Crossing the Smoke Bridge

Memory, Emotion, Social Interaction, and the Sense of Smell in Exhibitions

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Walking across the boardwalk, I am struck by the humid air wafting up from the water below. The wind is nonexistent and the sun's heat borders on oppressive. Mixed with the sticky decay of the cypress swamp is a heavy perfume of smoke. It slithers across the bridge from the ceremonial fire kept alight at the entrance of the museum. Immediately, I recall family camping trips in the Florida summer: mud, mosquitos, and marshmallows.

I had this experience while crossing the boardwalk entrance of the Ah-Tah-Thi-Ki Museum on the Big Cypress Seminole Indian Reservation (opposite). I was caught off guard by the way this peculiar mixture of odors was able to draw me into long-past memories associated with growing up in South Florida. This experience largely inspired my inquiry into the emotional and cognitive associations of scent in ethnographic museums, places devoted to people and cultures.

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even social interaction. Nonetheless, scent is often excluded from the repertoire of museums' exhibition practices. If anything, odors are often seen as a sign of danger—a warning of decay, pollution, and pests.[1] While there has been a recent boom in the technology and availability of synthetic scents, they are often treated as novelty, a fun experience planned to elicit patron engagement, rarely as a conduit for education. Yet scent holds great promise

1 Jim Drobnick, "Volatile Effects: Olfactory Dimensions of Art and Architecture," in *Empire of the Senses: The Sensual Cultural Reader*, ed. Davis Howes (Oxford: BERG, 2005), 266.

View of the Ah-Tah-Thi-Ki Museum from the boardwalk. The smaller structure in front of the museum covers a ceremonial fire consisting of four cypress logs pointed in each cardinal direction. The slow-burning logs are pushed incrementally toward the center as they burn, providing a delicate curtain of wood smoke around the museum entrance throughout the day. The Ah-Tah-Thi-Ki self-identifies as a "living museum," and encourages visitors to engage the local environment and culture with all of their senses.

COURTESY OF THE AH-TAH-THI-KI MUSEUM

as an interpretive tool. It has the ability to elicit emotional responses and encourage multidimensional understandings of place, space, and people.

This article links and discusses various scholarly writings about the sense of smell, memory, emotion, and the use of scent to develop emotionally engaging museum exhibitions. As a graduate student in anthropology and someone who works in museums, I am especially interested in the intercept between museum visitors and the peoples represented in museum exhibitions; my thesis, which I am currently working on, explores the effect of scent in ethnographic exhibits on visitor empathy toward the exhibited culture. While my discussion details the relationship between olfaction, memory, emotion, and learning as they apply to the ethnographic museum, many of these arguments are based in the biological and cultural processes through which information is processed in any given environment. Therefore, they may be easily adapted to exhibitions in a wide variety of contexts.

What the Nose Knows

The brain's olfactory bulb is directly connected to the amygdala and hippocampus, parts of the brain responsible for emotion and memory, respectively.[2] These three neurological structures are part of the larger limbic system, which controls memory, emotion, and learning, among other aspects of social and instinctual behavior.[3] The anatomical neighborhood through which olfactory cues are processed allow for a unique set of associations between odors, memories, emotions, and even interpersonal relationships.

In a fortunate turn for our species, the large human neocortex restricts our basal and instinctual behaviors, and instead imposes an exceptional level of cognition and self-control.[4] Even though many point to the supper-sniffing abilities of other species, usually of the canine variety, Lyall Watson, noted naturalist and anthropologist, argues that considering the human's cognitive ability to understand, rationalize, and situate odors, "far from being poor smellers, we may in some ways be the most evolved of all species."[5] If we are to take Dr. Watson at his word, we must ask: 1) in what ways do humans use this extraordinary sense of smell, and, 2) how can we then use these processes to develop more dynamic exhibit content.

Scent and Memory

The link between scent and memory is well known and readily observable (my experience on the smoke bridge is an example). Using the three phases of memory—encoding, storage and retrieval—I would like to quickly overview how olfaction fits into the process of making and keeping memories.

2 The brain consists of many parts, each with unique, yet interrelated, functions. The olfactory bulb lies directly between your eyes, above the nasal cavity, and is responsible for decoding the signals of neural chemical receptors in the nose. Rachel S. Herz and Trygg Engen, "Odor Memory: Review and Analysis," *Psychonomic Bulletin and Review* 3, no. 3 (1996): 300; David H. Zald and Jose V. Pardo, "Emotion, Olfaction and the Human Amygdala: Amygdala Activation during Aversive Olfactory Stimulation," *Proceedings of the National Academy of Sciences* 94, no. 8 (1997): 4119.

3 Mark B. Hamner, Jeffery P. Lorberbaum, and Mark S. George, "Limbic System," in *The Concise Corsini Encyclopedia of Psychology and Behavioral Science*, by W. Edward Craighead and Charles B. Nemeroff (Hoboken: Wiley, 2004).

4 Donald Tuzin, "Base Notes: Odor, Breath and Moral Cognition in Ilahita," in *The Smell Culture Reader*, ed. Jim Drobnick (Oxford: BERG, 2006), 60.

5 Lyall Watson, *Jacobson's Organ and the Remarkable Nature of Smell* (New York: Penguin, 2000), 212.

Starting with the encoding process—the continuous interaction between individual and environment, through which all sensory data is collected—it is important to note that all memories are composed of sensory data that our brain stiches together to create a representation of the past.[6] As evidenced by those who have lost one of their senses, the other senses can take on larger roles in cognitive functioning. Studies of individuals with varying forms of sensory loss suggest that while all of the senses are important, no one outpowers the others.[7] For those with limitations, access to multiple avenues of sensory data becomes more important; however, increasing evidence suggests that multisensory access can benefit all museum visitors.[8]

Providing access to multiple avenues of sensory encoding has a direct positive correlation with the viability of the memories created. As Rachel S. Herz and Trygg Engen explain in their work on the psychology of smell, the retentive strength of any memory is directly linked to the number of sensory cues recorded by the individual at the time of encoding.[9] While all senses are used in the development of memory, experimental evidence from multiple studies repeatedly suggest that scent-based memories are, quite possibly, the most resistant to decay, and can survive storage over significant lengths of time.[10]

6 Susan A. Crane, "Introduction: Of Museums and Memory," in *Museums and Memory*, ed. Susan A. Crane (Stanford: Stanford University Press, 2000), 1.
7 Oliver Sacks, "The Mind's Eye: What the Blind See," in *Empire of the Senses: The Sensual Culture Reader*, ed. David Howes (Oxford: BERG, 2005).
8 For more information see the fall 2015 (vol. 34, no. 2) issue of *Exhibitionist* (now *Exhibition*), which focuses entirely on the benefits and strategies of Universal Design. See: http://name-aam.org/resources/exhibition/back-issues-and-online-archive.
9 Herz and Engen, "Odor Memory," 302.
10 Ibid., 304; J. Douglas Porteous, "Smellscapes," *Progress in Physical Geography* 9, no. 3 (1985): 369; Ruth Winter, *The Smell Book: Scents, Sex and Society* (Philadelphia: J. P. Lippincott Company, 1976), 22.

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The memory study conducted among past visitors of the Jorvik Viking Center by John Aggleton and Louise Waskett, professors of psychology at Cardiff University, offers a great example of the benefits of scent in educational environments when it comes to memory storage and recall. Jorvik is a historic attraction in York, England, which features a recreated, multisensory, and particularly smelly Viking village. The researchers found that visitors expressed significantly improved recall of the center's educational content when in the presence of the same synthetic odors used in the replicated village. The results were significant, even though the participants had last visited the Viking center, on average, six years earlier.[11]

In terms of memory retrieval, other sensory stimuli are processed through series of higher-order cortical relays before triggering any limbic activity.[12] This is why you can see an object and know what it is before it triggers an emotional response.[13] The olfactory bulb shares a direct connection

11 John Aggleton and Louise Waskett, "The Ability of Odours to Serve as State-Dependent Cues for Real-World Memories: Can Viking Smells Aid the Recall of Viking Experience?" *British Journal of Psychology* 90, no. 1 (1999): 1–8.
12 Winter, *The Smell Book*, 17–18.
13 Porteous, "Smellscapes," 359.

with the amygdala (the emotion center) and the hippocampus (the memory center). This is why odors have the unique ability to initiate emotional responses before cognitive interpretation takes place.[14] In other words, with scent, you may very well remember a situation or an emotionally laden memory before you can name or identify the origin of the odor that provoked it. This interplay between emotional response and olfaction overflows into the ways that we, as humans, interpret and engage our world.

Scent and Society

Now we can dive into what I think may be the most interesting and potentially useful side-*affect* of olfaction—its association with morality and social relationships. Despite human ability to identify some 10,000 different odors, they are usually split into a simple binary scale: they are either pleasant or unpleasant, invigorating or calming, good or bad.[15] This peculiar distinction has given credence to the theory that odors have moral implication.[16] Kevin Low, president of the International Association of Sociology's Senses and Society chapter, points out how, "when people are olfactory perceived as pungent, the implication is that they are not only physically transgressive, but morally questionable."[17] This connection between scent and moral distinction of self, other, ordained, and sinner, plays an important part in the development and maintenance of interpersonal relationships.

Admittedly, the exact role and extant of

14 Herz and Engen, "Odor Memory," 300.
15 Donald A. Wilson and Richard Stevenson, *Learning to Smell: Olfactory Perception from Neurology to Behavior* (Baltimore: Johns Hopkins University Press, 2006), 6.
16 Kevin E. Y. Low, "Olfactive Frames of Remembering: Theorizing Self, Senses and Society," *The Sociological Review* 61, no. 4 (2013): 691; Anthony Synnott, "A Sociology of Smell," *Canadian Review of Social Anthropology* 28, no. 4 (1991); Tuzin, "Base Notes," 60.
17 Low, "Olfactive Frames of Remembering," 691.

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olfaction in the development of social relationships has not been well studied. The ways in which museums and exhibition practices could apply scent as a mechanism of social interaction is indeed the focus on my ongoing thesis. However, one of the strongest cases suggesting a functional link between olfaction and social interaction comes from a study conducted by Marcello Spinella, an associate professor of psychology at New Jersey's Stockton University. In a small study, Spinella tested a group of university students' olfactory performance in identifying unlabeled scents, and compared their success scores to the results of a self-reported empathy test.[18] He found that students who had a more acute sense of smell also reported higher levels of empathy, suggesting that olfaction and social behavior are deeply correlated. To me, this relationship between social relatability and olfaction, specifically when you consider the moral judgments that pertain to these *scents-ual* encounters, warrants evaluation of applied scent in museums.

Smelly Exhibits: Restrictions and Applications

While, of course, there is still much to learn about the connection and possibility of using scents in exhibits, we can start to piece together ideal practices and precautions for the use of scents in museum. Because odors, by their nature, are free-floating chemicals,

18 Marcello Spinella, "A Relationship between Smell Identification and Empathy," *International Journal of Neuroscience* 112, no. 6 (2002): 605–612.

there are two major concerns around using scent in exhibits. One is about air quality: the impact of odors on human health and on museum collections. The other concern is about interpretation: the danger of implying moral delinquency with a "bad" smell.

Regarding the first: I would discourage the use of ambient synthetic scents in enclosed spaces because of the potential harm to people, especially those with allergies, asthma, and/or other respiratory restrictions. Moreover, saturating the air with synthetic chemicals may have detrimental effects not only on human health, but to exhibited objects as well. More research is needed in both these areas.

For the above reasons, I am a proponent of using localized scent. Ideally, this would drawing attention to naturally occurring odors when possible. Or, it might mean using synthetic fragrances in designated smell stations or "sniffing spots." In both cases, there are clear benefits. Localized odors encourage active participation on the part of the observer, or rather the "olfactor."[19] Since both parties—the odorant and the olfactor—are active in some capacity, there is a more dynamic undertone to the exchange. Further, localizing an odor offers a clearer and more obvious opportunity for interpretation.

Which brings us to my second point of concern: scent interpretation. Isolating an odor provides the opportunity to explain and contextualize the scent within the exhibit. This is crucial if we are to avoid negative moral connotations. Research has shown that without contextualization, odors pose a danger because of their ability to elicit associated moral judgments about the exhibited culture. Just as scents can be perceived as good and bad, visitors can use scents to draw assumptions, good or bad (and possibly unfounded), about the people and cultures on display.[20] While I do not argue that unpleasant odors should be avoided, they certainly need to be situated into the dialogue of the exhibition to avoid having visitors leave with the impression that "those people stink."

Now let us turn to some of the benefits of a smelly exhibit. Above all, incorporating scents into an exhibition increases the opportunity for learning. As Herz and Engen point out, "the more about an item that is encoded during learning, the more elaborate and/or deeper the memory trace for that item will be."[21] Therefore, by simply incorporating multiple sensory elements into an exhibition experience, the lessons learned and observations made become more robust.

In Davidson, Heald, and Hein's 1991 redesign and subsequent study of the Boston Museum of Science's New England Lifezone Hall, they found that, when presented with multiple sensory interactives in the exhibit hall, visitors created and followed unique "sensory learning modes."[22] The three gave

19 You may have noticed by now that I have needed to use some creative wordplay to express some of these concepts. This is not merely for literary fun, though there is some of that, but because there is not a strong vocabulary for discussing scent, scents, scent production, or the act of smelling scents. As discussed by Anthony Synnott, this is yet another example of the general lack of interest ascribed to the sense of smell. The English language is restricted in the discussion of smell, because we do not have the conversation.

20 It is important to note that all forms of representation in a museum are subject to be misread by patrons. Museum visitors draw from unique life experiences and expectations when "reading" information presented in the museum. Therefore, I do not consider the use of scents to be any more dangerous than photographs, music, or any other form of sensory information. For more on the way patrons reinterpret information in museums, read John Urry, "How Societies Remember the Past" in *Theorizing Museums: Representing Identity and Diversity in a Changing World*, eds. Sharon Macdonald and Gordon Fyfe (Oxford: Blackwell, 1996), 45–65.

21 Herz and Engen, "Odor Memory," 302.

22 Betty Davidson, Candace Lee Heald, and George E. Hein, "Increased Exhibit Accessibility Through Multisensory Interactions," *Curator 34*, no. 4 (1991).

A properly curated odor can offer visitors new ways to form deeper and longer lasting memories of an experience, and to engage exhibit content, be it a campfire or a representation of a people's longstanding history in a place.

an ocular-centric natural history exhibition a multisensory makeover with the goal of increasing accessibility for a specific audience: people who are blind or have low vision. They added audio, scent, and touch stations to each diorama in the hall. Comparing their pre- and post-renovation observations, the researchers found that audience engagement increased among all demographics—not just the target audience—and among all measured variables: a larger percentage of patrons entered the exhibit hall; they spent more time with the exhibits; and they expressed a greater understanding of the content.

One of the most interesting observations, however, was that children were following unique patterns as they engaged the various sensory elements. These "sensory learning modes" allowed every patron to follow the learning pathways that worked best for them. In some cases, a visitor may be attracted to a smell station, then move on to reading the labels. In another, a visitor may check out all of the auditory recordings in the room, before returning to explore a specific zone further. This study suggests that through offering multiple sensory experiences, all visitors will benefit with the newfound opportunity to create an individualized path of discovery, self-curated for the optimal learning experience.

Offering multiple avenues for sensory discovery has undeniable benefits, with scent specifically offering a unique, and mostly untapped, learning channel for museum visitors. To me, the most interesting quality of olfaction is how important it can be used in fostering cross-cultural relationships. In the growing fields of sensory anthropology and sensory sociology, we are starting to understand the scope and role of culturally specific sensory structures.[23] Every object found in a museum, from priceless artifact to ballpoint pen, was created in a unique, culturally defined, sensory order.[24] Olfaction, with its ties to social behavior and empathy, has the potential to drive the cross-cultural exchanges between the patron and the exhibited culture by overlaying two distinct sensory orders. As we continue to learn more about the universal and unique experiences of scent and the other senses, museums stand to gain the most as contact points of peoples and places flung between time and space.[25]

Moving Forward: A Call to Action

A properly curated odor can offer visitors new ways to form deeper and longer lasting memories of an experience, and to engage exhibit content, be it a campfire or a representation of a people's longstanding history in a place. Scents, odors, and fragrances offer a new level of contact

23 Constance Classen and David Howes, "The Museum as Sensescape: Western Sensibilities and Indigenous Artifacts," in *Sensible Objects: Colonialism, Museums and Material Culture*, eds. Elizabeth Edwards, Chris Godsen, and Ruth B. Philip (Oxford: BERG, 2006); Synnott, "A Sociology of Smell."
24 Classen and Howes, "The Museum as Sensescape," 200.
25 There are some big themes and questions here that I have tried to simplify for the sake of this article. For more information about the way patrons and objects overlap in cross-cultural and cross-sensory exchanges, I would recommend the following book of essays, many of which I have drawn on already in this article: Elizabeth Edwards, Chris Gosden, and Ruth B. Phillips, eds., *Sensible Objects: Colonialism, Museums and Material Culture* (Oxford: BERG, 2006).

between the observer/olfactor and the people they came to the museum to "meet."

Because of this capacity to enhance interpretation and establish powerful memories of experiences and place, I believe it is well worth the effort to explore how scent can best be applied in exhibition settings. Moving forward, my goal is to facilitate further discussion and research, and towards that end, I would love to hear back from you. Share with me your success stories of using scent in exhibits, or reach out to me to brainstorm some smelly shortcoming. I am not foolish enough to believe that I have uncovered every case study, nor vain enough to think that I have discovered a new area of interest. Please share with me your expertise, experience, and knowledge, and I will continue to compile and fine-tune my own research. Very soon, I hope to expand upon this groundwork and continue to develop best practices for the application and use of odors in museums as means of expanded educational opportunities for visitors and toward the development of more complex—and hopefully more complete—representation of the smelly world we live in.

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