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Designing for Children with Sensory Integration Disorders: A Handbook for Residential Designers

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Designing for Children with Sensory Integration Disorders: A Handbook for Residential Designers

Abstract

Creating spaces for those with Sensory Integration Disorders, such as Autism is a relatively new niche in the Interior Design community. However, according to the Centers for Disease Control and Prevention (CDC), nearly 1 out of 45 children between the ages of 3-17 have been diagnosed with Autism (“New Government...”). Keeping this in mind, it is crucial that our field seeks out solutions to design for challenges which are prevalent for those with Autism. As designers, we need to know how Autism affects how environments are perceived.

Designing for Children with Sensory Integration Disorders: A Handbook for Residential Designers

Creating spaces for those with Sensory Integration Disorders, such as Autism is a relatively new niche in the Interior Design community. However, according to the Centers for Disease Control and Prevention (CDC), nearly 1 out of 45 children between the ages of 3-17 have been diagnosed with Autism (“New Government...”). Keeping this in mind, it is crucial that our field seeks out solutions to design for challenges which are prevalent for those with Autism. As designers, we need to know how Autism affects how environments are perceived.

What is Autism?



Autism is a mental condition which presents itself in early childhood and makes communication and developing social skills difficult. Autism can also make abstract concepts and language problematic, as they are unable to be fully understood by those with Autism (Merriam-Webster). What makes this condition more difficult to assess for medical professionals and for designers is that Autism is a “spectrum disorder, meaning its effects vary from person to person. No two people with autism have the same symptoms” (“What is Autism”).

Those with Autism commonly have difficulties experiencing sensory stimuli. Their senses “seem too acute (hypersensitivity) or not working at all (hyposensitivity)” (Bogdashina, Olga). Because, for those with Autism, there is a vast variance between reactions to stimuli, a designer cannot use a “one size fits all” approach to design.

Keeping in mind how and why hypo vs. hyper reactions occur, interior designers can better understand how to approach the creation of safe and comforting environments for those with Autism. No matter which kind of reaction autistic children have to stimuli, the most important thing to consider is whether or not individual children feel safe in the space being created. Regardless of where the child is on the spectrum, privacy and safety are the two most important aspects of the design.

There are seven senses which must be considered in any design. Designing for someone who is incredibly sensitive, or not sensitive enough, can be a daunting task. Time spent with the child and interviewing parents, caregivers, or medical professionals can help create a design that is tailor-made for the client. It is imperative that the end result is a safe place within the home which is made for the child’s special needs. Below are considerations and examples of how to create such a place.



<http://www.friendshipcircle.org/blog/wp-content/uploads/2013/07/autism-websites.jpg>

SIGHT

Sight is a major consideration for children with Autism.

Hypersensitive: Individuals who are sensitive to light can have “distorted vision”. Images may appear fragmented instead of seen as a whole picture. For Autistic children who are hypersensitive, it is “easier and more pleasurable to focus on a detail rather than the whole object”. Hypersensitive children may find it hard to sleep at night because of light disturbances (“Sensory Differences”). Hypersensitive children can find certain lights distracting. They also avoid direct eye contact with one another.

Hypersensitive Design Considerations and Recommendations:

- Focus on the details of your design. Hypersensitive children may fixate on seams in carpets and other minor details to the point of agitation. Parents can be very helpful in explaining their child’s particular visual distractors. Comb over the space and look for potentially distracting areas which might precipitate fixation.
- Be aware of lighting. Lights can be distracting and uncomfortable for someone who is sensitive to brightness and glare. Light sensitivity is a predominant characteristic of Autism.



<http://carpet.vidalondon.net/carpet-seams/>



<http://3.imimg.com/data3/RJ/VN/MY-9934023/power-cfl-light-500x500.jpg>

- Avoid lighting with ballasts, as they can irritate and distract. Certain lights “flicker,” according to Dr. Victoria L. Dunckley who works with Autistic patients. She claims lights “can trigger nervous system events like migraines, tics, or seizures in sensitive individuals (@PsychToday).
- Switch out lighting such as CFL’S to incandescent light as incandescent incites a much less stressful response in the body (@PsychToday).

SIGHT

Hypersensitive Design Considerations and Recommendations:

- Be aware that children who are sensitive to light can be greatly affected by Seasonal Affective Disorder. These children might become more sulen and withdrawn during the winter months. Having a therapeutic light source that can offer them relief can help soothe (“Light Sensitivity and Autism”).



By Sillu - Own work, Public Domain, <https://commons.wikimedia.org/w/index.php?curid=11244290>

- Fluorescent lights can increase visual stress factors because they “lack the balanced sectorial aspects of sunlight” (“Light Sensitivity and Autism”). Avoid them entirely.

- Opt for blinds that do not have cords as they can become choking hazards.

- Use blackout shades in bedrooms to help facilitate sleep.



<http://www.ecosmartshades.com/wp-content/uploads/2014/09/Blackout1.jpg>

SIGHT

Hyposensitive: Individuals who are under-sensitive do not see images clearly. Objects appear dim or dark. One's central vision is hazy and blurred, though the peripheral vision is clear. However, it can also appear to be the opposite where the outer objects are blurry and the central object is "magnified". Poor depth perception is another hallmark of hyposensitivity ("Sensory Differences").



<http://www.oasysps.com/portfolio/new-build-development-redland-bristol/>

Hyposensitive Design Considerations and Recommendations:

- Clearly illuminate pathways and stairs. Consider night lights to help guide in the evening and morning hours. Led strips under cabinetry in the kitchen and bathrooms can facilitate movement in a darkened room.
- Focus on wayfinding and using colors and textures to indicate changes in the space, such as stairs.
- Round edges on corners to prevent injury.



<https://www.architectsjournal.co.uk/buildings/specification/floors-stairs-lifts-and-wayfinding/8640623.article>

General Design Considerations for Sight:



http://www.houzz.com/ideabooks/22717181?utm_campaign=u435&utm_medium=email&utm_source=Houzz&utm_content=gallery10

- Install a camera at the front door. Older children will be able to see who has come to visit before the visitor enters the space. Previewing spaces and people creates an environment in which autistic children feel safe and in control of their surroundings.
- Make transitions from one room to another more predictable. Using pony walls or cutting an opening in a wall which can help one "preview" the room before entering can be beneficial. This allows the child to feel safe and secure as they orient themselves in the room.

SIGHT

General Design Considerations for Sight:

- A study found that visual balance was much preferred to asymmetry. In addition, placing furniture in a circular pattern was more accepted than a more angular, rigid pattern.
- Mix natural light with artificial light.
- Use clerestory windows for those easily distracted and then layer with artificial light to achieve a balanced light spectrum.
- Studies show that a connection to nature reduces stress. Allow views of nature in rooms in which it is appropriate.

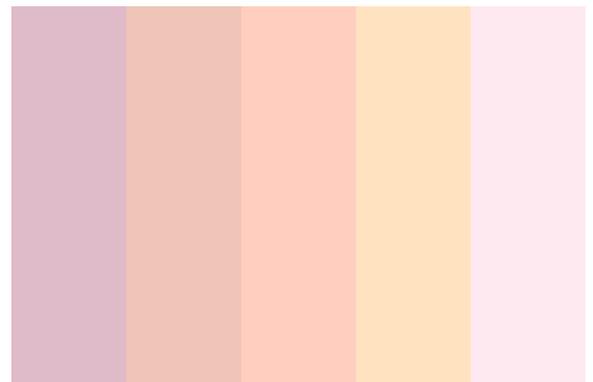


<http://rddavisarchitect.com/galleries/residential/mediterranean/>



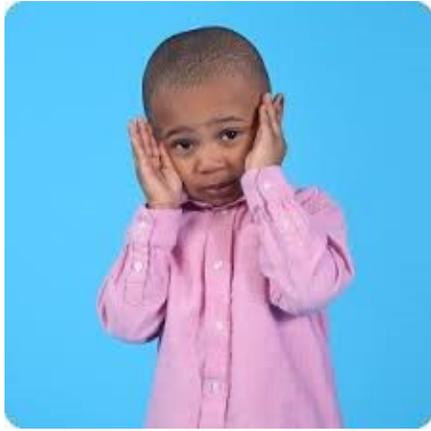
- Studies show that regardless of the gender, Autistic children respond well to pink, tranquil blues, light purples, pale greens and neutral colors.
- Avoid stark white and primary colors ("The Best Room Colors for Children With Autism").

<http://www.cyball.com/45187-costco-adjustable-beds-kids-transitional-with-bean-bag-beanbag-blue-bright-bright-colors-built-in/costco-adjustable-beds-bedroom-scandinavian-with-area-rug-artwork-black-trimmed-windows-clerestory-windows-floating/#main>



<http://www.color-hex.com/palettes/7095.png>

SOUND



https://encrypted-tbn2.gstatic.com/images?q=tbn:ANd9GcT-5yb-bnivqVrHS7UxGira785h19X8Tvb3Vy_jkGhi4Q6ZnbuEH

Sound is the most crucial of the senses to be aware of. Auditory and visual privacy have been proven to have the biggest impact on the wellbeing of a child with Autism (Gaines, Kristi).

Hypersensitive: Children who are very sensitive to sounds hear noises amplified. They are aware of sounds such as the humming of an appliance which might otherwise go unnoticed. Sounds can easily seem muffled and distorted. Some Autistic children can hear conversations across the room, because their hearing is so keen. Others have a hard time “cutting out the background noise”, being unable to concentrate on conversations (“Sensory Differences”). Hypersensitive Autistic children can startle easily and feel panicked by a noise. They avoid large crowds and noisy events.



<http://design.spotcoolstuff.com/home-decor/creative-soundproofing>

Hypersensitive Design Considerations and Recommendations:

- Place a bathroom on a corridor wall to help buffer hallway noise.
- Use sound-absorbent tiles or rubber on the floors and tile wall panels, especially in the bedroom to prevent noise pollution.
- Install quieter toilets with soft close seats, fans, and appliances.
- Create built-ins along shared walls to dull sounds.
- Orient the head of the bed away from a shared wall.
- Use plenty of soft goods to dampen the noise.
- Move vents and air conditioning units adjacent to the house to prevent disturbing background noises.
- Have a safe place in the house where noise is completely cancelled. This can be used in times of distress as a way to comfort and soothe.



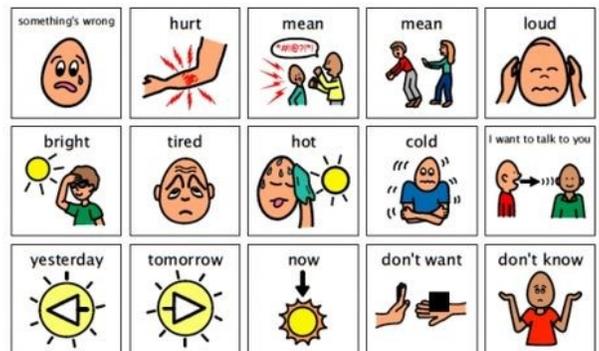
<http://www.houzz.com/ideabooks/2408278/list/clerestory-windows-are-tops-at-ushering-in-light>

SOUND

Hyposensitive: Children who are not sensitive to noise sometimes are hard of hearing in one or both ears. They appear to “make noise for noise’s sake” (“The Seven Senses”). They might not be able to register certain tones at all or be unaware as to where the sound is coming from all together. Hyposensitive children enjoy loud places and tend to bang doors and objects. They relish excessively loud music or TV. They tend to talk themselves through personal tasks out loud and frequently need directions repeated.

Hyposensitive Design Considerations and Recommendations:

- Children unable to hear well may need visual clues. Placing cards with pictures in various rooms can help the child understand directions without relying on hearing. Have a place for these cards so they are not lost or scattered would help the caregiver to more efficiently communicate with a child who “under-registers”.
- Lights can be used to direct their attention to a space or activity.



https://www.teacherspayteachers.com/Product/Visual-cues-get-ready-tell-whats-wrong-_autism-_other-special-education-966690



<http://www.toysrus.com/products/child-safety-cabinet-locks.jsp>

- Because sounds are exciting to them they look to create noises in places such as the kitchen. Make sure that kitchen cabinets are secured to prevent injury from sharp objects. Take inventory of the rest of the house for potential noise making items.

General Design Considerations for Sound:

- Be aware of the sounds in the space. Pay attention to appliances, plumbing, lighting, and outside noises as well.
- Use soft goods to cushion and dampen noise pollution as needed.
- Install slow close cabinets, cupboard doors, and toilet lids to avoid both wanted and unwanted noise.

SMELL

Smell is not something that Interior Designers tend to really consider in their designs. However, sense of smell should be a design consideration for those with Autism.



Hypersensitivity to Smell: Smells can be overwhelming for those with Autism. They can be intense, distracting, and physically impairing. Children who are hypersensitive dislike perfumes, shampoos, and even lotions. Sometimes, even the smell of pets can be too overwhelming. Foul smells can even cause children to avoid bathrooms altogether, causing substantial toileting problems (“Sensory Differences”). Some hypersensitive children can actually smell

<http://i.huffpost.com/gen/1370789/images/o-BABY-IN-HAT-facebook.jpg>

colors. This disorder is called Synesthesia. It is when two senses combine and one sense “triggers a response in a different sense” (“Synesthesia Linked to Autism”). Children may be able to smell or taste colors.

Hypersensitive Design Considerations and Recommendations:

- Pay attention to room placement in conjunction with the kitchen or other places where food may be consumed. Have bedrooms or safe places far away from such areas.
- Make sure proper venting is in place in kitchens and bathrooms to pull away noxious fumes. Look for low-sone venting options.
- Use low or zero-VOC paint and lacquer.
- Choose countertops that do not offgas.



<http://www.todayshomeowner.com/wp-content/uploads/2013/03/794-1-advantages-kitchen-range-hoods-microwaves-venting.jpg>

SMELL

Hyposensitive: Children who cannot smell efficiently may fail to notice obvious and powerful odors. They can even fail to notice their own body odor. Some children may lick things “to get a better sense of what they are” (“Sensory Differences”).

Hyposensitive Design Considerations and Recommendations:



- Provide a safe and inviting cleaning area in which they can bathe or shower to encourage cleanliness.
- Use proper venting in the bathroom to discourage exploration of “inappropriate strong-smelling stimuli (like feces).

http://i.dailymail.co.uk/i/pix/2013/12/12/article-2522714-1A102E0F00000578-159_634x374.jpg

- Some children who do not smell well seek out inedible foods such as dirt and cleaners. Keep cleaning supplies and pet food locked behind cabinets.
- Make sure that potted plants are out of reach.



<http://blog.mollymaid.com/wp-content/uploads/2013/01/cleaning-supplies-kit.jpg>

Taste:

Autistic children perceive taste differently as well.

Hypersensitive: Over-sensitive children have self-imposed restricted diets, because they find some flavors and foods too strong. They are highly sensitive to texture and might only find smooth foods acceptable. Whether it is obsessive behavior, a coping mechanism, or they are unable to know when they are full as a result of a sensory integrated dysfunction, some children overeat.



<http://s.hswstatic.com/gif/why-is-there-a-metallic-taste-in-my-mouth-1.jpg>

Hypersensitive Design Considerations and Recommendations:



- Keep pantries, freezers, refrigerators and cupboards locked to avoid over-eating.
- Place a kid-safe magnet lock for every door in the kitchen and bath. Cupboards are easier to lock than drawers, so if given the option, designers may plan for more cupboards. Magnet locks can be opened with a master key. As the child grows, she may be given access to some items in the cupboards. Allowing limited access teaches the child how to be more independent and to put things away safely.

https://images-na.ssl-images-amazon.com/images/I/81zgOHx2cAL._SY355_.jpg

TASTE

Hyposensitive: Children who have a difficult time tasting flavors tend to choose spicier foods. They can also fixate on non-edible foods such as dirt, rocks, glue, paper, metals, plastics, feces. This is known as Pica (“Tackling Difficult Behaviors Part 1”).



http://g-search3.alicdn.com/bao/uploaded/i4/151195966/TB2nsB7XPzyQeBjy1zdXXalnpXa_!!151195966.jpg_210x210.jpg

Hyposensitive Design Considerations and Recommendations:

- Keep everything out of reach, especially in bedrooms. Lock items behind doors and drawers. This phase might not last for a long duration, but it is an essential precaution.
- Pica can be brought on by stress. Make sure that you have a safe, stress-free zone to which they have access.
- Some therapies suggest that having food available can help reduce the need to eat non-food items. Creating a small area in the kitchen where they can have access to such food and “leaving those items available for the child to interact with” might prove helpful (“Love Many, Trust Few”).



https://d2v9y0dukr6mq2.cloudfront.net/video/thumbnail/vd3bj2jPe/fresh-apples-on-wooden-table-red-and-green-apples-be-different-big-beautiful-fruit-on-table-organic-fresh-apples-apple-juice-fruits-vegetarian-food-fresh-fruits_rfakpvbx__S0000.jpg

TOUCH

Touch is an important sense to Autistic children. Responses can range from feeling nothing to feeling pained by physical touch.



[https://encrypted-tbn2.gstatic.com/images?](https://encrypted-tbn2.gstatic.com/images?q=tbn:ANd9GcRMWSsUKX7uWHMAFTbirtkqERvSQ9AFM9rKP_hWzjO4cf7Yz1A)

[q=tbn:ANd9GcRMWSsUKX7uWHMAFTbirtkqERvSQ9AFM9rKP_hWzjO4cf7Yz1A](https://encrypted-tbn2.gstatic.com/images?q=tbn:ANd9GcRMWSsUKX7uWHMAFTbirtkqERvSQ9AFM9rKP_hWzjO4cf7Yz1A)
ETA

Hypersensitive: Children who are Autistic can be hyper or hypo-tactile. Hyper-tactile children may avoid being touched. Touch can be painful. They do not like having their hands and feet covered. Grooming can be a challenge, as brushing and washing their hair is too painful. Many children who are hyper-tactile find textured foods difficult to swallow. They can only tolerate certain fabrics in clothing and bedding.

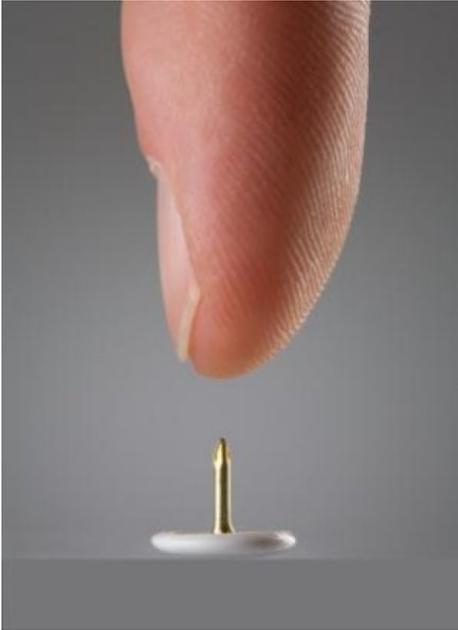
Hypersensitive Design Considerations and Recommendations:

- Create age-appropriate spaces in which to groom. Having the child be in control of their grooming can reduce some of the stress they feel in brushing and washing. A washing station that they can control will help them to feel less helpless.
- Pay attention to textiles in rooms. Avoid cold metals on furniture such as desks and tables, and opt for more natural materials.
- Keep textiles soft, avoid man-made materials.
- Allow the child the opportunity to control the temperature in their room.
- Consider a thermostatic shower, set up to keep the water at an enjoyable temperature.



<http://www.plumbworld.co.uk/mira-excel-thermostatic-shower-biv-all-00015218R.png>

TOUCH:



https://images.sciencedaily.com/2012/02/120219143049_1_900x600.jpg

Hyposensitive: Those who are hypo-tactile do not feel pain or temperature. They are prone to injury and seem unaware that they are hurt at all. Children who are under-sensitive can cause self-injury, such as banging their heads on the floor or biting their hands. These children like to feel pressure on their bodies (Bogdashina, Olga).



<https://s-media-cache-ak0.pinimg.com/originals/52/ad/37/52ad370098c59dbd1e217bd3adb37023.jpg>

Hyposensitive Design Considerations and Recommendations:



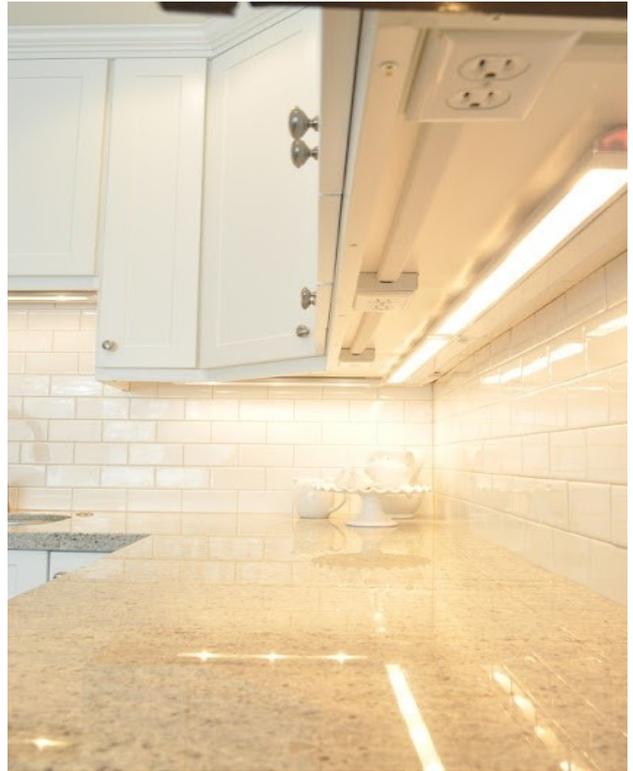
http://4.bp.blogspot.com/-PTKN-q_tBoM/UtM6Zu6vmbI/AAAAAAAAACDA/Na7vwEVChEk/s1600/IMG_0056.JPG

- Have a place in the child's room set aside for weighted objects such as blankets to calm.
- Make use of sensory walls or have a sensory station where they can explore. These stations must be able to be removable or easily locked away.
- In the kitchen, use an induction cooktop to avoid burning.
- Use dishwashers and ovens that have buttons out of reach.

TOUCH:

Hyposensitive Design Considerations and Recommendations:

- Hide power outlets under kitchen cabinetry, not exposed on the backsplash.
- Set the water temperature in the house below scalding.
- Consider a thermostatic shower set up with a locking temperature gauge to avoid scalding water (“Love Many, Trust Few”).



<https://cdn.decorpad.com/phtos/2012/12/27/94f140df9018.jpeg>http://4.bp.blogspot.com/-PTKN-q_tBoM/UtM6Zu6vmbI/AAAAAAAAACDA/Na7vwEVChek/s1600/IMG_0056.JPG



<https://s-media-cache-ak0.pinimg.com/564x/6a/f3/58/6af3588727a942528bd7b7f27fc51523.jpg>

- Keep all wet areas safe as children with autism like to explore with water. Use nonslip flooring and lavatory sinks with overflows.
- Create a water exploration space with safety in mind, a place that allows them to enjoy the feel of the water. However, a place that can also be monitored and locked away as needed.

VESTIBULAR:

The vestibular sense is one of the lesser-known of the seven senses. This sense is connected to the inner ear which affects balance. According to SPD Australia, “Dysfunction in this system may manifest itself in poor physical coordination; poor memory (due to difficulty with auditory processing, or receiving and understanding auditory stimuli as it is transmitted to the brain); difficulty with sequencing and timing (understanding the steps required to perform a certain action); and difficulty with understanding language, especially nonverbal social language (body language of self and others)” (“The Seven Senses”).



<https://s-media-cache-ak0.pinimg.com/236x/bd/c6/77/bdc677b4efcc0b4285620cc400e77c24.jpg>

Hypersensitive: These children have a fear of swings, slides or stairs. They have a difficult time playing active sports where motor skills are necessary. They have a hard time quickly stopping. Some children may also easily become carsick. Hypersensitive children have a difficult time in situations where “their head is not upright or their feet are off the ground” (Sensory Differences”).

Hypersensitive Design Considerations and Recommendations:

- Keep surfaces flush with one another so there are no steps to overcome. If stairs are necessary, try using a color or light to help identify a change in flooring.
- Plan for important rooms of the house to be on the main level.
- Position furniture around the edges of the room to help with navigation.



<https://s-media-cacheak0.pinimg.com/564x/84/f3/19/84f31957e783f118fa64ab231e04ba89.jpg>

VESTIBULAR:

Hyposensitive: Children who are under-sensitive want to be stimulated. They love twirling and swinging and do not get nauseated. They can rock their bodies endlessly. A child with a hyposensitive proprioceptive system “tends to jump around a lot to create ‘input’ to their joints and muscles, loves to roughhouse with others, crashes through the house like a bull in a china shop, likes big bear hugs, and can be viewed as aggressive with others” (“The Autism Life”).

Hyposensitive Design Considerations and Recommendations:

- Place a swing indoors.
- Create an obstacle course of various activities that stimulates their vestibular sense. Such obstacle courses should be easily put away or locked up entirely.
- Use objects that are soft and devoid of corners to avoid injury.
- Do not allow pets or animals to reside in the space as children who are hyposensitive cannot determine how much force they are using.
- Keep in mind the double rub count in fabric. Chose commercial textiles when appropriate.
- Use durable casegoods. Avoid chairs and other furniture that are not made using quality construction such as solid wood and dovetail joints



<http://www.buffalonews.com/storyimage/BN/20150129/CITYANDREGION/150128834/EP/1/6/EP-150128834.jpg&maxW=960>



<https://www.pinterest.com/pin/509258670335950219/>



Proprioceptive:

The final sense deals with body awareness. Proprioception was “developed by the nervous system as a means to keep track of and control the different parts of the body” (“Seven Senses”).

Hypersensitive: Have a difficult time with fine motor skills. Children who are over-sensitive hold their bodies in odd positions.

http://img.over-blog.com/300x193/4/13/07/22/519003053_o.jpg

Hypersensitive Design Considerations and Recommendations:

- Have a station to help with gross motor skills. Stations must be safely stored out of reach when not in use.
- Choose pulls and knobs that are comfortable and easy to use in the bathroom and kitchen.

Hyposensitive: Autistic children are unaware of their own body sensations. Children appear floppy and use furniture or people to lean on. They appear clumsy and frequently stumble. Hyposensitive children have a weak grasp and easily drop things. They have a hard time navigating around objects and do not understand “personal space”.



http://www.oneperfectdayblog.net/wp-content/uploads/2012/03/img_0839.jpg

Hyposensitive Design Considerations and Recommendations:

- Position furniture around the edges of the room to help with navigation.
- Using different flooring material can help indicate boundaries in a space.

Final Thoughts

It is the responsibility of an interior designer to consider many things when designing. Thought is given to color, light, line, space, weight, balance, rhythm, egress, codes, specifications, ergonomics, and so much more. However, it is imperative to also account for physiological and psychological effects the environment has on an individual.

A designer working with a person with Autism must be aware that, while meeting all the standards applicable to our industry, in the end they are tailoring a safe space for individuals with particular needs and those must be addressed as a result of collaboration with parents, caregivers and medical professionals.



http://assets.nydailynews.com/polopoly_fs/1.2671564.1465825575!/img/httpImage/image.jpg_gen/derivatives/article_750/483923258.jpg

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