Sensitive Design

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Sensitive Design
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In today’s world the field of architecture has become almost entirely focused on the sense of vision. Its primary focus is on how a building looks or how it appeals to people from the exterior. We have become an ocular centric society and profession where 75-80% of information we take in about the world comes through sight, but this does not mean it is the only sense to consider. Our other senses have just as much an effect on how we experience the world and architectural spaces, but also how we feel mentally and physically.

I contend that the architecture we produce should be a framework that is informed by our senses in order to create an experience for the user to better utilize and live in a space.

In order to prove this, I am proposing a housing community for autistic adults. Autistic people have very specific sensory needs and experience the world differently than we do. Designing for them needs to be well thought out, yet anticipating how they will experience and utilize the space is very difficult since those without autism have trouble understanding how an autistic person’s brain processes stimulation.
II. Architecture and the Senses
Architecture has become an ocularcentric profession throughout the years. Today it is highly focused on creating the perfect image in order to sell the project, to make it famous. If we look at traditional societies, there is a distinct relationship between construction, the body, and materials in the same way animals build their homes according to their body movements. The Greeks used techniques to optically correct their temples and other structures, yet on the greek island of Santorini we see a very haptic and material conscious architecture built into the cliffs. As time went on, and technology furthered, vision became more and more prominent, especially with the introduction of perspectival representation. Alberti was also a large contributor to placing vision in a prominent position. His architectural theory was all about questions of visual perception and harmonic proportions to the eye.

Vision and hearing have now become the senses associated with social or public situations, whereas the others have taken a backseat and become private. “The dominance of the eye and the suppression of the senses tends to push us into isolation, detachment, and exteriority.” Now that technology has taken precedence in the world, images are readily available for people around the world through the internet and publications, because of this architectural projects strive to produce an iconic image to represent itself and be remembered by.
The materials and design of a space make us feel certain ways both consciously and unconsciously. A recent study showed when people were asked to hold something warm like a hot drink, they were much friendlier and trusting than those asked to hold a cold one. Another showed that individuals being interviewed seemed more important when their resume was on a heavier clipboard as opposed to a light one. Puzzles with rough pieces made social interaction more difficult than those with smooth ones. The things that surround us and we interact with in a space unconsciously make us feel and experience it in a certain way, both physically and mentally. Our architecture should take this into account in choice of material and quality of space.

Alvar Aalto took this into account in his designs. He was more concerned with how his furniture would touch the user than how it was viewed. It can also be seen in his buildings, “they are not based on a single dominant concept or Gestalt; they are sensory agglomerations”.
ANALYZE SENSORY ITEMS--TABLE? RATING? GRAPH?

ALVAR AALTO
III. Autism & Sensory Perceptions
Autism Spectrum Disorder (ASD) or autism is a developmental disability believed to be a neurological condition affecting brain function, development, and social interactions. As stated in the name, ASD covers a wide range of symptoms and disorders. No two autistic people have the exact same symptoms, but many have enough similar symptoms to create 5 different disorders that fall within Autism Spectrum Disorder.

Autistic Disorder: occurs in males four times more than females and involves moderate to severe impairments in communication, socialization, and behavior.

Asperger’s Syndrome: typically diagnosed later in life, people with asperger’s usually function at an average to above average intelligence level and have no issues with language skills, but struggle with social skills and restrictive and repetitive behavior.

Rett Syndrome: primarily diagnosed in females who exhibit development until 5 to 30 months and then rapidly regress in motor skills and other areas.

Childhood Disintegrative Disorder: a significant loss of skills that have previously been acquired and deficits in communication and socialization, along with restrictive or repetitive gestures.

Pervasive Developmental Disorder Not Otherwise Specified: includes children that not fully meet the criteria or do not have the degree of impairment for other specific disorders.
In the past, Autism was defined as an impairment in social, communication, and imagination skills dubbed “The Triad”. More recently, research with various high functioning autistic adults has revealed that these issues are a result from an over or under-stimulation of their senses, which has caused them to use coping mechanisms that to us are “abnormal” behaviors. Autistic people’s senses perceive stimuli very differently than we do, which causes highly different reactions. The space where they live and spend the majority of their time and life should be the one place that caters to their sensory needs. They should feel comfortable, safe, and not over-stimulated.
CURRENT LIVING SITUATIONS OF ADULTS

ADULTS (19-30) with NO SPECIAL NEEDS

- With parents or guardian: 32%
- Independently, either with or without a spouse or partner: 58%
- With other family members/spouse/partner: 7%
- Supported residence for individuals with special needs: 3%
- Other: 3%

ADULTS (19-30) with ASD

- ADULTS WITH ASD
  - Autism: 81%
  - PDD-NOS: 84%
  - Asperger's: 71%
  - Other: 9%
  - 5%

Harris Interactive. (2008). Easter Seals’ Living with Autism Study
Parents of autistic children have different challenges and concerns when raising their children due to the variety of symptoms and impairments that autistic children are challenged with; however, almost all parents ask the same question: What happens when I am gone? Where will my child go? Who will take care of them? 80% of adults with autism between the ages of 19 to 30 are still living at home. Most parents continue to house their children after they leave school and enter adulthood, because they don’t know of a better place for them to go, and many can’t live on their own. Some adults also require care during the day which after a certain age is not available. Most parents assume that keeping their child at home is the best option since there are specific sensory needs of an autistic person.
People with autism have trouble with Gestalt Perceptions. When one without autism looks at the two groupings on the left, we would categorize both of them as shirts. Then within the category of shirts we could classify the arrangement and color of the three shirts.

When a person with autism sees the first grouping, and learns that as shirts, the other grouping would be unrecognizable as a group of shirts since they are out of order. They have so many details they focus on that they cannot think abstractly. This also causes difficulty when things are moved around in a familiar room, or approaching a location from a different direction.
props section - analyze how they relax people
SNOEZELEN
SNUFFLEN + DOEZELEN

to explore
to relax

A term developed by two Dutch therapists, Jan Hulsegge and Ad Verheul in the 1970s. They created multi-sensory experience spaces for children with learning disabilities using different objects like a fan blowing shards of paper, musical instruments, tactile objects, scent bottles, and flavorful foods. The results were very successful in both relaxing the children, and stimulating their senses in a positive way. The therapists then coined the term snoezelen, a combination of the dutch verbs snufflen and doezelen, as a name for the type of therapy.
Sight

HYPERSENSITIVE
Constantly looks at minute particles, picks up smallest pieces of dust. Dislikes dark and bright lights, and is frightened by sharp flashes of light. Looks down most of the time or covers or closes eyes at bright light.

HYPOSENSITIVE
Is attracted to light and looks intensely at objects or people. Moves fingers or objects in front of their eyes and is fascinated with reflections, bright colored objects. Runs a hand around the edge of the object and perimeter hugging.

EFFECT ON DESIGN
Lighting should definitely be considered. Fluorescent lighting tends to have a buzzing noise that is very distracting and annoying to autistic people. Downward lighting isn’t ideal either since looking directly into a light can set an autistic person off. Natural lighting is important, especially since they enjoy looking out the window at the movements and nature. However, some say that windows can be distracting. A variety of windows seems best, choosing what type depending on what is going on in the space. Education spaces shouldn’t have windows that can distract, or have shades that can delineate when it is time to focus on work. With interior lighting, dimmers are important to be able to adjust lighting levels according to time of day and a resident’s sensory needs.

more cohesive strategy for design section
Sound

HYPERSENSITIVE
Covers ears, is a very light sleeper, and is frightened by animals.
Dislikes thunderstorms, sea, crowds, and haircuts.
Avoids sounds and noises, and makes repetitive noises to block them out.

HYPOSENSITIVE
Bangs objects/doors, likes vibrations, the kitchen and the bathroom.
Likes crowds and traffic, tears and crumples paper in his hand.
Is attracted by sounds/noises and makes loud rhythmic noises.

EFFECT ON DESIGN
Sound proofing of bedrooms so that residents can use their room as an escape or quiet space. In laying out the design, separating spaces that are for louder activities like exercise or socializing is a priority. Most people get irritated when a person is loud in the room next to us but for an autistic person this could be more than an irritation, it could set off a reaction. Set back a building from a busy road to avoid traffic noises.

more cohesive strategy for design section
Smell

**HYPERSENSITIVE**
Toileting problems
Runs from smells and wears the same clothes
Moves away from people

**HYPOSENSITIVE**
Smells self, people and objects
Smears/plays with faeces and seeks strong odors
Bedwetting

**EFFECT ON DESIGN**
Keep kitchen and dining separate from bedrooms to try and avoid odors traveling and effecting residents. The other strategy is to place residents who are more sensitive to smells together so that they won’t cook things that would bother their housemates. Be sure to choose materials that don’t smell or off-gas.
Taste

HYPERSENSITIVE
Poor eater
Uses tip of tongue for tasting and gags/vomits easily
Craves certain foods

HYPOSENSITIVE
Eats anything and mouths/licks objects
Eats mixed food (sweet and sour)
Regurgitates

EFFECT ON DESIGN
Materials in a space can cause reactions in taste, through color or texture. “I felt compelled to kneel and touch with my tongue the delicately shining white marble threshold of the front door. The sensuous materials and skillfully crafted details of Carlo Scarpa’s architecture frequently present similar oral experiences” , said Juhani Pallasmaa of a Greene & Greene house in Carmel, CA. The materials you choose can evoke stimulation of the senses.

more cohesive strategy for design section
Touch

HYPERSENSITIVE
Resists being touched and cannot tolerate new clothes; avoids shoes
Overreacts to heat/cold/pain and avoids getting ‘messy’
Dislikes food of certain texture and avoids people

HYPOSENSITIVE
Likes pressure and seeks it by crawling under heavy objects
Hugs tightly and enjoys rough, tumble play and tight clothing
Prone to self-injuries and low reaction to pain and temperature

EFFECT ON DESIGN
The same way materials can cause sensations of taste, they can cause tactile sensations. Whether it is through the weight of a door, the feeling of the flooring under our feet, or the way our skin reacts to the temperature of the room, tactility is a huge factor in the experience of the space. It is what helps us verify what our eyes see.

more cohesive strategy for design section
**Proprioception**

The ability to sense the position and location and orientation and movement of the body and its parts.

**HYPERSENSITIVE**

Places body in strange positions  
Difficulty manipulating small objects (buttons)  
Turns the whole body to look at something

**HYPOSENSITIVE**

Low muscle tone, weak grasp; drops things  
Lack of awareness of body position in space and unaware of their own body sensations (i.e. hunger)  
Bumps into objects/people and appears floppy, often lean against things  
Stumbles frequently; has tendency to fall and rocks back and forth

**EFFECT ON DESIGN**

Multi-sensory rooms to stimulate the body.

more cohesive strategy for design section
Vestibular

One’s sense of balance related to the inner ear.

HYPERSENSITIVE

Fearful reactions to ordinary movement activities
Difficulty with walking or crawling on uneven unstable surfaces
Dislikes head upside down and becomes anxious or distressed when feet leave the ground.

HYPOSENSITIVE

Enjoys swings and merry-go-round
Spins, runs round and round and rocks back and forth

EFFECT ON DESIGN

No floor level changes to avoid issues of balance. Sensory rooms should include swings and trampolines.

more cohesive strategy for design section
IV. Program
Organize Strategies

Occupants would live in units of 1-6. Some with full-time caregivers, others without depending on their functioning level. Residents would be placed in a unit with other people that will complement their abilities, interests, and sensory needs. Including some cases where high-functioning residents live with less-functioning residents to create a more natural flow. An ideal ratio of residents to caregivers, with regard to those who need full-time assistance, is 2:1 or 3:1 at maximum. By mixing people who do not need a lot of assistance with those that do, it would lower the need for staff. The more functional people would be able to assist the less functional to alleviate some stress to the full-time caregivers. The bedrooms of each resident will serve as a retreat and quiet space for them.

- 2 residents : 1 caregiver
- 4 residents : 2 caregivers
- Mix of function levels to create a gradient
6 bedroom unit: 2 caregivers

3 bedroom unit: 1 caregiver

2 bedroom unit

1 bedroom unit

5 bedroom unit: 1 caregiver

3 bedroom unit: 1 caregiver

1 bedroom unit
Program

Units

- 1-6 Bedrooms per unit: 140 sf each
- Ensuite Baths: 50 sf each
- Shared Living Room: 250 sf
- Bathroom: 30 sf
- Shared Dining Room: 200 sf
- Shared Kitchen: 200 sf
- Shared Pantry: 30 sf
- Shared Laundry Room: 50 sf
- Office for Caregivers: 50 sf

Community Building

- Lounge: 300 sf
- Exercise Room or PT/OT: 200 sf
- 2 Sensory Rooms: 150 sf each
- 3 Education spaces: 100 sf each
- Teaching Kitchen: 300 sf
- Pantry: 75 sf
- Bathrooms: 100 sf
- Computer Lab: 200 sf
- Conference Room: 250 sf
- Supervisor Office: 75 sf
- Front Office: 100 sf
- Locker Room: 150 sf
- Records/Archive Room: 50 sf

Garden

- Garden Shed: 200 sf
- Veg. Prep/Washing Station: 100 sf
- Storage for Veg.: 150 sf
- Stand/Store: 200 sf
- U-pick facilities: 100 sf
- Garden: 2 acres
- Chicken & Rabbit Coops: 100 sf
- Parking: ??
SPECIFY!

variety of stimulation

high  mid  low

transition space

highstimulation  lowstimulation

too big: echoes overwhelming

too small: claustrophobic constricting

limits echoing still open, but more comfortable
There should be a variety of stimulation throughout the building, and variety of room sizes that correspond to the level of sensation happening. This would also correlate with the activities or programs of each space. The other consideration is how to transition from spaces of high stimulation to low stimulation. There should be a transition area or a buffer zone between the two, since autistic people have trouble with change and a sudden transition could be very bad for them. These are other reasons to separate the more public areas of the community such as the sensory rooms, teaching kitchen, and large gathering space from the individual housing units. This way the highest stimulation pieces are not directly connected to the lowest stimulating spaces: the residents bedrooms or quiet spaces.
space differentiation

A key element in laying out spaces for those with autism, is to delineate different spaces for different activities. It gets confusing when a space is used for both a relaxing activity, like studying or sleeping, and a high energy activity, such as sensory stimulation or exercise and play.

Another thing to consider is establishing routines. A daily routine is necessary for someone with autism. They have trouble with change and are comfortable when there is a consistent flow. The layout of rooms and/or circulation decisions in the home could help create a sense of hierarchy and routine.
Due to the Gestalt Perceptions discussed in the previous section, the organization and circulation of spaces in the facility are important. Those with autism may not be able to recognize a room coming from a different direction so minimizing possible approaches is ideal to limit confusion of the residents.
Circulation is definitely something to consider in relation to both daily routines and gestalt preceptions. With gestalt, having the fewest amount of entrances to not have confusion entering from different directions. The idea of having a hub, or a central location that everything stems from would create one entrance to each space, but then the hub itself could become confusing with 5 different entries. The linear option creates two entrances, but could help introduce a pattern or routine for the day.
Since people with autism can get easily startled if they are not prepared for what could be in the next room they enter, sight lines throughout the design are key. Minimizing blindcorners and increasing vision throughout the share spaces will help them transition from one space to the other, but also be aware of what to expect in the next room.

Part of the strategy would be to test different room configurations for visibility between spaces.
Why Ann Arbor?
Laboratory schools are a way for university students to research or observe students with disabilities and how they interact with and learn from their teachers. Different models can be seen in schools K-12.

By placing the site in Ann Arbor, there can be a connection with the University of Michigan. They can go to the university to continue working on their communication skills, especially for those that are non-verbal. They can also audit classes at the university to continue their education, since funding stops.

Connecting with the university would also foster a connection with the community. The university is very central within the city and could help residents create relationships and work on social interaction.
walking distances

- 25 min
- 20 min
- 15 min
- 10 min
- 5 min
Benefits of Farm Life

By studying farmstead models we can see that farm life is very beneficial and therapeutic for autistic people. It provides a variety of tasks which fit a wide range of interests and abilities. They are able to grow their own food, clean it, help cook it, and share it with others. They can have and care for animals, which they tend to easily connect with. Having a range of tasks helps prevent boredom and promote cognitive function (sage foundation).

By taking some of these attributes into an urban environment, the residents can have the benefits of a rural farm life as well as staying connected to the city. This also gives an opportunity to sell the produce grown on site at the local farmer’s market as a way of community interaction, as well as skill building through social interaction with people. There could also be a section of planting available for people of the city to plant their own food.
2 Acre Garden

1/2 acre: vegetable garden

1/4 acre: community plots

1 1/4 acres: fruits & field crops
1 1/4 acres:
fruits & field crops

- strawberries
- blueberries
- raspberries
- corn
- melon
- rhubarb
- asparagus

These crops take up more space and also shouldn’t be rotated like the plants in the vegetable garden.

1/2 acre:
vegetable garden

- leaves/flowers
- fruits
- roots
- legumes

The vegetables take up less space and should be rotated yearly. This amount of area would be plenty to both provide food for the residents and an overflow to sell in the community.

1/4 acre:
community plots

will vary

This space would be split up among people of the community to use and garden themselves.
vegetable garden

year 1
- salad greens
- lettuce
- broccoli
- cabbage
- spinach
- brussel sprouts

year 2
- tomatoes
- peppers
- eggplant
- squash
- corn
- cucumber
- potatoes

year 3
- carrots
- turnips
- onions
- beets
- radish

year 4
- beans
- peas
- peanuts
- alfalfa
- clover
- cover crops
community residents

chickens rabbits

eggs

fruits & vegetables

weeding fertilizer

furry friends

residents

sell gardening resident food

eggs

chickens rabbits
VI. Parti Studies
test design on site
VII. Design Practices
material studies: textures, smells, etc.
large scale models of spaces with materials
VIII. Precedents
bittersweet farms & urban institution comparison
UK buildings with qualitative aspects