not to add it to the next iteration of the guidelines.

Soothing spaces are meant to provide an escape from busy urban areas. Adults with autism can get overwhelmed, so providing quiet and relaxing spaces can ease stress.

- Far away, shaded, quiet space in park (away from playgrounds)
- O Maybe a rocking chair or a swinging chair like a cocoon
- o An overhang type building
- Plexiglas walls should be see through
- Something to reduce the outside noise
- Privacy (like a public bathroom)
- o Don't want the adults to stick out
- o They should blend in
- O Don't want the shelter to look like a sad spot

MULTI-USE TRAILS

Multi-model trails can be chaotic and stressful for adults with autism. The guidelines propose dividing trails by uses to make them safer and easier to navigate:

- o Trails shall be 22'0" wide.
- Trails shall be divided into a 10'0" bike lane, 2'0" buffer, and a 10'0" pedestrian lane.
- The bike lane shall be divided into two 5'0" sections traveling in opposite directions.
- The pedestrian lane shall be divided into two 5'0" sections, one for running, one for walking.
- Sections shall be divided using a magenta line.

This was tested by dividing a portion of a sidewalk on the Ohio State University campus using magenta tape. There were two lanes for pedestrians and two lanes for bikes.

DATA COLLECTION

The researchers worked with Autism Living, a local nonprofit autism advocacy group to find participants for the focus group. When the participants arrived on campus, they were given an overview of the research as a whole and the details of what they should expect during the focus group. After signing a consent form, the seven participants were split into two groups, one of three adults and one of four adults. Each group was accompanied by one-two facilitator(s), and two note takers. One note taker was tasked with recording the verbal responses of the adults, while the second note taker recorded any physical responses that the adults exhibited. The adults were taken to four different locations. Each station tested one of the four chosen designs from Guidelines 1.0 using the designs described above. The participants' verbal and non-verbal responses were recorded during the focus group and in the following debriefing session. The notes were immediately transcribed and can be found in the Appendix.

DATA ANALYSIS

Following the focus group, the transcribed notes were analyzed for repeated themes and response commonalities: these broader response themes were used to generate a list of recommendations for each of the four designs. First, the verbal and physical responses from participants were recorded. Next, the participants' reactions to each of the four design elements were summarized. Then, the researchers categorized the reactions in accordance with the Six Feelings Framework. Through the prior analysis, recommendations were written for improvements to Guidelines 1.0. Some of the changes that the adults with autism said they would like to see aligned with existing guidelines that were not realized in the physical build-out. These guidelines were considered confirmed.

The Findings and Recommendations section contains a description of the feedback on each design element, the guidelines that were confirmed, and new guidelines based on the results of the focus group.

FINDINGS AND RECOMENDATIONS

CROSSWALKS

DESIGN

The crosswalk used for the focus group was adapted from the Guidelines 1.0. It was fashioned in an existing intersection. Strips of magenta tape were placed diagonally to fill in the crosswalk.



LATEST RESEARCH

Focus group participants notes that it was easy to perceive the difference between a traditional crosswalk and the crosswalk constructed for the focus group, due to the color and size. The larger crosswalk allowed participants to walk side-by-side with their friends. Several participants felt the magenta was too bright and they suggested that other colors should be used. Nearly all participants disliked the diagonal lines. They appeared to direct walkers to move diagonally, outside of the crosswalk, rather than straight across the street; or they appeared to be no-walk zones. Wayfinding and directional elements were not included in the campus focus-group design. Participants recommended having a crossing guard or an accessible pedestrian signal should be used to direct movement through the crosswalk.

GUIDELINES

- Crosswalks shall be a minimum of 10'0".
- O Crosswalks shall include assistive wayfinding on the pavement.
- Crosswalks shall utilize digital voices to provide instructions and (soft) signaling lights for navigation.
- Crosswalks shall be white, yellow, or another color that clearly distinguishes the crosswalk from the road.
- Crosswalks shall appear solid or be filled with evenly-spaces straight lines that delineate the walking direction.

Italicized text denotes guidelines that are new or altered from the original guidelines.

PICK-UP & DROP-OFF

DESIGN

A simplified version of the design in the guidelines was constructed in an area designated on campus already used for a pick-up drop-off area. The zone was marked with pink duct tape and diagonally striped lines. The zone was accompanied by a designated area on the sidewalk for a covered shelter, marked in pink duct tape and enclosed with multicolored planters.



LATEST RESEARCH

Suggestions included marking the curb as yellow to indicate a change in elevation. Other suggestions are reflected in the guidelines below. There is further research needed as to how many drop-off spots are needed in a certain area or given a specific density and if they are needed on both sides.

GUIDELINES

- A minimum of 20% of the street front on selected blocks shall be designated for pick-up and drop-off purposes
- O Pick-up & Drop-off zones shall have a sign designating the lane as a pick-up drop-off zone.
- O Pick-up & Drop-off zones shall have a shelter that follows the bus stop guidelines.
- Pick-up & Drop-off zones shall be a solid color that is aligned with the city's general designations for idling or safety lanes.

Italicized text denotes guidelines that are new or altered from the original guidelines.

SOOTHING SPACES

DESIGN

The soothing space was constructed in a courtyard on campus near a busy area. It featured magenta chairs strategically located under a tree and 3-ft planters that sectioned-off the chairs.

Below is a possible design for future trials, incorporating some of the suggestions from the trial.



LATEST RESEARCH

The participants of the study interacted with the designed soothing space, utilizing the chairs and observing the space in a broader context and overall had a positive reaction. One of the participants mentioned that they liked that the chairs have backs unlike the benches nearby, demonstrating the effectiveness of our design for the seating in the soothing spaces. Participants enjoyed the environmental aspects of soothing spaces, but they recommended the addition of seat cushions and technology could improve comfort and provide opportunities for activity They also noticed a level of noise near the space that made them uneasy and recommended noise cancelling headphones. Recommendations also included changing the color from magenta as it was too bright and drew too much attention raising the concern of being isolated.

GUIDELINES

- O Soothing space shall include neutral colors and use magenta only to highlight the area.
- Soothing space may use the autism symbol to designate the space with the intent to make the space identifiable but not exclusive.
- O Soothing space shall incorporate technology for activities such as charging stations and headphones.
- O Soothing space locations shall be shady and include foliage.

Italicized text denotes guidelines that are new or altered from the original guidelines.

MULTI-USE TRAILS

DESIGN

Researchers built a simplified version of the Multi-Use Trail mentioned in the guidelines. Under the Knowlton Hall overhang, a to-scale mock-up up this trail was constructed using magenta duct tape. The tape was used to denote the separate lanes, while white chalk was used to draw arrows and other wayfinding.



LATEST RESEARCH

During the focus group, the participants mentioned that they liked the lane size and overall width of the multi-use trail design. Participants from both groups recommended a divider in the trail's two foot buffer to better separate the pedestrian and bike lanes. The participants that recommended a divider both mentioned a railing but also reacted positively upon the suggestion of using shrubs instead. One participant mentioned that utilizing two different kinds of materials for the pedestrian and bike lanes would also help to better delineate between the two lanes. Other participants reacted positively to these suggestions.

GUIDELINES

- O Trails shall be 22'0" wide.
- O Trails shall be divided into a 10'0" bike lane, 2'0" buffer, and a 10'0" pedestrian lane.
- O The bike lane shall be divided into two 5'0" sections traveling in opposite directions.
- The pedestrian lane shall be divided into two 5'0" sections traveling in opposite directions.
- O The bike lane shall be paved with asphalt, concrete or another smooth surface for biking. The pedestrian lane may be paved in similar fashion or may be made of crushed limestone, gravel, wood-chips or a similar material usable for walking.
- O The 2'0" buffer shall feature a raised divider such as low bushes, bollards, or a railing.
- O The specific form that this divider takes will depend upon the context of the area.
- O Sections shall be divided using a dashed line.
- O Trails shall include arrows to delineate direction, images of bikes or pedestrians to delineate between the pedestrian and bike lanes and posted signs and/or maps as needed to assist in wayfinding.

Italicized text denotes guidelines that are new or altered from the original guidelines.

CONCLUSIONS

TAKEAWAYS

The research conducted for this chapter entailed building four design elements from Guidelines 1.0 and facilitating a focus group of adults interacting with the built design elements. From this research, the following takeaways that were observed in the creation of Guidelines 1.0 were confirmed:

- City spaces should be designed with an awareness of the sensory impact of the space on neurologically atypical members of society.
- Public spaces should provide ample width for people to travel without feeling crowded.
- Public spaces should use wayfinding and signage to clearly communicate where key landmarks are and how to get to them.
- Public spaces should separate pedestrians from other forms of transportation including cars and bicycles.

In addition, the following two takeaways came specifically from this latest research:

- Design features of spaces designed for adults with autism should be consistent with general local design principles and signage when it comes to color and other markings.
- Spaces designed for adults with autism should not be isolating and should blend in with the overall space.

LIMITATIONS

Building upon the Autism Planning and Design Guidelines 1.0 requires an understanding of the limitations that may be encountered. This section details the limitations that were faced during this research so that such matters can be considered when conducting future research.

A major limitation that should be considered when conducting future studies is that Autism Spectrum Disorder (ASD) differs greatly between individuals. Future studies should consider these limitations when analyzing research results, as an individual study's results may not reflect the desires of the entire ASD community.

Another limitation that should be considered is the time allotted for research. With only four months to test the design guidelines, the present research was limited to the testing of only four elements from the Guidelines 1.0 (crosswalks, pick-up drop-off zones, soothing spaces, and multi-use trails). The analysis of the research was also limited in scope due to time constraints. With more time, a formal coding system could have been utilized in addition to finding key themes and using the Six Feelings Framework. When making additional contributions to this research, be sure to develop a project timeline that produces the most effective results. The concept of an effective time frame may vary depending on the additions you plan to add to the research, but allow time to prepare for the project, conduct research, and analyze research results. Strive for a time frame that both reduces bias and maintains productivity to allow for the most effective results.

The final major limitation to consider is your access to resources when conducting your own research contributions. For example, in the present study we were limited with our ability in testing the concepts that required semi-permanent aspects (i.e. barriers on multi-use trails, bus stop shelters at pick-up drop-off zones, etc.). The focus group was conducted on a university campus, which made it difficult to implement all of the designs from Guidelines 1.0, according to the exact specs prescribed in the document. While future studies may not be on a college campus, they may have similar physical limitations which should be considered when analyzing future results.

These revised guidelines are intended to serve as a beginning for this area of research. As planners continue this field of research, they should be cognizant of any limitations that may be encountered during the practical implementation of their studies.

MOVING FORWARD

Prior to the inception of the research that would become Autism Planning and Design Guidelines 1.0, very little research had been done on how to plan city spaces for adults with autism. Their particular needs were often not considered by policy makers, planners, and designers. The publication of Guidelines 1.0 brought the needs of adults with autism into the planning discourse. This trial went one step further and demonstrated how these design elements can be implemented, tested, and adjusted based on that feedback.

This research is intended to be a beginning not a conclusion. It is important to note that the research presented in this chapter, Guidelines 1.1, only applies to the Central Ohio adults who participated in the focus group. However, the impact of this chapter goes beyond the immediate research conclusions. It is intended to help planners begin implementing these design elements and testing their effectiveness in their own regions and cities. Ongoing research by academics and practicing planners is necessary to continue to develop the Autism Planning and Design Guidelines to best serve neurodiverse members of society.

Projects that seek to address neurodiversity in the built environment are qualitative and inherently riddled with confounding variables. The subjective nature of this research should not serve as a deterrent; instead, planners should view it as an opportunity to craft a unique environment that effectively meets the needs of their communities.

APPENDIX

POLICY RECOMMENDATIONS

INTRODUCTION

The needs of adults with autism are rarely considered in the planning process. Autism Spectrum Disorder (ASD) affects millions of adults and their families. Adults with autism suffer from stress, anxiety, and sensory overload from intense cognitive processing of sound stimuli; making it difficult to navigate the built environment. ASD is one of the fastest growing developmental disabilities, and the current infrastructure is not accommodating to those living with autism. The following proposal recommends a series of policy changes to ensure that all cities and communities can create environments where adults with autism can thrive (Reference: Research Protocol).

BACKGROUND

In Spring of 2018, researchers at the Knowlton School of Architecture created the Autism Planning and Design Guidelines 1.0 and the "Six Feelings Framework" to better accommodate adults with autism in cities nationwide. Specific recommendations include changes to bus stops, parking lots, streets, crosswalks, sidewalks, multi-use trails, pick-up/drop-off areas, and calming spaces.

After the publication of Guidelines 1.0, the research team conducted a focus group with adults with autism on Ohio State's campus to gather feedback. The following four aspects of the guidelines were built out on campus and tested to inform this trial:

- o Crosswalks
- o Multi-use trails
- o Calming spaces
- o Pick-up and drop-off zones

The study confirmed some elements of the guidelines and contradicted others. For example, the guidelines emphasize the use of magenta because the first focus group said it was a calming color. When testing magenta buildouts, many of the participants expressed that they did not like the bright color, and that natural colors are better. However, the focus group confirmed the need for soothing spaces and pick-up/drop-off zones. Overall, the research group gathered the following key takeaways:

- City spaces should be designed with an awareness of the sensory impact of the space on neurologically atypical members of society.
- Public spaces should provide ample width for people to travel without feeling crowded.
- Public spaces should use wayfinding and signage to clearly communicate where key landmarks are and how to get to them.
- Public spaces should separate pedestrians from other forms of transportation including cars and bicycles.

RECOMMENDATIONS

Based on the above findings, the research group recommends that cities adhere to the following policy proposals:

- O All neighborhood planning guidelines incorporate the Six Feelings Framework
- O Transportation options must be accessible and easy to use for all disability types
- o Interior accessory dwelling units (ADUs) shall be legal in downtown zones. Downtown
- ADUs are appropriate in the attic, basement, or other inward facing room of the existing building.
- Open spaces should feature "soothing spaces" designed in accordance with the standards outlined in the Autism Design Guidelines 1.0
- Connectivity between development should employ separation of transportation modes including between pedestrian and bicycling.
- Consistent wayfinding shall be installed as needed along pedestrian and cycling infrastructure to assist pedestrians and cyclists in locating and travelling to their destination.
- New development should be designed in accordance with the standards outlined in the
- Autism Design Guidelines 1.0 to minimize or mitigate impacts, including noise and light, on the adjacent uses, especially residential uses.

The research team urges all cities and communities to consider the needs of adults with autism when crafting their planning policies.

TRIAL INFORMATION

- I Trial Questions
- II Note-Taking Template
- **III** Transcription of Focus Group Notes
- **IV** Post-Focus Group Discussion and Analysis

I TRIAL QUESTIONS

First, the researchers briefly explained the research design. Then they used one or two broad questions to begin the conversation. While the conversation flowed naturally, the facilitators had general and specific complementary questions prepared which are below.

Broad Questions:

What do you think of _____? How did _____ make you feel? What was your experience with _____? Throw out some words that you would use to describe this space.

General complementary questions:

What made you feel that way?
What do you like?
Was this _____ different? How has it changed? Did you like those changes?
How do you normally feel in _____?
Which _____ made you feel more safe? How safe do you feel?
How safe do you feel: not at all, a little bit, mostly, completely?
In the city, which _____ would you want to see?

Complementary questions for Don't Bother Me Zones (Soothing Spaces)

Is it comfortable? Do you like to sit on park benches? How many chairs would you like in the park? Do you like this spot or that spot? In public, where do you go when you want to be alone?

Complementary questions for Multi-Use Trails

How does this trail compare to other trails you have experienced? What would you feel comfortable doing on this trail? How do typical trails make you feel? If you could change anything about this trail, what would you change?-If anything If this trail existed by your house, how often, if at all, would you use it?

I TRIAL QUESTIONS

Complementary questions for Pick-Up/Drop-Off

Where do you get dropped off? Who drops you off?

Do you like the color?

Do you get rained on sometimes? Would a shelter help?

How does your caregiver find you? Would it be easier to find them if there was a designated spot?

How do you feel when you get dropped off normally?

Complementary questions for Crosswalks

How do you normally feel in crosswalks?

Which crosswalk did you like better?

II NOTE-TAKING TEMPLATES



III TRIAL TRANSCRIPTION

Crosswalks:

Physical Observations:

Group 1

- C=about color of crosswalks ; looks both ways when talking about how he crosses the street; nods to indicate crosswalk hashes are confusing; overall +e /e
- O Contemplates with hands when walking through crosswalk: hand to chin; gestures straight line to indicate the path one would walk in crosswalk; gestures at crosswalk while talking about it; gestures with hands to show lines should be solid in crosswalk; C=diagonal lines, tilts head to show direction is confusing; quotation marks hand gesture around "professional" when talking about lines being straight rather than diagonal. IN BIG GROUP: jolts to show she was taken aback by magenta color/ too bright
- Deep breath before walking through crosswalk; nods and gestures that he likes size of crosswalks; gestures and nods often; gestures at crosswalk and nods to say he liked crosswalk.

Group 2

- Turned head to side as thinking and answering. Opens and closes hands when saying "wait, wait" about verbal tech for crosswalks. Fiddling with string.
- When crossing normal crosswalk, seemed very focused on cars. Had to get attention, really likes idea of having a crossing guard.
- o See overall notes.
- When crossing normal crosswalk, seemed very focused on cars.

Overall: Lot of walking around and looking at surroundings.

Verbal Observations:

Group 1

- Thought the color was "noticeable". Liked how wide the space was, thought the lines across the crosswalk look like a "don't cross here" section not a crosswalk.
- Likes the color red for a crosswalk. Always looks when walking and the wide space and and color make it very noticeable. Thought the stripes made it hard to know how to walk would rather follow the lines. Thought two straight lines would be nice if they were still wide.
- Thought the idea was nice to widen the crosswalk. Thought the color was really cool. And said it looked nice.

Group 2

- Vertical lines v. diagonal to help with wayfinding. Needs to be wider. Color is reflecting light. Likes this v. standard CW. No stop signs or street lights. Wayfinding and using sounds
- O Afraid of cross traffic. Would like a light purple instead of pink. Crossing guards
- "Which color is it?" (confusion on the white standard CW and the pink)."Truck just went by and didn't even stop"
- Wider, makes it easier to see where I am going. "I tend to lose direction sometimes". Likes this more than standard, likes the pattern

Soothing Spaces (Don't Bother Me Zones)

Physical Observations:

Group 1

- Plops into seat; Taps on chair to say it's too hard; Y to benches being uncomfortable at parks; tilts head back and forth to think about if parks are too busy, but says no; +e about wanting hammocks; IN BIG-GROUP: +e about name "chillax zone"
- Taps arms of chair to think about chair, crosses legs; shrugs to say DBMZ is rude; gestures with hand to say name should be shortened, indicates change in size with hands; gestures hits fists together to express annoyance at not having charger when phone dies; H-to say she'd probably snooze in a DBMZ; gestures-reclines to demonstrate relaxing in the sun; +e for charger/hammock
- Looks around at chair to consider what would be more comfortable; gestures-laying something down to say it would be nice to have a place to put your things down after class; e+ for hammock

Group 2

- o See overall notes
- Kicking around in leaves. Sat down after asking for permission. Waved leaves around while sitting. Smiled and seemed happy. Began crawling around in corner of DBMz as if playing.
- o Tapping hands together while thinking. Squinting throughout. Could be the light.
- o See overall notes

Verbal Observations:

Group 1

- O Didn't like how hard the seats were, would've prefered cushioning to go along the entire\ chair to increase comfort. Didn't like park benches either. Thought OSU colors would be better because we were on campus. Normally goes to the park with family and doesn't mind sitting with a couple of others at picnic tables. A large group would be unnerving. Liked idea of table w/ outlets and cup holders for drinks . Would use if seen in a park, liked that chair was in the middle of an open park. It looked secluded. Did not care about being able to see people and people being able to see him.
- O Did not like the name of the space, thought don't bother me zone was rude and standoffish. Liked chillax zone better. Wanted more trees around the area, thought it was too in the sun. would've liked more shade. Normally goes to the park with family or with friends. Said they would use the space in an actual park. Suggested that a table be by the chair to have a place to set things down while sitting. Wouldn't mind if it was a hammock that a nap could be taken in. would be aok with sitting at a table if one person came, but if a group came, would not like.
- O Likes the idea of a Don't bother me zone, did not like the chair. Wanted cushions on it to make it more comfortable. Thought it was a nice place to take a break in between classes. Thought a table to set things on would be nice and maybe something to do. Thought a picnic table would be ok with maybe one or two other people came over. Felt nice about the spaces seclusion

Soothing Spaces

Verbal Observations:

Group 2

- less crowded, Not too many people."When I want to get away there's nowhere to sit"."I need a place to escape and relax". Chairs are low, need cushions. Change color to brown (neutral). Don't want to draw attention with the colors or be judged. Use the pink to highlight the area, instead of it being so prominent. Incorporate technology, things to do (music, phone chargers, etc.)
- Listening to headphones could help with the noise. Maybe change the color. "Make a pink playhouse" something with a door
- O Chair feels good. Likes the trees and plants around. Like the chair better than benches
- Needs better designed dividers. Makes me feel calm. Intended use needs to be explained.
 Likes "Quiet Zone" v. DBM's. Use less prominent designs

Pick-Up/Drop-Off

Physical Observations:

Group 1

- Thinks (visibly) about where he'd like to be dropped off [visualizing other PUDO places]; nods to say pink marks are helpful in parking spot
- O Gestures to indicate collision; gestures with hand to indicate that parking space should be smaller; points to show parking spot should be moved up; makes hand-pushing motion to show there is no designated PUDO spot at another place; gestures to say that there's a clearly designated spot at Fresh Thyme for PUDO; gestured that shelter should be next to parking zone; puts hand to chin to think about diagonals in parking zone; gestures "maybe" by shrugging with hands up to say curb painted for step-down would be helpful. IN BIG GROUP: slopes hand upward to gesture that an incline would make the curb should be inclined or have ramp to prevent injury and to be more accessible; gestures C= about initially not knowing if zone is for bus or PUDO; nods up to show clarity after looking at zone.
- O Uses hand to count how many places he is dropped off at; nots to say a couple of places don't have specific PUDO zones; gestures to say area at library is big with a shelter; smiles when he says structure at library is nice but it is smaller, indicates that it is smaller with hands; nods to say it's hard to picture PUDO when you can't see it; gestures with hand (shakes hand) to say lines could be changed; nods to say parking space should be solid color.

Group 2

- o Mentioned her ears were cold and said "I could really go for some earmuffs".
- Grimaced for a while and uncomfortable breathing. May have been from wind. Turned away from wind as this occurred.
- o See overall notes.
- o See overall notes

Overall: All gathered into the zone automatically. All wandered and looked around after spending a brief period of time within zone.
Pick-Up/Drop-Off

Verbal Observations:

Group 1

- Drives to job at Zoo on own. Gets dropped off to job at TopGolf. Thought it would be a good idea to slightly change the layout depending on the season(a/c shelter in summer/ heated shelter in Winter) Gets dropped off at TopGolf main entrance and would like a drop-off zone right there if there needed to be one. Liked idea of curb being yellow to tell where to pick up. Liked the color yellow to mark a curb to help tell where to go.
- The drop-off space needed to be lined up with the car pull space. Thought the space marked for a car to pull up was too big. Liked the place being designated so that pickup/dropoff goes smoother. Thought it was kind of hard to picture. Said the space looked like a no parking zone because of lines across. Liked space at store she goes to sometimes. Thought a colored curb would be nice to help distinguish between street and sidewalk. Liked idea of entire lane being colored
- Thought that designated pick up space would be really helpful. Uses a pickup location at library in grove city and when they go to JoAnn's. Thought it was hard to picture a real pick up location at joann's because it is so chaotic. Uses a painted curb at library to know where to get picked up. Also liked idea of markers on the way to space. And that the entire lane should be colored.

Group 2

- Glass walls surrounding benches. Enclosed area to protect from varying weather. Signage for cars and pedestrians. Bigger (enough room for 2 benches). No opinion on pink but thinks yellow means safe. Sound proof. Maybe a PU/DO site at every 2 buildings
- Seating and benches. Find PU/DO helpful. Would be easy to find ride and to be found. Likes the space. Doesn't interact with bus stops because bus comes to house
- Takes buses but doesn't use the stops. Uses Uber for emergencies. Thought there were lots of buildings
- Thinks PU/DO's would be helpful. Doesn't really use bus stops to relate to the design. Usually uses Uber or Lyft

Multi-Use Trails

Physical Observations:

Group 1

- Gestures to clarify lanes, shows straight line with hands; points to center divider to say it needs railing; hits hand when talking about scooter hitting railing instead of people (laughs);
 IN BIG-GROUP: +e and nods to agree that current trails allow too much activity in one space
- O Points with crutch to express happiness about bike lanes; C=recalling that she can't remember where she parked when coming from a trail; gestures/C= upset when people speed past you when you don't know when they're coming in your lane; points to indicate on map "you are here" mark is helpful on map; frown/smile-looks frustrated when thinking about corn maze; indicates with hand how she curves around pedestrians on bike and walkers get upset, flippant "I tried to tell you!" (arms up); used hand to indicate wanting smooth path the length of path; laughs that it's okay if people get splinters from wood chips in walking lane; gestures straight lane motion to say sign should be as clear as possible on trail; points at sign in knowlton are helpful; IN BIG-GROUP: gestures at picture on powerpoint and says she understands concept and loves trails
- Laughs at idea of scooter hitting railing; uses hands to indicate a buffer of some sort would be good

Group 2

- o Walked up and down median of trail
- o See overall notes
- o See overall notes
- o See overall notes
- Overall: Wandered around surrounding area, looked around at surroundings, relatively neutral expressions, downward gazes.

Verbal Observations:

Group 1

- Thought a railing of some sort should be placed in between biking and walking lanes to keep people from crossing over to other side at free will. Thought signs on the road and in the air would help mark directions and location. Brought up idea of map that would show different trails before you get there. A smooth trail for bikes and possibly wood chips for walking would be nice.
- Likes bikes separate from walking. Bikes a lot and is always worried about getting hit by a car or hitting people while biking because they don't pay attention. Likes the idea of smooth trials because of biking.
- Likes a buffer zone between paths, bushes and shrubs were better. Thinks it is unnerving being around bikes while walking. Thought different pavements should be used because it would be easier to tell where to walk or bike.

Multi-Use Trails

Verbal Observations:

Group 2

- Asked would it be wider and would the middle divide be flat or a wall type of structure. Asked if it was one trail. Signage would be useful (bicycle or running images as well as direction indicators). Thinks the trail would be useful, better than average trails. Needs wayfinding and speed indicators. What about strollers, wheelchairs, and powered scooters?
- o Considered people on crutches
- o Considered wheelchair accessibility
- Special flooring materials. Doesn't really bike or use trails. Widen paths. Likes the idea of divider being white

IV TRIAL GROUP DISCUSSION/ANALYSIS

Crosswalks

Reactions

Didn't love the magenta -- felt it was too bright Liked that it was wider "I can walk with my friend"-- can fit multiple people across Did not react well to diagonal lines All liked the idea of voice instruction

Suggestions

White or yellow lines instead of magenta Vertical lines instead of diagonal to help with sense of direction Reflective/glowing material for night One suggested a crossing guard

Confirmations

10' width Reflective/glow paint Digital voice instruction

Debunked

Magenta -- not a good color

Don't Bother Me Zones

Reactions

Frustrated with noise level Liked trees/foliage One student particularly enjoyed sitting in the space Group 2 seemed neutral about it Most didn't like name "Don't Bother Me"--felt rude One person said they don't want to feel isolated One said she "would take a snooze" Seemed to feel nice in the sun Felt secluded in a good way Said they would use if it was in a park/other area

Suggestions

Incorporate something to do Both groups suggested technology -- charging stations, noise cancelling headphones Want a place to set their stuff/drinks Hammock, something more relaxing Rename to quiet/silent/relaxation/chillax zone Some suggested more shade Change color -- more natural, blends in Adding the autism symbol One suggested adding the symbol for autism on a sign/use a color to accent it (identifiable but not exclusive) CONTINUING QUESTION: Should this be a space for only people with autism or is

everyone welcome?

Don't Bother Me Zones

Confirmations

Don't want to stand out (didn't like color) Want to blend in

Debunked

Add "soothing spaces" into formal guidelines (our) Magenta is not a good color

Pick Up/Drop Off Zones

Reactions

Didn't like how the stop and the parking space were misaligned Felt the parking spot was too small Didn't like stripes on parking space

Suggestions

Wanted something more weather proof, temperature control Bus stops should be wider Wanted a sign that cars could see in addition to the signage on the ground Yellow mark on curb to increase visibility Signs directing people to the pick up/drop off zone

Confirmations

A pick-up/drop-off area is helpful Weather proof structure/shelter Solid color for the parking space

Debunked

Add more specific guidelines to the design Further research needed into how frequently/how many are needed and if they should be on both sides

Multi-Use Trails

Reactions

Liked width and how big it was Wanted maps/wayfinding

Suggestions

Images of bikes, arrows--better wayfinding/signage

Both groups recommended a divider in the middle--bushes, concrete, rail Materials--walking and biking two different materials (crushed limestone/gravel for walking, asphalt for biking)

Confirmations

Good width

Debunked

More details about the buffer--low level bushes or median "Raised buffer"--depends on context Change guidelines to be two different directions for walking lanes instead of walking and running

IMAGES FROM TRIAL

































































































