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Hands-on, Shoes-off: Multisensory Tools Enhance Family Engagement Within an Art Museum

Alison F. Eardley,¹ Claire Dobbin,¹ Joselia Neves² and Peter Ride¹

¹University of Westminster, United Kingdom

²Hamad bin Khalifa University, Qatar

Alison Eardley, Ph.D., is a Senior Lecturer in the Psychology Department at the University of Westminster. Her work has explored cognition in the sighted and people with a visual impairment, looking at attention, memory, nonvisual and multimodal sensory processing. Her current work is using memory as one of the indices for exploring how multisensory processing and imagery (including audio description) can create memorable inclusive Museums and Heritage environments which would benefit ALL visitors. Send correspondence to: Dr.

Alison F. Eardley, Psychology Department, University of Westminster, 115 New Cavendish Street, London W1W 6UW, UK. E-mail: a.eardley@westminster.ac.uk.

Claire Dobbin is a freelance curator and engagement expert. She specializes in multimodal forms of interpretation and display, and is a visiting lecturer on the MA in Museums Galleries and Contemporary Culture at the University of Westminster. She formerly worked for Qatar Museums, as Deputy Director of QM Family and Schools Programme, where she contributed to the development of exhibits, programmes and resources for children and families, as well as the strategic planning of a new museum. As a freelance interpretation and engagement specialist she has since worked with museums in Taiwan, Hawaii, Saudi Arabia, Qatar and the UAE.

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Joselia Neves, Ph.D., is Professor at Hamad bin Khalifa University, Qatar, where she teaches Audiovisual Translation. In her career as a University teacher and researcher, she has led a number of collaborative projects for the provision of subtitling, subtitling for deaf and hard of hearing viewers and audio description for blind audiences on television, the cinema, museums and cultural venues, the performing arts and education. She is a member of the TransMedia Research Group (transmediaresearchgroup.com) and a board member of the European Association for Studies in Screen Translation (<http://www.esist.org/>).

Peter Ride, Ph.D., is a Principle Research Fellow at the University of Westminster. He is the Course Leader for the Masters in Museums, Galleries and Contemporary Culture. He has worked in a wide range of museums and arts organizations in the UK with a particular emphasis on photography and digital media and he was one of the first curators in the UK to produce exhibitions of internet artworks in the 1990s.

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Abstract

Families with young children typically struggle to engage with traditional art museum environments. This research examined the impact of multisensory tools on family engagement within Mathaf: Arab Museum of Modern Art, Qatar. Sixty families with at least one child aged 0-11 were observed during two tasks. One task required participants to look at a series of paintings to select their favorite. In another task families were given a toolkit of multisensory items to facilitate interaction with a painting. A semi-structured observational method produced quantitative and qualitative data about participant engagement and intergenerational interaction. Self-rating scores of task enjoyment were also collected. Results indicated that multisensory tools enhance family engagement with museums, artworks and with each other. Results also suggested that word-based interpretation was not necessary. We consider the potential implications of these findings in relation to family programming within art museums and museums more generally.

Keywords: tactile, art, audience, engagement, multisensory, families

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There is a growing trend for exhibitions or events to incorporate non-visual sensory experiences (e.g., Eardley, Mineiro, Neves, & Ride, 2016; Levent & Pascual-Leone, 2014; see also Forrest, 2013). Indeed, research in cognitive neuroscience and psychology have shown that multisensory exposure enhances performance for both perceptual (e.g., Seitz et al., 2006; von Kriegstein, & Giraud, 2006) and memory tasks (Lehmann & Murray, 2005). Importantly, researchers have supported the benefits of multisensory information to formal and informal learning in children (Broadbent, White, Mareschal, & Kirkham, 2017; Heikkilä & Tiippana, 2016; Shams & Seitz, 2008). However, there is currently very limited empirical research that explores the impact of multisensory engagement in museums.

This issue becomes increasingly important in light of the shift in museums, over the last three decades, from being collection-focused institutions to a new museology, which is outward looking and puts the visitor at the center of museum thinking (e.g., Baddeley, 2013; McCall & Gray, 2014). The onus is now on museums to create engaging environments that have impact beyond the museum visit. Yet, with this shift in museological focus has come the challenge of evaluating visitor engagement within the museum, whether that be with visually presented or multisensory information. It is widely recognized that metrics, such as visitor numbers, have limited power to really define either engagement with content or the impact of a museum visit. Museums are making use of visitor surveys to better understand visitor satisfaction, motivations, preferences, and propensity for return-visitation (e.g., Brida, Meleddu, & Pulina, 2012; Hume, 2011; Kinghorn & Willis, 2007; Packer & Ballantyne, 2002; Paswan & Troy, 2004; Sheng & Chen, 2012). These are important factors for understanding what might interest a museum visitor, and satisfaction is one way of measuring if the visitor feels like their aspirations for a museum visit have been met. But these metrics

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are not able to inform understanding about what visitors did within the museum, to what they paid attention, what they interacted with, or how their interactions manifested themselves. In other words, these types of metrics do not directly address the visitor's engagement with or within the museum.

Azevedo has commented that “engagement is one of the most widely misused and overgeneralized constructs found in the educational, learning, instructional, and psychological sciences” (2015, p. 84). Indeed, whilst the term is often used in research articles, it is rarely defined. One form of engagement is to engage or attract someone's attention to a particular activity or object. Renninger and Hidi (2016) argue that engagement is distinct from interest. Nevertheless, and useful from a museum perspective, they note that engagement can help to develop interest (Renninger & Hidi, 2016).

It is not possible to engage without attention, which can be considered central to engagement. Bitgood (2016) describes a three-stage model of attention in relation to museum experience – capture, focus and engagement. This understanding of engagement is in line with the principle of engagement as occupying or attracting someone's attention. In this context, engagement is considered as a heightened level of attention. Although attention is crucial for engagement, people can attend within a museum, without fully paying attention to any specific content or collections on display. In other words, the depth of that attention can be variable. By defining what engagement is, it is possible to consider ways in which it can be measured or documented, in order to provide evidence of when visitor engagement does or does not take place. Within a learning context, time spent on a task, together with motivation, are considered key tenets of ‘engagement’ (e.g. Kuh, 2001 and Stovall, 2003). Research in art museums has shown that, even where people have physically stopped at a work of art (attention capture) to look at it (attention focus), the average time spent looking is only around 17 seconds (Smith & Smith, 2001; see also Brieber, Nadal, Leder, & Rosenberg,

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2014). Thus, it is possible for an artwork to capture attention, and for visitors to focus attention, but for that attention to occur with minimal engagement. For the purposes of this study we define one aspect of engagement as an attention or focus paid to a particular artwork or group of artworks.

A consideration of curatorial interpretation is central to an exploration of engagement with a work of art. Interpretation in museums has a complex range of functions because it needs to help visitors to pay attention and engage in a memorable experience, as well as communicating what curators consider to be significant information about the artwork, the artist, or the cultural context in which it was produced (Serota, 1996). Current approaches to interpretation aspire to posit visitors as active learners (Hein, 2002K). They increasingly suggest ways in which viewers might make personal connections to a work (Serota, 1996), drawing upon their social and personal memories and cultural knowledge (Hooper-Greenhill, 2000). Nevertheless, interpretation is typically still delivered through written information in the form of gallery text or artwork labels (Whitehead, 2011) and accompanies the act of looking at a work of art. Kesner (2006) argued that, more than interpretation, visitors require ‘cognitive competence’, or more specifically visual perceptual competence, for ‘looking’ at art to become a meaningful experience. Research has shown that although visitors with sight can see a work of art, they may not know how to use that vision to look in ways that draw out its specific cultural or artistic significance, context, or meaning (e.g., Koide, Kubo, Nishida, Shibata, & Ikeda, 2015; Vogt & Magnussen, 2007). This means that whilst novice museum visitors can see, they may not know to what they should pay attention to in order to create a memorable or engaging experience (Csikszentmihalyi & Robinson, 1990). Museums are becoming increasingly aware that interpretation can go beyond reading, into different forms and media (Pringle, 2009). Given the role that multisensory processing has on both perception and memory, it opens up the question as to whether multisensory interpretation

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can not only facilitate engagement with artworks beyond what is possible with vision alone, but also, in so doing, create a more inclusive interpretive approach which does not exclude those with limited or no access to written material.

Families come to engage with a museum and its content, but also to engage with each other (McManus, 1994), to share participatory experiences and to have fun together (Sterry & Beaumont, 2006). We also considered the ways in which museum visitors engage with each other as another aspect of engagement. Many studies have explored the ways in which adults shape children's learning in museums. However, Braswell (2012) developed a framework which prioritizes a broader range of intergenerational engagement within the museum context. His framework built on Morrissey's (2002) and examined the way: (a) children react to artefacts; (b) adults react to artefacts; (c) adults shape children's reaction to artefacts (e.g., an adult's explanations shape a child's understanding of an artefact; (d) children shape adults' reactions to artefacts; (e) adults and children react to one another; (f) children interact with each other (without artefacts). Braswell concluded that children interacting alone with artefacts was the most common behavior and, where applicable, children were more likely to react to artefacts in groups with other children than in adult-child groups. Braswell's study was carried out in a children's museum in the US. Research has suggested that in a children's museum parents often either lack an understanding of their proposed role or lack the confidence to fully engage in the play of their children (Downey, Krantz, & Skidmore, 2010). Children's museums are designed around the specific needs of children, with child-led play (e.g. Samuelsson & Carlsson, 2008) at the heart of the visitor experience.

An art museum is a distinctly different environment from that of a children's museum. The architecture, social conditions and behaviors associated with a typical art museum environment can create 'threshold fear', which prevents people from going in, or engaging when they are there (Gurian, 2006). Many art museums and galleries are presented as a

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‘white cube’, with white walls, floors and ceilings that remove the space of the gallery from the space of the ‘real’ world and strip out other points of reference (O’Doherty, 1986). This creates an environment that is not child-centric, and consequently not conducive to child-led learning. Research shows that these kinds of space alienates adults, and that as a result, interpretation is required on the part of the museum to help audiences overcome the barriers that this presents (Dewdney, Dibosa, Walsh 2012). As such, the way in which families engage with the museum environment was also considered as an aspect of engagement.

Our primary research question focused on whether or not multisensory tools impact on family engagement in a typical white-box art museum environment. We examined the way families engaged with the museum, the way they engaged with the artwork, and the way they interacted with each other. Families were recruited to take part in two activities at Mathaf: Arab Museum of Modern Art (Mathaf). The Turathiaat task provided families with a multisensory toolkit, which related to a painting entitled ‘Turathiaat’ (an Arabic word with a meaning related to traditions). With no specific instructions on how to engage, each family was given 25 minutes in the museum gallery with the painting and the multisensory toolkit. The toolkit was developed for families with children from birth to 11 years and contained 13 elements, referred to in this article as tools. These were objects, toys and games that had been selected or designed and fabricated to interpret specific elements of the painting. The aim of these tools was to facilitate tactile exploration and play. Unlike traditional forms of interpretation, the toolkit did not incorporate any written information about the painting. Although the artwork itself could not be touched, all elements in the toolkit permitted and encouraged tactile exploration or interaction (e.g. building blocks, tactile playmat). Others also simulated auditory (instruments), or olfactory engagement (smell pots). Some of the tools were accurate replicas of elements in the painting, whilst others were more subtle in their references to its subject matter and themes. Laid out in front of the painting, with

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cushions on which to sit, the toolkit helped create a welcoming space for families (see Figure 1).

A task was also created, in which families were required to look at a series of artworks in another gallery and select their favorite. The Favorite Painting (FP) task did not alter the existing art museum environment or context, nor did it introduce additional multisensory interpretive tools to aid interaction and engagement with the paintings. In this way, it was in line with the standard offer of this and other modern art galleries to families on an unfacilitated visit. Families were required to access and engage with the art through vision alone (see Figure 2). However, by asking families to decide on their favorite painting, we imposed an additional level of cognitive engagement. Thus, the control task was based on visual sensory information, and the experimental task enabled engagement through multiple senses.

Using a mixed methods design, we collected quantitative and qualitative data using a semi-structured naturalistic observational method. Observers filled out a semi-structured observation sheet, designed to enable quantitative analysis and thematic analysis using a deductive approach (Braun & Clarke, 2006), and enriched with self-report data from participants to examine the impact of multisensory tools on family engagement within a traditional art museum. We examined the impact on engagement with the museum environment quantitatively by looking at the time taken on the respective tasks. We also used observation data which classified overall family engagement with the task as either fully engaged, partially engaged, or not at all engaged. Subjective ratings of adult participant enjoyment of the two tasks were also compared. Finally, qualitative observations on engagement with the museum were also collected.

We examined the impact of the multisensory toolkit on engagement within families by comparing quantitative observational data on the level of engagement of families with

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each task. Developing on Braswell (2012), we collected quantitative observation on intergenerational engagement, and specifically who led the tasks (e.g. parent-led; child-led; mixed-lead). We also examined the qualitative reports on family interaction.

We also looked at engagement specifically with the artworks across the two tasks by comparing qualitative observations of the discussions about the artworks. Within the Turathiaat task, we also examined the impact of museum-authored, narrative interpretation on engagement with the artwork. Half of the families were also given a brief enriched descriptive guide (EDG) (see Eardley et al., 2017; Neves, 2016). This provided an introduction to the artistic context and content of the painting. Based on the principles of audio description, which aims primarily to provide information about visual content to blind people (Remael, Reviere & Vercauteren, 2014), it guided the listener's visual attention around the painting, enriching the experience with facts and questions about the work. The other half of the families were simply given the title of the painting, *Turathiaat* (traditions in Arabic), and invited to explore the toolkit. Using quantified observation, we compared engagement with the work of art across both conditions.

Based on the research on multisensory processing, we predict that family engagement with the museum, with each other, and with the artworks will be improved by the provision of the multisensory tools. Within the Turathiaat task, we also expect an impact of the EDG on family engagement with the work of art, compared to where there is no EDG.

Method

Participants

A total of 60 families participated in this research. They were recruited to take part in a family program at Mathaf, Doha, Qatar. The program was advertised as including a research element. Some participants were already on the Qatar Museums Family and Schools Programs mailing list, others were recruited through friends, by word of mouth, and using

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publicity on social media. No incentive was offered in exchange for participation. Eighty adults attended, with 26 unique nationalities. Sixty-two were female and 18 were male. Families ranged from one parent with one child to extended families with aunts, uncles, cousins, and grandparents. Of the adults, there were 55 mothers, 16 fathers, a brother, sisters, an aunt, grandparents, nannies, and a family friend. With them came 112 children (8 months – 11 years), with a mean age of 4.5 (SD = 2.5 years). In addition, 6 teenagers attended (12-14). Of the adults who came to the event, 59.8% visited museums at least twice a year, and for 19.4% it was their first experience visiting a museum. This research met all requirements of the British Psychological Society for human research and was approved by the Department of Psychology ethics committee of the University of Westminster.

Materials

Observation sheet. Refined through piloting, semi-structured observation sheets were constructed. These were structured around the research questions, and contained a combination of tables for categorizing behavior (for quantitative analysis) and comment boxes for qualitative observations (for thematic analysis), which specifically requested that participant quotes be recorded. There was one observation sheet for the FP task. For the Turathiaat task there were two observation sheets, one for the condition with EDG, and one for the condition without the EDG. Questions were framed the same way across both tasks and conditions. The questions that were included in all three observation sheets were Who takes the lead in the activity? and Do families seem engaged? For the Turathiaat task the questions were Who plays with the tools? and Do they make connections with the tools and painting? There were also specific questions for those who did the EDG condition within the Turathiaat task. These were Who listens to the AD and for how long (all/part/none)? and Do they discuss the connections between the AD and the painting? Qualitative free-text boxes in the FP task were focused on: engagement with the paintings and family interaction.

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Turathiaat task were focused on: engagement with the painting; engagement with the toys; family interaction and for the families with the EDG, engagement with the audio description.

Favorite Painting (FP) task. This task took place in a gallery which presented an exhibition of wall-mounted artworks by the Qatari artist Faraj Daham. The six artworks in this gallery provided a range of different styles, techniques, and media. Three artworks were made up of multiple components (see Figure 2).

Turathiaat task. The Turathiaat task took place in a gallery with several other wall-mounted artworks, a floor-mounted sculpture, and a display case. The task focused on one painting. *Turathiaat* (1970) is a mixed media artwork by important Qatari artist Jassim al-Zaini, predominantly using thick textured paint, but also incorporating real wood and metal studs (see Figure 1). On the floor below *Turathiaat* was the toolkit, a collection of 13 tools (see Figure 1), initially covered by a white sheet. There were cushions in front of the toolkit on which participants could sit. The toolkit was comprised of a playmat (a tactile fabric representation of the painting); a pylon (a tall structure with pegs to weave black elastic between, replicating the crisscross pattern of the one in the painting); a spider web (a wooden board with pegs on which to create spider web patterns using grey elastic, like that on the right of the painting); colored blocks (wooden building blocks made in the same colors as the semi-abstract cube-like forms on the left side of the painting); architectural blocks (wooden blocks with architectural shapes for constructing buildings similar to those in the painting); a sandoq chest (an accurate replica of the sandoq in the center of the painting); four scent pots (containing traditional smells associated with Qatar—cardamom, cinnamon, frankincense, and saffron); musical instruments (including three shakers and a drum, which were initially positioned inside the sandoq); a rainmaker (a long wooden tube containing small shells, which makes a soothing sound like running water when turned upside down); a small replica heb (a traditional clay jar used for storing water, which is specific to the region

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and represented on the right side of the painting); a gypsum panel (a replica of the panels depicted in the center of the painting); a stereo viewer (a plastic toy through which color images of present day Doha could be viewed); and a tactile puzzle (a 2 ½-dimension reproduction of the painting as a puzzle, with structural elements of the composition identified, that could be taken apart and put back together).

The enriched descriptive guide (EDG) contained description of and information about the painting, music and sound effects. It was based on the principles of audio description (AD), but, unlike traditional AD, this was also created for use with sighted participants. The EDG was written in English, translated into Arabic, and recorded in both languages. The duration of the EDG was approximately 4 min and was played on a small loudspeaker, which was positioned close to the toolkit.

Evaluation sheets: Participants completed questionnaires which included questions about how much they enjoyed the tasks for themselves, and for their families¹.

Procedure

Participants signed up to a two-part family program with a research component². The first part was carried out over a 3-week period, to allow each family to book their own time slot. The observation data reported here were collected in the first part of the program. The order of the two tasks was counterbalanced across participants. For the Turathiaat activity, participants were taken into the gallery with the painting and toolkit. Each family was invited to have a seat to make themselves comfortable and told that the activity was related to a painting (which was then indicated by the researcher). They were given the name of the painting, *Turathiaat* or *Traditions*, and that it was by an important Qatari artist called Jassim

¹ The data reported here is part of a larger corpus of data; see Dobbin, Eardley, & Neves, 2016

² The data reported here was all collected during the first part of the program.

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al-Zaini. All participants were invited to look at the painting and to play with the tools under the sheet, which were there to help them explore the painting using their senses. They were assured that it was their space for the next 25 min, that they could relax, enjoy themselves, and play together, and that they did not need to be quiet. For only the families with EDG, the researcher explained that they would listen to a story about the painting, in English or Arabic, before they removed the sheet covering the toys and started to play with them. The recording was started for the families at the beginning of their session, and was included in the 25 min. All families were told that they could uncover the toolkit and start to explore it whenever they were ready.

Participants were able to end their participation in the task whenever they wanted. If they were still playing after 20 min, they were notified that they had five minutes left. Following completion of the task, participants were taken into a different room to fill out an evaluation form. Once the evaluations were complete, participants moved to the location of the next task.

For the FP task, participants went into a gallery with 6 artworks on the walls. The researcher explained that the activity was to decide which artwork they liked most, with the suggestion to think about what they might enjoy having in their own home. They were also made aware that the researcher would be taking a few notes while they were carrying out the task. If the families asked whether or not they should choose as individuals or as a family, they were told that it was up to them. They were given up to 10 min. Once the family had chosen their painting(s) and the researcher had recorded them, the family was taken to a different room to complete the evaluations. Once both tasks and both sets of evaluation documents had been completed by the family, they were thanked for their time and free to leave.

Analysis

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Quantitative analysis Thematic Analysis (TA) was used to analyze the qualitative observational data recorded in the free-text response boxes (see Braun & Clarke, 2006). It is important to acknowledge that by using observation data as our primary data (collected by a pool of Research Assistants), we are examining a third- party assessment of behavior. The observations were gathered by a range of researchers; some with expertise in museums, and others without. The distribution of observers was random across the participants, but consistent across the two tasks A and B. Therefore, although there will may be limited consistent biases from the observers themselves, where there are biases, these will be consistent across the two tasks. Through the observation boxes, we were able to gather consistent observations about specific behaviors that we were interested in. However, in the qualitative free-response boxes, if something was not documented, it did not confirm that it did not occur. Consequently, we have not quantified the observations in the free-recall comment boxes. The thematic analysis of these qualitative responses was driven in the first instance by a deductive approach (Braun & Clarke, 2006). This approach provides a more detailed analysis of themes defined based on an a priori theoretical rationale (Braun & Clarke, 2006). This was achieved through the use of semi-structured observation sheets, with pre-defined categories for qualitative comment. Thematic analysis then took an iterative approach to the creation of the final themes. The first stage of coding, involved putting all of the handwritten comments into an electronic spreadsheet containing the observational data all participants. The lead author then went through the data from the free response boxes and coded the data with these themes in mind, allowing more focused themes to emerge from within the first broad categories. These additional themes were then discussed within the research team, and reorganized and refined. There was a final re-coding and reorganization of themes into the strongest and most meaningful categories that provided the focus for this paper. The theme that emerged in relation to engagement with the museum environment was

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make yourself at home. For engagement with the art, the theme was levels of processing, and a specific theme in relation to the EDG, which we have labelled the authoritative museum voice. For engagement within families, the themes that emerged were engagement within families. This approach for the treatment of qualitative analysis is in line with Spencer, Ritchie, Lewis, and Dillon (2003), who states that quality concepts developed for quantitative research such as generalisability, validity, reliability and replicability cannot nor ought not to be applied to qualitative research (see also Brannen, 2005).

Results

Engagement With the Museum

A direct comparison of the time spent on the tasks was not meaningful because the maximum duration of the FP task was 10 min and the Turathiaat task was 25 min. Therefore, we examined the percentage of the maximum time available that participants spent on the tasks. The median amount of time spent on the task was 80% (range = 20%-100%) for the FP task and 100% (range = 60%-100%) for the Turathiaat task. A Wilcoxon signed ranks test confirmed that the difference in the amount of time used for the task, between groups, was significant ($Z = 3.69$, ties = 8, $p < .001$). In other words, although participants had less available time for the FP task, they were less likely to use up all of their allocated time, suggesting that participants were more engaged with the Turathiaat task than the FP task.

These data are supported by the observations of family engagement. Table 1 shows the levels of engagement within families for the two tasks, based on an overall judgement given by observers. It shows that 86.7% of families fully engaged in the Turathiaat task for the entire time, compared to 38.3% of families in the FP task. For the FP task, the largest percentage of families were only engaged as a whole family for part of the time (43.3).

Table 1 about here.

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A chi-square test confirmed that there was a difference in the levels of engagement across the two tasks ($\chi^2(2, N = 120) = 37.69, p < .001$). In table 1, and for the analysis, family members not engaging were combined into one category. Although the numbers are low, 7 children did not engage with the FP task but all engaged with the Turathiaat task, and although 2 parents did not engage with the FP task, 6 parents did not engage with the Turathiaat task.

Both the time spent on the tasks and the observations of behavior are consistent with the adults' ratings of how much they enjoyed the two tasks. In the evaluation sheets we asked adults to rate how much they had enjoyed the task as a family activity and for themselves. As family activities, the majority of the adult participants enjoyed both the FP task (Median = 8, range = 3-10), and the Turathiaat task (Median = 10, range = 6-10), but they were significantly more positive about the Turathiaat task (Wilcoxon signed ranks: $Z = 4.52, p < .001$). When thinking about their own personal enjoyment of the tasks, again adults enjoyed both tasks (Turathiaat: Median = 9, range = 6-10; Favorite Painting: Median = 8, range = 3-10). There was no statistical difference in their personal ratings of enjoyment of the two tasks.

Make yourself at home. Within the FP task, there was evidence of difficulty with engagement with the museum environment. This seemed to result from the explicitly visual nature of the task and the restriction on being able to touch the artworks: "Mother was frustrated by the child having restrictions like not being able to touch" (Family 1, 2y). For older children, a lack of ability or inclination to enter into a dialogue with a painting through visual means alone, resulted in or reinforced disengagement: "...that's why I don't get art" (Family 11, 11y).

In the Turathiaat task, when people arrived in the gallery, they found the unusual set-up—a series of cushions and an inviting textured mat on which they could sit and make

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themselves at home. Adults as well as children. The result was that a number of families were observed to have taken off their shoes (recorded in free-text sections of the observation sheets and in photos) (see Figure 4), suggesting a level of comfort not usual within an art museum.

Most families played within the dedicated space next to the painting, but others strayed outside. One father (Family 21, 14m) used the elements of the toolkit, and even the sheet that had initially covered them, to create an adventure trail throughout the gallery, which the mother and daughter followed (see image Figure 5).

Engagement with the Art

Levels of processing: For the FP task, the most commonly noted observations refer to discussions or questions about the colors of the painting—the primary visual feature: “Mother talking about the painting. Big color questions are asked by the mother” (Family 14, 2.5y), and for Family 14, the children engaged with the paintings by “look at the different colors” (child 2.5y). Approximately 75% of the recorded quotes or references to the discussions between families related to color. For example, “Mother: The colors are nice, if we ignore the shape” (Family 12, 11m). A few discussions included references to Qatari heritage and stories or ideas that were inspired by the shapes. Nevertheless, the majority of discussions were based on the visual information, with little reference to cognitive, emotional, or other sensory information. In two recorded instances children engaged other senses in their responses to the paintings. In family 46, the boy (age 2) sat down and imitated the form of the man in the painting. In another, a boy stated that he liked the black painting because he liked the noise it made, which he then made himself (Family 29, 2y).

For the Turathiaat task, in which parents used questions to engage their children with the artwork, questions were much more related to the tools and the objects or elements depicted in the painting than the colors. Overall, 65% of families made explicit connections

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between items in the tool kit and the painting (see Table 2). For some families, making connections was about finding the tools in the painting. They particularly noticed the sandooq, the pylon, and the spider web: “look mum it is there! This tower [pylon] is in the painting...look mum, all these toys are like the painting” (Family 9, 3y). On occasions, this led to further discussion: “It’s the same!” (noticing the connection between box [sandooq] and painting). “This artist is talented!” (commenting on connection between old things and new—the painting, [play] mat and mini painting [puzzle]).” (Family 7, 9y, 21m). However, there were many instances where observations and discussions went beyond the visual recognition of commonalities between the tools and the painting. There were discussions about culture and heritage in relation to Qatar and beyond: “Mum related the sandooq to her Pakistani culture” (Family 55, 5y & 2y); “Mother: ‘look at the tower [pylon], it’s like this one’ (pointing at the one in the painting). Girl: ‘It’s like the Eiffel tower’” (Family 36, 3y & 4y). In comparing the two tasks, the engagement with art in the FP task was based more on color and shape whereas in the Turathiaat task it was based more on narrative content and shared meaning or experience.

Table 2 shows suggests that within the Turathiaat task, observers were more likely to witness families making connections between the toolkit and the painting for families who did not listen to the EDG. A chi-squared test confirmed that EDG there was a difference between the number of explicit connections between the toolkit and painting by families with the EDG than families who did not have the EDG ($\chi^2(1, N = 57) = 5.37, p = .02$).

Table 2 about here.

The Authoritative Museum Voice: The observational data confirmed that within many of families in the EDG condition, the children either paid no attention to the EDG, or only listened for some of the time. Indeed, the observations suggest that almost none of the children under 6 listened to the EDG. However, the in some instances the parents tried to

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engage their children with it by pointing at the painting or reproduction of the image in the playmat: “Mother connected the mat and the picture when listening to the EDG carefully. She asked her son to look at the painting. Child was not interested to listen at all. While listening to the EDG, the mother kept on pointing at the picture and the mat.” (Family 46, 2y). This was the case for younger and older children: “Father tries to encourage the children to listen and look at the painting...father pointed at the painting many times during the AD [EDG]...they didn’t pay much attention...” (Family 54, 8y, 6y & 5y). This conflict between the adults understanding of the demands of the task and the inattentive children created a level of conflict and arguably stress: “[the] Mother tries to silence them when they start making noise while the AD [EDG] is playing, but they were not paying attention.” (Family 39, 5y & 9y).

Engagement Within Families

The enhancement of shared, intergenerational engagement within the Turathiaat task, compared to the FP task, was evident from who took the lead in the families’ activity. When considering which family member took the lead in the tasks, the lead was identified as: adults, children, all (in which different people took the lead at different times, families worked together throughout the task in small groups, as a whole family, or one adult and one child shared the lead), and nobody (everyone worked as individuals). Table 3 indicates that for 33 families (out of the 50 for whom the data were recorded) an adult or adults took the lead in the FP task, compared with 21 in the Turathiaat task. Only 8 families shared the lead between the adults and children for the FP task, compared to 16 in Turathiaat task.

Table 3 about here.

This suggests that the experience was more collaborative in the Turathiaat task, but also that it both encouraged child-led activity and enabled adults to participate more actively

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in play with their children. A McNemar-Bowker test showed a significant difference in the pattern of lead activity ($\chi^2(3, N=50) = 8.38, p=.039$). This suggests that overall, adults were more likely to take the lead in the FP task.

Engagement within families: In line with this, within the FP task the qualitative data indicate that parents often relied on their own ability to interpret or discuss the works:

“parents were explaining the painting to them [the children] the whole time. They asked multiple times to take a second look before deciding their favorite [painting]” (family 8, 3y, 4y, 18m) and “Mother interacted positively with the artwork, and explained it to her daughter, especially the oldest” (Family 50, 4y & 6y). However, there were also instances where this strategy failed. Although the children might have engaged initially, they lost interest quickly: “In the end, the girls started playing with each other and lost interest in the paintings” (Family PC). For one 2 year old, the response to her mother at the end of the task was “I want to sleep”! (Family 18, 1y & 2y).

In most instances the task did not facilitate a whole family engagement. In some instances, parents engaged with the task either without attempting to engage the children. This was most often when the children were young, but sometimes following on from a failed attempt to engage the children. Some of the children appeared content even if not engaging with the task and the environment: “Only the mothers pay attention to the art. The kids are having fun playing. They don’t even look at the pictures briefly” (Family 41, 2 mothers, 7y, 5y, 4y & 2y). However, there were other instances in which there were intergenerational conflicts that arose as a result of the task: In family 47 the observer noted that the “girl wanted to leave but the mother insisted that she look at all of the paintings” (Family 47, 4y).

In Turathiaat task, the qualitative data supported the quantitative findings indicating that the pattern shifted so that the task was more family- or child-led (see Figure 3). For example, Family 1: “Discuss how to play with toys. Negotiate who plays with them. Talk

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about colors, shapes, smells or noises and if they are reminded of anything” (Family 1, 2y, 4y, 6y & 8y). In another family group, “The mother tried the water stick, but she did not recognize the water sound. Later the younger girl recognized it” (Family 34, 6y & 4y).

The family groups who took part in these activities were diverse in nationality, size, and the ages of the children. Nevertheless, one of the themes that emerged across families during the Turathiaat task was the way in which the activity provided permission to play for the adults. Family units that consisted of more than one adult-child pair, and especially groups consisting of both fathers and mothers, observers noted that the items in the toolkit appeared to provide adults, and particularly fathers, with permission to play. In groups that fathers had come as the sole parent, some began the task as observers but were drawn into the activity: “Both children at first play together while father looks at painting...father plays with the cobweb [Spider-web], boy then comes over to help...father wants to make it in a certain way and then the boy goes away to play with instruments” (Family 17, 6.5y & 5y). However, in a couple of instances the fathers simply enjoyed the playing for their own sake: “Mother is with the child and father plays alone” (Family 12, 11m); “Almost all the time the daughter plays individually as does the father. However sometimes the mother and the daughter play in a small group” (Family PB, 11y).

Based on the comments in the free-recall boxes on the observation sheets, it seemed that the most popular elements of the toolkit were those items that transcended the age barriers. The pylon and the spider web were popular with the families with older children and adults and enabled both collaborative lacing with the elastic or independent play. The colored blocks were popular across all ages, particularly with the younger children. One of the tools that seemed to facilitate intergenerational interaction was the stereo viewer. The images it presented were modern, but the toy itself was one that would be familiar to the older generations in the groups: “The boy stretched his body over the [play]mat to take the camera

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[stereo viewer] from his mum” (Family 37, 4y and 10y). “Mother is mainly engaged and looks on. She only interacts when child calls on her. The glasses [stereo viewer] bring both together discussing the images, they say it is Doha” (Family 57, 6y). “Mum picks up the camera [stereo viewer] and says “Look at this [giving it to child]. This was my favorite toy as a kid.” Father: “Can I see?” (Family 58, 3y).

Discussion

This research examined the impact of multisensory interpretative tools on visitor-led family engagement within an art museum. One aim of multisensory tools was to provide children with a way into art through play, which would be intuitive and fun. They were also created to appeal to adults, with the aim of facilitating intergenerational interaction and learning. Overall, the intention was to enhance family engagement with art, with each other and with the museum space.

The families were significantly more likely to use the entire time on offer for the Turathiaat task than the FP task. We are inferring that if people are chose to spend time, they were engaged. Given that the time duration was not imposed, if people had wanted to stop sooner, this would have been possible. People did choose to stop sooner with the FP task, so they did not feel pressured to remain for the full duration. Families also rated the Turathiaat task as a more enjoyable family experience, and the observational data suggested that whole family were more likely to engage with the task together for the duration of the task, compared to the FP task. These measures of engagement were supported by the qualitative data, which suggested that within the Turathiaat task, families were not only engaged, but also more relaxed, to the extent that children and in two families, adults, removed their shoes during the task. This stands in marked contrast to the research which described the ‘fear

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threshold' (Gurian, 2006) that can exist when adults engage with an art museum. In order to engage within a museum, Bitgood's model suggests that attention needs to be first captured and then focused, and that this leads to engagement. We would argue that the Turathiaat task met Bitgood's (2016) criteria for engagement within museums more than the FP task, based on both the time spent on the task and the levels of engagement reported by observers. Indeed, the lure of an opportunity to "engage with art using all their senses," which was the tag-line used in the promotion material to recruit families to participate in the activity, was enough to attract 14 adults (out of 80) to visit a museum for the first time.

When considering how families engaged with the art, the qualitative observations noted that discussions in the FP task were on visual content. However, in the Turathiaat task there were instances of discussion which moved beyond the visual content (including the observation from participants that items in the toolkit could be found in the painting) into deeper levels of cognitive engagement. One of the research questions was whether multisensory interpretation would be sufficient to elicit family engagement with the artwork. This was examined within the Turathiaat task, by giving half of the families a word-based audio description about the painting at the start of their session. Observational data indicated that, rather than facilitating engagement with the painting, participants were significantly less likely to make connections with the painting if they had the audio description. We argue that the families without the EDG were given a space that was truly "theirs to explore in whatever way they wanted" (quoted from the instructions given to families at the start of the task). The families were aware that they were within an art gallery, but the play-based nature of the toolkit enabled them to relax and develop their exploration, discovery, and learning in any way that they chose. In contrast, the families with the EDG were given something to listen to. The qualitative observations document the conflict that this created between the children who wanted to start exploring the toys, and the parents who were telling their children to listen.

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We suggest this relates to the ‘threshold fear’ (Gurian, 2006), specifically difficulties caused by behavioral expectations in the white box environment. These can create barriers to engagement based on a respect, veneration or perceived requirement to attend to the expert knowledge being presented by the museum. It was clear for many families that the conflict between the parental desire to listen to the voice of the museum themselves, and also to ensure that their children did so too, created an initial sense of stress and in some cases disharmony, when the children actively did not want to listen to that voice. Furthermore, the requirement and expectation to listen alone appeared to change the learning context, the family dynamic and in turn the environment. The museum voice appears to have inhibited some families’ ability or confidence to naturally and intuitively explore and discover for themselves, as shown by the reduced connections made between the artwork and the contents of the toolkit. This may have resulted, within some families, in a less open-ended and empowering experience for both children and adults.

From the outset, the museum team saw the inclusion of an EDG as an integral part of the toolkit as conflicting with the nature of open-ended, self-led family learning, due to it providing concrete, authoritative facts about the painting. In view of this, attempts were made to keep the content and tone of the EDG intentionally non-didactic and aimed at a family audience. Nevertheless, in order to explore and measure the impact of EDG on the experience of the Turathiaat task in a consistent way, it was a necessary requirement for participants to listen to the EDG at the start of the activity. The EDG did have a significant impact on the Turathiaat task, evidenced by both qualitative and quantitative measures. It is worth noting that we asked families to listen to the EDG through speakers, rather than on a personal headset, so that it could be a shared experience. However, this created additional issues, including atmospheric background sounds within the recording being greatly diminished and barely detectable, as a result of the size of the speaker and the acoustics within the space. In

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a future project, it would be interesting to explore what the impact would have been had the EAG been optional, or better still, an optional component within the toolkit that could be discovered, chosen, or rejected equivalently to any other component. This would have allowed those who wanted to listen—and who felt they benefited from doing so—to use the information it provided within their own approach to exploring the painting. While those who did not want to listen—or who had children too young to engage with such an EDG—would have the free choice to opt out of that element of the offer.

Irrespective of whether the EDG could be presented differently, it was clear from the Turathiatt condition with no EDG, that it is possible for children of all ages, and families with different levels of experience in an art museum context, to effectively engage with art without word-based interpretation and without an institutional voice. Families will, if given the chance, make the space their own and will construct their own meaning around art. The emphasis for this research, moving forward, is on museums to rethink what the information they provide about artworks looks like, or indeed feels, tastes, smells, and sound like, and how it can be accessed in new and engaging ways for different audiences.

This research also looked at the ways in which families engaged with each other, with a particular focus who led the tasks. Importantly, it also provided families with a key objective of a family museum visit (McManus, 1994; Sterry & Beaumont, 2006), which was the opportunity to engage with each other. Results indicated that whereas the FP task was more often adult led—with parents working to engage their children in some cases, and in others simply letting the children disengage—the Turathiaat task was more often led by children or a shared partnership between parents and children (led by whole family). There were more instances of parents disengaging in the Turathiaat task because children were able to engage without requiring parental input. With only a few exceptions, the children intuitively knew what to do and readily accepted the invitation to play within the Turathiaat

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task. Overall, qualitative observations indicated that family interaction within the Turathiaat task was more collaborative and inter-generational, than within the FP task, creating opportunities for children to contribute to the learning opportunities for their adults in a meaningful way.

The data in this study is based primarily on observations made by a series of observers using a set observation sheet, given that in the cultural context of this study it was not appropriate to video-record the family sessions. One could argue that, due to the fact that observers were present in the galleries for both tasks, this might reduce the naturalistic validity of the data. Although it is probable that the observers did have some impact on the visitor experience, it is also likely that their impact would have been to inhibit families' behavior. This would have been particularly the case for the Turathiaat task, where observers needed to sit reasonably close to families to see and hear what they were doing and saying. With this in mind, it becomes even more significant that families were able to relax and play in the way that they did. As mentioned above, this cannot be attributed to the families being experienced museum visitors, given that for some adults, and many children, it was their first visit to a museum.

Within these tasks, engagement in a task which involves uniquely visual engagement (FP) was compared to a task which also incorporates touch, and potentially sound and smell (Turathiaat). The result is clearly two quite different tasks. It could be argued that time spent on the task is not comparable, given that once a family have decided on their favorite painting, the task is complete, whereas the other task provides more opportunities for diverse engagement. However, the very fact that when using vision alone, families find it hard to engage with 6 artworks for even 10 minutes is essentially part of the point of this research. We wanted to investigate whether or not the provision of multisensory facilitation would enrich and extend the experience of families with artwork. This was confirmed by the amount

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of families that spent the maximum duration of 25 minutes on the Turathiaat task. The appeal of the Turathiaat task, compared to the traditional offer, is confirmed by the higher ratings for family enjoyment, compared to the FP task. Thus, we would argue that we did create a meaningful way of comparing the standard offer, to that which art museums could offer families.

This research has implications for museum practice that extend beyond family programming. The multisensory engagement is appealing to families, and can contribute to audience development more generally. There are clearly opportunities for art museums, in taking more open-ended, collaborative and multisensory approaches to engagement, to develop and support the needs of more diverse audiences. The parents in this study represented 26 unique nationalities and included both people who visited museums regularly and those who had never previously set foot in a museum or gallery (19.4%). Yet the same interpretation, in the form of a multisensory toolkit, was engaging across all families. Through exploration and discovery, this inclusive provision enables multiple generations, with diverse cultural backgrounds to find their own meaning and way to engage with artworks. From an audience development perspective, with minor modifications, toolkits could be created to support not only different generational and cultural needs, but also different sensory and learning needs. The implication of this research for art museums, is that they should be rethinking what interpretation looks like, and indeed feels, tastes, smells and sounds like.

Conclusions

In summary, the multisensory tools in the Turathiaat task enabled families to spend time in a traditional art museum exploring, talking, concentrating, and ultimately engaging, in a relaxed way. Families came in, hands went on, they started to play, the relaxed to the extent

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that their shoes came off. Although some families did enjoy the FP task, some parents tried and failed to fully engage their children, others with very young children didn't bother trying and just selected their paintings as adults. This contrasts with the Turathiaat task, where children automatically knew what to do with what they identified as toys. This resulted not only in more child-led engagement, but also more family-led engagement, where families played together, they found things out, they taught and learned from each other, and they created meaning. Crucially, the levels of engagement seen in the Turathiaat task did not require an active facilitator. The task was deliberately visitor-led, and demonstrated the potential of multisensory approaches for engaging families with art, with each other, and with museums.

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Images

Figure 1: Sensory tool kit, initial set up. In front of Jassim al-Zaini's *Turathiaat* at Mathaf: Arab Museum of Modern Art, Doha (Picture by Angela Ruggles).



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Figure 2: Family participating in the Favorite Painting task in the Faraj Daham Gallery at Mataf: Arab Museum of Modern Art, Doha (Picture by Angela Ruggles).



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Figure 3: Intergenerational interactions in the Turathiaat task (Picture by Angela Ruggles).



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Figure 4: Family with shoes off enjoying the Turathiaat task (Picture by Angela Ruggles).



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Figure 5: Family taking ownership of the gallery as part of the Turathiaat task (Picture by Angela Ruggles).



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Table 1.

Frequency (and percentage) of observed family engagement with the Turathiaat and FP tasks

Task	Is the family engaged with the task?			Total
	All of the time (whole family)	Part of the time (whole family)	Member of the family not engaged	
Turathiaat	52 (86.7)	0	8 (13.3)	60
Favorite Painting	23 (38.3)	26 (43.3)	11 (18.3)	60

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Table 2.

Frequency of families, who heard the EDG and those who did not, which make explicit connections between the tools and the painting in the 'Turathiaat' task.

Task	Do they talk about connections between the toys and the paintings?		Total
	Make Connections	Do not make connections	
EDG condition	14	14	28
No-EDG condition	23	6	29

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Table 3.

Tally table of who took the 'lead' within in the Turathiaat task and the FP task

	Who took the lead?				Total
	Adult(s)	Child/ren	All	None	
Turathiaat	21	13	16	2	52
Favorite Painting	33	9	8	4	54