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To cite this article: Alison F. Eardley, Claire Dobbin, Joselia Neves & Peter Ride (2018) Hands-On, Shoes-Off: Multisensory Tools Enhance Family Engagement Within an Art Museum, Visitor Studies, 21:1, 79-97, DOI: [10.1080/10645578.2018.1503873](https://doi.org/10.1080/10645578.2018.1503873)

To link to this article: <https://doi.org/10.1080/10645578.2018.1503873>



Published online: 14 Dec 2018.



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## Hands-On, Shoes-Off: Multisensory Tools Enhance Family Engagement Within an Art Museum

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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 indicate that multisensory tools enhance family engagement with museums, artworks, and each other. Results also suggest 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.

There is a growing trend for exhibitions or events to incorporate nonvisual 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, 2018; 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 an impact beyond the museum visit. Yet, with this shift in 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 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 museum visitors, and satisfaction is one way of measuring if visitors feel like their aspirations for a museum visit have been met. But these metrics 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 visitors' 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” (Azevedo, 2015, p. 84). Indeed, although the term is often used in research articles, it is rarely defined. One form of engagement is to attract someone's attention to a particular activity or object. Renninger and Hidi (2016) argued that engagement is distinct from interest. Nevertheless, and useful from a museum perspective, they note that engagement can help to develop interest.

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. 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 attention can be variable. By defining what engagement is, it is possible to consider ways in which it can be measured or documented, 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). 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 s (Smith & Smith, 2001; see also Brieber, Nadal, Leder, & Rosenberg, 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 and to communicate 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 posit visitors as active learners (Hein, 2002). They increasingly suggest ways in which viewers might make personal connections to a work (Serota, 1996) by 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 their 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 although novice museum visitors can see, they may not know what they should pay attention to in order to create a memorable or engaging experience (Csikszentmihalyi & Robinson, 1990). Museums are increasingly becoming 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 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 that 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 consider the ways in which museum visitors engage with each other as another aspect of engagement. Many studies have explored how adults shape children's learning in museums. However, Braswell (2012) developed a framework that prioritizes a broader range of intergenerational engagement within the museum context. His framework built on Morrissey's (2002) work and examined the way (a) children react to artifacts, (b) adults react to artifacts, (c) adults shape children's reaction to artifacts (e.g., an adult's explanations shape a child's understanding of an artefact), (d) children shape adults' reactions to artifacts, (e) adults and children react to one another, and (f) children interact with each other (without artifacts). Braswell concluded that children interacting alone with artifacts was the most common behavior and, where applicable, children were more likely to react to artifacts in groups with other children than in adult-child groups. Braswell's study was carried out in a children's museum in the United States. Research has suggested that in a children's museum parents often either lack an understanding of their 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 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 into the museum or engaging when they are there (Gurian, 2006). Many art museums and galleries are presented as a white cube, with white walls, floors, and ceilings that remove the gallery from the real world and strip out points of reference (O'doherty, 1999). This creates an environment that is not child-centric and, consequently, not conducive to child-led learning. Research shows that these kinds of space alienate adults and that, as a result, interpretation is required (Dibosa, Dewdney, & Walsh, 2012). As such, we also consider that the way in which families interact with the museum environment is an aspect of engagement.

Our primary research question focused on whether or not multisensory tools impact family engagement in a typical white-box art museum. We examined the way families

engaged with the museum, engaged with the artwork, and interacted with each other. Families were recruited to take part in two activities at Mathaf: Arab Museum of Modern Art. 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 min 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, which we refer to as tools. These were objects, toys, and games that had been designed to help children to interpret specific elements of the painting through 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 encouraged tactile exploration or interaction. Other elements also simulated auditory (instruments) or olfactory (smell pots) engagement. 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 cushions on which to sit, the toolkit helped create a welcoming space for families (Figure 1).

A second task required families to look at a series of artworks in another gallery and to 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 (Figure 2). However, by asking families to decide on their favorite painting,



**Figure 1.** Sensory toolkit and the initial set up for the *Turathiaat* task, shown in front of Jassim al-Zaini's *Turathiaat*, at Mathaf: Arab Museum of Modern Art, Doha, Qatar. (Photograph by Angela Ruggles.)



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

we imposed an additional level of cognitive engagement. Thus, the FP task was based on visual sensory information, and the Turathiaat task enabled engagement through multiple senses.

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). The observations were enriched with self-report data from participants. 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 by comparing the level of engagement of families with each task. Building on Braswell (2012), we collected quantitative observation on intergenerational engagement, and specifically who led the tasks (e.g., parent-led, child-led, mixed-led). We also examined the qualitative reports of family interaction.

We also looked at engagement specifically with the artworks across the two tasks by comparing qualitative observations of families' 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 in this condition were 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 listeners' 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*, and invited to explore the toolkit. Using quantified observations, we compared engagement with the work of art with and without the EDG.

Based on the research on multisensory processing, we predicted that family engagement with the museum, each other, and the artworks will be improved by the provision of the multisensory tools. Within the *Turathiaat* task, we also expected an impact of the EDG on family engagement.

## Method

### Participants

Sixty families participated in this research. They were recruited to take part in a family program with a research element at Mathaf, Doha, Qatar. Some participants were on the Qatar Museums Family and Schools Programs mailing list, others were recruited through friends, by word of mouth, and using 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, six teenagers attended (12–14 years). 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.

### Materials

#### Observation sheet

Semistructured observation sheets were constructed and refined through piloting. 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 without. 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 (audio description) 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, and in the *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.

### **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 styles, techniques, and media. Three artworks were made up of multiple components (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 (Figure 1). On the floor below *Turathiaat* was the toolkit, a collection of 13 tools (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 in the painting); a spider web (a wooden board with pegs on which to create spider web patterns using gray 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 sandooq chest (an accurate replica of the sandooq 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 sandooq); 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 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<sup>1</sup>/<sub>2</sub>-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 EDG contained description of and information about the painting, music, and sound effects. It was based on the principles of AD, but, unlike traditional AD, it was 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 families.<sup>1</sup>



## Procedure

Participants signed up to a two-part family program with a research component.<sup>2</sup> 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*, and that it was by an important Qatari artist called Jassim 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 the families with EDG, the researcher explained that they would listen to a story about the painting, in English or Arabic, at the start of the session. 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 5 min 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 six 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 favorite 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

### Quantitative analysis

Thematic analysis was used to analyze the qualitative observational data recorded in the free-text response boxes (Braun & Clarke, 2006). It is important to acknowledge that by using observations as our primary data, 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 assignment of observers was random across participants, but was consistent across the two tasks. Therefore, although there 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 information about specific behaviors. However, 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. This was achieved through the use of semi-structured observation sheets with pre-defined categories for qualitative comments. 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. The lead author then coded the data from the free response boxes with the themes in mind, allowing more focused themes to emerge from the first broad categories. These additional themes were 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 “make yourself at home.” For engagement with the art, the theme was “levels of processing,” and a specific theme emerged in relation to the EDG, which we have labeled “the authoritative museum voice.” For engagement within families, the theme that emerged was “engagement within families.” This treatment of qualitative analysis is in line with Spencer, Ritchie, Lewis, and Dillon (2003), who stated that quality concepts developed for quantitative research such as generalizability, validity, reliability, and replicability cannot nor ought not to be applied to qualitative research (see also Brannen, 2005).

## Results

The results section is organized by the three forms of engagement we examined—engagement with the museum, engagement with the art, and engagement within families. Within each section, we consider first the quantitative data, and then the qualitative theme, evidenced using the recorded quotes and descriptions of participant behavior from the observation sheets, that emerged in relation to each of the areas of engagement. Family participant numbers are reported, followed by the age of the child/children in the family group.

### *Engagement with the museum*

A direct comparison of 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.

This finding is supported by the observations of family engagement. Table 1 shows the levels of engagement within families for the two tasks, based on an overall judgment 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 engaged as a whole family for part of the time (43.3).

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, seven children did not engage with the FP task but all engaged with the Turathiaat task, two parents did not engage with the FP task, and six 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, adults enjoyed both tasks (Turathiaat: median = 9, range = 6–10; FP: 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, 2 years). 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, 11 years).

In the Turathiaat task, several families were observed to have taken off their shoes, 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, 14 months) used the elements of the toolkit and the sheet that had initially covered them to create an adventure trail throughout the gallery, which the mother and daughter followed.

**Table 1.** Frequency (and percentage) of observed family engagement by task.

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

## Engagement with the art

### Thinking about art

For the FP task, approximately 75% of the documented quotes or references related to discussions about the paintings focused on color: “Mother talking about the painting. Big color questions are asked by the mother” (Family 14, 2.5 years), and for Family 14, the children engaged with the paintings, “look at the different colors” (child 2.5 years). “Mother: The colors are nice, if we ignore the shape” (Family 12, 11 months). A few discussions included references to Qatari heritage and stories or ideas that were inspired by the shapes. 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 Family 29, a boy (age 2) stated that he liked the black painting because he liked the noise it made, which he then made himself. Overall, the majority of discussions were based on the visual information, with little reference to cognitive, emotional, or other sensory information.

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 rather than the colors. Overall, 65% of families made explicit connections between items in the tool kit and the painting (Table 2). For some families, making connections was about finding the tools in the painting. They particularly noticed the sandoq, 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, 3 years). On occasions, this led to further discussion: “It’s the same!” (noticing the connection between sandoq and painting); “This artist is talented!” (commenting on connection between old things and new—the painting, play mat, and mini painting puzzle) (Family 7, 9 years and 21 months). However, there were many instances in which 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 sandoq to her Pakistani culture” (Family 55, 5 years and 2 years); “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, 3 years and 4 years). 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 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 the number of explicit connections between the toolkit and painting by families was greater for families with the EDG compared to families who did not have the EDG,  $\chi^2(1, N = 57) = 5.37, p = .02$ .

**Table 2.** Number of families who make explicit connections between the tools and the painting in the Turathiaat task by Enriched Descriptive Guide (EDG) condition.

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

### *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, almost none of the children under 6 listened to the EDG. However, in some instances the parents tried to 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, 2 years). 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, 8 years, 6 years, 5 years). The conflict between the adults’ understanding of the demands of the task and the inattentive children created conflict and arguably stress: “Mother tries to silence them when they start making noise while the AD [EDG] is playing, but they were not paying attention” (Family 39, 9 years, 5 years).

### *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. The lead was identified as either 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) one or more adults took the lead in the FP task, compared with 21 in the Turathiaat task. Only eight families shared the lead between the adults and children for the FP task, compared to 16 in the Turathiaat task.

These results suggest that the experience was more collaborative in the Turathiaat task, and both encouraged child-led activity and enabled adults to participate more actively in play with their children. A McNemar-Bowker test showed a significant difference in the pattern of lead activity,  $\chi^2(3, N = 50) = 8.38, p = .039$ . Overall, adults were more likely to take the lead in the FP task.

### *Engagement within families*

Within the FP task the qualitative data analysis indicates 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

**Table 3.** Number of participants who took the lead by task.

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

before deciding their favorite [painting]" (Family 8, 3 years, 4 years, 18 months); "Mother interacted positively with the artwork, and explained it to her daughter, especially the oldest" (Family 50, 6 years, 4 years). However, there were also instances where this strategy failed. Although children might have engaged initially, they often lost interest quickly: "In the end, the girls started playing with each other and lost interest in the paintings" (Family PC). One 2-year-old responded to her mother at the end of the task: "I want to sleep!" (Family 18, 2 years and 1 year).

In most instances the task did not facilitate whole family engagement. In some instances, parents engaged with the task 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, 7 years, 5 years, 4 years, and 2 years). However, there were other instances in which intergenerational conflicts arose as a result of the task: In Family 47, the observer noted, "Girl wanted to leave but the mother insisted that she look at all of the paintings" (Family 47, 4 years).

In the Turathiaat task, the qualitative data supported the quantitative findings, indicating that the pattern shifted so that the task was more family- or child-led. For example: "Discuss how to play with toys. Negotiate who plays with them. Talk about colors, shapes, smells or noises and if they are reminded of anything" (Family 1, 8 years, 6 years, 4 years, and 2 years). 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, 6 years, 4 years).

For families 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 were 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, 6.5 years, 5 years). However, in a couple of instances the fathers simply enjoyed playing for their own sake: "Mother is with the child and father plays alone" (Family 12, 11 months); "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, 11 years).

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 age barriers. The pylon and spider web were popular with the families with older children and enabled collaborative lacing with the elastic or independent play. The colored blocks were popular across all ages, particularly with the younger children. The stereo viewer facilitated intergenerational interaction. 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 [stereo viewer] from his mum" (Family 37, 10 years and 4 years); "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, 6 years); and “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, 3 years).

## Discussion

This research examined the impact of multisensory interpretative tools on visitor-led family engagement within an art museum. One aim of multisensory tools is 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, each other, and the museum space.

Families were significantly more likely to use the entire allotted time for the Turathiaat task than the FP task. We can infer that if people chose to spend time, they were engaged. If people had wanted to stop sooner, this was possible. Families also rated the Turathiaat task as a more enjoyable family experience, and the observational data suggested that the whole family was more likely to engage with the task 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 is in marked contrast to research that described a “fear threshold” (Gurian, 2006) that can exist when adults engage with an art museum. To engage within a museum, Bitgood’s (2016) model suggests that attention needs to be first captured and then focused, and that this leads to engagement. We argue that the Turathiaat task met Bitgood’s 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 study, was enough to attract 14 adults (out of 80) to visit a museum for the first time.

The qualitative observations noted that discussions in the FP task were about visual content. However, in the Turathiaat task there were instances of discussion that moved beyond the visual content 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. We suggest this relates to 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 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 to ensure that their children also did so, 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.

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

One could argue that the presence of observers for both tasks 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, in which observers needed to sit reasonably close to families to see and hear what they were doing and saying. With this in mind, it is even more remarkable that families were able to relax and play in the way that they did. 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.



A task that involves uniquely visual engagement (FP) was compared to a task that also incorporates touch and potentially sound and smell (Turathiaat). The result is two quite different tasks. It could be argued that time spent on the task is not comparable, given that once a family has decided on their favorite painting the task is complete, whereas the other task provides more opportunities for diverse engagement. However, that families find it hard to engage with six 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 number of families that spent the maximum duration of 25 minutes on the Turathiaat task. The appeal of the Turathiaat task, compared to the FP task, is confirmed by the higher ratings for family enjoyment. Thus, we believe that we created a meaningful way of comparing the standard offer to something that art museums could offer families.

This research has implications for museum practice that extend beyond family programming. Multisensory engagement is appealing to families and can contribute to audience development more generally. There are opportunities for art museums, by 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 nationalities and included both people who visited museums regularly and those who had never previously set foot in a museum or gallery. Yet the same interpretation, in the form of a multisensory toolkit, was engaging across all families. Through exploration and discovery, this inclusive tool enabled multiple generations with diverse cultural backgrounds to find their own meaning and way to engage with artworks. From an audience development perspective, 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.

## Notes

1. The data reported here are part of a larger corpus of data; see Dobbin, Eardley, and Neves (2016).
2. The data reported here were collected during the first part of the program.

## Acknowledgments

We would like to thank Maral Bedoyan and Mathaf: Arab Museum of Modern Art for their support and assistance during the data collection phase, and Qatar Museums Family and Schools Programme for their role in developing the Ektashif, Art through the Senses program, on which this research was based. We would also like to thank all our data collectors and our participants. We would like to acknowledge KCA London and Sophy Cave Design for their contribution to designing and fabricating the Multisensory toolkit. Finally, we would like to thank the reviewers for their constructive and thoughtful comments and suggestions on a previous version of this manuscript.


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