
Visitor Responses
and
Behaviors
in the
Kenneth E. Behring Family
Hall of Mammals
at the
National Museum of Natural History
Smithsonian Institution
Washington DC

Office of Policy and Analysis
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Preface

The mammals exhibition is an important exhibition to study because it is one of the key attractions for families in the National Museum of Natural History.

In a direct and powerful way, this exhibition shows visitors the nature of mammals inhabiting a remarkable planet. It also implies fun, freedom to move about, and greater awareness that we are one with all other mammals.

Capturing this awareness was accomplished by many staff members from the Office of Policy and Analysis (OP&A). Interviews and observations were conducted by staff members Zahava Doering, Amy Marino, Ioana Munteanu, Andrew Pekarik, James Smith, and Whitney Watriss, and interns Shaundina Watson, Lisa Hamilton, and Marisa Peeters.

I am very grateful for the interviews with teenagers and the personal opinions on the exhibition provided by the teen reviewers of this project, Sherri J. Barber, Teresa Amberley Bryant, and Shayla Shabazz. I appreciate the experienced views of our anonymous panel of peer reviewers. The observational data were assembled and analyzed by Ioana Munteanu, and the interview data was analyzed by Andrew Pekarik, who wrote this report.

These words cannot possibly convey the effort that goes into producing a study that will, hopefully, spark new interest in how to characterize visitors' reactions to exhibitions.

Carole M.P. Neves

Director

Office of Policy and Analysis



Introduction

The mammals exhibition is a complete reworking of one of the museum's most popular exhibition themes, and is presented within an historic, Beaux Art hall that has been carefully restored.

The Kenneth E. Behring Family Hall of Mammals is a new exhibition in a 25,000 square foot hall off the main rotunda of the National Museum of Natural History (NMNH). The exhibition replaced a mammals exhibition that was one of the museum's most popular attractions between 1957, when it opened, and 1999, when it closed.

Unlike the previous exhibition, which had a relatively linear path, and was didactic and focused on realistic dioramas, the new exhibition is open and spacious, uses short texts, and highlights the taxidermied specimens without elaborate contextual settings. In addition, the new exhibition makes extensive use of hands-on displays, including things to touch, videos, push-buttons, flip panels, and other interactives.

The heart of the exhibition is its 274 taxidermied mounts, which are arranged in realistic poses, sometimes in dynamic juxtaposition with one another. The layout has seven principal sections: an introductory section that sets out the key themes of the exhibition, a film theater, and five geographical areas (Africa, North America Temperate Zone, North America Far North, South America, and Australia).

The major themes presented in the exhibition are that humans are mammals, that mammals are defined by three characteristics (hair, milk, and special earbone), that they evolved from a common ancestor, and that they became more diverse in response to environmental conditions.

The previous mammals exhibition drew a high proportion of visitors with children under 12, and the new mammals exhibition was designed for that target audience. In addition to extensive

use of hands-on displays and interactives, the designers created areas that are primarily accessible to young children (crawl-in spaces, displays near the ground, etc.), used sound effects widely, and added design touches likely to appeal to children (such as footprints on the floor).

The exhibition layout is open and non-directive. On either side of the main entrance are two other entrances to hallways in the exhibition, one of which contains the mammals shop. There is another entrance/exit at the back of the exhibition, between the two North America sections.

The gallery as a whole is spacious because of the very high ceiling and its large skylight. Additional lights are positioned on structural elements within the exhibition, as are the sound systems, video walls, and barriers.

This study, requested by Smithsonian Secretary Lawrence Small, was conducted between April 2004 and May 2005, over all four seasons, and used the following methods:

- 1) open-ended interviews with 55 visit groups;
- 2) formal observations of a sample of 100 visitors, for which the observer estimated the age and gender of visitors and noted their paths, all stops over 3 seconds in length, what displays they looked at, and which hands-on devices they used;
- 3) a peer review panel comprised of seven exhibition specialists (curators, designers, writers, educators, and exhibition developers) who work at or for the Smithsonian;
- 4) a teen review panel of three local high-school students, who also conducted interviews with teens in the exhibition.



Visitor Responses

Visitors liked many aspects of the exhibition, including its content, its presentations and design, and its general atmosphere. They also liked seeing other visitors, especially children, enjoying themselves in the exhibition.

The Mammals

Number

Pretty awesome - all the animals in there.

Diversity

Interviewer: What's interesting?

Visitor: Just the assortment, from cute little things to huge ugly things.

Seeing the real thing

I don't really come so much for the information, but to actually see what I've learned, because I've learned about all these animals. But I kept saying, "Oh, I didn't know it was that big! Oh, I didn't know it was that color!"

Size

There was a bear that was seven feet tall and he wasn't prehistoric. It's a grizzly. It had really big legs, and when it bends down it is seven feet tall.

Personal favorites

I like the lion because my birth-symbol-thing is a lion, and since I found that out, I have been excited about them, and I always think they're really cute.

Humor

Interviewer: Do you like the way the animals are set up?

Visitor: Yes. They're funny. The giraffe is funny.

Photography

It was awesome. I almost went through a whole roll of film, and I had to censor myself when I only had three.

The Mammals

The animals were a central focus of many favorable comments about the exhibition. Visitors noted how many there were, how diverse they were, and how often they were new to the visitors' experience. Seeing the real thing was important for many visitors to the exhibition, especially younger visitors and those with a special interest in particular mammals.

During the 55 interviews conducted in this study visitors specifically mentioned 40 different animals, from aardvark to zebra. Visitors connected with mammals as ordinary as squirrels and as exotic as the thylacine. Children seemed to be especially drawn to the giraffe, lions, and brown bear. Size was an important factor in the attraction of the bear, and the giraffes were considered amusing.

There were multiple giraffes, lions, and bears in the exhibition, and many visitors stopped in front of them. Among the observed visitors, 48% stopped in front of at least one giraffe, 54% stopped in front of at least one lion, and 40% stopped in front of the brown bear, the black bear, or the polar bear.

Photography

The back-lit photographs in the exhibition drew considerable visitor attention – 18% of observed visitors stopped at the wall of photos near the entrance. One visitor under observation took a photograph of the wall of photos and then had her husband take a picture of her standing in front of the wall. One interviewee said, "There was some incredible photography."



Picture-taking was a visitor activity in the exhibition – 17% of the observed visitors took photos, using everything from their cell-phones to sophisticated cameras with telephoto lenses. Some visitors made their way through the exhibition photographing one another in front of interesting mammals or trying to create humorous juxtapositions (especially in front of the hippo).

Hands-on Displays

For the children

Interviewer: What do you like best about the exhibition?

Visitor: It's for the children, actually. The hands-on stuff for the children. A lot of them touch, a lot of them manipulate the bat thing, flip the books over to see what animal makes what [sound], and that stuff.

An improvement

I've been here before, but they've redone this exhibit since the last time I was here and it is a lot more interactive, as far as being able to go up and feel and touch, and a little more informative as far as learning things about the different animals.

Touch

Interviewer: What do you think of the mammals exhibit?

Visitor: It was fun. It had cool animals. And, umm...

Interviewer: How was it fun?

Visitor: It was cool things -- all the animal bones.

Texts and Labels

Engaging

Interviewer: What did you think today about the exhibit?

Visitor: Pretty cool.

Interviewer: Why was it cool?

Visitor: I don't know. I liked the signs and the buttons, and everything.

Effective

Interviewer: It's interesting how much you picked up in a short time in the exhibition.

Visitor: Yeah. That's what the signs are for, to make it simple and effective. To leave an impact in a quick and easy way that people can recall. That's what I did.

Brief

The text is simply written, but it gives you a quick, easy perspective on how the animal exists, which is just fantastic. So you're able to quickly assimilate the information, and then move on to the next thing.

Hands-on Displays

Visitors spoke highly of hands-on displays. Most adults and children referred to them as if they were more for children (although some children said that they did not like them and did not use any in the exhibition). Visitors aged six to ten were the heaviest users of hands-on displays – all of them used at least one, and on average each of them touched seven hands-on items. Visitors under six used an average of six, and all other visitors used an average of four or less. For those who remembered the old mammals exhibition, the addition of hands-on displays was a notable improvement.

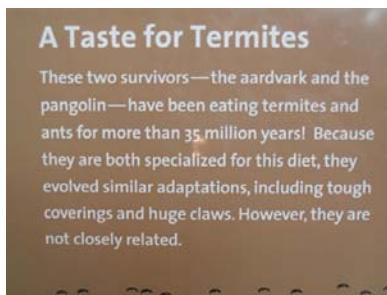


Altogether, 67 % of observed visitors used a hands-on exhibit. There was a gender difference in their use. Males used hands-on exhibits 4 times on average, while females used them 3 times on average.

Interviewed visitors spoke of types of hands-on exhibits that they enjoyed, including things to touch, doors or flaps to flip or lift, computers, and buttons to push. The touchable objects seemed to have been particularly well received, perhaps because they are the most numerous.

Texts and Labels

Some visitors noted that they appreciated the exhibition texts and labels, referring especially to their effectiveness, brevity, and relaxed style. One visitor, in particular, remarked on how these labels differed from other texts in the museum, “I thought it was cute



how you said, ‘this lion is looking to have her dinner.’ Those kinds of cute things. It’s a nice contrast to the more scientific kind of displays.”

Early in the study some visitors criticized the fact that some animal silhouettes on the labels did not match the poses of the animals.

The silhouettes were corrected and simplified during the course of the study, and in the later interviews there was no mention of any problem with them.

Some texts were rarely read. No observed visitor read the panel on “Evolution at Work” near the front of the exhibition, and only 3% of observed visitors read the Pangea text/graphic near the entrance, although 86% of them walked past it. The large dual-image photograph and its text on how giraffes came to have long necks was the largest display bypassed by all observed visitors.

Taxidermy

Lifelike

Everything looks so real.

Natural

I like the way it's presented, with the animals looking as if it's real life instead of just posing there. The giraffe at the waterhole. The lions. That sort of thing.

Realistic

Visitor: I liked all of it.

Interviewer: Why?

Visitor: Because they were real.

Most of the animals weren't alive, but they looked like the real thing.

Interviewer: What did you mean by real?

Visitor: They looked realistic. Like they froze or something.

Entertaining

I thought [the exhibition] was a serious attempt on the part of the museum to try to grapple with realism, as well as making it entertaining and enjoyable. That is a good dynamic to combine.

Direct connection

They look so lifelike you sure don't want to get in the cage with them.

Emotional

They make it look so real, almost. They're endangered antelopes. That cat looks scary with its ears. That one's sleeping.

Non-traditional dioramas

Visitor: The presentation is really good... I like the organization, you know, how animals that would be together in their natural habitat are together. And the re-creation of the environment...

Interviewer: So you like the re-creation of the environment?

Visitor: Yeah.

Interviewer: Would you have liked to see more trees, or water, or whatever?

Visitor: Eh. Not really. I'm more concerned with seeing the animals.

Taxidermy

Interviewed visitors frequently mentioned the lifelike poses of the animal mounts. For some this was the single factor that distinguished this mammals exhibition from others that they have seen. One visitor who has seen many other exhibitions said, "I think in here the displays are lighter. Kind of more vivid, more close-up. They're very realistic. It is just as if the animals truly are alive."

Interviewed visitors most often used the words "lifelike," "natural" and "realistic" to describe the way the animals were presented. But



some visitors went beyond this in their remarks, showing how that feeling of aliveness also created a sense of context, especially when combined with the video footage of animals in motion. One visitor called it "authenticity" and described it as, "their posing and then

their environment and what would appear to be their natural environment -- the combination of looking real and the backdrop being real. For a child -- for me too -- but [especially] for a child, it is more gripping, I think."

Visitors indicated how this realism aroused direct emotional responses when they spoke of their attraction to the displays that linked animals in a scenario. The two scenarios most often referred to were the lions attacking the African buffalo and the leopard with its impala prey hanging on a tree.

The realistic mounts, background videos, and combinations of animals led visitors to speak of the animals as being shown "in their own habitats," despite the lack of specific contextual representations such as those found in traditional dioramas. Visitors who were asked to compare this exhibition in detail to other mammals exhibitions never mentioned the absence of traditional dioramas in this exhibition. The combination of poses, groupings, videos, photographs and suggestive patterns seems to have created a kind of "virtual diorama." There were peer reviewers, however, who regretted the absence of traditional dioramas, because they had enjoyed them so much elsewhere.

Exhibition Layout

Wide and open

I enjoyed not feeling like I was being herded to a specific thing first. I liked being able to see a variety of things just in walking into the hall and being able to choose what to look at first and not feeling like I had to rush to the back of the room first because that's where all the exciting stuff was going on.

Flow

I would imagine you must have people involved in the setup who set the animals in such a way that... they flow from one animal to the next. I think there must have been a lot of input as far as that is concerned.

Little backtracking

It's set up nice. It's laid out nice. You don't have too much backtracking to do, you know. You can keep moving forward through it, which is a real help. As far as layout goes, it's real nice.

Relaxing

When you first walk into the hall, it's really nice because it opens up and helps you relax, and then you take it all in perspective and [say], "Do I want to go here? Do I want to go here?" and you don't feel so closed in.

Geographic areas

Interviewer: Why did they divide the exhibition into different geographic areas?

Visitor: I think that was just to give more organization to it. If you are looking for a specific animal you can go to a specific area and then it wouldn't be too hard to look around there, if you knew what it looks like.

Lack of direction

[The exhibition would be better if] you got directed more easily through everything, because you kind of go here, then go here, and it would be nice if you could go through like halls and see it all.

Exhibition Layout

The overall layout of the exhibition was often mentioned favorably by the interviewed visitors, as well as by the peer reviewers and teen reviewers. Although there is a backlit map of the exhibition at the front of the exhibition (at the base of the wall of photographs), it did not draw much attention, and most visitors navigated instinctively. Because the space is, in the words of a peer reviewer, "wide and open," and because there was no explicit path, visitors felt free to wander.



At the same time, some visitors felt that there was a subtle guidance or "flow" that helped them move through the exhibition. The whole exhibition can be visited without much "backtracking," an efficiency that was appreciated by those in a hurry.

The relative spaciousness (due in part to the very high ceiling and skylight) and openness of the exhibition layout seemed especially attractive to visitors who prefer open entrances and who said that they had felt

some discomfort in crowded, close exhibitions elsewhere, such as the *Price of Freedom* at the National Museum of American History or the Sikh exhibition next door to the mammals exhibition.

As one of the teen reviewers noted, "I felt like I could go to any display I wanted to, I didn't have to follow a certain walk-through or something. I could just go wherever I want to go, whether I want to start in the back, the front, the middle, wherever." The many different paths chosen by the observed visitors reflect this freedom. When we examine how many observed visitors entered each of the five principal geographic areas of the exhibition (Africa, Australia, South America, Far North of North America, and Temperate regions of North America), we find that 95% of all visitors moved through Africa (whether they stopped or not), 54% through the Far North of North America, 44% through Australia, 44% through South America, and 42% through the temperate region of North America.

Some visitors noted that they would have liked the layout to be somewhat more directive. As one peer reviewer put it, "I felt a little aimless in there." And there were visitors who thought they had seen the whole exhibition, but who had, in fact, missed major areas.

Design Features

Looking up

Immersion

What else caught me was that the animals were hanging, they weren't just on the ground, just looking at you. They were hanging and in action, in motion, jumping around. I liked that because it made me feel like I was in a zoo. It also made me feel like I was actually in the wildlife, chilling with them, just sitting around while they're running around chasing prey.

Animals everywhere

[Other mammals exhibitions] weren't as big and they weren't as creative. They were in cases. And this one was all over the place -- above your head, in the floor -- it was everywhere.

Polar bear through the ice

But I did find a spot where there was a polar bear looking down at you and then there was blue and there was a seal and ...the polar bear looking down. And there was plastic over it to look like glass.

Polar bear and the glass

Interviewer: How did you spot the polar bear?

Visitor: From the picture. Then I looked up.

Interviewer: Why did they put the glass there?

Visitor: I don't know. Maybe in case the polar bear starts to fall.

Importance

One of the animals I really like is the lion, so I thought it was cool that they had the lion up on top of that big thing.

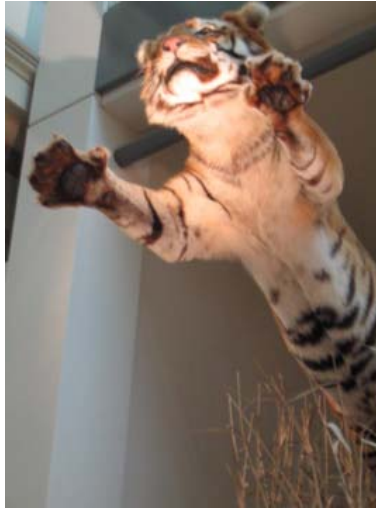
Inaccessible

I still have a problem with the height, which I thought wasn't accessible of the animals. I mean, [in] the first case on the left, the animals have to be 30 feet up [in the air].

Design Features

Looking up

Visitors appreciated the way that animals were positioned overhead, like the tiger that leaps out over the entrance or the lion that stands proudly on the Africa section panel. For some these positionings communicated the impression that the visitor was im-



mersed in a world of mammals. In some cases where that impression was specifically intended, as in the display of the polar bear (positioned to suggest that the visitor is a seal under the ice being hunted by the polar bear), some visitors missed it. Other visitors took an elevated position as a sign of the animal's importance.

A dialogue between two interviewees revealed how this simple design feature could lead to interesting interpretations:

Visitor 1: I wonder why everything is so high up? Maybe there is a message behind that.

Visitor 2: Also just respect for nature.

Visitor 1: Maybe respect and looking up.

Visitor 2: Absolutely. I mean just how we all fit together in this world. How everything works...

Visitor 1: And we're not necessarily looking down on everything. Sometimes we have to think of looking up.

Visitor 2: Yeah, because you're sitting there and you're looking, and you look up and all of a sudden there's a polar bear up there and you go, "I'm not quite so big in this world."

Visitor 1: Yeah. Who do we think we are? Maybe there are things that are bigger and taller and greater than we are. And it gives just that more of a respect.

One peer reviewer criticized the elevated displays from an accessibility viewpoint.

Looking up was also mentioned favorably by some young visitors who enjoyed crawling into the spaces like the one in front of the jaguar, from which they looked up at the animal.

Rainstorm

Narrative

They had a thunderstorm. One time it was dry, and then they had some lightning to make it kind of look like the desert, and they let you know when the rain was about to come, and then they had the effect, and on the screen they had the little rain and things like that, and they had the lighting fall so you could see the mood change. So that was kind of cool.

Realistic

It made you feel, "Well, we're about to get wet. We need an umbrella or something."

Animal roars

Interviewer: How about that thunderstorm? Was that o.k. for your child?

Visitor: I didn't know what it was. I couldn't tell what it was.

Interviewer: Did it scare him?

Visitor: No, it didn't.

Interviewer: Did it add anything to your appreciation?

Visitor: It was hard to tell what it was. I thought it was lions from the other thing.

Other sounds

Ambience

Visitor: It sounds like you're in the wild.

Interviewer: Did you like that?

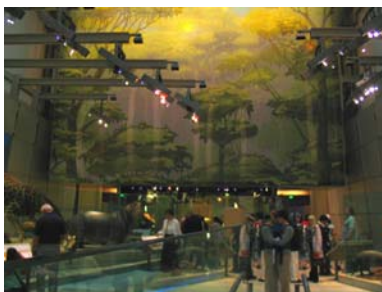
Visitor: Yeah, because I could hear the tigers roar and I saw the children excited about that. I can still hear it. I don't know if you can hear those other background sounds. It sets an ambience.

Unexpected

You usually see [background sounds] in the aquarium or in an aviary, but I never recall seeing it in a display at a natural history museum with only mounts.

Rainstorm

Interviewees had mixed responses to the sound and light thunderstorm in the Africa area. Some enjoyed it and tied it directly to the story of mammals at the waterhole and the images on the videos. Others just appreciated it as a very realistic atmospheric device (in keeping with the realism of the animal poses and the exhibition's tendency to involve multiple senses). Not everyone who heard it realized what it was. Some visitors (who were outside the Africa area when it began) thought that it represented the roar of animals. A visitor with a hearing aid complained that it was too loud.



Some children were frightened by the sound, while others were drawn to it. One woman who had visited previously with her grandchildren said, "The younger one -- she's eight years old -- I must admit, she's childish, I think, in some ways. When the thunder came on, it scared her. We said, 'Oh, it's just pretend. It's not real. It's not going to rain. Nothing's falling apart.' So that reassured her." At the other extreme, a family that was being observed heard the thunder just after they had left the Africa area. The young girl (about 8 years old) immediately started running back towards the rainstorm, obviously thrilled and excited.

Because the average visit time was less than the rainstorm's cycle time, many visitors never heard it.

Other sounds and other hands-on displays

Aside from the thunderstorm, some visitors noted the other wildlife sounds in the exhibition and appreciated the ambience that they created. Some of these sounds came from interactives in use, and others were intentional background sounds. The sound interactive in the rainforest case (where you push a button to hear the sounds of particular mammals) seemed particularly well-liked. It was the most used interactive in the exhibition (13% of observed visitors used it). One visitor suggested that all the animals should have had a sound button, so that we could hear what they sound like.

The other top hands-on displays (i.e., those used by at least 10% of observed visitors) were the African lion paw (11%), zebra stripes (11%), bears in snow (11%), bear paws (10%), and pangolin touch (10%). The only hands-on display that was not used by any of the observed visitors was the capybara in the South America area.

Video monitors in the floor

Interesting

Interviewer: What did you think of the displays in the floor?

Visitor: Oh, very interesting...That's why I'm saying there must be some very creative people involved in how the Smithsonian -- all the museums -- set up their exhibits.

Surprising

The first time we walked by we were looking at something else, and we didn't see them, and Tirrell started out and said, "My goodness!"

Avoidance

Interviewer: When you got up to those videos what did you do?

Visitor: I just looked. I don't think it's a good thing to put any pressure on it. You have to show respect for the different things.

Scary

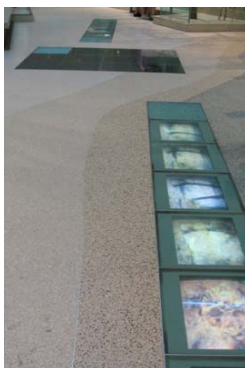
And there were TVs on the floor and it showed like you're walking and then raindrops hitting the ground and stuff. It's scary because it's like "sceow."

Hard to see

[My daughter] loved the monitors in the floor which are so scratched up now that you can barely see them.

Video monitors in the floor

Visitors responded in many different ways to the videos in the floor of the Africa area. A number of interviewees paid very little attention to them, or, when asked, said that they had not noticed them at all. Others considered them interesting, and some were surprised and pleased to see them.



These differences in response were evident in the behavior of the observed visitors. Most visitors just glanced at the floor monitors in passing, but 25% of visitors stopped at the first set (in front of the waterhole) and 5% stopped at the second set (in front of the bench). In addition, 17% of visitors stopped at the casts of footprints of early humans that were set in the floor under glass between the two rows of floor monitors.

Although 75% of observed visitors passed nearby these three displays, 17% of observed visitors seemed to deliberately avoid walking on or over any of the three floor-embedded displays. At the other extreme, at least 4% of observed visitors deliberately walked along the top of a row of monitors as if it were a path, 2% followed in the path of the early footprints, and 1% both followed the footprints and walked along a row of monitors. The remaining 51% either stepped on a single monitor or stepped over them.

As one of the peer reviewers noted, by the end of the study the glass over these displays had become significantly abraded and the footprints, in particular, were hard to see.

Animal footprints on the ramp

Following the footsteps

Interviewer: What did you do in the exhibition?

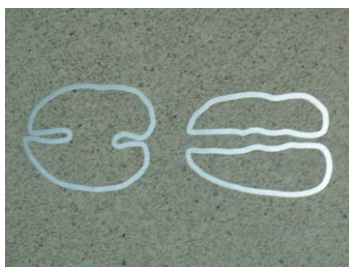
Visitor: Oh. When I saw the giraffe, we saw footprints, and I saw if I could reach in how they walk. And I could reach, but I had to do a big, big step.

Interviewer: How was that for you? Did you like it?

Visitor: Yeah, but then my Mom told me that the giraffes walk like this when their feet come and they one behind the other. And I tried that, but I couldn't do it, because I don't have her legs.

Animal footprints on the ramp

The ramp leading from the entrance up into the Africa area features metal footprints of a giraffe embedded in the terrazzo surface.



Most of the observed visitors (87%) walked along this ramp at some point in their visit. Although it is impossible to say from this study how many visitors noticed them, one visitor clearly stopped and looked down at them, and 3% of observed visitors (including a man in his 20s) tried to walk in the footsteps.

Other favorable features

Lighting

Actually I like this [mammals exhibition] better because the American Museum is very dark. Here it has daylight and natural light and that's better.

Seating

They had lots and lots of places to sit.

Temperature

The temperature was just right for each section.

Clean

I think [the exhibition] is well run. It's extremely clean. You don't see a lot of litter around, or anything of that nature.

Family atmosphere

Social interaction

There were a number of people in there. Everybody seemed to be having a good time. There were families with kids; people were talking to each other and reading labels and things like that ... so people did seem to enjoy it.

Child-friendly

I really liked how it was child-friendly. So [in] several of the exhibits it looked like a small child -- because we've been to exhibits when she was a baby -- they could get under and look up and still see. You weren't always seeing parents having to lift their small children up to see. So I thought that was a nice touch. I've never seen that in a museum before.

Family-friendly

It was very family-oriented. Because it had stuff for kids, it makes you want to bring the whole family, like grandma and grandpa, daddy, mommy, cousins, brothers, sisters, that kind of thing.

Other favorable features

Visitors, especially those who remembered the previous exhibition of mammals at the museum or who were familiar with the American Museum of Natural History in New York (both of which were considered too dark), spoke favorably of the lighting in the hall.

Seating within the exhibition area was used by 12% of the observed visitors. Sometimes individuals sat down to rest, sometimes parents sat down to play with their children, and sometimes part of a visitor group sat down to wait for the rest of the group to finish with something they themselves were not interested in. These are just a few of the many reasons why visitors used the seats. The number of seats appeared to be adequate, even at the busiest times.

Some visitors, the teen reviewers in particular, enjoyed the cold wall effect in the Far North area, and others noted that the temperature of the exhibition was fine. Several visitors appreciated that the exhibition was clean and "well-kept."

Family atmosphere



Some interviewees noted how much they enjoyed the overall atmosphere of the exhibition, especially the sight of children enjoying themselves. This point was also made strongly by both the peer reviewers and the teen reviewers.

Both visitors and peer reviewers made the connection between this sense of family engagement and displays that simultaneously encouraged multiple points of view. One peer reviewer described it well:

I liked the fact that there were little crawl spaces that only a little kid [could enter], like in the Arctic region, and there would be a little tiny case with animals sleeping there ... The first time I went in where the squirrels were, you could actually go under it, look up and you could see the undergrowth of the trees. [Or] like the porcupine case where you would see it from two perspectives ... It was really fun. And I went on a Saturday when there were a billion kids and ... "Daddy, daddy ... look, look!" They were so excited and happy that they could find the little peek-hole first and then drag their parents to take a look.

Ambivalent Responses

Not so interested

It's good for the kids. I like it all. It's interesting. It's just not... It's interesting. It's just not anything that I need to... anything I'm overly interested in. So. It's all neat. It's all fun. But it's nothing that I really have a passion for.

For children

I thought the exhibition was somewhat childish.

Stuffed

Visitor: I'm an old softy. Even though I know the exhibits are beautiful, I don't like seeing the poor animals all stuffed. I know it's a different time, a different era, totally we don't go and kill them all now. It still horrifies me that they used to do that. A beautiful tiger on the wall. Poor creature.

Interviewer: How did it make you feel, the tiger up there?

Visitor: It was a very cool setup, but I just kept thinking that the poor tiger died for a museum exhibit.

Dead

Interviewer: Is there anything you didn't like about the exhibit?

Visitor 1: They're all dead.

Visitor 2: They're all real, dead animals.

Thinking of live animals

You say to yourself, "That's a very nice exhibit. It's a shame we can't see the live ones."

Thinking of the zoo

Interviewer: Comparing the zoo and what you learned today, is there anything that...

Visitor: Well it's nice to see them moving and alive rather than... We did kind of comment on that.

Real or fake

They look real, but I feel that someone made them.

Ambivalent Responses

Not all interviewed visitors were thrilled with the exhibition. Some who said they are not particularly interested in mammals visited more for the sake of their children or companions than for their own satisfaction. Others (including some children) felt that the exhibition was too oriented to young children. Still others were bothered by the idea that these animals were all dead. Many believed that the animals had been killed for the purpose of displaying them, as is apparent in this dialogue between two adults:

Visitor 1: Are they stuffed?

Visitor 2: I think so.

Visitor 1: It's sad.

Interviewer: Why is it sad?

Visitor 2: Because she loves animals.

Visitor 1: God, they had to stuff them and kill them. Its last motion before it died.

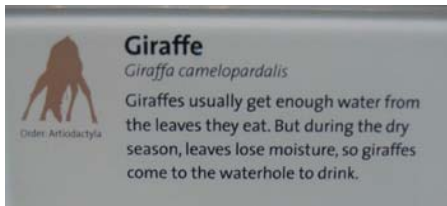
Visitor 2: When they stuff them, is it their last position? Or can they do whatever they want?

Some children believed that the animals were not hunted, "They raised them on farms. Farmers gave them. Farmers raised them."



This general uncertainty of origin, for those who thought about it, also related to the question of what is real. During a visitor observation, a 12-year-old girl approached an observer and asked, "Are all the animal furs real?" She said she had a bet with her 13-year-old sister. They said that an adult in the exhibition had told them that half of the furs were fake.

The observation data suggests that visitors to the exhibition were self-selected. Because the main entrance is so well-marked, and the exhibits so visible from outside, those in the Rotunda who were not interested in the exhibition could easily avoid it. But for visitors who entered the hall from the Sikh exhibition (later in the study many of these were leaving the *Orchid Express* exhibition on the other side of the Sikh display), there was notably less interest in the exhibition. The 6% of observed visitors who were tracked entering from the Sikh exhibition spent less than half as much time, made one-quarter as many stops, and passed through about half as many geographic areas on average as compared with observed visitors overall (6 minutes, 5 stops, and 1.6 areas on average vs. 13 minutes, 20 stops, and 3 areas on average for all visitors).



Visitor Learning

Visitors spoke of different kinds of learning in the exhibition, including learning by looking, by reading texts, and by watching the film.

Learning by Looking

Variety

I learned that mammals come in all shapes and sizes.

Features

[I learned that] that deer thing had teeth, fangs on its lips.

Habitat

I learned a lot of things like what the animals are, and what are their habitats.

Already knew a lot

Interviewer: Did you learn anything new?

Visitor: Not anything new. I'm a little bit knowledgeable about the modern animals. I actually studied a lot.

No learning

I didn't really learn anything because it was so boring.

Learning by Reading

Following up on interest

Whatever catches my eye, I read the stuff there.

Informative

I learned all babies fed from their moms. I never knew that all animals had milk and stuff.

Interesting

Interviewer: You said that you liked the variety of animals. Was there anything else you liked?

Visitor: Yes. A lot of interesting facts.

Interviewer: Did you learn anything new?

Visitor: Kind of.

Interviewer: What do you mean by that?

Visitor: I don't know.

Learning by Looking

The most obvious way that visitors learned in the exhibition was simply by looking at the mammals. In particular, some visitors spoke of seeing types of animals that they had never seen before or had not seen up close. From these observations they learned what mammals look like, how different they are, and how large (or small) they are. Some visitors noted that they already knew quite a bit about mammals, primarily from watching programs on television, especially National Geographic and Discovery Channel. And while many visitors said that learning was important for them in exhibitions, some claimed not to have learned anything in this exhibition, either because they were already knowledgeable or because they were not interested.

Learning by Reading

Visitors noted that the exhibition was informative and that facts were plentiful and interesting. A few of the visitors who were asked directly what they learned in the exhibition were able to give a specific example from the labels or texts of something they learned, especially in those cases where a prior interest in a particular mammal gave personal relevance to the information. Identifying instances of learning was complicated by the fact that many visitors already had a knowledge base drawn from television programs and magazines.

In general, it seemed that just as visitors saw many more animals than they could specifically recall, so, too, they read and learned many more facts than they could immediately recite. However, in the more extended interviews it was apparent that some visitors picked up much more information from the exhibition labels than they consciously realized. The information was accepted so readily and easily that it was sometimes hard to recognize whether or not it had been learned in the exhibition.

Learning from the Film

Learning from the Film

Mammals and dinosaurs

Visitor: But what I just learned is [that] there was this tiny, tiny little mammal animal that -- you know those meteorites that hit the earth a long time ago that killed most of the dinosaurs? Did you know what those little animals did? They were able to run down their hole as fast as they could and get under cover underground....They didn't get hit. The dinosaurs got hit.

Interviewer: What happened to the dinosaurs?

Visitor: They died. So it left some room for the little ones. They could play. A new world began for them.

Interviewer: What did they do with the whole world?

Visitor: They got bigger and bigger and got almost like dinosaurs and started losing fur....

Morgie

I think the film did a really good job of showing how mammals could grow from this little rat thing to human beings and all the other species that exist.

Fun

Interviewer: What did you think about the movie?

Visitor: It was really cute and a lot of the stuff I already know, but there were a lot of little kids there who would learn from it, and I thought, "Oh my god, that's cute!" It was actually fun to watch. It was an enjoyable movie and it was also informational.

Knowledge about evolution

I didn't watch the video, because I understand what they are going to show in it.

Time pressure

Interviewer: Did you see the movie?

Visitor: No. We haven't stopped for anything. We've got three hours, and I figured we could do that on the Internet or National Geo channel or whatever.



About two out of five observed visitors (39%) stopped in the film. On average those who stopped in the theater spent six minutes looking at the film, and, excluding the time they spent in the film, spent three more minutes in the exhibition on than those who did not stop in the theater (i.e., 13 minutes rather than 10). There-

fore, stopping in the theater significantly increased the overall visit time -- those who stopped in the theater spent an average of 18 minutes in the exhibition, compared to an average of 10 minutes for those who did not stop in the theater.

The impact of the film was also evident in the interviews. When visitors who saw the film were asked what they learned in the exhibition, they responded much more readily and easily than visitors who had not seen the film. The main points that these visitors mentioned were how mammals such as Morgie (*Morganucodon*) evolved in the age of dinosaurs, and how polar bears evolved from brown bears. (Some also mentioned the characteristic features of mammals, the position of mammals on the tree of evolution, and the relatively short time since mammals evolved.)

The subject of evolution was more readily evident to visitors in the film than anywhere else in the exhibition. For example, the interviewees who mentioned their opposition to the idea of evolution were asked specifically if they had seen anything about evolution elsewhere in the exhibition, and they all said that they had not seen it in the displays. Some of them said that they enjoyed the film even though they disagreed with it. One visitor, however, who had deliberately walked out of the film and waited outside the theater for his wife to finish with it, called it "propaganda" and took a fairly hostile position, even while praising the rest of the exhibition and the presentation overall. In any event, it seemed possible for some visitors to accept that humans are mammals while rejecting evolution. As one visitor said, "We're mammals, but God made us as men. We're Baptists. We know."



Very few visitors who had seen the film and who talked about how mammals began were able to remember the name "Morgie," although the idea that humans evolved from such a tiny creature made a big impression on some visitors. One visitor, for example, shook his head in wonder as he noted that it felt different to realize that "We are descended from rodents."

Other Learning

Mammals characteristics

Mammals have hair, and ears that have bones that not all others have, and have a mom that gives milk.

Humans as mammals

I'm a mammal because I'm an evolved form of a monkey.

Not a mammal

Interviewer: Who are mammals?

Two-year-old girl: Mammals are eat a baby's mom a numnee.

Girl's father: That means "milk."

Interviewer: What else do they have?

Girl: I don't know.

Interviewer: Are you a mammal?

Girl: Ah, nooo.

Interviewer: What are you?

Girl: I'm a...I'm a... I'm little....

I'm my mommy's daughter. That's who I am.

Different kinds of mammals

Interviewer: How come there are so many different kinds of mammals now?

Visitor: Because they started breeding and they started becoming different species.

Adaptation to climate

Interviewer: How come the animals in some continents are the same and some are different?

Visitor: I think it's because at first when the continents were connected, they had a fairly even population of the same kind of animal. And then, when they started splitting apart, the animals stayed in their places, and some animals adapted to their climate differently from other animals.

Message

Interviewer: Does the exhibition have a message?

Visitor: Yeah, that you should appreciate animals.

Meaning

Interviewer: Does this exhibit have a meaning for you?

Visitor: All these animals are sort of beautiful. We should try to preserve them, and help them survive.

Other Learning

Learning also took place in the exhibition as a result of discussions among visitors. Some visitors were asked about mammal characteristics, humans as mammals, adaptation and other messages.

Mammal characteristics

Interviewed visitors who were asked about the characteristics of mammals had a range of responses. Some mentioned the three features highlighted in the exhibition (hair, mammary glands, and a special earbone) or some variation of that list. Others gave their own definitions (e.g., warm-blooded, not egg-laying). Some said they had not seen the characteristics of mammals mentioned in the exhibition; others said they had known of these three characteristics before they came; and others reported that they had learned one of the three points in the exhibition.

Humans as mammals

Except for one two-year-old girl, all interviewed visitors who were asked whether humans are mammals said that they are and that they knew this before the exhibition. Some visitors did not see mention of that idea in the exhibition.

Adaptation

Visitors who were asked why there are so many different kinds of mammals offered a wide range of responses, from complete disinterest in the question to a subtle appreciation of geographical adaptation and evolution. One visitor saw the issue of adaptation in terms of present-day environmental concerns: "I think that by changing our environment so much, we're causing animals to either become endangered, extinct, or having to adapt to something else."

Other messages

Visitors who were asked if they thought the exhibition had a message mentioned such themes as:

- appreciation of mammals,
 - diversity of mammals,
 - how scientific thinking changes,
 - responsibility to take care of animals and the environment,
 - museum's desire for everyone to learn more about mammals,
 - the sense that animals do not want to hurt people,
 - the way that animals interact with one another,
 - the idea that many people like animals, and
 - the fact that people and animals are closely related.
-



Visitor Approaches

Visitors differed not only in the ways they responded to and learned from the exhibition, but also in the ways they approached the Hall of Mammals and the ways they used it.

Aims

Love animals

Interviewer: Why did you guys choose the mammals exhibit?

Visitor: Because we love animals. We used to own a dog, but he died. And we just love anything with fur.

Seeing the Smithsonian

Interviewer: Are you especially interested in animals?

Visitor: No, not really. Just seeing all the Smithsonian that we can while we're here.

Group dynamics

Interviewer: Did you find that your children wanted to spend longer in the exhibition than you did?

Visitor's son: Tell him how you were rushing us.

Visitor: OK. Well, I guess so. We've divided it where Mom gets the art museum after this, and we've been here all morning. So before we all die, we have to get over there.

Enjoy and relax

Visitor: I just came to enjoy, and relax.

Interviewer: That's interesting. It's kind of hard work, though, isn't it?

Visitor: Oh you mean tiring. Yeah. My feet get a little sore, but the rest of me would like to keep going. It is educational and I really love to learn about these different things.

Aims

The interviewed visitors to the mammals exhibition differed significantly in how interested they were in the subject matter. Some were dedicated animal lovers, including those who had seen major mammals exhibitions in other museums (most notably in New York, Chicago, and London) and those who demonstrated a fairly detailed knowledge of mammals. At the other extreme were those who were only visiting to accommodate the interest of their companions. A number of interviewed visitors were neutral with respect to the subject matter, and described their aims more in terms of the broader Smithsonian visit. Many such visitors seemed to be under pressure to see as much as possible as quickly as possible.



The different degrees of interest in the subject matter and conflicting visit goals within visit groups sometimes affected the nature and duration of the visit. For example, observers noted a number of occasions when adults pulled children away from displays with which they were happily engaged, sometimes to strenuous objections. Some younger children were repeatedly confined to strollers or picked up and carried, in order to better control and manage the time they spent in the exhibition.

Even among visitors who expressed a clear interest in learning in the exhibition, there were those who saw the visit more in terms of enjoyment and relaxation, and those who were eager for specific types of information.

Styles

Taking what's good

Visitor: You like to look around and take what's good, and maybe not necessarily pay attention to the stuff that doesn't quite interest you as much. Not that you don't want to learn...

Seeing everything

Visitor: I mean big things will catch my eye. Those will of course. I walk in and here's the elephant. It's kind of hard not to look at him first. But I do want to see everything in that [Mammals] exhibit. I don't want to walk out without checking out -- not *reading* every single little thing -- but at least *looking* at everything that's there, and reading as much as I can about the different items.

Jumping around

Interviewer: Did you actually get to all the sections?

Visitor: No, I kind of jumped around. The bigger mammals, except for the cats, I just kind of breezed over. But I'm anxious to get upstairs to see the diamond and to see the traveling exhibits. I haven't been here in seven or eight years.

Just drive

Interviewer: Do you have a family negotiation here about what to see?

Visitor: No, I do what they want. All I do is just drive.

Bone and skin

Visitor: We started upstairs and came down. We started with the gems and then we did the reptiles, the bones, skeletons.

Interviewer: So how does this one compare to the other exhibitions in the museum?

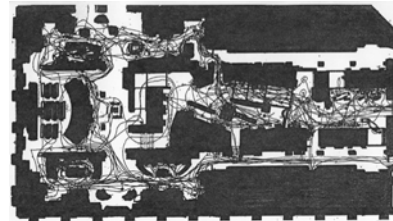
Visitor: I think it's impressive. We should have started here.

Visitor 2: You see the skeletons and then you come down here and you have a picture of what they look like -- bone and skin [together].

Styles

Both interviews and observations provided examples of visitors who, at one extreme, moved carefully through the entire exhibition and looked at every display, and, at the other extreme, gave the exhibition only cursory or occasional attention. Interestingly, the

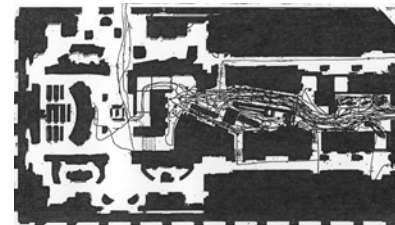
paths of the 14% of observed visitors who visited all five major sections of the exhibition show a strong pattern, as illustrated by this overlay of their mapped routes. Most of these thorough visitors came in through the main entrance (on the right side of this illustration),



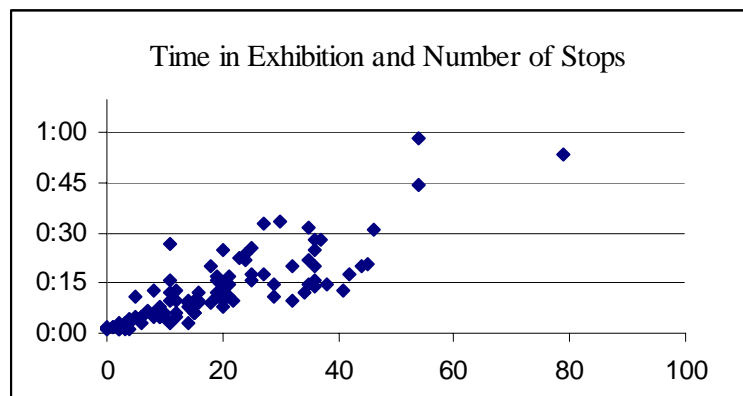
turned right at the termite mound and continued counter-clockwise around the exhibition, exiting down the south hallway.

By contrast, the 20% of observed visitors who saw only one section of the exhibition mostly came in the main entrance, walked into the Africa section, then turned around and left through the entrance, as shown in this overlay of their mapped routes.

(Only three of these 20 visit groups who walked back out included children.)



The degree of focus that visitors brought to the exhibition is reflected in the data on how often they stopped. Observed visitors made an average of 19 stops during an average of 13 minutes in the exhibition. Few visitors stayed longer than 30 minutes or stopped more than 40 times. As illustrated by this chart showing the relationship between the time that observed visitors spent in the exhibition and the number of stops they made, on average, stops were quite short. Visitors on average made one stop every 42 seconds in the exhibition (one stop every 60 seconds when film-viewing time is excluded).





Discussion

The Hall of Mammals exhibition is a striking example of an exhibition that clearly identified a target audience and then focused on reaching the majority of that audience directly and effectively.

Around the time that the previous mammals exhibition was being dismantled, in February of 1999, the Smithsonian's Institutional Studies Office (predecessor to the Office of Policy and Analysis) published a survey study and two interview studies of the existing mammals hall. The survey study determined that NMNH visitors with children were especially drawn to mammals. In addition, the study found that the most satisfying visitor experiences in the exhibition were seeing rare or unusual things (34%) and gaining knowledge or information (30%).

The new mammals exhibition is custom designed for families and those two key experiences. As noted, families appreciated the hands-on displays, the user-friendly texts, and the lifelike mounts, and interviewed visitors felt that they learned something, either by looking, reading, or watching the film.

The design and layout seem to have encouraged these experiences as they generated a sense of exploration and play. Even visitors who were less satisfied with the exhibition, because they were disinterested in the subject matter, or uncomfortable with the idea of dead animals, or disagreed with its views on evolution, or unhappy with the level of information, openly admired the exhibition and were reluctant to criticize it.

The exhibition also functioned well for the many visitors who were in a hurry and wanted to see as much as possible in as short a time as possible. Those who wanted to organize their

visit systematically were able to see the whole exhibition without backtracking. Texts, organization, and pacing supported easy movement and the kind of scanning behavior that people like to use in busy settings. As a result, visitors moved fairly quickly on average.

NMNH is changing some parts of the exhibition. The silhouette labels, for example, are being replaced by line drawings, and the glass over the cast footprints of early hominids is about to be changed. In addition, consideration should be given to adding something in the exhibition that tells visitors where the specimens came from and how they were made to look so lifelike, and that addresses the problem of "real" vs. "fake."

The exhibition's effectiveness for its target audience of families with children made it somewhat less compelling for those interested in a more in-depth, reflective experience. There were visitors who criticized the exhibition as "childish." This is a problem for any exhibition – the very features that make it highly desirable to one group make it less desirable to another. In this case, the downside was at least partly mitigated by the pleasure of seeing children having such a good time in the museum. Those visitors who were seeking a more seriously scientific and in-depth learning experience will hopefully be able to find it elsewhere in the museum.
