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## Exploring the Usefulness of Pre-Visit Materials for Children with Autism at a Public Museum

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# Exploring the Usefulness of Pre-Visit Materials for Children with Autism at a Public Museum

## Abstract

### Abstract

Children with autism spectrum disorder (ASD) participate in community-based settings at lower rates than typically developing children. Museums provide a structured, predictable, and supportive place for children with ASD to learn. Visiting a museum may create unique challenges for children with ASD and their families. Sensory processing disorder (SPD) is a common barrier to participation that makes it difficult to process information coming in through the senses. For children who are easily overstimulated, crowds, noise, and long lines can be a source of anxiety and stress. Providing pre-visit materials such as social stories, accessibility maps, and communication books can support engagement in the museum setting. This study explored the usefulness of pre-visit materials for children with ASD who attended a low sensory event at a public museum. Data were collected during interviews with 22 parents and care partners. All participants found the pre-visit materials useful before and during the museum visit. Participants provided recommendations for improvement including developing multiple formats (e.g., audio, video), different languages, and limiting the pictures per page. This study highlights the unique value of occupational therapy in a community setting. Occupational therapists consider how features of the environment may support or limit participation. The pre-visit materials developed in this study may help museums offer more inclusive experiences to children with ASD and their families. Partnerships with disciplines such as occupational therapy may help museums and other community organizations welcome visitors of all abilities.

## Plain Language Summary

Museums are key educational resources in the community. Families of children with autism spectrum disorder (ASD) face unique challenges to participating in museum settings. This study explored the usefulness of pre-visit materials including a social story, accessibility map, and communication book. These materials were developed through a partnership between a public museum, occupational therapy graduate program, and 22 parents and care partners of children with ASD. All participants found the pre-visit materials useful for improving participation in a museum visit. This study highlights the unique value of occupational therapy at a museum. The materials developed for this study could be replicated to promote a more inclusive experience in other community settings. Partnering with disciplines experienced in working with people with disabilities can assist in creating welcoming environments for people of all abilities. Additional research is needed to explore the benefits of collaborative partnerships between community organizations and occupational therapy programs.

## Keywords

Occupational therapy, pre-visit materials, museum, autism spectrum disorder, ASD, inclusion, accessibility

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## Cover Page Footnote

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#### **ABSTRACT**

Children with autism spectrum disorder (ASD) participate in community-based settings at lower rates than typically developing children. Museums provide a structured, predictable, and supportive place for children with ASD to learn. Visiting a museum may create unique challenges for children with ASD and their families. Sensory processing disorder (SPD) is a common barrier to participation that makes it difficult to process information coming in through the senses. For children who are easily overstimulated, crowds, noise, and long lines can be a source of anxiety and stress. Providing pre-visit materials such as social stories, accessibility maps, and communication books can support engagement in the museum setting. This study explored the usefulness of pre-visit materials for children with ASD who attended a low sensory event at a public museum. Data were collected during interviews with 22 parents and care partners. All participants found the pre-visit materials useful before and during the museum visit. Participants provided recommendations for improvement including developing multiple formats (e.g., audio, video), different languages, and limiting the pictures per page. This study highlights the unique value of occupational therapy in a community setting. Occupational therapists consider how features of the environment may support or limit participation. The pre-visit materials developed in this study may help museums offer more inclusive experiences to children with ASD and their families. Partnerships with disciplines such as occupational therapy may help museums and other community organizations welcome visitors of all abilities.

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Museums are key educational resources in the community. Families of children with autism spectrum disorder (ASD) face unique challenges to participating in museum settings. This study explored the usefulness of pre-visit materials including a social story, accessibility map, and communication book. These materials were developed through a partnership between a public museum, occupational therapy graduate program, and 22 parents and care partners of children with ASD. All participants found the pre-visit materials useful for improving participation in a museum visit. This study highlights the unique value of occupational therapy at a museum. The materials developed for this study could be replicated to promote a more inclusive experience in other community settings. Partnering with disciplines experienced in working with people with disabilities can assist in creating welcoming environments for people of all abilities. Additional research is needed to explore the benefits of collaborative partnerships between community organizations and occupational therapy programs.

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### **Exploring the Usefulness of Pre-Visit Materials for Children with Autism at a Public Museum**

In the United States, one in 36 children have been diagnosed with autism spectrum disorder (ASD) (Centers for Disease Control [CDC], 2023). ASD is a developmental disability that may cause significant social, communication, and behavioral challenges (CDC, 2020). Research has shown children with ASD participate in their community at lower rates than typically developing children (Devenish et al., 2020). Children with ASD often face barriers that prevent them from participating in community-based settings (Kulik & Fletcher, 2016; Lam et al., 2010). Research has also shown that community participation has a positive impact on development and quality of life for children with disabilities (Dunst et al., 2006; Odom, 2000).

Sensory processing disorder (SPD) is a common challenge to participation for children with ASD. Chang et al. (2014) stated that over 90% of children with ASD have difficulty integrating sensory input from the environment. Stimuli such as bright lights, sounds, and smells, can feel overwhelming, creating barriers to participation. SPD can make it difficult for children with ASD to process information (University of Michigan Health, 2020). The most common characteristics of children with SPD include seeking or avoiding sensory stimuli found in the natural environment (Cole & Tufano, 2020, p. 289). For example, children who seek sensory input may crash into people and objects or invade the personal space of others. In contrast, children who avoid sensory input often struggle with transitions and change in routine, appear anxious, or have outbursts (Arky, 2023). Children with SPD may avoid situations they perceive as threatening (Cole & Tufano, 2020, p. 289). They may become physically aggressive or display self-injurious behavior (National Autistic Society, 2020). These behaviors can create barriers to participation in community-based settings for both the child and family.

Community outings create unique circumstances for the families of children with ASD. For children who are easily overstimulated, crowds and long lines are often a source of anxiety and stress (Langa et al., 2013). Museums can provide a supportive place for individuals with ASD to learn because the environment is structured and predictable (Bishop et al., 2018). Planning is key to optimizing the museum experience. Pre-visit materials such as social stories, accessibility maps, and communication books can help children and families prepare for community-based outings (Camilleri et al., 2021; Fletcher et al., 2018). Social stories are narratives with personalized text and illustrations that share meaningful information including social rules and expectations (Gray, 2015, pp. xvii-xviii). The purpose of a social story is to make the child feel emotionally and physically safe by preparing them for situations they may encounter in the environment. Research shows social stories can help children with ASD alleviate challenging behaviors and social difficulties (Wright et al., 2016). Accessibility maps provide information about the museum floor plan to identify areas of high and low sensory stimulation (Children's Museum of Indianapolis, n.d.). Communication books allow children with limited verbal communication to express their needs, such as requesting to visit a specific exhibit, using the bathroom, or seeking a quiet space. Museums that provide pre-visit materials can improve the museum experience for children with ASD and their families (Fletcher et al., 2017). To accomplish this goal, it is necessary to work with museum visitors and community partners to ensure that multiple perspectives are considered.

This research took place through a partnership between the Occupational Therapy Department at Grand Valley State University (GVSU), and the Grand Rapids Public Museum (GRPM). Founded in 1854, the GRPM is the oldest museum in Michigan (GRPM, 2021). The GRPM is a significant cultural and educational resource in West Michigan. In the five years prior to the COVID-19 pandemic, attendance increased by 5,000-10,000 visitors annually. In 2019, the GRPM welcomed over 250,000 visitors (GRPM, 2019). During this period of growth, the museum was unable to meet the needs of all visitors with

disabilities, including those with ASD. Currently, the GRPM is in the planning phase of a major renovation that aims to provide a more inclusive museum experience by creating frameworks to support visitors of all abilities. The primary goal of the partnership between GVSU and the GRPM was to develop pre-visit materials that will improve the museum experience for children with ASD and their families. Through this partnership, the team decided that receiving direct feedback from families was the best way to inform the development of materials. Few studies have explored the use of pre-visit materials in museum settings. The purpose of the study was to develop pre-visit materials for the GRPM and gather feedback on their usefulness. The study is needed to help the GRPM facilitate a more inclusive and welcoming museum experience for children with ASD and their families.

Existing research is limited on the use of pre-visit materials in museum settings. A study by Woodruff (2019) explored the concerns of families of children with ASD when visiting a museum and identified preferences for intervention materials. Data were collected through observation and pre-post visit interviews. Findings showed museum visits were stressful. Parents expressed a desire for pre-visit materials such as social narratives and orientation guides. Museums can accommodate children with ASD and their families by providing materials to alleviate anxiety before, and during a museum visit.

A study conducted by Langa et al. (2013) examined how web-based pre-visit materials improved the museum experience for children with ASD and their families. The materials examined included a sensory map and guide, social stories, a picture schedule, and a tip sheet. The sensory map and guide were designed to help visitors decide which areas of the museum to visit. Social stories demonstrated social cues and appropriate behavioral responses in specific situations. Picture schedules of specific artifacts and exhibits were provided. The tip sheet assisted families in navigating the museum. These materials were made specifically for the Smithsonian National Museum of American History. Findings from this study showed several benefits of pre-visit materials including helping children to become familiar with the museum environment and setting clear expectations. Few studies exist on this topic.

According to Lussenhop et al. (2016), pre-planning prior to community participation in a museum setting is common for families of children with ASD. The authors defined a museum visit as successful when the outcome aligns with family goals. Socially inappropriate behaviors were common when children with ASD face unfamiliar situations and environments. In general, adaptive behaviors are described as meeting societal expectations related to everyday functioning (Tillman et al., 2019, pp. 646). A study by Ozdemir (2008) found exposure to social stories prior to engagement in novel situations increased desirable behaviors in children with ASD. Planning ahead can also ease anxiety and decrease tantrums when transitioning from one activity to another (Kuhanek et al., 2010, pp. 6). Devenish et al. (2020) identified adaptive functioning and inclusive environments as strong predictors of successful community participation in children with ASD. Participation included use of the communication and social skills required to participate in a museum setting. Findings from the study highlighted the potential for developing inclusive museum environments that promote community participation for children with ASD. Additional research is needed to identify how pre-visit materials may enhance community participation in museum settings.

The authors intended to answer the following research questions: (1) How are pre-visit materials useful for parents and care partners of children with ASD? (2) What are some suggestions for making the pre-visit materials better for families visiting the Grand Rapids Public Museum? Museum administrators, occupational therapists, and researchers informed the development of the research questions.

## Methods

Researchers applied the Person-Environment-Occupation-Performance (PEOP) model to explore contextual factors that may disrupt occupational performance (Christiansen et al., 2015, pp. 45-55). In addition, the PEOP model's appreciation for the natural environment informed the creation of pre-visit materials that could support participation in museum settings for children with ASD and their families. We used a research-practice partnership (RPP) framework to address problems through partnerships that produce knowledge, build capacity, and inform action (Henrick et al., 2017; Tseng & Nutley, 2014). The GRPM strives to create welcoming and inclusive spaces for all visitors; however, rapid growth made this challenging. We addressed the challenge through a collaborative partnership between museum administrators, researchers, occupational therapists, and the families of children with ASD. Occupational therapists are educated with the skills necessary to create pre-visit materials tailored to the unique learning needs of the individual (American Occupational Therapy Association [AOTA], 2020). All partners shared a goal to develop useful pre-visit materials. Achieving the goal required partners to respect all roles and to work together. Consideration of multiple perspectives was important during the decision-making process. Direct feedback provided by families was invaluable for informing the creation of pre-visit materials. Researchers used a mixed methods convergent design, gathering quantitative and qualitative data to give insight into the problem from multiple perspectives.

### **Participants**

The study was approved by the Institutional Review Board at Grand Valley State University: No. 22-229-H. Researchers recruited a convenience sample of participants with assistance from a local community organization providing services to children with ASD and their families. This organization provides diagnostic services and treatment to families in the community. A study flyer was shared with consumers via email two weeks before a Sensory Friendly event. The flyer stated the purpose of the study and inclusion criteria. Eligible participants included people who were (a) 18 years or older; (b) English speaking; and (c) a parent or care partner of a child with ASD.

In addition, participants were informed of the steps required to participate in the study: meeting with researchers at the museum during the sensory-friendly event, reviewing pre-visit materials, and completing a brief survey. Participants provided informed consent before reviewing the pre-visit materials. Prior to data collection, the researchers informed participants they could ask questions and choose to stop participating at any time and without penalty. Researchers gave each participant a \$10 gift card to the museum gift shop.

### **Procedures**

Each year, the GRPM hosts an annual Sensory Friendly Night for children with ASD and their families. The event is held after hours, and attendance is limited to prevent overcrowding. The families who participated in this study represent a small sample of people in attendance. Prior to the event, the researchers met with museum administrators to conduct an environmental analysis. The purpose of this assessment was to identify sources of high and low sensory input (e.g., lights and sounds). These findings informed recommendations for making the environment friendlier for children who are overly reactive to sensory stimuli. Museum staff followed the recommendations to reduce the sensory stimuli in the environment that would be present during a typical museum visit.

### **Pre-Visit Materials**

The pre-visit materials created for this study included a social story, accessibility map, and communication book. The purpose of a social story is to help children know what to expect during social situations (Camilleri et al., 2021; Fletcher et al., 2018). The researchers developed a story that identifies some general rules and expectations when visiting the GRPM. To improve readability, multi-syllabic



words were replaced with plain language that is easy to read and understand. A formal assessment of readability was not conducted for this study. Photographs were also included to reinforce understanding. Researchers developed an accessibility map to help parents and care partners find or avoid environmental barriers such as specific sources of sensory stimulation. For example, a child who seeks sensory stimulation may favor movement, flashing lights, and hands-on experiences such as touchable artifacts; whereas a child who is overwhelmed easily may prefer experiences that are quiet and less crowded. The researchers assessed the first three floors of the GRPM in for sources of sensory stimuli (e.g., loud noises and lighting effects). They also documented accessibility features such as Braille, hearing loops, and restrooms with changing tables. The researchers met with museum administrators to incorporate these findings into an existing map of the museum. Communication books are another helpful resource for children with ASD who have limited verbal skills (CDC, 2020). The researchers developed a communication book that would make it easier for children to express their needs when visiting the GRPM. The book features photographs of popular exhibits and artifacts to help children communicate their interests. In addition, simple icons were included to help children share their emotions and make requests (e.g., food, drink, a quiet space to take a break). Prior to the Sensory Friendly Night event, museum administrators reviewed all pre-visit materials and provided suggestions for improvement. The researchers made revisions prior to data collection. All materials developed through this study are available on the accessibility page of the GRPM's website (<https://www.grpm.org/accessibility/>).

### **Instruments**

Currently, there are no existing instruments to explore the usefulness of pre-visit materials for museum visitors with ASD. The researchers developed a four-item survey approximately one month before the Sensory Friendly Night event. Three museum administrators assessed the survey questions for content validity and made suggestions for improvement. The first item confirmed the participant was a parent or care partner of a child with ASD. The second item identified which pre-visit materials were reviewed during the event. The third item asked whether the materials were useful (yes or no). This response prompted a follow-up question. If participants selected "yes," they were prompted to describe how the materials were useful. In contrast, if participants selected "no," they were asked why the materials were not useful. The final survey item asked for participants' suggestions on how to make the pre-visit materials better.

### **Data Collection**

During the Sensory Friendly Night event, the researchers were stationed at a table near the main entrance of the GRPM. Museum visitors who passed by the table were invited to participate in the study. Museum visitors became participants in the study after providing informed consent. Participation in the study involved reviewing the pre-visit materials (social story, accessibility map, communication book), and completing the survey to provide feedback with suggestions for improvement. After participants reviewed the pre-visit materials, the researchers conducted a brief interview using the established survey questions. During the interview, all verbal responses were transcribed verbatim with a laptop computer in real time. Data were collected and stored using Qualtrics software (Qualtrics XM, 2023). No personal identifiable information was collected.

### **Data Analysis**

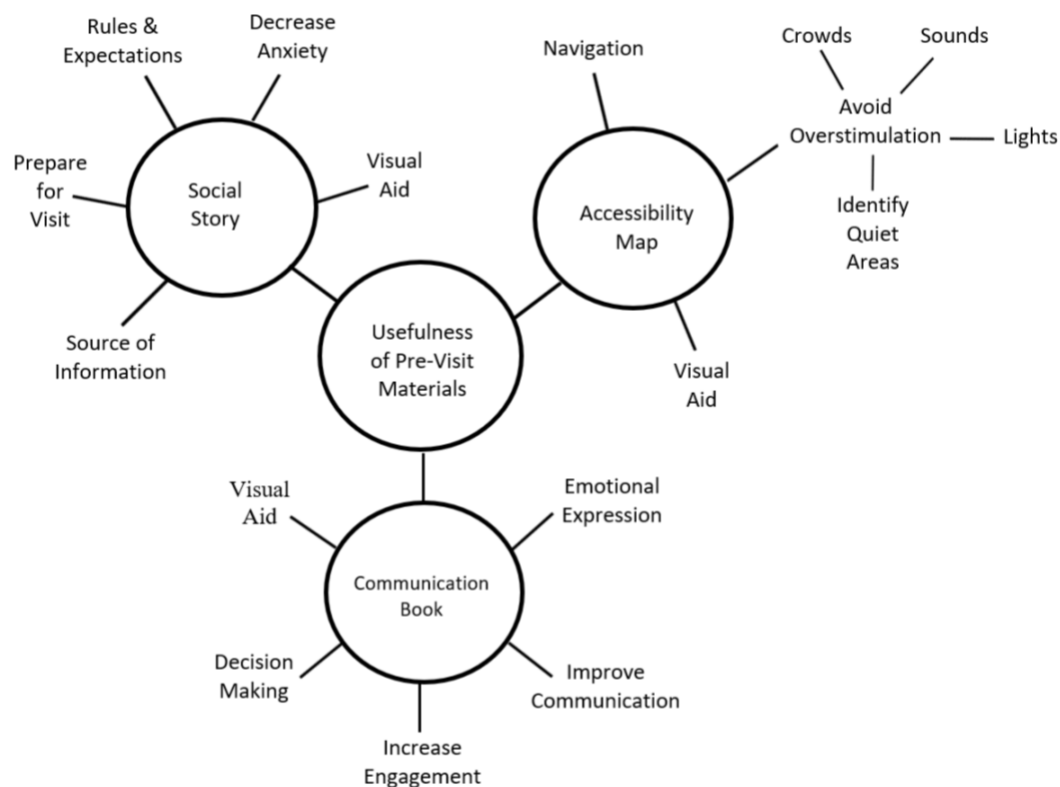
Researchers analyzed quantitative and qualitative data by hand. Quantitative analysis summarizes participant data. Qualitative findings describe feedback provided, including commonalities. Researchers coded open-ended responses to identify themes (Miles & Huberman, 1994, pp. 10-12). The analysis took place in three phases: data reduction, data display, and conclusion drawing and

verification. During the data reduction phase, the researchers highlighted chunks of data that may inform the research question. A basic coding process was used to categorize the data chunks based on common meanings. The steps included: becoming familiar with the data, initial coding, searching for themes, reviewing themes, defining themes, and producing a report (Creswell & Poth, 2018, pp.79-80). During the data display phase, concept maps were used to identify patterns and relationships within the data (Mason, 2002, p. 196) (Figure 1). During the conclusion drawing and verification phase, researchers identified common themes related to the usefulness of pre-visit materials and suggestions for improvement.

Researchers integrated quantitative and qualitative data were merged during mixed methods analysis. Both types of data were collected at the same time with the intent to use qualitative information to validate the quantitative results (Creswell & Plano Clark, 2017, p.84). The internal validity of data were enhanced through the triangulation of multiple forms of data. Tables and figures provide a visual representation of the results.

**Figure 1**

*Example of Concept Map for Qualitative Analysis*



## Results

A total of 22 parents or care partners participated in the study. All participants were included whether they provided suggestions for improvement or not. All participants provided feedback on the pre-visit materials. Participants were asked to identify which materials they reviewed. The number of respondents are reported in Table 1. Missing responses were factored out in further descriptive analysis.

**Table 1**

*Summary of Pre-Visit Materials Reviewed by Participants*

<b>Pre-Visit Material</b>	<b>n = 22 (%)</b>
Social Story	22 (100%)
Accessibility Map	21 (95%)
Communication Book	19 (86%)

When asked if the pre-visit materials were useful, all 22 (100%) participants responded “yes.” The perspectives of children and care partners were evident in the data. When asked *how* materials were useful, a common refrain across all materials was their use as visual aids. A summary of self-reported usefulness of the pre-visit materials is provided in Table 2.

**Table 2**

*Self-Reported Usefulness of Pre-Visit Materials*

<b>Pre-Visit Material</b>	<b>Usefulness</b>
Social Story	Decrease anxiety Clarify rules and expectations Prepare for visit Easy to read and understand Informative Visual aid
Accessibility Map	Assist with navigation Avoid overstimulation Simple Visual aid
Communication Book	Improve communication Support emotional expression Increase engagement Visual aid

### **Social Stories**

Sixteen of 22 participants (73%) provided feedback on the social story. One comment from a care partner was using the story to prepare for the visit stating, “Letting kids know what to expect can help with anxiety and to feel prepared.” Another participant said, “It is useful as a visual aid to help children with autism see what is expected of them. It is similar to a visual schedule, and better versus going in blind.” Several participants stated the social story was easy to use and understand. One participant commented, “It’s step-by-step. This is really important for children with autism going from point A to point B. You want something very simple.” Another participant stated:

I think the social story was an effective way to communicate for everyone. It gives parents and caregivers something good to discuss beforehand. It’s more geared toward children, but easy enough to understand and accessible to any kid, teen, or adult.

### **Accessibility map**

Eleven participants (50%) shared feedback on the accessibility map. From a care partner perspective, the map was useful for helping the child avoid sources of overstimulation. One participant stated, “I like to avoid the flashing lights and loud spaces. Avoidance is important for me.” Another participant said, “It was nice to see where flashing lights were for neurological purposes.” Navigation was another way participants found the map useful. One participant stated, “It (the map) was a great help. Every time I come with my son there is something new, so going through and knowing where

things are at will be really cool.” Another participant said, “The map was really helpful, so you know where different things are and avoid the areas where it’s loud.”

### Communication book

Ten participants (45%) provided feedback on the usefulness of the communication book. Improving care partner-child communication was a common refrain reported by eight 80% of participants. One participant stated, “When she doesn’t want to talk anymore, she might be willing to show me with the book.” Another participant said, “My child is not a talker. With the communication book, to get him to say, ‘I want,’ or tell me what he needs is great!” Emotional expression was another use expressed by care partners. One participant stated, “The communication book gives them a way to express their feelings in a very clear way.” Another participant said, “The emotion chart really helped because some of my kids are nonverbal, and this would be very overwhelming for them.”

### Participant suggestions for improvement

When asked for suggestions on how to make the pre-visit materials better, all participants (100%) provided specific examples. A summary of suggestions for improving the pre-visit materials is provided in Table 3.

**Table 3**

*Suggestions for Improving Pre-Visit Materials*

	<b>Suggestions</b>
Social Story	Provide other formats (audio, video, digital, multiple languages) More pictures Simplify (fewer words) Create a shorter version Add parking ramp and crosswalk for safety
Accessibility Map	Larger map More detail (color code floors, label exhibits, location of headphones, loud hand dryers in bathrooms)
Communication Book	Provide digital format Larger pictures Fewer pictures per page More detail (label pictures, make faces more realistic)
Other	Provide a video tour on the website Allow caregivers to reserve materials online Update materials based on availability of exhibits Create a picture schedule

Seven participants (32%) made suggestions for the social story. From the child’s perspective, providing information in multiple formats was a common recommendation. One participant stated, “It would be great to have a video format to help children know what to expect.” Another participant suggested, “I would add a barcode so if they speak a different language, they could access it just like that.” Adding more detail to the social story was also recommended. One participant stated, “Could you include parking? Parking is part of the visit. Address the situation of having to walk from the parking ramp, use a crosswalk, and not run out into the street.” Another participant stated, “There are too many words in the book. If there was something that had audio, too. Visual and audio formats for those who

are non-verbal." Additional suggestions included creating a shorter version for younger children and removing information on exhibits that are not open.

Four participants (18%) offered suggestions to improve the accessibility map. The most common requests were to make the map larger. One participant stated, "The map itself is a little clustered. The icons are bigger, so it is hard to see where I am going." Another participant said, "Mention the hand dryers in the bathroom are [brand name electric blow dryers]. Even walking up to the bathroom is loud and he does not want to go in." Creating a picture schedule to assist with navigation and transitions between activities was also suggested. One participant stated, "He does really good with visual schedules. If you made something [to identify] where you are going first, then that would be helpful."

Five participants (23%) shared suggestions for improving the communication book. The most common requests included adding more pictures and increasing their size. One participant stated, "Add more pictures. He does not understand the words, but he likes to point. He understands best by pictures or signing." Another participant suggested simplifying the pages of the communication book. She said, "When there are multiple pictures it is visually overstimulating." Additional suggestions include providing a digital format, making the faces more realistic, and adding the following icons: not available, quiet mouth, worried, and overwhelmed. One participant stated, "Maybe add hair to the faces. He likes them to look similar to him."

In addition to improving the pre-visit materials, participants made recommendations on how to improve the overall museum experience. One participant stated, "It would be great to have a video tour to know what to expect." Other suggestions included creating a picture schedule, developing an online system to reserve pre-visit materials prior to visiting the museum, and updating the materials to remove exhibits that are not available.

### Discussion

The first aim of this study was to identify how pre-visit materials are useful to a small sample of children with ASD and their care partners. Participants reported each type of pre-visit materials was useful. A 100% positive response to social stories suggests its valuable use as a visual aid to help children prepare to visit the museum. Cohen (2007, p.126) stated offering visual aids to children with ASD helps them to compensate for deficits in verbal processing and communication. The pictures in the social story provide a clear visual representation of what children can expect to see and experience at the GRPM. Making the museum environment feel more familiar and predictable can help to alleviate anxiety, which is often the source of inappropriate social behaviors. Social stories have been found effective for addressing inappropriate behaviors in children with ASD (Kokina & Kern, 2010).

Participants' 95% positive rating of the accessibility map confirms its usefulness to avoid and/or seek specific sensory stimuli. Considering environmental factors enables children with ASD to interact more effectively with peers and the world around them (Clouse et al., 2019). The map can assist families with navigating the museum in a way that fits the needs of their child. Participants gave the communication book an 86% positive rating, reported as useful for empowering children to facilitate communication. It may be that families already use some other style of communication, finding the book less useful than other materials. Rao and Gagie (2006) also supported the use of visual aids to promote communication, self-expression, attention, and focus for children with ASD.

The second aim of this study was to gather suggestions from parents and care partners for overall improvement of pre-visit materials. A common theme from several participants included

suggestions for the materials in multiple formats (e.g., hard copy, digital, video, audio, and multiple languages). It is important to consider how the learning needs and abilities of children with ASD vary to support institutions as a substantial educational resource in their communities. Children with ASD may have preferences for visual learning formats or limited environmental stimulation. Schmit et al. (2000) stated children with ASD are more likely to respond in a manner suitable to the circumstances when presented with visual rather than auditory cues. According to Sloan et al. (2006), providing informational materials in multiple formats can increase accessibility.

Another theme suggested including more details while reducing distractors. For example, adding the parking garage and crosswalk locations to the accessibility map, and labeling the photos in the communication book. Adding these details may promote safety, improve planning, and facilitate a more successful museum experience at the GRPM. In addition, some participants requested reducing the number of pictures per page in the social story and communication book. Decreasing the number of pictures could benefit children who are easily overwhelmed by visual stimulation, or who have a short attention span. These suggestions contradict each other, serving to demonstrate the large variation in skills and abilities of children with ASD, and a need to accommodate.

A final theme from participants centered on availability and accessibility of information to improve the museum experience for children with ASD. Suggestions included a picture schedule specific to the GRPM, posting materials online, and multiple languages. A study by Langa et al. (2013) explored the association between pre-visit materials, including a picture schedule, and motivation of children with ASD to visit a museum. Findings from the study show one of the biggest motivators for visiting a museum was to be better informed. Another participant suggested the GRPM offer the option to reserve pre-visit materials online, prior to visiting the museum. This would ensure the materials are available and allow staff to facilitate a more inclusive experience.

At the close of the study, pre-visit materials were revised based on the feedback provided by participants. Examples of the completed revisions include a shorter version of the social story and additional detail on the accessibility map (e.g., parking, crosswalks, and hand dryers). The pictures in the communication book were enlarged and reduced in number. All the pre-visit materials were translated into Spanish. All revised materials are available on the GRPM's website. Offering pre-visit materials in multiple formats will accommodate a larger audience and provide the greatest benefit to museum visitors with ASD.

Pre-visit materials were developed for this study to increase engagement in the museum experience. Occupational therapy practitioners recognize the unique components of occupational engagement (AOTA, 2020). For example, understanding of how the features of built and natural environments may support or limit participation in community-based settings. When using pre-visit materials, other targeted outcomes should be considered in relation to occupational science and therapy. The field of occupational science explores the nature of human occupation in relation to health and well-being. One benefit of engagement in meaningful occupations is opportunities to develop personal capacities (Wilcock, 1993). Museums provide valuable opportunities for informal learning. For a child with ASD who enjoys learning but finds social situations confusing, a crowded museum may create a barrier to social participation. Social stories can provide strategies that make it easier to respond to social norms and cues (Gray, 2015). For a child who is overstimulated, providing access to a communication book may facilitate problem solving and decision making. In addition, improving inclusion and participation in social settings promotes occupational justice and community integration (AOTA, 2020; Townsend & Wilcock, 2004). Providing an accessibility map can help parents and care

partners identify designated quiet areas may alleviate anxiety and enhance well-being for the entire family.

### **Limitations**

The results of this study are limited to the experiences of 22 parents and care partners of children with ASD from the same geographic location. Such a small sample may limit the generalizability of results to the larger population of children with ASD, however, the authors believe there to be common utility in accessible pre-visit materials. This study included one structured question in which participants had to choose from one of two possible options (e.g., yes, or no). A closed-ended question does not allow for free responses. During data collection the researchers transcribed all responses verbatim, and in real time but did not provide for member checking of responses. This may have influenced the accuracy of the data collected.

### **Conclusion**

Museums are key educational organizations in the community. Families of children with ASD face unique challenges to inclusion and participation in museum settings. This study highlights a unique partnership between a museum and an occupational therapy graduate educational program. In general, museums can benefit from establishing collaborative partnerships with disciplines experienced in working with people with disabilities. This type of networking will continue in the GRPM's redesign process for years to come. This study also highlights the unique value of occupational therapy in a community setting. Development of pre-visit materials that promote engagement requires distinct knowledge of the transactional relationship between the person, environment, and occupation. In addition, occupational therapy practitioners understand how pre-visit materials can be used as both the means and the ends of intervention to promote inclusion, participation, health, and well-being for children with ASD and their families. Finally, this study has identified benefits for all knowledge users. For example, the pre-visit materials will assist the GRPM in offering a more welcoming environment for visitors with ASD and their families. Parents are care partners who had an opportunity to share valuable insight and contribute to the development of the materials. The project also provided invaluable experiences for occupational therapy students. Additional research is needed to explore the benefits of collaborative partnerships between community organizations and occupational therapy programs. Future research could also explore the usefulness of pre-visit materials in other community-based settings such as a library or movie theater. In addition, reverse translating the Spanish pre-visit materials and assessing their usefulness is also needed. This museum-occupational therapy collaboration exemplifies the level of community engagement needed to ensure public museum spaces are accessible to visitors of all abilities. Partnering with occupational therapists could enable communities to reach their accessibility goals.

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