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Developing Inclusive Museum Environments for Children With Autism Spectrum Disorder and Their Families

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Participation in social aspects of daily life is crucial to a child's development (Cosbey, Johnston, & Dunn, 2010). Children with an autism spectrum disorder (ASD) often demonstrate sensory processing differences (Baranek, 1999; Ermer & Dunn, 1998; Kientz & Dunn, 1997; O'Neill & Jones, 1997; Rogers, Hepburn, & Wehner, 2003; Rogers & Ozonoff, 2005) that can impact their ability to successfully engage in community-based activities (Tomchek & Dunn, 2007). With an increasing number of ASD diagnoses in recent years (Centers for Disease Control and Prevention [CDC], 2012), it is paramount that social and environmental supports are put in place to create inclusive community settings.

Professional knowledge and skills in the application of activity analysis, universal design, and environmental modifications place occupational therapists in a unique position to foster occupational performance and participation of children and youth with an ASD in community settings. This article describes the development, implementation, and evaluation of inclusive learning materials designed to address the sensory and social needs of children and youth with an ASD in a public science center. The project represents a collaboration between University of Washington Master of Occupational Therapy (MOT) students and the Pacific Science Center (PSC) in Seattle.

Strategies to Improve Community Participation for Children With an ASD

Initially, the MOT students completed a review of the literature to identify effective strategies and efforts that promote accessibility to museums and community spaces for children with an ASD. Children with an ASD were identified as a target group for this project because of the high prevalence rates of ASDs (1 in 88 children; CDC, n.d.), along with reported evidence of sensory processing differences and related social challenges (Baranek, 1999; Ermer & Dunn, 1998; Kientz & Dunn, 1997; O'Neill & Jones, 1997; Rogers et al., 2003; Rogers & Ozonoff, 2005). Although we focused on children with an ASD, the strategies identified and developed for this project may also be helpful for individuals with other diagnoses who have sensory processing differences and/or social participation challenges.

Intervention strategies that were identified as potential supports to improve social and educational participation for children with an ASD included the use of Social Stories™ and visual schedules (Kokina & Kern, 2010; Meadan, Ostrosky, Triplett, Michna, & Fettig, 2011; Waite, 2012). Sensory guides, which outline the sensory characteristics of museum exhibits, can also be used to help children prepare for a new sensory environment, thus serving as another way to help families plan successful outings and navigate less familiar public spaces (Ideishi, Willock, & Thach, 2010).

Additionally, empirical support for the effectiveness of front-line staff training to facilitate the social participation of individuals with ASD was found. For example, McDonnell et al. (2007) reported that staff who received behavior management training were significantly more confident in handling challenging behaviors presented by patrons with an ASD than untrained staff. In addition, staff training and coaching on inclusive learning techniques such as using photographs, toys, textures, and stories to introduce an exhibit have been described as ways to increase positive staff interactions with children in a comfortable manner (Ideishi et al., 2010).

Finally, we reviewed the work of Roger Ideishi, JD, OT/L, who is a pioneer in using occupational therapy expertise to increase community accessibility. In a project with the Adventure Aquarium in Camden, New Jersey, Ideishi et al. (2010) worked to overlay universal design principles onto the aquarium's existing structure and programs. They created Social Stories, sensorimotor activities, and learning kits, which included a sensory map, tactile objects for both learning and calming, as well as a Picture Exchange Communication System. Ideishi's work on community-based inclusion builds on the work of Ingrid Kanics, an occupational therapist who has helped more than 40 children's museums become more welcoming to families with children with an ASD and other community members (Waite, 2012). Both are prime examples of how occupational therapy knowledge and consultation can be applied to create more inclusive public environments.

Pacific Science Center

The PSC is an interactive science museum in Seattle. Thousands of families and students, including children with an ASD, visit each year to participate in museum exhibits, summer camps, and special events (PSC, 2012). When implementing their most recent exhibit, PSC staff took special care in addressing issues of universal design and accessibility to align with Americans with Disabilities Act (ADA) regulations (U.S. Department of Justice, 2010). The ADA provides clear guidelines for physical accessibility for individuals with a wide range of disabilities; however, PSC staff wanted to be more responsive to the diverse needs of children with an ASD who have sensory, social, or other behavioral challenges.

The PSC already offered a yearly Autism Early Open Event for families for 2 hours on a Saturday morning before the museum opened to the public. In 2011, 156 individuals attended this event, and 245 individuals attended in 2012 (S. Huschle, personal communication, November 26, 2012). Because this is a popular event, PSC staff wanted to provide supports for children and families with an ASD on a more regular basis.

Needs Assessment

Following the review of research literature and museum practices, two focus groups were held to understand the perceived needs of local parents and staff. One focus group was composed of PSC staff,

and the other was composed of families who have a child with an ASD. The staff focus group included both museum floor and summer camp staff. The floor staff reported that they typically were not aware of whether visitors had sensory processing difficulties due to the brevity of their interactions. Camp staff reported that many parents did not disclose details of their child's diagnosis or strategies to minimize undesirable behaviors related to sensory processing difficulties. Staff members from both groups expressed a desire for additional information on autism, sensory processing difficulties, and behavior management strategies that could readily be applied in the museum setting.

For the family focus group, we invited them to explore the museum for approximately 1 hour and then answer questions about their experience. Specifically, we asked (a) what was enjoyable or challenging for their child; (b) what supports would be useful for their child; (c) and about their awareness of, and interest in, the PSC early open autism event. As expected, reports of challenging and enjoyable exhibits varied between families. Overall, parents suggested the following supports for improving their family's museum experience:

- Museum ground rules in picture or written form
- Noise canceling headphones
- Customizable picture or word schedule
- A quiet room
- Social Stories
- Sensory guide
- More pictures of exhibits on the website

Parents also reported that they would like the Autism Early Open Event to occur more often and that they were willing to pay regular museum admission to attend.

Materials Developed

Based on the literature and information gathered from the family and staff focus groups, we developed materials for patrons and staff. Patron materials, available for download on the PSC website (PSC, n.d.) include (a) sensory guide; (b) two versions of an adventure planner; (c) a visual schedule; and (d) a tip sheet for parents. Staff materials included a training module and a list of recommendations to further enhance museum inclusivity. These materials are described briefly below.

Patron Materials

Sensory Guide

The *Sensory Guide* was created to address the multitude of sensory experiences at the PSC. The guide was designed to highlight areas that families may want to select or avoid based on the sensory needs of their child (Figure 1).

Adventure Planner

A series of 29 Social Story–type narratives, termed *Adventure Planners*, were created to explain social scenarios such as how to buy an entry ticket, as well as sensory information that includes, for example, what sounds, smells, and textures to expect at a particular exhibit (Figure 2). Each card is enhanced by a corresponding picture

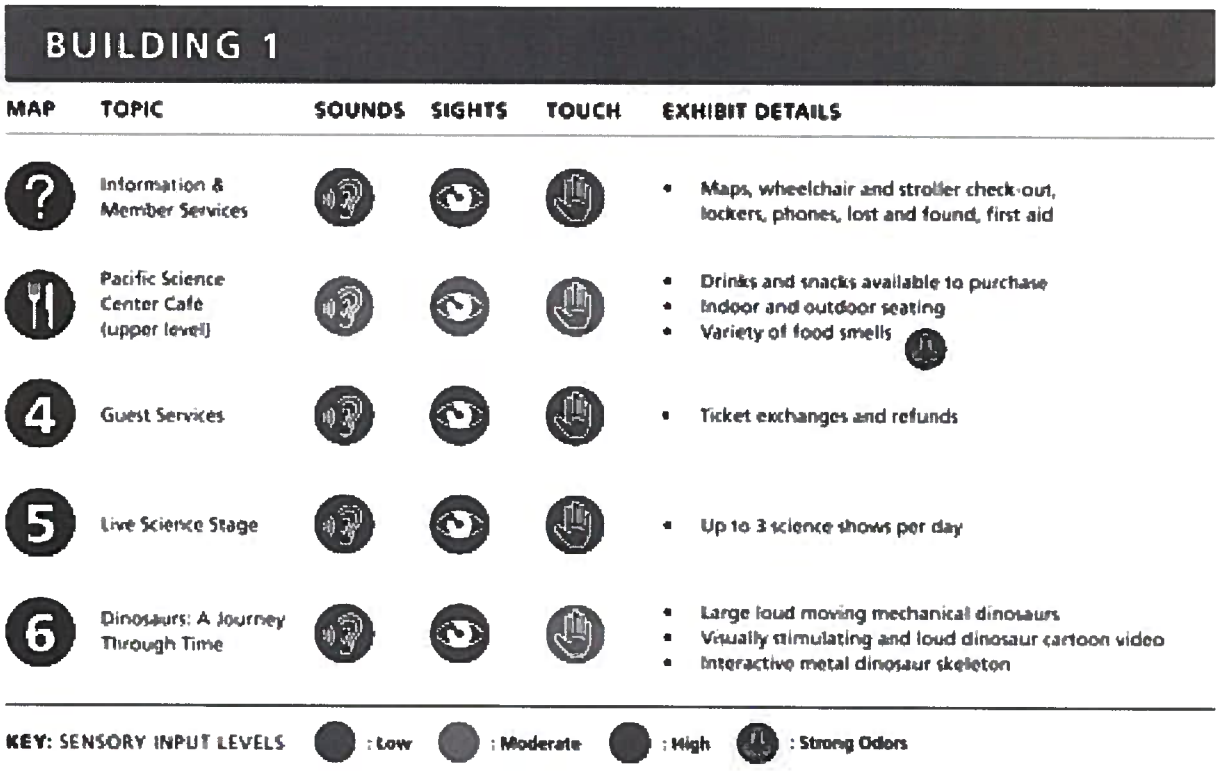

Figure 1. Sensory guide: Pacific Science Center, p. 2. Copyright 2013, by the Pacific Science Center. Reprinted with permission.

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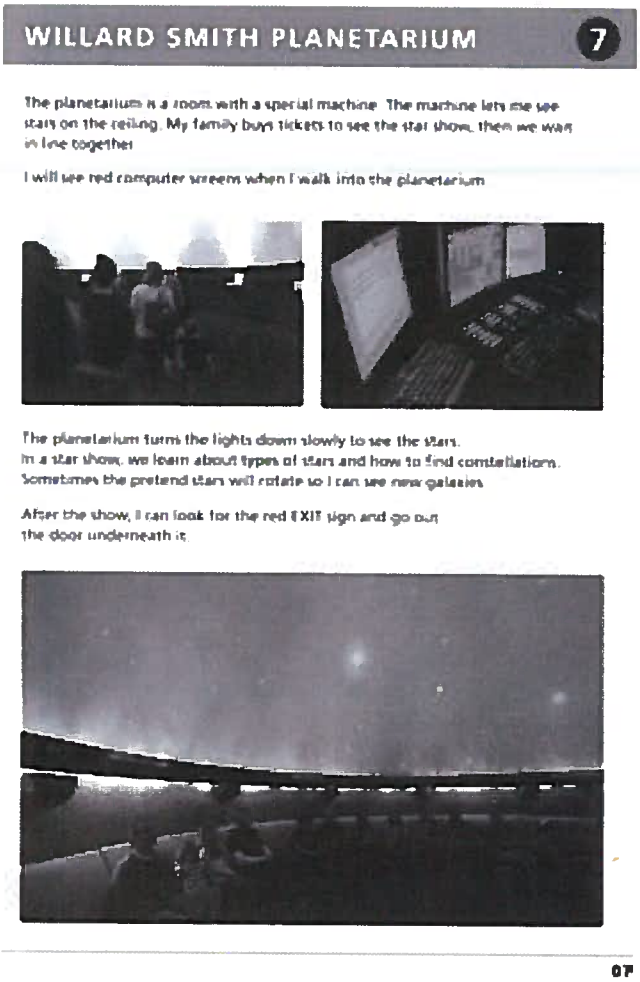

Figure 2. Adventure planner: Primary grades, p. 7. Copyright 2013, by the Pacific Science Center. Reprinted with permission.

aimed at familiarizing the viewer with the specific exhibit at the PSC. Adventure planners were developed for two different developmental levels (early and intermediate) to meet the needs of a wide range of patrons.

Visual schedule

A visual schedule with images of all regular and special exhibitions was also developed to allow families to create a pictorial representation of their visit prior to their arrival.

Tips for Parents

A tip sheet to help parents plan a successful visit to the PSC was created highlighting available supports, lower volume times for visiting the museum, and transitions between exhibit areas that may be challenging for some children.

After the materials were developed, a follow-up focus group was held to obtain family feedback. Families were again invited to explore the museum and then were asked questions about how and when they used each of the materials, what they liked about the materials, and any suggestions they had on ways to make the materials easier to use. The *Sensory Guide* and *Adventure Planner* were also reviewed by a group of pediatric occupational therapists and speech pathologists as well as by the PSC director of science and education.

Families reported using the *Sensory Guide* and *Adventure Planner* prior to and during their visit to the PSC and stated that it was helpful in preparing for exhibits. Most families thought that each *Adventure Planner* provided an appropriate amount of information about each exhibit or activity, and they only read the specific stories that were of interest to them. In addition, families who used the visual schedule reported that it was useful in structuring their visit. Based on family feedback, a table of contents was added to the final version of the *Adventure Planner*.

Staff Materials

To address staff training needs, an ASD information sheet was developed. The information sheet included (a) general information about ASDs and sensory processing difficulties, (b) two case studies that illustrate how ASDs and sensory processing difficulties may impact a child at the PSC, and (c) tips for successful interactions with individuals with an ASD that can be utilized on the museum floor. This information was presented to the autism early open event staff, along with information about how to use the *Sensory Guide*, *Adventure Planner*, and visual schedules. The information sheet was added to the staff training manual for all museum staff to access.

Conclusion

This project exemplifies a successful collaboration between occupational therapy and a public, community-based setting to increase access to and participation in museum activities for children with an ASD and their families. Occupational therapy practitioners can play a critical role in shaping physical and social environments as well as provide training to create and support inclusive learning environments. Future efforts and research studies in this area can foster the development and promotion of inclusive community settings to advance the quality of social participation for children with an ASD, and for other children with sensory and related developmental needs and their families.

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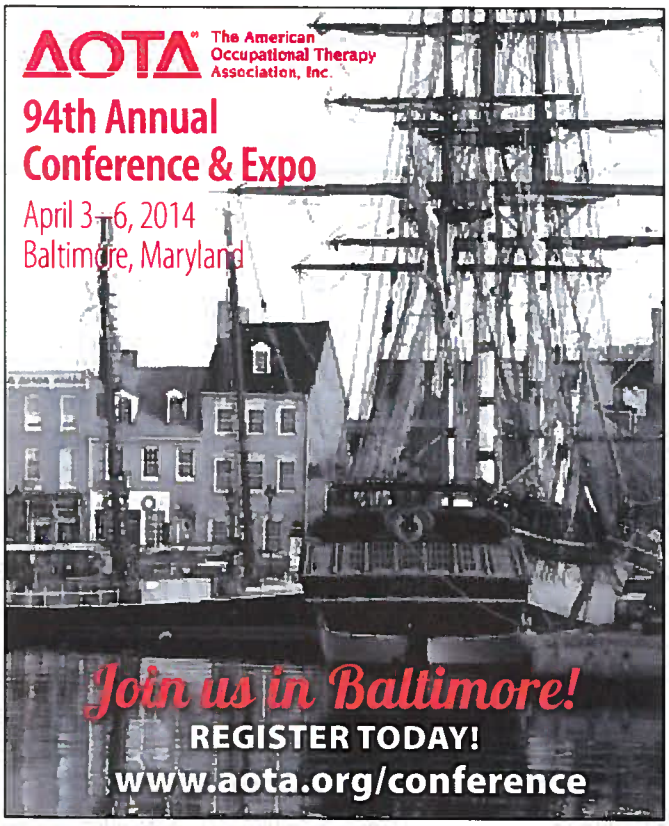

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At the time of this project, **Jennifer Leichtman**, MS; **Clara Palek-Zahn**, **Valerie Tung**, and **Sarah Becker** were students in the Master of Occupational Therapy program at the University of Washington in Seattle. They have since graduated.

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