Introduction

Accessibility in the public realm should be viewed through two lenses: access to the built environment and access to the experience of the built environment. Physically accessing and experientially accessing the built environment are two distinct concepts. Physical access involves overcoming architectural barriers in order for one’s body to physically enter a building or facility. Experiential access involves a person actively participating in the experiences offered within the built environment. These experiences may not be readily accessible to youth living with disabilities for two main reasons. First, the overarching legal principles guiding the design of the public realm is barrier removal which is often interpreted as architectural barrier removal only, e.g., slope of ramps and design of door handles. Architectural barrier removal only addresses physical access to the built environment but not experiential access. Experiential access of the public realm may not be dependent on physical access alone. Other factors may be at play, especially for youth living with a disability. This chapter examines the current laws governing accessibility in the public realm in the United States and explores the very broad concept of ‘services’ as defined by these laws. Second, without a deeper understanding of the experience of living with a disability, policy makers, planners, and designers may not be aware of how to provide experiential access. The chapter explores the experiences of young people living with a disability. While the term ‘disability’ captures many experiences, the chapter focuses on the experiences of youth living with Autism Spectrum Disorder (ASD), mobility limitations, and hearing and vision impairments. Some common experiences of disability are sensory processing issues and barriers to social interaction. These common experiences are potential barriers that hinder experiential access for youth living with the disabilities explored within the chapter. By understanding how these common experiences prevent experiential access, accommodations toward accessibility are possible.

While the legal responsibility of accessibility rests with the owner, policy makers, planners, and designers of the public realm have a professional responsibility to create physically and experientially inclusive spaces. Inclusion involves more than providing accommodations toward physical access; experiential access should also be considered. Professionals involved with the creation of public space can provide experiential access by adopting a therapeutic approach to the design of the public realm. A therapeutic approach prioritizes the benefits to health and well-being that a well-designed built environment can provide. The chapter closes with a proposition that a therapeutic approach to the design of the public realm focuses on remediating the experiences of sensory processing issues and barriers to social interaction in order to provide experiential access. The
The therapeutic approach incorporates simple gestures, such as inclusion of nature, escape spaces, transitions, and 3D models, into the public realm to achieve experiential access.

The purpose of the chapter is to explore why practitioners should consider affording physical and experiential accessibility in the creation of public space for youth living with a disability. Physical accessibility of buildings and facilities is covered with the way the American with Disabilities Act (ADA) is interpreted through executive, legislative, and judicial efforts in addition to the interpretation of design practitioners; what is lacking is attention to the experiential accessibility of services protected under ADA. With a general understanding of the experience of living with a disability and the common experiences of issues with sensory processing and barriers to social interaction, experiential accessibility can be achieved through a therapeutic approach to design. With the simple gestures required for a therapeutic approach, the question shifts from why to why not provide experiential access to the public realm.

Accessibility in the United States

Public inclusion of people living with disabilities is regulated by three main laws in the United States: the Architectural Barriers Act (ABA) of 1968, the Rehabilitation Act of 1973, and the ADA of 1990. While all three laws affect access, the remainder of the chapter will focus primarily on ADA since practitioners most often address ADA in the planning and design of the public realm; details on the ABA and the Rehabilitation Act can be found in Callout Box 5.1.

CALLOUT BOX 5.1 U.S. Laws Regulating Public Inclusion

Before the American with Disabilities Act (ADA) of 1990 was passed into law, two previous laws existed: the Architectural Barriers Act (ABA) of 1968 and the Rehabilitation Act of 1973. The ABA applies to any building that is constructed, renovated, or leased by or on behalf of the Federal Government, or financed in whole or in part by a federal grant or loan. The Architectural and Transportation Barriers Compliance Board (Access Board) was established under the ABA to develop and maintain Accessibility Standards to ensure ABA compliance of federal buildings. Section 504 of the Rehabilitation Act prohibits discrimination in accessing programs or activities that receive federal funds or are conducted by any Federal agency.

ADA greatly expanded protections for individuals living with a disability. The ABA and Section 504 of the Rehabilitation Act only governed entities receiving federal funds for facilities or for providing programs or activities, respectively. ADA expanded regulatory control to public entities (Title II) and private entities (Title III), regardless of funding source.

While these laws pertain to accessibility in the United States only, several countries have their own version of accessibility laws.

Signed into law on July 26, 1990, the ADA consists of 5 Titles protecting people with disabilities from discrimination in regard to (I) employment, (II) public services, (III) public accommodations, (IV) telecommunications, and (V) miscellaneous. Titles II and III are the most relevant to the planning and design of the public realm. Title II states:

No qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs, or activities of a public entity, or be subjected to discrimination by any public entity.

(CFR, 1991a)
Title III states:

No individual shall be discriminated against on the basis of disability in the full and equal enjoyment of the goods, services, facilities, privileges, advantages, or accommodations of any place of public accommodation by any private entity who owns, leases (or leases to), or operates a place of public accommodation.

(CFR, 1991b)

A distinction between Title II and Title III should be noted. Title II protects access to ‘services, programs, or activities,’ and Title III protects access to ‘goods, services, facilities, privileges, advantages, or accommodations.’ For the purposes of this chapter, ‘services, programs, or activities’ in Title II and ‘goods, services, facilities, privileges, advantages, or accommodations’ in Title III will be referred to simply as ‘services’ when referencing ADA. The chapter asserts that access to these services defined in Titles II and III relies more heavily on providing experiential access rather than physical access. The experience of the built environment depends on one’s ability to access services. In other words, accessing the services defined within the ADA represent the experiential quality of the built environment. Successfully participating in and benefiting from these services constitute experiential access of the public realm.

Interpretation of the ADA through Executive, Legislative, and Judicial Efforts

Since the adoption of the ADA in 1990, the Executive, Legislative, and Judicial branches have worked to refine and interpret the law. U.S. Supreme Court rulings in 1999 (Sutton et al. v. United Airlines, Inc., Murphy v. United Parcel Service, Inc., and Albertson's Inc. v. Kirkingburg) and 2002 (Toyota Motor Manufacturing v. Williams), which greatly narrowed the definition of ‘disability,’ prompted President George W. Bush to sign the ADA Amendments Act in 2008. This amendment supported a broad definition of disability and expanded the population protected from discrimination under the ADA (ADA National Network, 2015). In 2010, the Department of Justice revised the accessibility standards concerning Titles II and III establishing a minimum standard for facilities (DOJ, 2010). The establishment of minimum standards for Titles II and III was guided by the ADA Accessibility Guidelines (ADAAG) which are created and maintained by the Access Board under the ABA. Since the adoption of the ADA in 1990, the Access Board responsibilities expanded from federal projects only to all projects in the public realm.

In reading DOJ and Access Board publications regarding ADA and ADAAG, the attention is directed toward physical access as the main barrier to accessibility and no considerations are given to experiential access. The minimum standards established by the ADAAG mainly address the accessibility of facilities, e.g., accessible routes, parking, and restrooms (U.S. Access Board, 2002). Access to services as outlined in Title II and Title III of ADA seems to be dependent on the ability of an individual to physically access a facility. For many living with a disability, rectifying architectural barriers only will not fully address inclusion. Recognition of the omission of experiential access is evidenced by increasing ADA litigation focusing on a person’s disability preventing their experiential access of services. At the time of writing the chapter, the author conducted a search of the ADA website (www.ada.gov) to identify settlements involving youth with a disability that prevented them from accessing a service that was not building related. The settlement agreement between the United States of America and Youth Fitness and Fun, LLC (DJ #202-48-312) detailed an incident where a 6-year-old child with multiple medical disabilities, one of which required a gastrointestinal feeding tube, who had participated previously in classes at the facility was denied participation in a gymnastics class due to the possibility of a Youth Fitness and Fun employee damaging the feeding tube while assisting in gymnastic exercises. Youth Fitness and Fun was required to accommodate participation of children with disabilities in classes offered without the
requirement of enrolling “in a ‘separate or different’ Special Needs Class” pursuant to CFR §36.203(b) of Title III of ADA (US v. Youth Fitness and Fun, 2018). The necessity of a feeding tube prevented the child from experiencing the benefits of participating in the gymnastics class. In other words, the child’s physical disability prohibited experiential access. Similarly, the settlement agreement between the United States and Bar-T Year Round Programs for Kids detailed an incident where a child with ASD was denied participation in summer and after-school programs over concerns with his disability-related behavior. Bar-T was required to make reasonable modifications to their programs to accommodate children with disabilities that may affect their behavior (US v. Bar-T Year Round Programs For Kids, 2018). In both settlements, the legal argument centered on the ways in which the defendants failed to accommodate a youth living with a disability the opportunity to experience the benefits of participating in a service and not accessing a building.

As more ADA litigation focuses on the experiential access of services, a reasonable expectation is that the interpretation of the ADA will expand to include providing experiential accessibility in addition to physical accessibility; therefore, professionals involved in the creation of the public realm should begin to consider planning and designing for experiential accessibility. The key is to adopt a therapeutic approach to the design of the public realm by prioritizing benefits to health and well-being. Providing experiential accessibility in the public realm is critical for full inclusion and has many benefits that will be discussed later in this chapter.

**Interpretation of the ADA by Design Professionals**

In addition to Executive, Legislative, and Judicial efforts, design professionals also interpret the ADA in the creation of the built environment. Accessibility is the legal responsibility of the owner, both public (Title II) and private (Title III), charged with administering services as defined by ADA. However, in practice, the owner places the responsibility of ADA compliance, specifically in regards to physical access, on design professionals. These professionals typically utilize the ADAAG, which contain minimum design standards that mainly address physical access of buildings. The impact of ADAAG is that practitioners solely focus on physical accessibility at the exclusion of experiential accessibility. Essentially, making sure facilities are physically accessible is where most attempts of inclusion stop, and experiential accessibility is often overlooked. As stated earlier, accessibility in the public realm should be viewed through two lenses: *access to the physical environment* and *access to the experience of the physical environment*. ADAAG ensures access to the physical environment only, so how can experiential access be provided? Facilitating individual participation in services regardless of ability could be key to experiential inclusion. While planning and design practitioners are not responsible for administering services or ensuring participation in services within the public realm, they have the opportunity, if not professional responsibility, to create physical environments that are inclusive, supportive, and welcoming to all regardless of ability. In instances where inclusion involves more than physically accessing a building or facility, practitioners can accommodate inclusion by intentionally designing environments which remove barriers that prevent experiential access. In order to understand how to remove experiential barriers, an understanding of the experience of living with a disability is needed.

**The Experience of Youth Living with a Disability**

Experience is not a universal concept because everyone’s experience is unique. While the individual experience of disability may be hard to capture, mechanisms exist which monitor the experience of disability in the United States. The U.S. Census and other organizations track population counts of Americans living with disabilities and the medical community identifies common symptoms and comorbidities of disability. For the purposes of the chapter, the experience of disability was examined from the perspective of U.S. population counts and medical diagnoses for youth.
living with ASD, mobility limitations, and hearing and vision impairments. The chapter will briefly review the scale and impact of these four experiences as they relate to youth and then identify similarities across experiences.

Autism Spectrum Disorder

While mobility limitations account for the majority of people living with a disability, the incidents of ASD are ever increasing. From 1997 to 2008, the population of children diagnosed with ASD increased 289.5% (Boyle et al., 2011). In 2018, the Centers for Disease Control (CDC) estimated that 1 in 59 children is diagnosed with ASD (CDC, 2018a). Many factors contributed to the increase. For example, the method used to diagnose ASD changed. Essentially, the list of behaviors identifying ASD expanded and, therefore, more children were diagnosed with ASD (Autism Speaks, 2012; CDC, 2018a). However, this change only accounts for a portion of the increase; genetic, chromosomal, and environmental factors also contributed. For example, the age of the parents at conception has been linked to autism; older parents are more likely to have children with autism (CDC, 2018a). As the age of marriage and childbirth increases, the trend of increasing diagnosis of ASD will likely continue.

Youth with ASD perceive and process environmental information in a non-neurotypical manner. Youth with ASD may have difficulty with social interaction and communication. In fact, approximately one-third of children with ASD are completely nonverbal (Autism Speaks, 2012, 2014). Many children with ASD experience challenges with muscle tone and/or coordination that can affect their ability of speech and gross motor function. Bhat, Landa, and Galloway (2011) report that school-aged children and adults with ASD experience impairments or delays in gross and fine motor coordination. Children with ASD may have either an extreme sensitivity, i.e., hypersensitivity, or extreme lack of sensitivity, i.e., hyposensitivity, to sensory stimulation, e.g., sound, sight, smells, tastes, and textures (Autism Speaks, 2012). Hypersensitive ASD children can become agitated when overstimulated and hyposensitive ASD children can be unaware of danger and run into dangerous situations like high speed traffic. Problems with proprioception present differently in children with ASD than neurotypical children. Blanche, Reinoso, Chang, and Bodison (2012) found that significant differences occurred in proprioception presentation: “feedback-related motor planning; tip toeing; pushing others or object; and crashing, falling, and running” (p. 623). Children with ASD may also engage in repetitive behaviors, such as rocking, head banging, and organizing objects, to self-soothe when environmental stimuli are too overwhelming. Differences in perceiving and processing environmental information present a range of experiences within the ASD diagnosis. An inclusive environment that supports experiential accessibility would address these differences in processing environmental information such as providing spaces where a hypersensitive child who was overstimulated could go and calm down or a space that was contained that would prevent a hyposensitive child from escaping into danger situations.

Youth with ASD experience a high rate of comorbidities or chronic diseases that occur simultaneously in a patient. Some comorbidities associated with ASD are disrupted sleep, gastrointestinal issues, mental health issues, and eating issues which may lead to obesity due to overeating (Autism Speaks, 2017). Of children with ASD, 40% to 80% experience chronic sleep problems, such as trouble falling asleep, sleepwalking, or simply require less sleep to function (Cortesi, Giannotti, Ivakenko, & Johnson, 2010). Genetic studies show that people with ASD are twice as likely as other people to have a genetic mutation that disrupts the circadian rhythm or sleep–wake cycle (Autism Speaks, 2017). Studies suggest that people with ASD have a high rate of one or more other mental health conditions, such as attention-deficit/hyperactivity disorder (ADHD) (30–61%), anxiety (11–42%), depression (7% of children and 26% of adults), and schizophrenia (4–35%) (Autism Speaks, 2017). Research finds that 70% of children with ASD have feeding and/or eating problems which may lead to obesity (Autism Speaks, 2017). A study of children with ASD ages 2 to
5 years old documented that unhealthy weight gain starts early. The study found that 32% of children with ASD were overweight compared to 23% in the general population; 16% were medically obese compared to 10% in the general population (Autism Speaks, 2017). Youth with ASD may experience higher rates of lower self-esteem when compared to their neurotypical peers. Cooper, Smith, and Russell (2017) found that children with ASD reported significantly lower rates of self-esteem than neurotypical children in the study. While no explanation exists as to the association between these comorbidities and ASD, the instance of comorbidities is high enough to suggest a relationship; however, these comorbidities, e.g., disrupted sleep, gastrointestinal issues, mental health issues, and obesity, also exist in neurotypical youth. Since these conditions are shared with neurotypical youth, environments that are ASD inclusive would benefit all children.

**Mobility Limitations**

Given the influence of the ADAAG and the resulting focus on accessible facilities, most accommodations toward inclusion in the public realm address mobility limitations. Another reason is that mobility limitations represent the largest population of people living with disabilities. According to the 2017 American Community Survey conducted by the U.S. Census, 6.9% of the population experience an ambulatory disability and 0.6% of children 5–17 years old are affected (Kraus, Lauer, Coleman, & Houtenville, 2018). While no accepted single definition exists on what constitutes a mobility limitation, physical mobility is restricted in some capacity (Alriksson-Schmidt & Thibadeau, 2012). Mobility limitations can be experienced from birth or acquired in childhood and include “spina bifida, cerebral palsy, juvenile rheumatoid arthritis, neuromuscular disease, different types of skeletal/joint diagnoses, and peripheral nerve disease” (Alriksson-Schmidt & Thibadeau, 2012, p. 89). Youth with a mobility limitation may or may not require a special device, such as braces, a cane, or a wheelchair, in order to get around.

Some common experiences of children with mobility limitations may be obesity, lower self-esteem, impaired proprioception (balance), and barriers to social interaction. Obesity may be a comorbidity of mobility limitations since youth with limited mobility may experience reduced physical activity levels (Ayyangar, 2002). Jemtä, Fugl-Meyer, Öberg, and Dahl (2009) found that people with an acquired limitation and adolescents with a mobility limitation may experience lower self-esteem than their mobile peers. Mobility limitations may also impair proprioception. Cerebral palsy, the most common childhood motor disability, affects the “ability to move and maintain balance and posture” (CDC, n.d.a). Barriers to social interaction experienced with youth with mobility limitations may be a product of opportunity. Youth with a mobility limitation may be dependent on others for transportation which may afford fewer opportunities to socially interact. Jemtä et al. (2009) found that while children with mobility limitations did not report problems with familial relationships, they reported a lower estimation of their relationship to peers which may be a product of opportunity.

Mobility impairments are not always as obvious as wheelchairs, and exclusionary design exacerbates comorbid factors faced by youth with and without mobility impairments. Inclusive design of the public realm for youth living with a mobility limitation would address physical access first and foremost; however, given the potential of comorbid factors of living with a mobility limitation, experiential accessibility cannot be ignored. The striking difference between living with ASD and mobility limitations is the genesis of comorbidities. While the origin of comorbid factors is unknown with ASD, the origin of comorbid factors with mobility limitations may be environmental. Lack of environmental opportunity for physical activity compatible with physical ability level may contribute to obesity and impairment of proprioception skills in youth living with a mobility limitation. Also, lack of accessible spaces that promote social inclusion may contribute to the barriers to social interaction. Designing an inclusive environment for youth living with mobility limitations would afford experiential access as well as physical access.
Hearing Impairment

Hearing loss can happen when any part of the ear is not functioning at expected levels and can happen at any point during the lifespan. Approximately 0.002%–0.003% of U.S. children are born with a hearing disability in one or both ears (NICDCD, 2016). About half of instances of deafness at birth result from genetic causes; one-third of babies with genetic hearing loss also have genetic syndromes, e.g., Down and Usher syndromes. About a quarter of hearing loss at birth is environmental, i.e., gestational exposure to infection and complications and/or trauma after birth (CDC, 2018b). For the remaining quarter of infants with hearing loss, the cause is unknown. “Hearing loss can affect a child’s ability to develop speech, language, and social skills” (CDC, 2018b).

Studies show that rates of ASD and mental illness in children with hearing disabilities are higher than in children with no hearing issues (Sessa & Sutherland, 2013). Children with a hearing disability are seven times more likely to experience ASD than hearing children (Sessa & Sutherland, 2013); about 40% of children with a hearing disability experience mental health issues, compared to 25% of hearing children (NIMHE, 2005). In regard to mental health, children with a hearing disability experience higher rates of ADHD, trouble with behavioral control, ASD, and bipolar disorder and are in treatment three times longer than hearing children (Landsberger, Diaz, Spring, Sheward, & Sculley, 2014). The stigma surrounding mental health issues may lead to social exclusion (NIMHE, 2005). All of this is exacerbated by the potential of low self-esteem of children with a hearing impairment. While research may be inconclusive as to a link between hearing impairment and self-esteem (Jambor & Elliott, 2005), the potential of low self-esteem may exist due to the disconnect between the child’s expectation of their ability to communicate and their reality (Sessa & Sutherland, 2013). Youth with hearing loss experience similar conditions to youth with ASD and mobility limitations, e.g., ASD, ADHD, and low self-esteem; therefore, inclusive environments would benefit a range of youth with a range of abilities.

Similar to ASD and mobility limitations, exclusionary design limits youth with hearing loss from experiential access to services. If experiential access is dependent on the ability to effectively process sound, then youth with hearing loss are excluded. If hearing the sound of rushing water, wildlife calls, or orchestral compositions is integral to the service provided, then no one must be prevented from participating in or receiving the service per ADA and accommodations must be provided.

Vision Impairment

According to the 2016 American Community Survey, 0.8% of the U.S. population ages 4 to 20 years old reported a vision impairment (Erickson, Lee, & von Schrader, 2017). Vision loss or impairment refers to individuals who have trouble seeing, even when wearing glasses or contact lenses, as well as to individuals who are blind or unable to see at all. Problems with vision can include blindness, a severe vision disability not correctable by standard glasses, contact lenses, medicine, or surgery; legal blindness, 20/200 vision or worse; or a vision impairment, 20/40 vision or worse (CDC, 2017). Total blindness refers to an inability to see anything with either eye. Legal blindness is a level of vision loss that has been legally defined at 20/200 in order to determine eligibility for benefits. Visual impairment refers to a loss of vision that may be severe enough to hinder an individual’s ability to complete daily activities, such as reading, cooking, or walking outside safely, while still retaining some degree of useable vision. Vision loss can happen at any point during a lifespan.

Beyond interfering with daily activities, vision impairment can create additional problems with social interaction and sleep. Youth with a vision disability, depending on the severity, may not experience eye contact, integral in the development of early social understanding, which may lead to lifelong struggles in social understanding (Campbell, 2007). Youth with a vision disability may also experience insomnia (Leger et al., 1999).
Similar to ASD, mobility limitations, and hearing impairment, exclusionary design limits youth with vision impairments from experiential access to services. If experiential access is dependent on the ability to see, then youth with vision impairments are excluded. If viewing wildlife or seeing a choreographed water fountain display is integral to the service provided, then no one must be prevented from participating in or receiving the service per ADA and accommodations must be provided.

**A Therapeutic Approach to Design**

A therapeutic approach to the design of the public realm prioritizes the benefits to health and well-being that a well-designed built environment can provide and affords opportunities for therapeutic activities. A growing body of research is showing an association between exposure to nature and positive health and well-being outcomes for children (e.g., Chawla, 2015; Kuo, 2015). Studies have shown that nature may be a protective factor against or ameliorate the negative consequences of living with a disability (see Table 5.1). Incorporating nature into the public realm represents the first step in creating a therapeutic approach to design.

Being in nature may help with sleep that is not associated with a medical issue, such as obstructive sleep apnea. Morita, Imai, Okawa, Miyaura, and Miyazaki (2011) found that participants who engaged in the traditional Japanese act of forest bathing (Shinrin-yoku), or walking through a forest, slept longer, and experienced better sleep quality. Research links nature to improved mental health in youth. Children diagnosed with ADHD demonstrated improved mood after a walk in a park when compared to a neighborhood and downtown (Faber Taylor & Kuo, 2009). Research also links exposure to nature and natural places with improved mood (Berman et al., 2012; Roe & Aspinall, 2011) which may be due to the presence of mycobacterium vaccae, a strain of bacterium found in soil that has been found to elevate mood, decrease anxiety, and improve cognitive function (Kuo, 2015). While the mechanism is unknown, research suggests that living in close proximity to green space in early childhood may be a protective factor against developing schizophrenia later in life (Engemann et al., 2018).

Nature may promote healthy weight through the association with specific hormones. Research found that participants who walked in a forest experienced increased levels of didehydroepiandrosterone (DHEA), a hormone that protects against obesity and diabetes, and adiponectin, a hormone that regulates metabolic processes (Kuo, 2015).

Nature has been theorized as contributing to the development of healthy self-esteem. Self-esteem, the belief in your worth as a person, is an important developmental concept for children (Leary & Baumeister, 2000). The quality of the environment in which you develop may impact your view of yourself, i.e., self-esteem (Wilson, 1997). If an environment is stimulating and nurturing, then a child may believe that they are valued and respected. If an environment is dull, then the child may believe that they are not valued and respected. Nature contributes to a sense of wonder which makes an environment stimulating and nurturing (Wilson, 1997).

Natural environments provide unique opportunities to engage all the senses, and children with special needs may actively seek out sensory stimulating opportunities. Hussein (2012) observed that children with special needs spent more time in sensory stimulating play settings. Manipulating lightweight natural loose parts, such as acorns, leaves, and twigs, provides opportunities for proprioception stimulation via fine motor engagement, and manipulating heavier natural loose parts, such as larger rocks and sticks, provides opportunities for proprioception stimulation via gross motor engagement. With self-smoothing activities, such as stimulating or stimming and rocking, opportunities for tactile, vestibular, and proprioception processing are particularly important for children with ASD. Li et al. (2019) found that parents of children with ASD reported that climbing on natural elements promoted proprioception stimulation in their children. While the sense of sight or hearing may be hindered in children with vision and hearing impairments, a child has...
**Table 5.1** Research suggests that nature is a protective factor against or ameliorates the negative consequences of living with a disability

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<td>Adolescents and those with acquired limitation (Jemtå et al., 2009)</td>
<td>Impaired balance (proprioception) in children with cerebral palsy (Blanche et al., 2012)</td>
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<td><strong>Hearing impairments</strong></td>
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<td>Higher rates in deaf populations than in hearing populations*** (NIMHE, 2005)</td>
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<td>Social exclusion due to mental health issues (NIMHE, 2005)</td>
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<td><strong>Vision impairments</strong></td>
<td>Insomnia (Leger et al., 1999)</td>
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*Impaired motor functioning* (Bhat et al., 2011)
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**Notes**

* Vision, hearing, taste, touch, smell, proprioception (body movement), and vestibular (balance).
** ADHD, anxiety, depression, schizophrenia, and bipolar disorder.
*** ADHD, trouble with behavioral control, ASD, and bipolar disorder.
other senses to engage. Nature provides myriad opportunities for children to touch, taste, and smell.

Social interaction can be difficult for children with disabilities. Nature may facilitate social interaction by supporting cooperative play, e.g., children work together to achieve play objectives, such as building a stick fort or making an entire meal from mud. Herrington and Studtmann (1998) observed that children with greater physical abilities directed play on manufactured play equipment, while children with greater proficiency of language and imagination directed play in natural play environments. Play in nature may not be dependent on physical ability which may allow children with disabilities more opportunities to direct and participate in play. Even children with ASD may experience more social opportunities in natural environments. Parents of children with ASD reported that natural environments provided their children with more opportunities for social interaction (Li et al., 2019).

**Common Experiences across Disabilities**

In reviewing the literature on living with a disability as displayed in Table 5.1, issues with sensory processing and barriers to social interaction are common experiences across the disabilities examined within the chapter. As previously stated, the experience of disability is not universal, but issues with sensory processing and barriers to social interaction appeared in the literature for ASD, mobility limitations, and hearing and vision impairments. These experiences may prevent youth living with disabilities from participating in services, thus preventing experiential accessibility. While accommodating the vast range of experiences within disability may be overwhelming, focusing on the common experiences of issues with sensory processing and barriers to social interaction may assist policy makers, designers, and planners in adopting a therapeutic approach to design to facilitate experiential access to youth with a wide range of abilities. Environmental interventions such as escape spaces, providing transitions between experiences, and incorporating 3D models in the public realm address sensory processing issues and barriers to social interaction and may facilitate experiential access in the public realm.

**Escape Spaces**

Escape spaces may help resolve issues with sensory processing for children with ASD who may be hypersensitive to sensory input (Autism Speaks, 2017). In other words, they may perceive even minimum sensory input, e.g., loud noises, as overwhelming and become agitated, aggressive, or cause self-injury. Escape spaces are sensory neutral spaces that afford an overstimulated child with ASD a space to calm down and reset (Mostafa, 2014). Escape spaces can be informal and intimate spaces defined by a circle of vegetation. Further, using vegetation may provide an opportunity for an overstimulated child to experience the calming effects of nature. Any planting bed or out of the way corner can be utilized for an escape space. Escape spaces may benefit neurotypical children as well (Shirtcliff, 2010; Sobel, 2002); these spaces could become the clubhouses, hideaways, or dens that children love to explore.

Designing escape spaces to afford children the opportunity to control their sensory input may be an important consideration. Some children with ASD utilize sensory input as a way of self-soothing as evidenced through activities like rocking and stimming (fine motor manipulation), or fidgeting. Mostafa (2008) observed an autistic child utilizing controlled sensory input as a means of self-soothing in an escape space: “auditory reduction by distancing herself, tactile by inflicting pain, and proprioceptive through the rhythmic movement and physical boundary of the wall” (p. 201). Escape spaces can be equipped with calming prompts such as noise reducing headphones or signage describing calming techniques such as breathing exercises. Utilizing vegetation to define escape spaces increases the potential of natural loose parts, such as twigs, leaves, and seed pods, for stimming.
Transitions

Transitions are buffers between experiences that help youth with disabilities prepare for and navigate the public realm; they signal that a new experience is approaching. Providing transitions within the public realm may help children with ASD prepare and successfully transition to the next experience (Mostafa, 2014). Transitions should occur between distinctly different areas, such as “an area of high-stimulus to one of low-stimulus” (Mostafa, 2014, p. 148). A successful transition may facilitate removing barriers to social interaction and issues with sensory processing since the youth with ASD may enter the next experience calmer.

Transitions can take many forms. Separating experiences with low-growing vegetation may create an effective transition and incorporate nature into the space to support the therapeutic approach to design. Low-growing vegetation may visually block the next experience from the youth with ASD without visually blocking the view of an adult who could see over the vegetation. The adult could prepare the youth with ASD by explaining the next experience, and that youth could decide the next move. Signage placed between experiences may provide an effective transition. Signage could describe the next experience or explain therapeutic activities supported within the experience. Pathway surfacing changes at critical places, such as at signage and entrances, signal a new experience and can serve as a transition.

Transitions could also benefit other youth living with a disability. For youth living with vision impairments, transitions may assist in navigation. Changes in pathway material alert youth with a vision impairment to an environmental transition. Also, information regarding the description of the experience and possible activities could appear in Braille or be represented by a 3D model on the sign. Transitions that use vegetation to define spaces could help to contain any loose parts and keep pathways free of obstacles which may impede navigation. If a youth with a vision impairment can navigate an environment successfully, then their opportunities for social interaction and sensory processing increases.

Integration of technology into the public realm could create transitions. In other words, transitions could be virtual or augmented. The basic goal of transitions is to prepare youth with a disability for the next experience. The next experience could be portrayed in virtual or augmented reality. A QR code, a graphic link to a webpage accessed by scanning with a smart phone, on signage could link to a YouTube video demonstrating a virtual re-creation of the setting and the possible activities available. Suggested activities could be therapeutic in nature. The video could display an Occupational Therapist demonstrating therapeutic activities designed to directly address a specific disability. The signage could display multiple QR codes each connected to a different disability and associated therapeutic activities. QR code generators are available free of charge on the Internet, and QR code readers are free apps that can be downloaded on smart phones. Augmented reality in addition to virtual reality could also be useful. Augmented reality consists of transposing virtual images within real-world contexts. Best known examples are smart phone games, such as Pokémon Go and The Walking Dead Encounter, where virtual characters are visible in the real world when viewed through a smart phone. Activities could be recreated using augmented reality; pointing a smart phone toward the setting would reveal people using the setting as intended. While creating an augmented reality app seems like a difficult technological feat, the QR code option is extremely low-tech. Basically a QR code on signage links to a video on the Internet. The only technology involved would be creating a video which can be done on most smart phones, uploading the video onto an Internet site such as YouTube, and creating the QR code.

3D Models

Use of 3D models in the public realm is not a new concept. Institutions like zoos and museums utilize 3D models to display information such as site maps or comparative models of animal tracks.
Beyond conveying information, 3D models may help facilitate social interaction. Consider a natural construction area in a public playground where children are building forts from sticks and branches. A 3D model depicting what a fort could look like may help youth living with disabilities engage in the cooperative activity of fort construction. Youth with ASD who are literal thinkers may not be able to construct a fort only utilizing their imagination. A 3D model would provide a guide on which they could base their fort, thus affording their participation in the activity. For youth with communication barriers, e.g., ASD youth who are non-verbal and youth with hearing and vision impairments, 3D models could act as a prompt supporting communication and facilitate the child in engaging in fort construction with other children. Youth with a mobility limitation who lack the upper body strength to participate in fort building could refer to a 3D model in directing the other children in building the fort. For youth living with a vision impairment, a 3D model can illuminate what a stick fort looks like and potentially enable the youth in participating in fort construction with other youth.

Unlike models at zoos and museums, 3D models to facilitate social interaction in the public realm can be ephemeral and low cost. Small twigs could be used to represent larger branches used in fort construction. 3D models could be assembled with cost-effective materials, such as popsicle sticks and pipe cleaners or printed with a 3D printer. The models could change weekly; therefore, frequent visitors will discover something new with each visit.

**Summary**

Accessibility in the public realm should focus on providing both physical and experiential access. Physical access is achieved when buildings and facilities are accessible through the addition of ramps, automatic door openers, etc. Experiential access is achieved when participation in services is possible for everyone regardless of ability. Policy makers, planners, and designers of the public realm need to look beyond physical accessibility, i.e., making buildings and facilities accessible per ADAAG guidelines, and consider experiential accessibility, i.e., making the services offered within the public realm accessible as mandated by ADA. While the responsibility of delivering services ultimately rests with the owner, practitioners are responsible for shaping the public spaces in which the services are offered. As ADA litigation begins to focus more on the experiential inclusion of people living with disabilities in accessing services and not just buildings and facilities, these professionals may not be able to solely focus on buildings and facilities much longer. Since accounting for the vast range of abilities is overwhelming, focusing on the possible common experiences of issues with sensory processing and barriers to social interaction may offer a good foothold toward experiential inclusion in the public realm. As demonstrated in this chapter, a therapeutic approach to the design of the public realm which prioritizes the benefits to health and well-being that a well-designed built environment can provide is needed. The therapeutic approach facilitates experiential inclusion by including environmental interventions that research suggests contribute to either health and well-being or therapeutic activities. Incorporating nature has been associated with providing benefits to health and well-being, and escape spaces, transitions, and 3D models contribute to and facilitate therapeutic activities. Both strategies of the therapeutic approach foster experiential accessibility. Ultimately, these interventions benefit youth living with and without disabilities. Regardless of ability, research suggests positive outcomes to health and well-being when exposed to natural environments. Also, researchers suggest that youth, regardless of ability, may view escape spaces as special spaces, such as dens and clubhouses. With the simple gestures required for a therapeutic approach and the benefits to youth regardless of ability, the question shifts from *why* to *why not* provide experiential access to the public realm.
References


Albertson’s, Inc. v. Kirkingburg, 527 U.S. 119 (9th Cir. 1999).


Toyota Motor Manufacturing v. Williams, 534 U.S. 184 (6th Cir. 2002).


Chapter Takeaways

Key Talking Points

• Accessibility in the public realm should be viewed through two lenses: access to the built environment and access to the experience of the built environment.
• Current ADA interpretation focuses on equality over equity since the minimum standards mainly address building accessibility and not accessibility of services, programs, and activities.
• Identifying common experiences among youth living with Autism Spectrum Disorder (ASD), mobility limitations, and hearing and vision impairments may assist in creating experiential access. Common experiences may include having issues with sensory processing and barriers to social interaction.
• Incorporation of nature into the public realm may also be important since research shows nature to be a protective factor against or ameliorate the negative consequences of living with a disability.
• Environmental interventions, such as escape spaces, transitions, and 3D models may help to overcome issues with sensory processing and barriers to social interaction.

Benefits for Youth

• Accommodating youth living with disabilities in the public realm may foster a feeling of belonging within them that could translate into a more meaningful and productive life.
• Exposure to youth of all abilities in the public realm may cultivate empathy and understanding of the many experiences possible.

Benefits for the Public

• Inclusion of all citizens regardless of ability strengthens society. Every person deserves to be included.

Recommended Actions

• Talk with youth living with a disability to understand their experience.
• Ask youth living with disabilities how to best address their issues with sensory processing and barriers to social interaction, if applicable.
• Find ways to incorporate nature into the public realm.

Supportive Resources

www.ada.gov/
https://adata.org/
www.cdc.gov/
www.autismspeaks.org/