



The Multisensory Museum

*Cross-Disciplinary Perspectives on Touch,
Sound, Smell, Memory, and Space*



edited by **NINA LEVENT** *and* **ALVARO PASCUAL-LEONE**

FOR EDUCATIONAL PURPOSES ONLY

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Dedication

To my children, Edis-Alexander and Isabelle, for accompanying me on many trips to museums around the world. They did so from the time they could barely walk, and most times without a fight. They almost always found ways to enjoy the experience—by stuffing a sibling headfirst into an ancient sarcophagus, racing up and down the stairs, or engaging in some other hijinks. They also made sure every museum trip was a sensory experience by never skipping the museum café.

—NL

I would like to dedicate this book to my father, Alvaro Pascual-Leone Pascual, who introduced me early to the joy of visiting museums. Without his early influence, I would not have developed a delight and appreciation for the importance of the appropriate display and presentation of art such that all might enjoy and learn from it. I would also like to dedicate this book to my wife Elizabeth and my children, Ana, Nico and Andres, who keep reminding me what is important.

—APL

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Contents

Acknowledgments	xi
Introduction	xiii
<i>Nina Levent and Alvaro Pascual-Leone</i>	

PART I: MUSEUMS AND TOUCH

1	Please DO Touch the Exhibits! Interactions between Visual Imagery and Haptic Perception	3
<i>Simon Lacey and K. Sathian</i>		
2	“First Hand,” not “First Eye” Knowledge: Bodily Experience in Museums	17
<i>Francesca Bacci and Francesco Pavani</i>		
3	Art Making as Multisensory Engagement: Case Studies from The Museum of Modern Art	29
<i>Carrie McGee and Francesca Rosenberg</i>		
4	Multisensory Engagement with Real Nature Relevant to Real Life	45
<i>Molly Steinwald, Melissa A. Harding, and Richard V. Piacentini</i>		
5	Touch and Narrative in Art and History Museums	61
<i>Nina Levent and D. Lynn McRaney</i>		

PART II: MUSEUMS AND SOUND

- 6** A Brain Guide to Sound Galleries 85
Stephen R. Arnott and Claude Alain
- 7** Ephemeral, Immersive, Invasive: Sound as Curatorial
Theme, 1966–2013 109
Seth Cluett
- 8** Soundwalking the Museum: A Sonic Journey through the
Visual Display 119
Salomé Voegelin
- 9** The Role of Sensory and Motor Systems in Art Appreciation
and Implications for Exhibit Design 131
A. Casile and L. F. Ticini

PART III: SMELL AND TASTE IN MUSEUMS

- 10** The Forgotten Sense: Using Olfaction in a Museum Context:
A Neuroscience Perspective 151
Richard J. Stevenson
- 11** The Scented Museum 167
Andreas Keller
- 12** The Museum as Smellscape 177
Jim Drobnick
- 13** Taste-full Museums: Educating the Senses One Plate at a Time 197
Irina D. Mihalache

**PART IV: MUSEUM ARCHITECTURE
AND THE SENSES**

- 14** Navigating the Museum 215
Fiona Zisch, Stephen Gage, and Hugo Spiers
- 15** Museum as an Embodied Experience 239
Juhani Pallasmaa

16	Architectural Design for Living Artifacts <i>Joy Monice Malnar and Frank Vodvarka</i>	251
-----------	--	-----

PART V: FUTURE MUSEUMS

17	Multisensory Memories: How Richer Experiences Facilitate Remembering <i>Jamie Ward</i>	273
-----------	--	-----

18	The Secret of Aesthetics Lies in the Conjugation of the Senses: Reimagining the Museum as a Sensory Gymnasium <i>David Howes</i>	285
-----------	--	-----

19	Multisensory Mental Simulation and Aesthetic Perception <i>Salvatore Maria Aglioti, Ilaria Bufalari, and Matteo Candidi</i>	301
-----------	--	-----

20	Islands of Stimulation: Perspectives on the Museum Experience, Present and Future <i>Rebecca McGinnis</i>	319
-----------	---	-----

21	The Future Landscape of 3D in Museums <i>Samantha Sportun</i>	331
-----------	--	-----

22	Technology, Senses, and the Future of Museums. A Conversation with Nina Levent, Heather Knight, Sebastian Chan, and Rafael Lozano Hammer	341
-----------	--	-----

	Conclusion: Multisensory Art Museums and the Experience of Interconnection. <i>Elisabeth Axel and Kaywin Feldman in conversation with artists and curators</i>	351
--	--	-----

	Index	361
--	-------	-----

	About the Contributors	371
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Introduction

Nina Levent and Alvaro Pascual-Leone

Today's museums are much more than repositories of ancient artifacts to be preserved for the future, although collection care remains a critical function in any museum. They are centers of learning, community centers, social hubs, even places of healing and contemplation. Museums reach out to their communities by facilitating important and relevant conversations through their collections and exhibits, and by making the objects in their collections accessible and meaningful to a wide variety of visitors. Many exhibits focus on the materiality of a single object and help visitors connect with the sensory properties of historic artifacts, their context, and the stories behind them. Other museums, with the use of technology, create immersive learning experiences that have no artifacts at all.

We now understand that a museum visit is not simply an encounter between an eager visiting public who soaks up the knowledge articulated by the curatorial team. The museum experience is a multilayered journey that is proprioceptive, sensory, intellectual, aesthetic, and social. The end result might be learning, wonder, reflection and relaxation, sensory stimulation, conversation with friends, new social ties, creation of lasting memories, or recollection of past events.

At the same time as the meaning and purpose of museums is being redefined, the study of the human brain and its function has profoundly modified our understanding of perception, cognition, and knowledge. Modern neuroscience has come to view the brain as a creator of expectations and hypotheses of reality, which then get contrasted against experience. The brain is not a passive recipient of information through the senses but instead an active seeker of information to confirm or refute predictions. Human neuroscience has taught us that our internal representations of reality, and thus the predictions we

approach experience with and the nature of such experiences themselves, are intrinsically multisensory (Pascual-Leone and Hamilton, 2001). Therefore, museums need to consider the combined and complex interactions between visual, auditory, olfactory, spatial, and other aspects of the visitors' experience. Human neuroscience has also taught us that the brain is intrinsically plastic, dynamically changing to respond to changes in environment, activity, demands, and so forth (Pascual-Leone et al., 2005). As a result, museums need to consider their potential impact on visitors and the opportunity they represent to literally shape visitors' brains.

This book seeks to open a dialogue between modern museum science and human neuroscience. We aim to highlight today's best multisensory practices and reflect on how new research and technology will influence museums of the future. We hope to inspire museum staff to develop layered museum experiences and try to provide practical information on how to do so. We challenged the book's contributors—experts in various disciplines—to take a critical look at current trends in designing multimodal museum experiences and exhibits and to think about the sensory dimensions of museum learning, contemplation, and dialogue. We are most fortunate to have the contributions of leading neuroscientists, cognitive researchers, architects, anthropologists, historians, artists, curators, and educators to shape a framework of ideas. This book is thus a cross-disciplinary effort to create a conceptual framework for thinking about present and future sensory experiences in museums.

COGNITIVE RESEARCH SENSES AND MUSEUM PRACTICE: A BIT OF HISTORY

Art Beyond Sight (ABS, formerly Art Education for the Blind) has been fostering a dialogue between museum practitioners and cognitive researchers since the organization's inception in 1987. Because Art Beyond Sight's original goal was to make museums and visual culture accessible to people who are blind, much of its effort was initially focused on developing multisensory tools for blind audiences, such as tactile images, verbal descriptions, touch collections, and sound images. ABS founder Elisabeth Axel and her team pioneered tactile book printing and developed a tactile language of lines and patterns; they created the first tactile art history encyclopedia, *Art History through Touch and Sound*. Axel and her team also developed the first guidelines for verbal descriptions of art and museum objects in 1996 and periodically update these guidelines.

In the 1990s, ABS, led by Axel, established itself as a think tank and clearinghouse for the latest research on multisensory perception, including tactile

images for people who are blind, haptic perception of forms and shapes, auditory perception, verbal description, sonification, and art education through the senses. One of ABS's first national conferences focusing on research done by cognitive psychologists, including John M. Kennedy (*Drawing and the Blind*, 1993) and Morton Heller (*Psychology of Touch*, 1991), was held in 1990 at the Metropolitan Museum of Art. Over the next two decades ABS became a hub for cutting-edge research and best practices in museum pedagogy. One of the most critical partnerships formed early on was with Alvaro Pascual-Leone and his colleagues at Berenson-Allen Center for Non-Invasive Brain Stimulation at Beth Israel Deaconess Medical Center and Harvard Medical School. Pascual-Leone and his colleagues collaborated with ABS on a study involving a congenitally blind figurative artist, Esref Armagan (Amedi et al., 2008). The group worked together to identify new research areas that held particular relevance for museum and art practice.

ABS began partnering with the Metropolitan Museum of Art on a biennial international conference, *Art Beyond Sight: Multimodal Approaches to Learning*. With creative input from Rebecca McGinnis at the Metropolitan Museum of Art, the conference expanded to address larger issues around multisensory learning for all museum audiences. The four such conferences that have taken place in the last ten years have brought together researchers and practitioners from disciplines as varied as neuroscience, social psychology, museology, education, art history, computer science, and art therapy.

The conversation about art, senses, and cognition connects to museum practice through a number of recent innovative collaborations between museums, artists, and neuroscience research labs. In 2010 the Walters Art Museum announced a major collaboration with John Hopkins University's Mind/Brain Institute. The same year, the renowned performance artist Marina Abramović, during her retrospective at New York City's Museum of Modern Art, was inspired to collaborate with neuroscientists from New York University on a project that looks at the art and science of the mutual gaze. A growing number of museums on both sides of the Atlantic are sponsoring lectures and presentations on the neuroscience of sound, visual attention, learning, aesthetics, creativity, and other aspects of the museum experience.

NEUROSCIENCE AND PERCEPTION OF OBJECTS TODAY

Confronted with the question of how we perceive objects in the world, we are often taught that we have a series of distributed systems structured according to the sensory modalities that they process. We talk about a visual system, a somatosensory or tactile system, an auditory system, and so forth. Certainly,

the existence of specialized detectors or receptors for different sensory modalities grants us the opportunity to process different forms of energy and hence capture different views of the world in parallel. Some experiences are uniquely unimodal. Hue can only be experienced by sight, tickle can only be felt by touch, and pitch can only be differentiated by audition. Nevertheless, our perceptual experience of the world is richly multimodal, as eloquently elaborated by Barry Stein and Alex Meredith (Stein and Meredith, 1993). We are able to integrate into a richer percept the impressions generated by different sensory modalities. Furthermore, we routinely extract information derived from one sensory modality and use it in another; we can, for example, know a shape by touch and subsequently identify it correctly by sight. This raises the broad issue of internal versus experiential influences in the organization of the brain, and in that context modern neuroscience increasingly emphasizes the importance of internal representation. Our brain is not a passive recipient of sensory inputs, but rather an active source of expectations—hypotheses about the world and its objects—that we can then contrast with and refine by experience.

In this role of creator of expectations and predictions about the world and its objects, the brain might in fact have a metamodal representation of reality (Pascual-Leone and Hamilton, 2001). The brain appears to be made up of metamodal operators, local neural networks defined by a given computation that is applied regardless of the sensory input received. This does not mean that there are not preferred sensory modalities for specific computations (and hence operators). Indeed, this is the case and the reason that the cortex gives the illusion of being built around sensory modalities rather than operators. However, internal representation of reality appears to effectively transcend specific sensory modalities. If this is so, it would imply a multisensory experience of the world as default.

SENSORY STUDIES, MULTISENSORY LEARNING, AND MUSEUM STUDIES

The field of sensory studies has flourished in the last two decades as a result of researchers from across the humanities and social sciences turning their attention to the sensorium and delving into the cultural life of the senses. Much of this research has been generated or inspired by the work of anthropologist David Howes and historian Constance Classen who, together with sociologist Anthony Synnott, formed the Concordia Sensoria Research Team in 1988. They and their colleagues have published a range of books, beginning with *The Varieties of Sensory Experience* (Howes, 1991) and continuing with in-

vestigations of the five canonical senses (for example, Classen, Howes, and Synnott, 1994; Bull and Back, 2003; Classen, 2005, 2012; Korsmeyer, 2005; and Edwards and Bhaumik, 2008), as well as other studies that focus on the shifting relationships among the senses in history and across cultures (Classen, 1998; Howes, 2005; M. Smith, 2007). (Literary scholars and medical historians have also joined this movement to “culturalize” our understanding of the sensorium [B. Smith, 1999; Bynum and Porter, 1993; Jütte, 2005; *pace* Ackerman 1991].) There is much material of both general and particular interest to museum professionals in this literature, such as the chapter on visitor experience in the early museum in *The Book of Touch* (Classen, 2005). In this chapter, Classen relates how in the late seventeenth and eighteenth centuries, visitors to the Ashmolean and British Museum would rub, pick up, shake, smell, and even taste the artifacts on display. Other historians have documented how the restrictions on the senses, which we take for granted today, emerged gradually (Leahy, 2012) and culminated in only conservators and connoisseurs being permitted to enjoy the intimate interaction with museum objects that had once been the norm (Candlin, 2010).

In the wake of this “sensory turn,” contemporary museum professionals have started rethinking the multiple restrictions on the use of the senses in the museum and begun actively soliciting the senses instead (to the extent that the competing demand for conservation will allow). The role of touch in the museum has been expanded significantly as more and more studies have pointed to the social, cognitive, and even therapeutic value of handling objects (Pye, 2008; Chatterjee, 2008). A new emphasis on “experiencing the properties of things” directly has taken shape (Dudley, 2010, 2012), which has revolutionized the ways in which the material legacy of the past and other cultures is now being interpreted. Museum educators are also benefiting from a growing body of research on multisensory learning strategies that address the needs of not only young children but school-age and adult learners as well. Education researchers and practitioners point to the success of multisensory methods used in learning math, language, and reading (Birsch, 2005; Campbell et al., 2008; Kerry and Baker, 2011; Shams and Seitz, 2008; Scheffel et al., 2008). Among the benefits of multisensory learning are increased student engagement, better information retention, improved native and foreign language skills, better performance on reading tests, enhanced mathematical skills, and improved ability to multitask. Such multisensory teaching approaches could be particularly effective when working with learners with disabilities (Malatesha Joshi et al., 2002; Axel and Levent, 2003; Al-Hroub, 2010).

The sensory turn that has been sweeping the academy has also inspired artists to explore the aesthetic potential of the nonvisual senses. Over the past few decades, artists have abandoned the easel and started incorporating

sound, smell, touch, movement, and also taste into their creations. Thanks to advances in technology, it has become possible to better control sound and smell experiences, as well as use complex digital and robotic technologies to amplify touch and movement. Multisensory immersion has taken the place of disinterested contemplation as the goal of much art (Jones, 2006; Schwartzman, 2011) and has in turn led art critics and philosophers to challenge the restrictive sensory politics of the modern museum (Drobnick, 2004, 2006; Voegelin, 2010; Serres, 2009; Kelly, 2011; Bacci and Melcher, 2011). Breaking down the barriers to and among the senses and the drive to include rather than exclude populations, such as the visually impaired, has opened up an exciting new terrain for museum studies, which this book seeks to extend even further.

SENSORY EXPERIENCES AND CONSUMER TRENDS

Multisensory museum experiences are still few and far between. There are only rarely attempts to attend to the different senses and design museums to promote the multisensory experience. This is important because, whether addressed explicitly or not, modern neuroscience teaches us that basically all experience of the world is multisensory. Therefore, museum curators and directors ought to understand the importance of explicitly designing multisensory museum experiences. Essentially, the museum experience will be multisensory, whether we want it or not—thus it is better to pay attention to achieve desired effects rather than allowing for incidental and potentially undesirable effects.

With that in mind, let us go back to the situation nowadays. Touch and smell in museums, as many of this volume's contributors remark, are still subject to the "sense hierarchy" that elevates and privileges sight above other senses. When many of the exhibits are under glass and art is still often arranged in salon style, sensory experiences may get into the museum culture through the "back door" of museum shops and restaurants that are eager to respond to consumer trends towards more sensory merchandise. Dahesh Museum, which is dedicated to European academic art, used to have its galleries on Madison Avenue and 57th Street in New York City. The museum's gift shop, featuring Victorian jewelry, silk and cashmere shawls, fine art objects, and furniture celebrating nineteenth-century orientalism, rivaled any other commercial venue on Madison Avenue. Many visitors and hurried tourists never made it past Moroccan stools, Turkish pillows, Parisian pill boxes, and Indian shawls into the downstairs galleries.

Neue Galerie is a small jewel of a museum on New York's Upper East Side devoted solely to early-twentieth-century German and Austrian art and design. This museum houses not one but two restaurants in its relatively small space, Café Sabarsky and Café Fledermaus, both featuring traditional Viennese menus. In these cafes patrons are seated in chairs designed by the modernist Austrian architect Adolf Loos, and in the restaurant spaces are other period objects, including lighting fixtures by Josef Hoffmann and banquettes upholstered with a 1912 Otto Wagner fabric. Thus, as you dine on Viennese classics you are offered the most authentic experience of Viennese Café Kultur in New York City. The restaurants are almost always packed, whether the upstairs galleries are crowded or not. To the naked eye it seems that Café Sabarsky's sensory experience is getting many more new and repeat visitors than the museum galleries.

SENSORY MUSEUM OF THE MIND

Museums are places where we have a chance to explore and contemplate objects—curious and bewildering objects, functional objects, and elegant art objects. Museums are also places where we encounter each other, create social bonds, share stories, gauge our opinions, and debate ideas. Our experience in the physical space of a museum, however, is colored by our previous knowledge, motivations, and background (Falk, 2009). In fact, as discussed above, modern neuroscience reveals this role of the brain as predictor of experience to be pervasive. We enter a museum like we travel through life, with our brains creating frameworks of expectations that determine what we perceive (we only see what we look for) and influence our experience (we feel more comfortable when our brains' models map onto our experience).

Young and not-so-young visitors are reminded about the museum of the mind by brilliant British children's author Jan Mark, who wrote this about the ultimate museum collection:

It is in your head. Everything you have ever heard, smelled, tasted, or touched is in there. Most of it has been pushed to the back, like things in a real museum, but an enormous amount is still there when you need it. You can get it out and have an exhibition whenever you want; you can spend as long as you like wandering around it. As you get older, many things that you did not understand when you first stowed them away suddenly start making sense. Bring them back from the basement. . . . Memory is your museum, your cabinet of curiosities, your Wunderkammer. It will never be full; there is always room for something new and strange and marvelous. (Mark, 2007)

As if following Mark's advice, a blind New Yorker in her seventies walked us through her museum of the mind. One of the first things she described vividly was her childhood experience of a ninety-foot whale at the American Museum of Natural History. She did not have vision to see the whale, nor could she touch it, as the model is on the ceiling of the gallery, but she had carried around for decades a vivid mental image that was created through verbal description and the dynamic and joyous experience of measuring ninety feet with a yardstick to understand the scale of this giant animal (Reich et al., 2011, p. 95). When we leave a museum, we leave behind the giant blue whale, Ben Franklin's walking stick, Lincoln's top hat, the Mona Lisa; what we take home is a mental image of the object or work of art, a dynamic image that is colored by our own preconceptions, the atmosphere of the museum, enthusiasm of the gallery guide, conversations we overhear standing in front of the object. Museums of the mind are universal; adults and children, those who can see and those who are blind, collect mental images of objects they encountered. This multisensory museum of the mind is a context for most of the experiences we have in a physical museum space.

BOOK STRUCTURE: A CROSS-DISCIPLINARY FRAMEWORK FOR THE FUTURE MUSEUM

We want to acknowledge the paradox of this book in which we attempt to create a discourse about rich sensory experiences through narrative only. We applaud the many authors who tackled the task of describing complex multisensory museum encounters and recreating the essence of subtle and intense sensory object experiences on these pages.

The book is organized around the overarching themes of touch, sound, space, smell, taste, and the future museum. However, its goal is to emphasize the fact that such a separation, while practically useful, is in fact ultimately artificial given the interwoven, multisensory (metamodal) reality of our brains' representation of reality, and of our experience of the world.

Each thematic section opens with a chapter that gives a broad overview of current research and the science behind tactile, auditory, spatial, and olfactory perception. These opening chapters shed light on what we know about the workings of the brain, including how it processes information through different sensory pathways and how it creates mental images and memories based on different sensory inputs. All of the thematic sections include examples from current museum practice and reviews of trends in museum programming, studio art, and exhibition design. For the purpose of this book we define museums broadly, as does the American Alliance of Museums; this