Amazing Feats of Aging Exhibit
A Summative Evaluation Report

Prepared for

OMSI
OREGON MUSEUM OF SCIENCE AND INDUSTRY

by
Patty McNamara
Independent Evaluator
Chicago, Illinois

with the generous support of

NCRR
Department of Health and Human Services • National Institutes of Health

Supported by a Science Education Partnership Award (SEPA) from the National Center for Research Resources

This project was supported by grant number R25 RR16247 from the National Center for Research Resources, National Institutes of Health. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of NCRR or NIH.

"Aging is an amazing process, even though it's not the greatest."
12-year-old OMSI visitor

"Aging can be an interesting experience if one stays consciously & actively involved in it. At over a half century old, I can still take enjoyment in learning."
78-year-old visitor, Lafayette Natural History Museum

Table of Contents

List of Tables

List of Figures

Executive Summary

This summary highlights this study's most salient findings—readers are encouraged to refer to the body of the report for a far more detailed portrait of visitor behavior in and response to *Amazing Feats of Aging*.

Introduction

This report summarizes a summative evaluation of *Amazing Feats of Aging*, an exhibition developed by staff at the Oregon Museum of Science and Industry (OMSI) in Portland, Oregon. Patricia McNamara, an independent evaluator, designed this study to document the exhibition's impact on visitors at two locations: its permanent installation at OMSI itself and at the installation of the exhibit's traveling version at the Lafayette Museum of Natural History (LMNH) in Lafayette, Louisiana.

Data collection strategies included visitor interviews, self-administered questionnaires and unobtrusive observation of visitor interactions with exhibition components. Visitors who completed interviews and questionnaires were "cued," that is, they were asked to spend time viewing the exhibition prior to answering questions concerning their experiences and memory of the exhibition. A pre-visit sample of OMSI interviewees was included to gauge visitors' initial awareness of aging–related concepts. Children and adults were included in the study samples at both sites.

Timing and Tracking Observations: Principle Findings

A total of thirty-three adults were unobtrusively observed during exhibit interactions (twenty-seven adults at OMSI and six adults at LMNH). Eleven children, nine to twelve years old, were unobtrusively observed in the exhibition's installation at OMSI (no children were observed at LMNH). Males and females were equally represented among the observed adults; boys outnumbered girls in the sample of children. Approximately one half of adults were between thirty and forty-nine years of age. Nearly all of the observed adults and children were non-Latino Caucasians. The observed adults were typically in the company of at least one other visitor. For example, all of the visitors observed at OMSI were accompanied by at least one other adult and one child.

Since the sample sizes differed dramatically between the two sites, findings for each are reported separately in the body of the report with comparisons made where appropriate. Note, however, that the very small number of adults observed at LNHM limits the meaningfulness of such comparisons.

Nearly 40 percent of adults observed at OMSI spent less than five minutes in the exhibition and typically stopped at six or fewer components (approximately 25 percent of the exhibition). Adults observed at LNHM installation, on the other hand, spent somewhat more time in the exhibition and made a greater number of exhibition stops. For example, all but one of these adults spent between five and fifteen minutes in the exhibition and all but one stopped at six or more components.

Adult activity patterns were very similar at the two sites. At least 40 percent of all component stops made by adults included reading explanatory copy, using interactives (where possible), watching another visitor use interactives or conversing with another visitor about the component. Adults at OMSI were more likely to use the "flip" labels while adults at LNHM seemed slightly more likely to engage in social interactions than their counterparts at OMSI. However, even at OMSI, 75 percent of adults and 90 percent of children did engage in such exhibit-related conversations.

Children's interactions were observed only at OMSI. Children's pattern of activity in the exhibition resembled that of adults. Nearly 40 percent of the observed children spent less than five minutes in the exhibition and 60 percent stopped at four or fewer components. Only one exhibit component (Free Radical Attack) prompted stops from 50 percent or more of either adults or children. Not surprisingly, children were more likely to engage with interactives and less likely to read explanatory text. Children were somewhat more likely to read exhibit copy when it was hidden by "flip" labels.

Cued Interviews: Principle Findings

A total of eighty interviews and sixty-one questionnaires were completed by OMSI visitors; thirty questionnaires were completed by LNHM visitors. Post-exhibit visitor participation was solicited in advance and visitors knew that an interview/questionnaire would follow. This "cuing" procedure was employed to test the exhibition's communication effectiveness in a situation where visitors would be highly motivated to use the exhibits and attend to their messages.

Thirty adults and ten children were interviewed prior to any exposure to *Amazing Feats of Aging*; the same interview was also conducted with thirty adults and ten children following time spent on their own in the exhibition. All interviews (whether with adults or children) were conducted at OMSI.

Interviews with Adults

Males and females were equally represented among the adults interviewed after experience in the exhibition; females dominated the pre-exhibit sample. All but one of the adults in the pre-exhibit sample and three adults in the post-exhibit sample described themselves as non-Latino whites. Sixty percent of both samples were repeat OMSI visitors and very few mentioned having any special interest or training in a related discipline (such as medicine or biology). Sixty percent of adults in the post-exhibit sample were accompanied by children during their time in the exhibition.

The evaluators noted time spent in the exhibition by interviewees, but made no record of specific activity. The cuing procedure dramatically increased time that adults spent in the exhibition, from a median time of five minutes (non-cued adults) to a median time of eighteen minutes (cued adults).

The structured interview protocol prompted visitors to share their knowledge of the aging process in various animals, compare aging in animals to that in humans and evaluate the extent to which they (the visitors themselves) have control over the aging process. To begin the interviews, visitors were shown three-by-five-inch photographs of ten different animals, all but one of which (the snake) was featured in *Amazing Feats of Aging*. Adults who had seen the exhibition were most likely to remember having seen the elephant, the whale, the gorilla, and the roundworm (all recalled by 70 percent or more). No visitor recalled seeing a snake.

When asked to pick out one animal whose aging process is similar in some way to that of humans, adults who had not seen the exhibition tended to focus on either the gorilla or the dog. Post-exhibit interviewees identified similarities in the animal/human aging processes across a wider variety of animals, including the gorilla, dog, elephant, whale, and even the roundworm in their responses. Few adults in either group discussed similarities between the aging process in humans and that of either rats, tortoises, mongooses, or rockfish.

Pre- and post-exhibit differences also emerged with respect to the *kinds* of similarities interviewees were likely to mention. Comparing humans with animals, adults interviewed before seeing *Amazing Feats of Aging* were much more likely to describe the aging process in terms of debilitating changes (e.g., failing eyesight or hearing, development of arthritis) or other physical changes (e.g., graying hair). Such observations were made by nearly 60 percent of adult visitors in the pre-exhibit sample. On the other hand, adults who had seen the exhibition were more likely to mention similarities in life span (particularly that females live longer than males) and similarities in social behavior (e.g., that both live in families or maintain relationships with grandparents).

When interviewees were asked to pick out animals whose aging process especially differs from that of humans, one-third of adults who had not seen the exhibition selected the giant tortoise and 17 percent picked out the dog. Adults interviewed after seeing *Amazing Feats of Aging* also tended to pick out the giant tortoise, but rarely mentioned the dog in that context. The most striking contrast between pre- and post-exhibit responses to this item emerged when the accuracy (or appropriateness) of the adults' responses are compared. Adults interviewed after seeing the exhibition were more likely to be correct in their assessment of differences between humans and animals regardless of topic or animal discussed. Pre-exhibit interviewees tended to be correct *only* when discussing differences in life span.

Finally, the interview probed visitors' sense of "control" over the aging process. Using a scale of "1" (no control) to "5" (total control), adults were asked to rate the extent to which they felt themselves to have control over their own aging process and to explain their rating. Experience in the exhibition seemed to persuade adults that the aging process (and its effects) are not entirely inevitable. More than 80 percent of all interviewees discussed how personal habits—whether healthy (more exercise) or not (sun exposure)—affect how we age and many of these visitors discussed the interplay between factors that we can control and those (e.g., genetics) over which we have little control. Adults who had not seen the exhibition, however, were more likely to focus solely on the inevitability of the aging process.

Interviews with Children

Children completed very similar interviews—ten were interviewed prior to seeing the exhibition and an additional ten following time spent with *Amazing Feats of Aging*. Boys slightly outnumbered girls in these interview samples; children ranged in age from seven to twelve years of age. The children's interview protocol was very similar to that followed for adults. While children were often accompanied by adults during the interviews, all questions were addressed to the children and adults were discouraged from responding on the child's behalf.

As was true of the cued adults, children who were asked to spend time in the exhibition spent considerably more time there than did children in the Tracking and Timing sample (median time spent increased from six minutes to twenty-two minutes).

Both groups of children were shown photographs of nine animals featured in the exhibition (the photographs shown to post-exhibit interviewees included an additional photograph of a snake, an animal not mentioned in the exhibition). Children who had seen *Amazing Feats of Aging* were instructed to pick out pictures of all animals that they remembered seeing in the exhibition; children who had not seen the exhibition were instructed to pick out pictures of any animals that they recognized.

Post-exhibit interviewees recalled seeing an average of five animals featured in the exhibition and those animals most likely to be remembered were not always those most often recognized by the pre-exhibit interviewees. For example, more than one-half of the children who had seen *Amazing Feats of Aging* remembered the whale and mongoose (animals recognized by only one or two children in the pre-exhibit sample).

When children were asked to pick out one animal and talk about is aging process, pre-exhibit interviewees concentrated exclusively on the dog, elephant, or giant tortoise. As was the case for adults, experience with *Amazing Feats of Aging* seemed to expand children's awareness of the aging process across a much wider variety of animals—with the exception of the elephant, every animal pictured was discussed by at least one child in the post-exhibit sample. Children without any experience in the exhibition were more likely to describe specific physical changes that accompany aging or to equate "aging" with maturation, i.e., getting bigger or stronger.

Responses of several post-exhibit interviewees clearly reflect specific exhibit content (especially that some animals do maintain cross-generational relationships). When children in both groups were asked whether humans experience aging in similar ways, they tended to agree overall that that was the case, regardless of whether or not they had seen the exhibition. Post-exhibit interviewee responses to this question were more varied, echoing the variability of their initial descriptions of the aging process in particular animals.

Experience in the exhibition did not seem to dramatically affect children's awareness of the role that "healthy habits" play in improving the quality of life in old age since a majority of children raised such ideas, regardless of when they were interviewed. Obviously, children have many opportunities to learn about the positive effects of exercise, diet, staying mentally alert, limiting sun exposure, etc.

Cued Questionnaires: Principle Findings

Brief self-administered questionnaires were completed by adults and children at both OMSI and LNHM and only by visitors who had already seen *Amazing Feats of Aging*. Fifty adults and eleven children completed questionnaires at OMSI; ten adults and ten children comprised the corresponding LNHM samples.

Again, the cuing procedure increased time spent in the exhibition by both adults and children at both sites. Median times spent by those completing questionnaires ranged from seventeen minutes (adults at OMSI) to thirty-two minutes (children at LNHM). Both adults and children at LNHM tended to spend more time in the exhibition than did their cued counterparts at OMSI.

Both adults and children described what they thought the exhibition was "about" by completing four open-ended prompts:

(1) To show ….
(2) To make people ….
(3) I never knew or never realized that ….
(4) It reminded me that ….

Responses at both sites were grouped by similar concepts/ideas expressed by visitors. These response categories included the aging process in general, causes and effects of aging, healthy aging, and life span or rates of aging.

Questionnaires Completed by Adults

Adult responses were especially likely to be influenced by the specific prompt. For example, the prompt, "to show," led adults at both OMSI and LNHM to recall comparisons made across species. Adults at OMSI were also very likely to discuss causes or effects of aging. When considering unfamiliar concepts that they encountered in the exhibition ("I didn't know that …"), adults at both sites were very likely to recall points made about life span (e.g., that females live longer than males or that certain animals are particularly long lived). Recalling what the exhibition reminded them of, adults were most likely to mention how personal habits influence one's own aging process.

Regardless of prompt, 54 percent of adults questioned at OMSI related ideas associated with "healthy aging" or the role of "healthy lifestyles" in at least one of their responses. At least one-third of these adults also discussed the aging process in general, mentioned comparisons across species, commented on the causes and effects of aging, or recalled details of the life span of an individual animal or the difference in the life spans of males and females. Even though far fewer adults were questioned at LNHM, very similar patterns characterized their responses.

Nearly all of the adults in this questionnaire sample mentioned concepts obviously related to the content of specific exhibition components. Two components ("What Can We Do About Aging?" and "Older Males or Older Females?") were most likely to prompt identifiable recollections at both sites.

Questionnaires Completed by Children

Children's responses to the same prompts exhibited similar patterns, especially with respect to the tendency of certain prompts to evoke distinctive responses. For example, responding to the prompts, "to show …" and "to make people …," nearly all children talked about the aging process, either in general terms or mentioning specific details. The prompt, "to make people …," especially encouraged children to mention the exhibition's educational potential. In fact, children were much more likely than adults to describe the exhibition's impact in terms of what visitors could learn—eighteen of the twenty-one children questioned used words or phrases like "learn," "think," "understand," or "be aware of" in at least one of their questionnaire responses.

Children at both sites resembled adults in their likelihood to be surprised by details of the life spans of particular animals. The prompt, "I didn't know that …," led six children at OMSI and all ten children questioned in Lafayette to comment on the relationship between size and length of life, the remarkably long (or short) life span of certain animals or the tendency of females to live longer than males.

Discussion and Recommendations

The study's findings underscore *Amazing Feats of Aging*'s potential educational and affective impact for both adults and children. Unfortunately, tracking and timing data indicate that few casual (or "non-cued") interactions will be sufficiently intense or sustained to make such communication possible. OMSI staff are encouraged to develop and test strategies that could increase visitors' interest in (and time spent with) various exhibition components, especially those that made the strongest impressions on cued visitors (e.g., "Older Males or Older Females?").

The exhibition's impact on children is particularly notable. Although a variety of circumstances at both sites limited the number of children who could be included in this study, future studies at OMSI should be designed to specifically recruit increased participation by children, especially those who are visiting in the company of adults. This study's findings suggest that children not only learn from their interactions with well-designed exhibitions, but that they can also express their reactions very articulately.

I. Introduction

This report summarizes the summative evaluation of *Amazing Feats of Aging*, a 2,500-square-foot exhibition developed by the Oregon Museum of Science and Industry (OMSI). Patricia A. McNamara (an independent evaluation consultant) planned this summative study, designed the evaluation instruments, supervised the data gathering, analyzed the resulting data, and prepared this report. Since *Amazing Feats of Aging* was specifically developed as a "traveling exhibit," visitor reactions to the exhibition were gauged both at OMSI and at its first venue, The Lafayette Natural History Museum and Planetarium (LNHM) in Lafayette, Louisiana. Part-time data collectors were responsible for the on-site visitor observation and interview at OMSI; Ms. McNamara and OMSI's staff evaluator gathered data at LNHM.

As expressed by its "Big Idea,"[1] the exhibition's planners designed *Amazing Feats of Aging* to communicate that "we learn about aging by studying the universal and distinctive ways that adult animals (including humans) change over time." This central concept was further elaborated by four additional ideas:

- Aging is a multi-faceted process of many small changes that accumulate over time.
- Nurture has a greater impact (larger role) than nature on the experience of aging.
- Every species has a unique aging profile (life span and physical changes).
- There are similarities in the aging process between species because of underlying similarities in body structure, function, and environment.

Amazing Feats of Aging includes twenty freestanding components that offer visitors a variety of opportunities for interaction, ranging from simple hinged labels (or "flips") to a computer-mediated simulation of facial aging. Additional graphic panels (referred to as "posters") are mounted on otherwise blank surfaces of selected components. See Appendices D and E for a list of exhibition components and photographs of selected components.

At OMSI, this exhibition was housed within the Life Science Hall. While its components share a common design motif and color palette, there were no physical barriers separating *Amazing Feats of Aging* from other nearby exhibitions. In Lafayette, the exhibition shared gallery space with two other (and smaller) temporary exhibitions also developed by OMSI, *Dinostories* and *Brain Matters*.

This summative study was undertaken to establish visitors' patterns of behavior in the exhibition, gauge the extent to which visitors grasped the exhibition's main message and document other ideas and feelings that might be prompted by visitors' experiences in the gallery. Visitor observations and interviews were conducted at OMSI during August and September 2003 and at LNHM during August 2004. The study sample at both sites included adults and children.

[1] Beverly Serrell, Exhibit Labels, An Interpretive Approach. Alta Mira Press: 1996.

II. Study Methodology

Three data collection strategies were employed to assess visitors' use of and reactions to *Amazing Feats of Aging*: timing and tracking observations of visitors in the exhibition; questionnaires completed by visitors following time spent with exhibit components; and interviews conducted with visitors either prior to any experience in the gallery (pre-exhibit) or after spending time with exhibit components (post-exhibit).

This study was initially designed to include information from 300 visitors at OMSI and 70 visitors at the exhibition's first venue. The LNHM component of the study was planned to supplement the OMSI data, and so was less comprehensive in scope. A variety of logistical challenges at both sites limited the size of the visitor samples to a total of 149 visitors at OMSI[2] and 26 visitors at LNHM.[3] The completed study components and corresponding sample sizes are summarized in Table 1.

Table 1: Study Components and Corresponding Sample Sizes

	Sample sizes at OMSI		Sample sizes at LNHM	
Component	**Adults**	**Children**	**Adults**	**Children**
Tracking & Timing Observations	27	11	6	0
Cued Interviews (pre-exhibit)	30	10	0	0
Cued Interviews (post-exhibit)	30	10	0	0
Cued Questionnaires (post-exhibit only)	50	11	10	10
Total Sample	**137**	**42**	**16**	**10**

Timing & Tracking Observations (OMSI and LNHM)

Unobtrusive observations of visitors' behaviors, time spent at individual components, and paths taken through an exhibition can provide a good overview of the range of behaviors prompted by an exhibition and the extent to which that exhibition captures and holds visitor attention. Such data can indicate whether casual visitors tend to spend enough time (or visit a wide enough variety of components) to come in contact with the exhibition's key messages and ideas. Findings from observations thus complement the insights about visitors' learning from and reactions to the exhibition that more direct interactions with visitors can provide (e.g., interviews and written questionnaires).

Procedure Followed at OMSI

This exhibition's design and location at OMSI posed unusual challenges for the tracking and timing study. Because *Amazing Feats of Aging* could be approached from a number of different directions, it was difficult (if not impossible) for observers stationed near the exhibition itself to

[2] Originally planned to be completed by mid-August, the evaluation did not get underway until late August. OMSI's general visitor population tends to be smaller overall during this time period and the availability of children in the target age range was especially affected. The exhibition's location posed additional challenges to visitor recruitment and tracking—those are described in more detail in subsequent sections of this report.

[3] LMNH is a relatively small museum (compared with OMSI) and late summer visitation is typically very low.

tell whether approaching visitors were seeing the exhibition for the first time (or were in the midst of an interaction that had begun earlier or outside of the observer's view).

Instead, observers waited in a second-floor corridor near the entrance to OMSI's Life Science Hall and randomly selected visitors for observation as they arrived on the second floor via a nearby escalator or elevator. Selected individuals were kept in view as they moved through the Life Science Hall until they either stopped at an *Amazing Feats of Aging* component or exited the Life Science Hall. In the latter case, the observation was terminated and the observer returned to the corridor to await the next eligible visitor.

Once a selected visitor stopped in *Amazing Feats of Aging*, the observer activated a stopwatch, noted the clock time, and began recording the visitor's activity and time spent at individual components. If a visitor entered the Life Science Lab (at the rear of the exhibition) or stopped at components of any other exhibitions, the observer noted time spent at each non-*Aging* stop but did not record any other information about the visitor's activity until she made her next stop at a component of *Amazing Feats of Aging*. An observation was concluded when the selected visitor entered a nearby exhibition area and did not return to *Amazing Feats of Aging* for at least five minutes. The Life Science Lab was an exception to this rule; observation of visitors who entered that lab resumed once they re-entered the exhibition, regardless of how much time they spent in the Lab.

This unanticipated (and somewhat unconventional) shift in procedure dramatically increased the time spent per visitor observation (and thus reduced the overall number of adults and children who could be observed).

Procedure Followed at LNHM

The LNHM's smaller size and gallery configuration simplified the timing and tracking procedure considerably. All visitors approached *Amazing Feats of Aging* by walking through *Dinostories* and it was relatively easy for an observer stationed at the rear of the gallery to note a visitor's first interaction with an exhibition component. As was the case at OMSI, visitor interactions with any unrelated exhibit components were noted and timed but no additional information about the visitor's activity was recorded until she returned to *Amazing Feats of Aging*. An observation was concluded when a visitor entered either *Dinostories* or *Brain Matters* and did not return to *Amazing Feats of Aging* for at least five minutes.

Visitor Interviews (OMSI only)

Trained interviewers spoke with OMSI visitors either before any experience with *Amazing Feats of Aging* (pre-exhibit sample) or following time spent in the exhibition (post-exhibit sample). These structured interviews prompted visitors to share their knowledge of the aging process in various animals, compare aging in animals to that in humans, and evaluate the extent to which they (the visitors themselves) have control over the aging process. The adult and child interview protocols were substantially equivalent, with wording modified slightly to make it easier for children to understand the questions (see Appendix A for copies of the interview forms).

Eligible visitors (adults who appeared to be at least eighteen years old and children between the ages of eight and twelve years) were randomly selected for interview (i.e., interviewers approached the first eligible visitor to cross an imaginary line on the floor in a pre-designated area). *Pre-exhibit* interviewees were stopped shortly after entering the museum. *Post-exhibit* interviewees were *cued* – that is, they were intercepted near the entrance to the Life Science Hall and asked to spend time in *Amazing Feats of Aging* and speak with the interviewer afterwards.[4]

Visitors who agreed to the post-exhibit interview were escorted to *Amazing Feats of Aging* by the data collector, who pointed out the exhibition components, instructed the cued visitor to spend "about ten minutes looking at these exhibits as you would any other exhibits at OMSI," and requested that the visitor notify the interviewer when finished looking at the exhibition. The interviewer recorded the time spent by cued visitors in the exhibition but did not otherwise interact with target visitors or record the visitors' activity in the exhibition. Interviews were conducted at a table near the exhibition. The interviewer recorded visitor responses in longhand on the interview form. When interviewing children, the interviewer allowed any accompanying adults to join the child at the interview table but actively discouraged those adults from prompting the child's answers or otherwise participating in the interview.

Cued Open-Ended Questionnaires (OMSI and LNHM)

A short (four item) self-administered questionnaire prompted visitors to relate their personal interpretation of the exhibition's main message, recall new ideas about aging that they came across in the exhibition, and share feelings and memories that the exhibition invoked. This questionnaire was completed only by adults and children who had seen the exhibition. At OMSI, adults and children were randomly selected as they approached the Life Science Hall and escorted to *Amazing Feats of Aging*. At LNHM, adults and children were recruited shortly after entering the museum and similarly escorted to the exhibition area. The interviewer recorded the amount of time that cued visitors spent in the exhibition but made no other observations of the visitors' behavior. Visitors completed the questionnaire without any assistance from the data collector; minor wording changes were made to facilitate children's use of the questionnaires. When the target visitor was a child, the accompanying adult was encouraged to remain with the child, helping him understand the questions or reflect on his exhibit experience. The interviewer did emphasize, however, that the child should write his own answers and that those answers should reflect only the child's ideas and feelings. See Appendix B for copies of the questionnaires used at OMSI.

To thank them for participating in the study, all OMSI visitors who completed either interviews or questionnaires were offered coupons for a free return visit to the museum; no compensation was offered to LNHM visitors.

[4] Alerting visitors in this way is assumed to increase visitors' attention to the exhibition's components and maximize the exhibition's communication potential.

III. Principal Findings

Tracking & Timing Observations (OMSI)

Visitor Characteristics

Twenty-seven adults and eleven children were unobtrusively observed as they spent time in *Amazing Feats of Aging*. The adult sample included approximately equal numbers of men and women; adults estimated to be between thirty and forty years of age accounted for nearly one-half of the adult sample. Among the children observed, boys outnumbered girls and the majority appeared to be at the older end of the target age range. More than 80 percent of the observed adults and children were white, and all but two of those were non-Latino. The sample did include a very small number of non-white or Latino individuals.

Table 2: Demographic Characteristics of Visitors Observed at OMSI

		Children		*Adults*	
Characteristic		**Number**	**Percent**	**Number**	**Percent**
Gender	Female	4	36%	14	52%
	Male	7	64%	13	48%
Estimated Age	9–10 yrs	4	36%	--	--
	11–12 yrs	7	64%	--	--
	20–29 yrs	--	--	4	15%
	30–39 yrs	--	--	11	41%
	40–49 yrs	--	--	4	15%
	50–59 yrs	--	--	7	26%
	60 yrs and older	--	--	1	4 %
Race	Amer Indian/Alaska Native	1	9%	0	0%
	Asian	1	9%	1	4%
	Pac Islander/Native Hawaiian	0	0%	0	0%
	Black	0	0%	1	4%
	White	9	82%	25	85%
	More than one race	0	0%	0	0%
	Not sure	0	0%	0	0%
Ethnicity	Latino	0	0%	2	7%
	Not Latino	11	100%	25	93%
	Not sure	0	0%	0	0%

Tables 3 and 4 display group compositions for observed adults and children. All of the observed visitors were accompanied by at least one child or adult. Eighty percent of the observed adults were accompanied by one or more children.[5] Sixty-four percent of the children were accompanied by just one adult; one half of those were accompanied by a second child.

[5] Note that more than one half of these groups included pre-school-age children.

Table 3: Group Composition (Adults Observed at OMSI, N = 27)

# Children	# Adults One	Two	Three	Four	Total
None	0%	11%	4%	4%	**19%**
One	22%	19%	4%	7%	**52%**
Two	7%	11%	0%	7%	**26%**
Three	4%	0%	0%	0%	**4%**
Total	**33%**	**41%**	**7%**	**19%**	**100%**

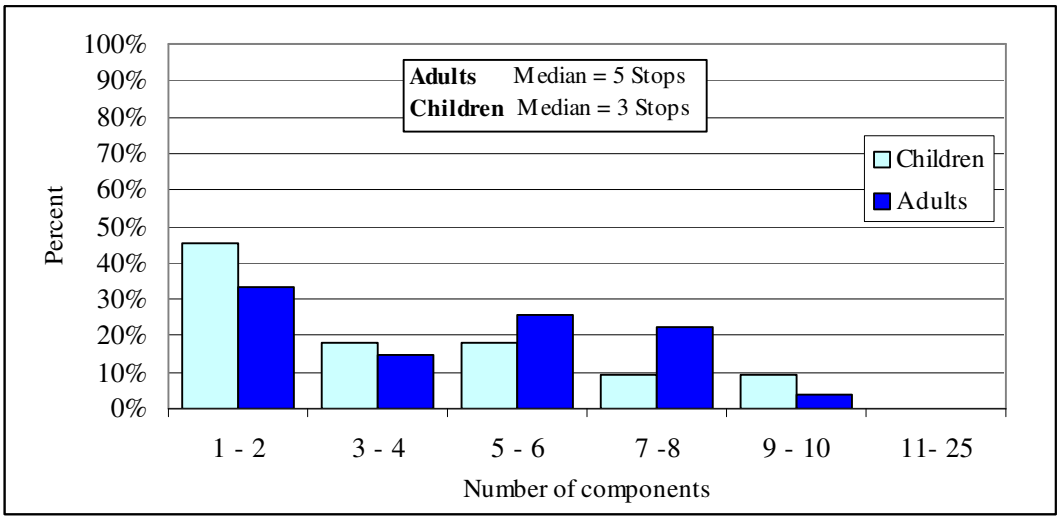
Table 4: Group Composition (Children Observed at OMSI, N = 11)

# Children	# Adults One	Two	Three	Four	Total
One	27%	9%	0%	0%	**36%**
Two	27%	9%	0%	0%	**36%**
Three	0%	0%	0%	0%	**0%**
Four	9%	9%	0%	0%	**18%**
Five	0%	9%	0%	0%	**9%**
Total	**64%**	**36%**	**0%**	**0%**	**100%**

Stops Made by Visitors at Exhibit Components

For the purposes of this study, a "visitor stop" was recorded if the visitor paused in front of an exhibit component and directed attention to it for at least *three* seconds. If a visitor returned to a particular component, that subsequent interaction was *not* recorded as a separate stop (but any additional activity or time spent was recorded and added to data for the original stop). As Figure 1 indicates, none of the observed visitors stopped at more than ten of the twenty exhibition components and five posters.[6] The majority of all visitors observed stopped at six or fewer components (approximately 25 percent of the exhibition).

Figure 1: Component Stops Made by OMSI Visitors

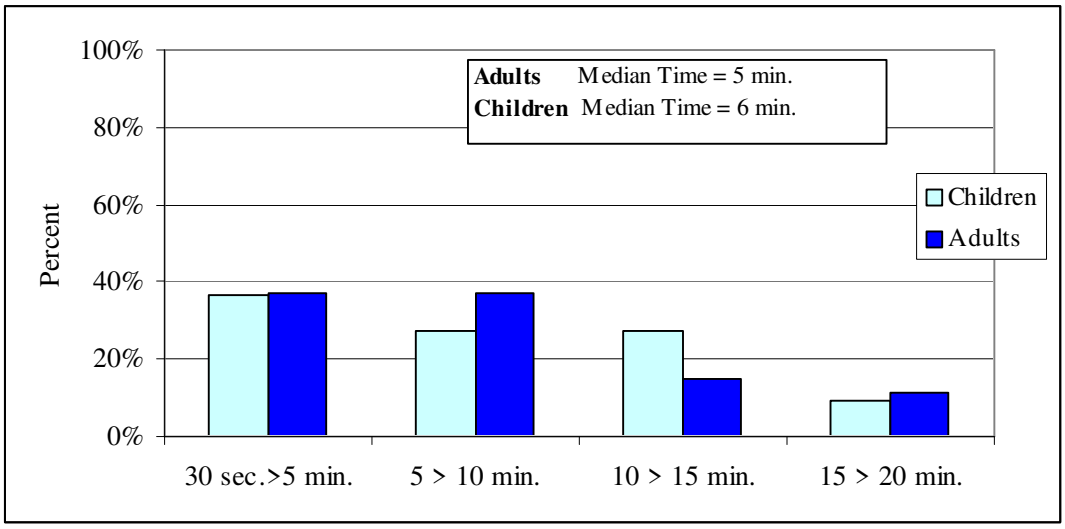


[6] Posters mounted on otherwise blank surfaces of the freestanding components were considered potential "stops."

Total Time Spent by Visitors in the Exhibition

Observers noted the clock time as visitors made their first stop at an exhibition component and the clock time as visitors left the area. That "total elapsed time" was subsequently corrected to reflect only time actually spent in *Amazing Feats of Aging*. The distributions of time spent in the exhibition by adults and children were similar (see Figure 2). Approximately one third of all visitors spent less than five minutes in the exhibition; an additional third spent between five and nine minutes. The longest time spent by any child was eighteen minutes, while the maximum time spent by an adult was nineteen minutes.

Figure 2: Total Time Spent by OMSI Visitors in *Amazing Feats of Aging*



Interactions with Individual Components

Visitor Pathways

Amazing Feats of Aging was not designed with any sequential narrative in mind; visitors can easily choose idiosyncratic pathways through the exhibition. With that in mind, it is not surprising that few commonalities were observed among the paths taken by visitors included in this study.

As Table 5 indicates, both adults and children did tend to make their first stop at "Free Radical Attack," an interactive component located in a position to attract visitor interest as they first entered the exhibition space. This component also featured moving balls, a video, the opportunity for physical interaction, and was the only component to attract the attention of more than 50 percent of either visitor group. By contrast, the exhibition's nearby Introduction panel (a freestanding graphic with "flip" labels located on its rear face) was the first exhibition stop for only three adults and none of the children.

Table 5: Components Most Frequently Stopped at First, Second, Third, Fourth, and Fifth (OMSI)

Adults			
Stop #	**Component**	**Number**	**Percent**
1	Free Radical Attack	12	44%
2	Older Males/Females?	7	27%
3	Older Ages Through Ages	3	13%
4	[no commonality]		
5	[no commonality]		
Children			
Stop #	**Component**	**Number**	**Percent**
1	Free Radical Attack	5	45%
2	[no commonality]		
3	Healthy Aging Brain	3	38%
4	[no commonality]		
5	Life Science Lab	2	33%

Visitor Stops at Individual Components

Since 40 percent of the observed adults were accompanied by school-age children, it is perhaps not surprising that there is some overlap between the components that were most attractive to adults and those that were most attractive to the sample of observed children. As Table 6 indicates, "Free Radical Attack" was equally attractive to both visitor groups, drawing stops from 59 percent of adults and 64 percent of children.

Table 6: Percent of Visitors Stopping at Individual Exhibit Components (OMSI)

Adults			***Children***		
Component	**N**	**Percent**	**Component**	**N**	**Percent**
50 Percent or more Stopping					
Free Radical Attack	16	59%	Free Radical Attack	7	64%
At least 40 Percent Stopping					
Life Science Lab	13	48%	Age Machine (Computer)	5	45%
At least 30 Percent Stopping					
Healthy Aging Brain	9	33%	Healthy Aging Brain	4	36%
Older Males/Females?	8	30%			
At least 20 Percent Stopping					
Age Machine (Monitor)	7	26%	Age Machine (Monitor)	3	27%
Age Machine (Computer)	6	22%	Do About Aging (1–4)?	3	27%
Introduction Panel	6	22%	What Is Your Real Age?	3	27%
Older Ages Through Ages	6	22%	Life Science Lab	3	27%
Think Fast!	6	22%			

Children were next most likely to stop at the "Age Machine Computer," "The Healthy Aging Brain," and the "Age Machine Monitor". Adults were similarly drawn to "The Healthy Aging Brain," "Age Machine Monitor," and "Age Machine Computer". However, one third of adults also stopped at "Older Males or Females," a component that attracted only two of the children.

This sample of children seemed least likely to be interested in graphic panels and posters—components that offered no opportunities for interaction (beyond lifting flip labels). None of the children stopped at the "Age Machine" poster, the "Animal Families" panel or posters, or the poster accompanying "Can Older Brains Learn New Tricks?" "Amazing Aging Animals" and "Which Lives Longer?" were the only components with obvious interactive elements that failed to prompt a stop by any of the children.

With the exception of "Can Older Brains Learn New Tricks?" (poster), at least one adult stopped at every exhibition component. That poster was mounted on the back of a component at the north end of the exhibition and few visitors were likely to even notice that it was there. Like the children, adults were less likely to notice other posters—fewer than 10 percent of the adults stopped at posters mounted on or near "Age Machine" or "Animal Families." The only interactive element failing to draw more than one adult stop was "What Can We Do About Aging? (5–8)".

As noted in this report's Introduction, *Amazing Feats of Aging* is located in the midst of other attractive exhibitions and immediately adjacent to OMSI's popular Life Science Lab. One quarter of the observed children and nearly one half of the adults interrupted their time in *Amazing Feats of Aging* to spend time in the Lab.

Time Spent by Visitors at Individual Components

Several exhibit components attracted the attention of only a small proportion of visitors. Since the overall sample sizes are small (and in the case of the children, *very* small), median times spent at individual components are reported only for components attracting a minimum number of visitor stops. Table 7 displays these median stop times for components that attracted the attention of at least 20 percent (five) of the adults or 27 percent (three) of the children. Exhibit components that appear on both sample lists are *highlighted*.

Table 7: Median Times (in seconds) Spent by Adults and Children at Individual Components (OMSI)

Adults			***Children***		
Component	**Time**	**N**	**Component**	**Time**	**N**
Age Machine (Computer)	*210*	6	*Age Machine (Computer)*	*189*	5
Think Fast!	145	6	*Free Radical Attack*	*111*	7
Banded Mongoose Puppet Theater	93	5	*Age Machine (Monitor)*	*42*	3
Age Machine (Monitor)	*57*	7	*Healthy Aging Brain*	*34*	4
Free Radical Attack	*53*	16	*What is Your Real Age?*	*29*	3
Older Males/Females?	50	8	Do About Aging ? (1-4)	16	3
Older Ages Through Ages	38	6			
Healthy Aging Brain	*28*	9	*Life Science Lab*	*245*	3
Introductory Panel	27	6			
Older/Younger (right)	24	5			
What is Your Real Age?	*22*	6			
Older/Younger (left)	18	6			
Sticky Situation	11	5			
Life Science Lab	*272*	13			

For the most part, those components that tended to attract more visitor attention were generally *not* those that tended to hold visitor attention longer (this was especially true of the observed adults). Both adults and children spent most time at "Aging Machine Computer" (median time for adults was 3.5 minutes; median time for children was 3.1 minutes). Two other components ("Think Fast!" and "Banded Mongoose Puppet Theater") held the adults' attention for more than one minute (median times were 2.4 minutes and 1.5 minutes, respectively). On the other hand, those components that were most likely to prompt an adult stop ("Free Radical Attack," "Healthy Aging Brain," and "Older Males or Older Females?") managed to hold adult attention for only 53 seconds, 50.5 seconds, and 28 seconds, respectively.

Visitor Activity at Individual Components

In addition to recording and timing exhibit stops, the observers noted occurrences of five specific exhibit-related behaviors:

	Definition
Reading text	Visitor looks at supplemental text on panel for at least three seconds. [7]
Using a "flip" label	Visitor lifts top level and gazes at text mounted below.
Using an interactive	Visitor actively manipulates appropriate exhibit components.
Watching another visitor	Visitor observes others using the exhibit.
Exhibit-related social interaction	Visitor talks with another visitor or member of own group about a component.

One component ("Free Radical Attack") featured a continuously running video presentation; observers noted whether the target visitor attended to that video while at that particular component.

Table 8 summarizes the incidence of exhibit-related activity across all components where such activity was possible.[8] Not surprisingly, adults were more likely to read supplemental text, whether it was immediately visible or hidden below a "flip." Children's likelihood to read text did increase, however, when that text was hidden. A majority of adult stops at interactive components included use of that interactive, and adults seemed as likely to use an interactive as to watch someone else do so. Nearly all stops made by children included personal use of an interactive (when possible) and children were less inclined than adults to spend time watching others interact.

[7] "Reading" was recorded only for text that offered additional explanation (or for non-interactive components such as posters). Reading of any other text (instructions for interactives, etc.) was not independently recorded.
[8] See Appendix D for more detailed descriptions of components, including opportunity for observed activity.

Table 8: Incidence of Activities during Visitor Stops at Components (OMSI)

Activity	*Adults* Number of Components	*Adults* Number of Stops	*Adults* Percent with Activity	*Children* Number of Stops	*Children* Percent with Activity
Reading	10	64	53%	26	15%
Using Flips	9	46	57%	13	38%
Using Interactives	15	92	61%	40	97%
Watching Another	15	85	53%	38	37%

Social activity was possible during any component stop and most adults and children engaged in such exhibit-related conversations. Approximately 75 percent of all adults and 90 percent of all children were observed to interact with another visitor during at least one component stop; approximately 50 percent of adults (and 60 percent of children) engaged in social interaction during 50 percent or more of their component stops.

The small size of the two visitor samples limits the usefulness of more detailed analyses of activity data. Keeping that in mind, Table 9 does provide additional information about the extent to which individual components prompted specific visitor behaviors. Data is reported for adults only and information is included only for components attracting at least five adult stops.

Table 9: Adult Visitor Activity at Specific Components (OMSI)

Component	N (Stops)	Read	Flip	Use	Watch	Socialize	Watch Video
Free Radical Attack	16	50%		44%	63%	31%	50%
Healthy Aging Brain	9	33%		33%	56%	33%	
Older Males/Females?	8		75%	50%	75%	63%	
Age Machine (M)	7	57%	43%		**100%**	71%	
Age Machine (C)	6			67%	**83%**	67%	
Introduction Panel	6		**100%**			17%	
Older Ages	6	**83%**		**100%**	17%	33%	
Older/Younger (Left)	6		**83%**		17%	17%	
Think Fast!	6	**100%**		67%	33%	33%	
Your Real Age?	6	50%	50%	**100%**	33%	33%	
Older/Younger (Right)	5	20%	60%	**80%**	0%	40%	
Sticky Situation	5	40%	20%	40%	**80%**	40%	
Banded Mongoose Puppet Theater	5			40%	**80%**	**80%**	

"Age Machine Computer" and the nearby "Age Machine Monitor" particularly encouraged adults to become actively involved and talk with others about the experience. "Older or Younger," "What is Your Real Age?," and "Longer and Longer Lives" also promoted adult interaction. While adults were less likely to use the puppets at "Banded Mongoose Puppet Theater," 80 percent of those who stopped there watched others interact and carried on exhibit-related conversations.

Tracking and Timing Observations (LNHM)

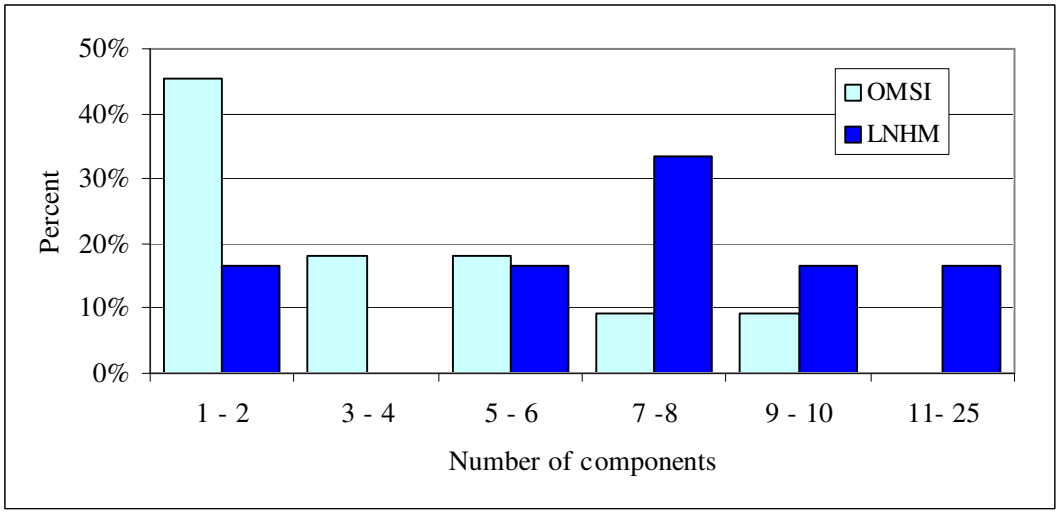
Only six adults were observed at the LNHM installation (two males and four females; all were non-Latino Caucasians). With the exception of one solo adult, all were accompanied by one or more children. Generally, these adults seemed to spend more time in the exhibition and stop at a

greater number of components. However, the very small number of observations made in Lafayette limits the extent to which findings at the two sites can be meaningfully compared.

Stops Made by Visitors at Exhibit Components

Figure 3 compares the number of component stops made by adults at OMSI and LNHM. One adult in Lafayette stopped at twelve different components; no visitor in either sample stopped at more than twelve components.

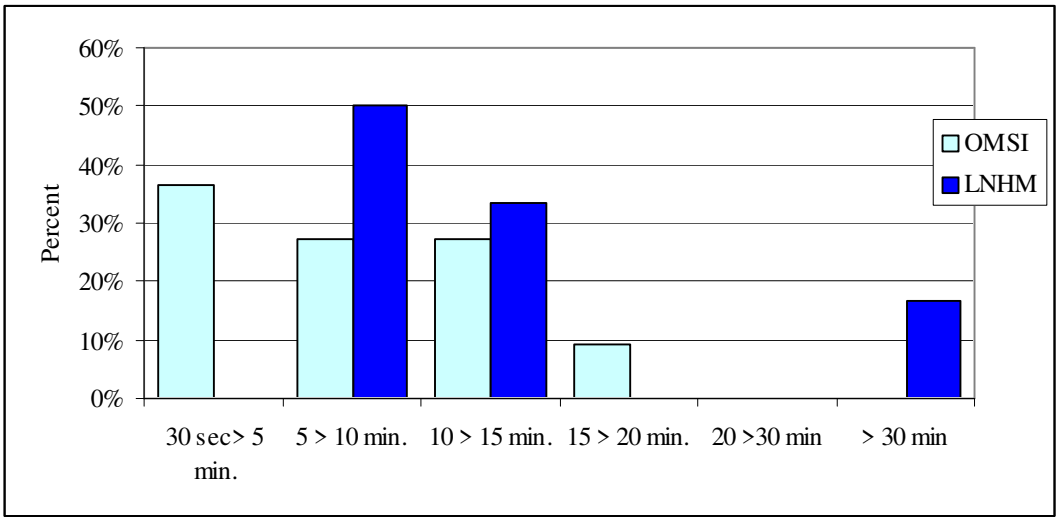
Figure 3: Number of Components Stopped at by Adults at OMSI and LNHM



Total Time Spent by Visitors in the Exhibition

All but one of the adults at LNHM spent between five and fifteen minutes in the exhibition. That was true of approximately one half of the OMSI sample.

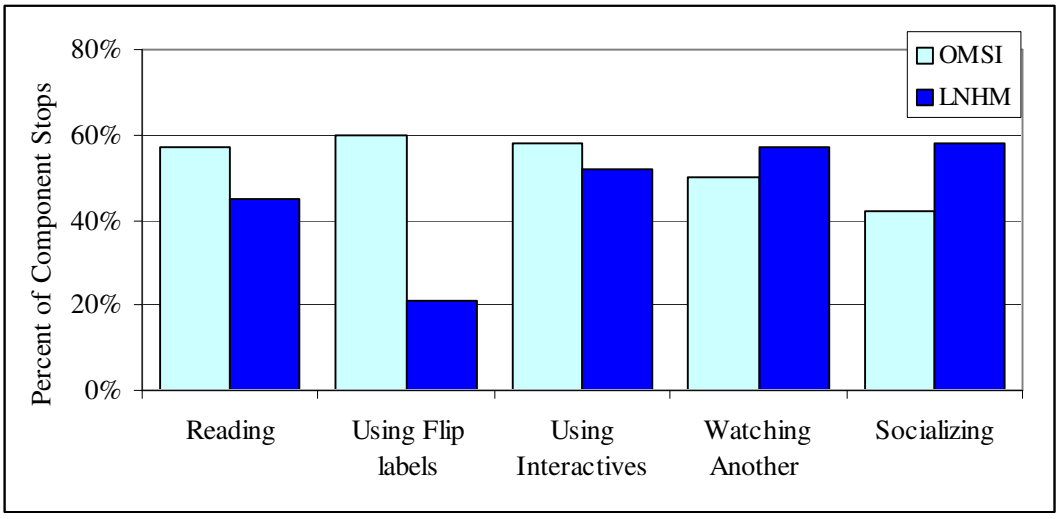
Figure 4: Total Time Spent by LNHM and OMSI Adults in Amazing Feats of Aging



Interactions with Individual Components

Given the very small number of adults observed at LNHM, no comparison of visitor pathways or tendency to stop at particular components was made. As Figure 5 indicates, however, the adults' likelihood to engage in reading, interacting, watching another interact, and socializing at exhibit components was similar at the two sites.[9]

Figure 5: Adult Activity at Exhibit Components (OMSI and LNHM)



Cued Interviews and Questionnaires (OMSI and LNHM)

A total of eighty interviews and sixty-one questionnaires were completed by OMSI visitors; thirty questionnaires were completed by LNHM visitors. Thirty adults and ten children were interviewed at OMSI prior to any exposure to *Amazing Feats of Aging*; the same interview was also conducted with thirty adults and ten children following time spent on their own in the exhibition. Inclusion of both pre- and post-exhibit samples made it possible to examine how the exhibit experience might change how visitors described the aging process or their awareness of how aging varies across different species. Questionnaires were only completed by visitors who had already seen the exhibition (that sample included fifty adults and eleven children). In Lafayette, identical questionnaires were completed by twenty adults and ten children.

As described above, post-exhibit visitor participation was solicited in advance and visitors knew that an interview/questionnaire would follow. This "cuing" procedure was employed to test the exhibition's communication effectiveness in a situation where visitors would be highly motivated to use the exhibits and attend to their messages. Of the 165 adults approached by an interviewer for either the interview or questionnaire at OMSI, 51 percent (or 85 visitors) either refused outright or initially agreed but did not actually complete an interview or questionnaire. All but one adult and one child agreed to participate at LNHM.

[9] In both cases, incidence of activity was tracked only for stops made at components where such activity was possible.

Adults who refused to participate at OMSI resembled those who agreed to continue (in terms of approximate age, gender, and ethnicity/race). Those adults who agreed to the interview were, however, more likely to be visiting in adult-only groups (40 percent vs. 26 percent of those who declined). Twenty-eight percent of those adults who did not participate were solo adults accompanied by one child and the difficulty of participating while having to keep track of children (or that children would not be interested in the task) was the most common reason cited by adults who refused (32 percent). "Not having enough time" or "not interested" were reasons mentioned by approximately 25 percent of refusing adults.

Refusal rates for children were comparable; twenty children were recruited to complete either post-exhibit interviews or questionnaires and ten children (or an accompanying adult) refused to continue. In nearly all cases, these visitor groups included only one adult and one or more children (six of the ten groups included between two and four children).

When adults were approached to complete a pre-exhibit interview at OMSI, refusals were slightly less common. Fifty adults were recruited and twenty of those (or 40 percent) declined to participate. Refusal rates for children in that situation were identical to those for children approached for post-exhibit interviews or questionnaires. Again, those visitor groups most likely to refuse participation were single adults accompanied by one or more children. No one reason for refusing predominated; among those cited were "not interested," "on our way to the Café," and "already saw the exhibit."

Cued Interviews with Adults (OMSI only)

In the presentation of findings that follows, "verbatim" visitor statements are included (where appropriate) to illustrate particular response categories.[10] The qualitative nature of much of this data precludes tests of statistical significance; when differences between groups are mentioned, statistical significance should not be assumed.

Visitor Characteristics

Table 10 summarizes demographic and other characteristics of adult interviewees (both pre- and post-exhibit). Females dominated the pre-exhibit sample; males and females were equally represented among post-exhibit interviewees. All but one of the pre-exhibit and three of the post-exhibit interviewees described themselves as non-Latino whites. Sixty percent of both samples were repeat OMSI visitors and very few mentioned having any interests or training in a related discipline (such as biology or medicine).

[10] Visitor comments were not tape-recorded; visitor statements were taken from interviewer notes.

Table 10: Characteristics of Adults Interviewed at OMSI

Characteristic		*Pre-exhibit* Number	*Pre-exhibit* Percent	*Post-exhibit* Number	*Post-exhibit* Percent
Gender:	Female	19	63%	15	50%
	Male	11	37%	15	50%
Age:	20–29 yrs	3	10%	5	17%
	30–39 yrs	10	33%	9	30%
	40–49 yrs	7	23%	9	30%
	50–59 yrs	8	27%	4	13%
	60 yrs and older	2	7%	3	10%
Race:	Asian	1	3%	-0-	0%
	Black	-0-	0%	-0-	0%
	White	29	97%	28	93%
	More than one race	-0-	0%	2	7%
Ethnicity:	Latino	-0-	0%	3	7%
	Not Latino	30	100%	28	93%
First Visit to OMSI?	No	18	60%	18	60%
	Yes	12	40%	12	40%
Related Interest or Training?					
	Yes	7	23%	6	20%

Group composition was recorded only for post-exhibit interviewees. Although 60 percent of these visitor groups included both adults and children, 27 percent of the interviewed adults were accompanied by just one other adult and no children.

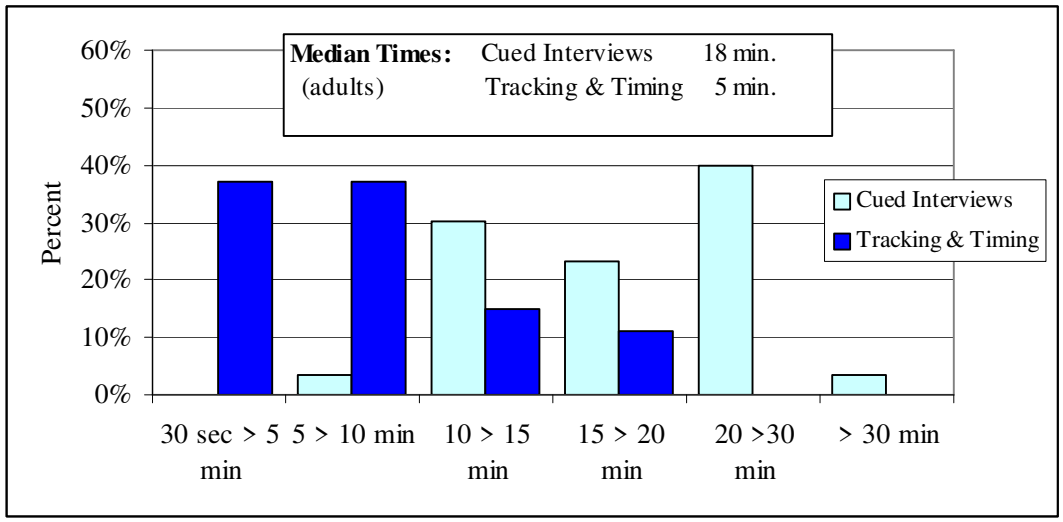
Table 11: Group Composition (cued adults interviewed at OMSI)

	Adults				
Children	**One**	**Two**	**Three**	**Four**	**Total**
None	3%	27%	7%	3%	**40%**
One	20%	17%	3%	0%	**40%**
Two	7%	7%	0%	0%	**13%**
Three	3%	3%	0%	0%	**7%**
Total	**33%**	**53%**	**10%**	**3%**	**100%**

Time Spent by Cued Visitors in the Exhibition

Figure 6 contrasts the time spent by cued adult interviewees with that spent by visitors who were unobtrusively observed during the Tracking and Timing component of this evaluation. Note that the cuing procedure more than tripled the median time spent by those visitors who were subsequently interviewed. While 40 percent of the interviewed adults spent more than twenty minutes in *Amazing Feats of Aging*, the longest time spent by a visitor in the Tracking and Timing sample was nineteen minutes.

Figure 6: Time Spent in the Exhibition by Adults at OMSI (cued interviewees vs. unobtrusively observed visitors)

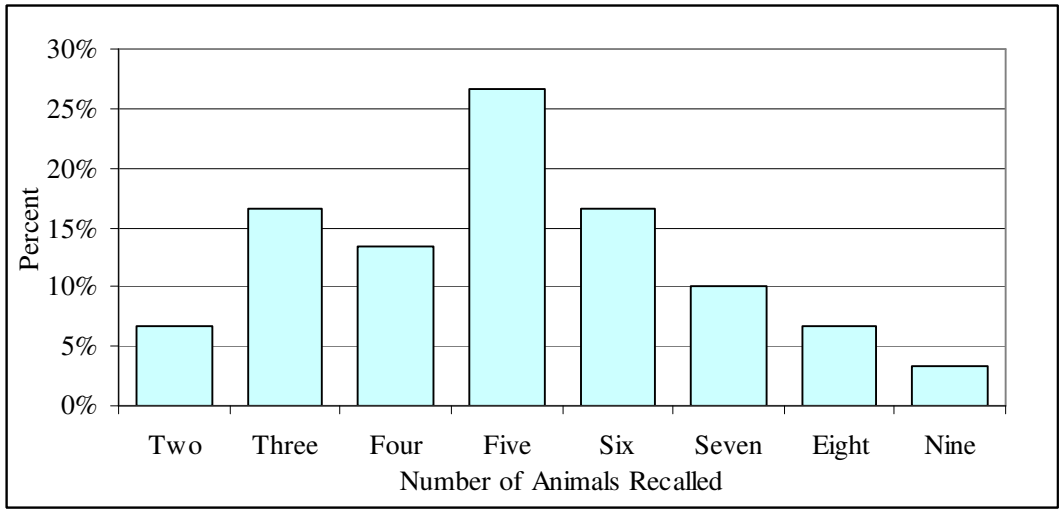


Animals Recalled by Post-exhibit Interviewees

To begin the interviews, visitors were shown three-by-five-inch photographs of ten different animals: gorilla, dog, elephant, giant tortoise, rat, whale (orca), rockfish, roundworm (C. elegans), mongoose, and snake. All but the snake were featured in one or more exhibition components and the images used in the interview also appeared in the exhibition. Each image was labeled with the animal's common name (e.g., "whale"). Adults interviewed after seeing the exhibition were asked to pick out images of all the animals that they recalled seeing in the exhibition. Adults interviewed prior to seeing *Amazing Feats of Aging* were not asked this preliminary question.

As Figure 7 indicates, only one of these adults recalled seeing all nine animals that were also mentioned in exhibition components.

Figure 7: Animals Recalled by Post-exhibit Interviewees



The majority of these interviewees remembered the elephant (93 percent), the giant tortoise (80 percent), the whale (73 percent), the gorilla (70 percent), the roundworm (70 percent), and the rat (57 percent). No visitor recalled seeing any snakes in the exhibition (the one picture of an animal that was not discussed in the exhibition).

Similarities Identified between Animals and Humans

Interviewees were asked to pick out one animal whose aging process shared something with that of humans.[11] Table 12 compares the animals that either pre- or post-exhibit adults identified as meeting this criterion.[12] Note that neither group chose to discuss the mongoose or rockfish in this context.

Table 12: Animals Selected by Interviewees Discussing Similarities between Humans and Animals

	Pre-exhibit		*Post-exhibit*	
Animal	**N**	**Percent**	**N**	**Percent**
Gorilla	13	43%	7	23%
Dog	13	43%	6	20%
Elephant	6	20%	8	27%
Tortoise	2	7%	3	10%
Rat	2	7%	2	7%
Whale	3	10%	8	27%
Roundworm	0	0%	6	20%

Adults who had seen *Amazing Feats of Aging* identified similarities in aging across a wider variety of animals. While pre-exhibit interviewees tended to focus on either the gorilla or dog, between 20 and 30 percent of the post-exhibit interviewees recognized similarities between humans and whales, elephants, gorillas, dogs, or roundworms. Few adults who had not seen the exhibition discussed similarities between humans and elephants or whales and none of them believed that roundworms shared anything in common with humans. Neither group of adults was likely to focus on similarities between the aging processes of humans and rats, tortoises, mongooses, or rockfish.

Pre- and post-exhibit differences also emerged with respect to the *kinds* of similar characteristics or changes that interviewees were likely to mention (regardless of which animals they were discussing). Overall, visitor comments about similarities could be grouped into one of six broad categories: (1) debilitating changes/characteristics, (2) other physical changes, (3) similarities in life span, (4) social characteristics, (5) other behavior changes, and (6) "other" (either aging-related or irrelevant). Table 13 displays the proportions of visitors in each group whose comments fell into each category. Since some visitors mentioned more than one kind of similarity, total percentages exceed 100 percent. Numbers in parentheses indicate how many visitors mentioned particular characteristics.

[11] Interviewees who had seen the exhibition were asked to select from those animals that they did recall seeing in the exhibition.
[12] Since many interviewees chose to discuss more than one animal, total percentages exceed 100 percent.

Table 13: Similarities Discussed by Pre- and Post-exhibit Interviewees (OMSI adults)

	Pre-exhibit	Post-exhibit
(1) Debilitating changes	**60 %**	**17%**
failing eyesight/hearing	(6)	
changes in/loss of hip bone		(3)
problems with teeth	(3)	(2)
arthritis	(7)	
Alzheimer's disease	(2)	
cataracts	(2)	
other	(13)	(1)
(2) Other physical changes	**57%**	**33%**
gray hair	(12)	(6)
wrinkles	(2)	
females not reproductive	(3)	(2)
other	(2)	(2)
(3) Life span similarities	**13%**	**57%**
Life span is same	(4)	(7)
females live longer		(9)
other	(2)	(2)
(4) Social behavior	**10%**	**30%**
cares for/respects elders	(2)	
role of grandparents		(3)
lives in families	(1)	(4)
other	(1)	(1)
(5) Other behavior changes	**30%**	**23%**
slows down	(8)	(6)
other	(2)	
(6) Other	**14%**	**10%**
Don't know or can't say		**13%**

Comparing humans with animals, adults interviewed *before* seeing *Amazing Feats of Aging* were much more likely to describe the aging process in terms of debilitating or other physical changes. Fewer than 15 percent of those respondents discussed similarities in life span or social characteristics.

"Maybe humans lose their hearing and dogs lose their hearing as well." [OMSI Log # 3, PRE, adult]

"[Gorillas] probably develop some kind of muscle problems like tendonitis. [Anything else?] They grow a beard, they turn gray." [OMSI Log #5, PRE, adult]

In contrast, adults who *had seen* the exhibition were most likely to describe similarities in life span (particularly that females live longer than males). These interviewees also tended to identify similar changes in physical appearance (especially gray hair) and similarities in social behavior.

"The female gorilla lives longer than the male gorilla, but she doesn't live that much longer, which I guess is different than humans." [OMSI Log # 29, POST, adult]

"Elephants stay close to their young—children and grandchildren." [OMSI Log #35, POST, adult]

The kinds of similarities described by post-exhibit interviewees varied across the animals they chose to discuss (pre-exhibit interviewees are not included in this discussion, since descriptions of debilitating changes dominated their discussions of all animals except the giant tortoise). For example, six adults (20 percent) discussed similarities between the whale's life span and our own.

"The female [whale] can live after reproductive age. [Anything else?] The female lives longer…." [OMSI Log # 38, POST, adult]

On the other hand, only one adult (3 percent) described similarities in social behavior between humans and apes or rats. A wider variety of similarities was identified for some animals than for others. Overall, visitors who compared elephants to humans mentioned characteristics or changes in every category, whereas the only characteristic mentioned for roundworms was that it moves more slowly in old age ("Other Behavior"). These response patterns are detailed in Table 14.

Table 14: Relationship between Animals and Characteristics Discussed by Adults at OMSI

Animal	Debilitating Changes	Other Physical	Life Span	Social Behavior	Other Behavior	Other
Elephant	3%	3%	13%	17%	3%	
Whale		3%	20%	7%		
Ape	3%	10%	13%	3%		
Dog	10%	17%				
Roundworm					20%	
Tortoise			10%			
Rat				3%		3%

As Table 15 highlights, certain changes or characteristics were more closely associated with specific animals. More than half of all visitors who described similarities in social behavior were comparing humans and elephants. Sixty percent of all comments about debilitating changes concerned dogs (as did 50 percent of discussions of changes in physical appearance).

"[Elephants] had a family structure … I didn't dwell on it. They were in an area where they lived 60-some years and lived in groups like humans …." [OMSI, Log #22, POST, adult]

"[Dog] grays and grows white hair just like ours does when we age. Probably the teeth decay and erode just like ours do. And the bones—I saw the aged bones there, they got jagged. [What do you mean?] Comparing old and young—older bones were looser with more space between the joints." [OMSI Log #28, POST, adult]

Table 15: Relationship between Animals Mentioned When Specific Characteristics Were Being Discussed

	Debilitating Changes	Other Physical	Life Span	Social Behavior	Other Behavior
N	*5*	*10*	*17*	*9*	*7*
Elephant	20%	10%	24%	56%	14%
Whale		10%	35%	22%	
Ape	20%	30%	24%	11%	
Dog	60%	50%			
Roundworm					86%
Tortoise			18%		
Rat				11%	

Differences Identified between the Aging Processes of Humans and Animals

Adult interviewees were also prompted to pick out pictures of animals whose aging process particularly *differed* from that of humans. Table 16 illustrates that differences emerged between the animals selected by adults interviewed before and after exhibit exposure. Adults who had *not* seen *Amazing Feats of Aging* were most likely to pick out the giant tortoise and dog; adults interviewed *after seeing the exhibition* were similarly likely to discuss the tortoise and elephant, but only one discussed differences between humans and dogs. Note that this question was more difficult for both groups of interviewees to answer. Overall, 20 percent of those interviewed were not able to describe any differences between animals and humans (by comparison, only 7 percent were unable to describe similarities in the aging processes of humans and animals).

Table 16: Animals Selected to Illustrate Differences between the Aging Processes of Humans and Animals[13]

Animal	Pre-exhibit (N = 30)	Post-exhibit (N = 30)
Giant Tortoise	33%	40%
Dog	17%	3%
Elephant	10%	17%
Rockfish	13%	3%
Roundworm	13%	10%
Whale	7%	7%
Mongoose	3%	0%
Ape	0%	7%
Rat	0%	7%
Don't Know	17%	23%

The most striking difference between pre- and post-exhibit interviewees emerged when the accuracy (or appropriateness) of their statements are compared (see Table 17). Adults interviewed after experience in the exhibit were more likely to be correct in their assessment of differences between humans and animals *regardless of topic or animal discussed*. Pre-visit interviewees tended to be correct *only when discussing life span*.

[13] Since some visitors chose to discuss more than one animal, total percentages exceed 100 percent.

Table 17: "Correctness" of Interview Statements Describing Differences between Animals and Humans

Topic	Animal	*Pre-exhibit* Number of Statements	*Pre-exhibit* Number Correct	*Post-exhibit* Number of Statements	*Post-exhibit* Number Correct
Life Span	Tortoise	9	8	4	3
	Dog	5	5	1	1
	Elephant	1	0	4	4
	Rockfish	2	0	0	--
	Whale	0	--	1	1
	Ape	0	--	1	1
	Roundworm	2	2	3	3
	Total	**19**	**15**	**14**	**12**
	Percent		**79%**		**86%**
Other	Tortoise	2	2	8	8
	Rockfish	2	0	1	1
	Elephant	2	0	1	1
	Roundworm	2	0	0	0
	Whale	2	0	1	0
	Mongoose	1	0	0	0
	Ape	0	0	1	0
	Total	**11**	**2**	**12**	**10**
	Percent		**18%**		**83%**
Overall Correct			**57%**		**85%**

For example, these statements made by pre- and post-exhibit interviewees were rated as substantially "correct/appropriate." Note that in some cases, a statement considered appropriate might also include less appropriate rationalizations (this tended to be more true of pre-exhibit interview statements).

"[Tortoise] might age, lives longer. Its longevity might be longer. It might live up to 200 years." [OMSI Log #1, PRE, adult]

"[Roundworms] die sooner. [It's] harder for wild animals—don't have families, hospitals to take care of them." [OMSI Log #37, PRE, adult]

"The turtle has no family structure. They lay eggs and that's about the last they have to do with the family. They don't seem to be a together-type people. Humans need other humans." [OMSI Log #22, POST, adult]

"It talked about [roundworm] having a short life span in contrast with humans which have a relatively long life span." [OMSI Log #14, POST, adult]

These statements illustrate the range of those that were judged to be substantially "inappropriate:"

"I don't … don't think a roundworm gets as discouraged about its loss of mobility and eyesight." [OMSI Log #28, PRE, adult]

"[Elephants] remain social—more than humans. When one dies, the whole group comes, seems to mourn." [OMSI Log #24, PRE, adult]

"[The rockfish] doesn't live as long as a human being. I haven't seen a fish that is 88 years old." [OMSI Log #31, PRE, adult]

"The elephants—they are not commanding, we think we own the world and I think that would be more stressful." [OMSI Log #12, POST, adult]

"Whale doesn't have teeth at all, so you can't compare the loss of its teeth to when its gonna die." [OMSI Log #37, POST, adult]

References Made to Specific Exhibit Components

Responses made by post-exhibit interviewees were also examined for identifiable correlations between such statements and the content of specific exhibit components. Visitors tended to reference different components when describing similarities than when describing differences between the aging processes of humans and specific animals. This discussion maintains that separation.

When discussing how the aging process of specific animals resembled that of humans, interviewees' answers were most likely to echo information found at two components ("Older or Younger?" and "Older Males or Older Females?"). For example:

"The female gorilla lives longer than the male gorilla, but she doesn't live that much longer, which I guess is different than humans." [OMSI Log #29, POST, adult, "Older Males or Older Females?"]

"The older the dog gets, the grayer [its] hair gets around its mouth. The older [roundworm] gets, the less it moves, the more you can see through it." [OMSI Log #2, POST, adult, "Older or Younger?"]

When identifying differences, adult interviewees were more likely to recall details of animal aging explored at "Amazing Aging Animals," a "quiz" that challenged visitors to pick out animals that exemplified various characteristics of aging. Fifty-three percent of all interviewed adults seemed to draw on information conveyed by that component when answering this question.

"It talked about it [roundworm] having a short life span in contrast with humans which have a relatively long life span." [OMSI Log #14, POST, adult]

"Elephants have six sets of teeth and after their last set of teeth, they starve themselves to death. I didn't know that." [OMSI Log #38, POST, adult]

Tables 18 and 19 display additional information about these (and other) parallels between visitor statements and component content.

Table 18: Relationships between Similarities Discussed and Specific Component Content

Component	Percent (Visitors)	Sample Statement
Older or Younger?	40%	*see above*
Older Males/Females?	33%	*see above*
Amazing Aging Animals Older Males/Females?	20%	*"The female [whale] can live after reproductive age."* [OMSI Log #38, POST, adult]
Animal Families	29%	*"Elephants stay close to their young—children and grandchildren."* [OMSI Log #35, POST, adult]
Longevity Parade	7%	*"Elephants and whales—mammals like us. Live longer than some things do."* [OMSI Log #18, POST, adult]
Could not identify exhibit source for statement/idea	10%	*"I'm just guessing that maybe ape females become infertile as they grow old. I'm just guessing though."* [OMSI Log #6, POST, adult]
Visitor responded "I don't know"	13%	

Table 19: Relationships between Differences Discussed and Specific Component Content

Component	Percent (Visitors)	Sample Statement
Amazing Aging Animals	53%	*see above*
Older or Younger	7%	*"The rockfish—we don't get rings."* [OMSI, Log #35, POST, adult]
Longevity Parade	7%	*"Large animals live longer, but we are an exception because of our wonderful big brains. We have pretty long lives in comparison to our size."* [OMSI Log #36, POST, adult]
Could not identify exhibit source for statement/idea	13%	*"The rat has a shorter life expectancy."* [OMSI Log #10, POST, adult]
Visitor responded "I don't know"	23%	

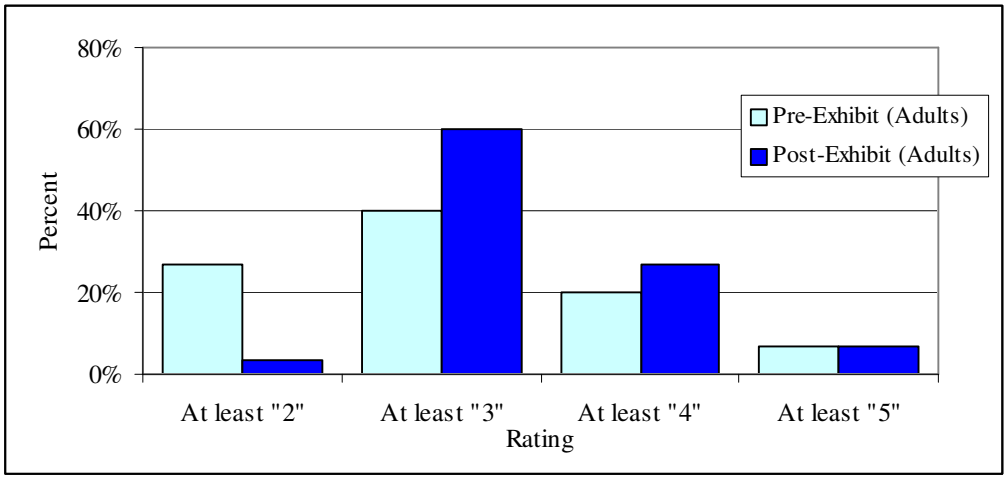
Personal Control over the Aging Process

Exhibit developers were also interested in conveying to visitors that the effects of aging in humans are not necessarily inevitable but are influenced by genetic, environmental, and lifestyle factors. Interviewees were asked to both rate the extent to which they felt themselves to have control over the aging process and to explain why they felt that way.

"Level of control" ratings

Adults were shown a rating scale ranging from "1" (no control) to "5" (total control) and asked to use that scale to indicate how much control they felt they had over their own aging process. As Figure 8 reflects, adults who had seen *Amazing Feats of Aging* were slightly less convinced of the inevitability of the aging process (and its effects) than were those who had not seen the exhibition.

Figure 8: Level of Control Ratings (pre- and post-exhibit adult interviewees)



Interviewees explanation of ratings

As they reflected on their ratings, most interviewees tended to express a sense of control (or lack of control) over one of five factors: personal habits/lifestyle, environment, biology/aging, and "things"/"the unknown."

More than 80 percent of all interviewees discussed the role of lifestyle variables, and this was equally true of those assigning "control" ratings of "3" or less and those whose rating exceeded "3." For example, this pre-exhibit interviewee assigned a rating of "2" and mentioned having some control over lifestyle but little control over environments and "things we don't understand:"

> *"Well, there's such environments and things we don't understand. We control some of our lifestyle, but basically we don't control everything. Look at George Burns—he lived to be 100 and he smoked and drank and some people don't even make it to 60."* [OMSI Log #5, PRE, adult, rating = 2]

Many interviewees did consider this interplay between factors that we do control (such as diet or exercise) and factors over which we have little (if any) control (especially genetics and the biological aging process). However, more of the pre-exhibit responses focused *only* on the inevitability of the aging process or assigned greater importance to biological or genetic factors.

> *"I think it's a biological process. Exercise and diet can help but biology is more powerful, not a lot you can do about it."* [OMSI, Log #24, PRE, adult, rating = 2]

> *"You have some control, but you're not going to stop it. [Stop what?] Not going to stop from growing old. You can't just stop at 37. [You are] less active, heal more slowly, start to wind down before you die. Unfortunately, that's the way it works."* [OMSI Log #29, PRE, adult, rating = 2]

These statements contrast with many of those made by post-exhibit interviewees, who were less likely to assign a predominant role to biology or genetics.

"Because I can limit risk factors and I can exercise and eat right. I can't control heredity and stress. They can't reverse aging or stop it but you can age gracefully." [OMSI Log #10, POST, adult, rating = 3]

"Because I have to be realistic and I know I'll deteriorate in one way or another, but I am doing the best that I can. I'd like to say "5" but that's not realistic so I'll pick the next one down. Because I have to take care of myself and occupy my mind and read and I exercise and eat the right things. So, everyone tells me I will live a long time—and I have good friends, that's important. [Anything else?] I have a pet, so I'm doing everything I'm supposed to be doing." [OMSI Log #27, POST, adult, rating = 4]

A small proportion of both pre- and post-exhibit interviewees expressed unrealistic optimism about their level of control over the aging process.

"You do have a way with controlling how you change. Control how you eat and your environment where you live. If you live somewhere polluted, you can move like I did. I lived in southern California and moved up here." [OMSI Log #31, PRE, adult, rating = 5]

I could have total control as far as things you need to do to stay healthy and in shape. Right diet, family, friends. It could be "5" if you set your mind to it. I haven't been taking control all these years—I decided to take control. [OMSI, Log #30, POST, adult, rating = 5]

Table 20 summarizes and contrasts pre- and post-exhibit interviewee discussions of "level of control" over the aging process.

Table 20: "Level of Control" Explanations

	Pre-exhibit	Post-exhibit
Biology/Aging		
Control	0%	3%
No Control	61%	38%
Personal habits/Lifestyle		
Control	86%	90%
No Control	0%	0%
Environment		
Control	4%	3%
No Control	11%	10%
"Things"/"The Unknown"		
No Control	14%	21%

Cued Interviews with Children (OMSI only)

Pre and post-interview samples included only ten children each. As a result, this data summary is less detailed than that of the adult responses and raw numbers are reported rather than percentages. This very small sample limits the extent to which these findings can be assumed to be representative of how children in general might respond to the exhibition.

Visitor Characteristics

The pre- and post-visit samples were nearly identical in demographic and background characteristics. The majority of children interviewed were non-Latino White and repeat OMSI visitors. Boys slightly outnumbered girls in each sample. The post-exhibit sample was slightly younger overall than those interviewed prior to any experience in the exhibition. Table 21 displays this background information in more detail.

Table 21: Characteristics of Children Interviewed at OMSI

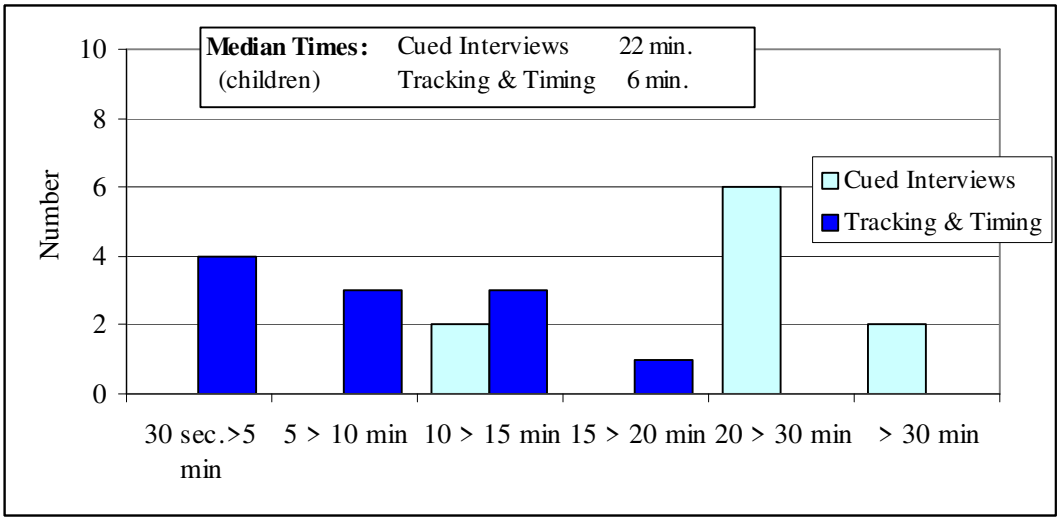
		Pre-exhibit Number	Post-exhibit Number
Gender	Female	4	4
	Male	6	6
Age	7–8 years old	1	3
	9–10 years old	3	3
	11–12 years old	6	4
Race/Ethnicity			
	Non-Latino White	7	8
	Latino White	1	-0-
	Non-Latino, more than one race	1	1
	Latino, more than one race	1	-0-
	Not recorded	-0-	1
First Visit to OMSI?	No	7	7

Group composition was recorded only for post-exhibit interviewees. Six of the ten children in that sample were in groups that included no other children.

Time Spent by Cued Children in the Exhibition

Figure 9 contrasts the time spent by cued child interviewees with that spent by children who were unobtrusively observed during the Tracking and Timing component of the evaluation. As was the case with adult visitors, the cuing procedure dramatically increased the time that children spent in the exhibition (median time spent increased from six minutes to twenty-two minutes). The majority of children in the interview sample spent more time than the longest time spent by any child observed in the Tracking and Timing study.

Figure 9: Time Spent in the Exhibition by Children (cued interviewees vs. unobtrusively observed visitors)



Animals Recognized/Recalled by Children

To begin the interview, both pre- and post-exhibit interviewees were shown three-by-five-inch photographs of several animals. Children interviewed after experience in the exhibition were shown the same ten pictures used during the adult interviews—gorilla, dog, elephant, giant tortoise, rat, whale (orca), rockfish, roundworm, mongoose, and snake. Children who had not seen the exhibition were shown all of the above with the exception of the snake. Post-exhibit interviewees were instructed to pick out the pictures of all the animals that they *remembered seeing* in the exhibition; pre-exhibit interviewees were asked to pick out pictures of any animals that they *recognized*. In both cases, each picture was labeled with the animal's common name (e.g., "whale").

The post-exhibit interviewees recalled seeing an average of 4.9 of the nine animals also featured in *Amazing Feats of Aging* (one of these children did pick out the picture of the snake, an animal not mentioned in the exhibition). The average number of animals recognized by pre-exhibit interviewees was 4.3.

As Table 22 indicates, those animals most likely to be recalled by the children who had seen the exhibition were not necessarily those most often recognized by children who had no experience with the exhibition. The dog, elephant, and rat were recognized by all but one of the pre-exhibit interviewees. The gorilla and giant tortoise were also familiar to more than half of those children. Two or fewer of them recognized the mongoose, rockfish, roundworm, or whale. In contrast, only two of the children who had seen *Amazing Feats of Aging* recalled seeing the dog in the exhibition, but seven recalled seeing the whale and six recalled seeing the mongoose or roundworm (animals unfamiliar to nearly all of the pre-exhibit sample). The majority of post-exhibit interviewees also remembered seeing the elephant, giant tortoise, and rat.

Table 22: Animals Recognized/Recalled by Children at OMSI (pre- vs. post-exhibit)

Animal	Pre-exhibit	Post-exhibit
Rockfish	0	2
Roundworm	0	6
Whale	1	7
Mongoose	2	6
Giant tortoise	6	6
Ape	7	5
Dog	9	2
Elephant	9	7
Rat	9	8
Snake	n/a	1

Children's Descriptions of the Aging Process in Animals

Both samples of children were asked to pick out one of the animals either recalled or recognized and talk about that animal's aging process. Pre-exhibit interviewees were instructed "tell [the interviewer] something that you know about what growing old is like for that animal." Post-exhibit interviewees were asked "tell [the interviewer] something that you learned about what growing old is like for that animal." Table 23 identifies those animals selected for discussion by these two groups of children. Note that nine of the ten children interviewed before seeing *Amazing Feats of Aging* picked out a total of ten different animals to discuss, while nine of those interviewed after seeing the exhibition picked out a total of twelve animals for discussion (one child in each group was unable to discuss the aging process of any animal). While the pre-exhibit interviewees concentrated exclusively on the dog, elephant, and giant tortoise, children interviewed following time spent in *Amazing Feats of Aging* were much more eclectic in their choice of animals. Nearly every animal pictured was discussed by at least one child.

Table 23: Animals Selected by Children for Discussion of Animals' Aging Processes

Animal	Pre-exhibit	Post-exhibit
Dog	6	2
Elephant	2	0
Giant tortoise	2	2
Ape	0	1
Rat	0	3
Mongoose	0	1
Roundworm	0	1
Whale	0	1
Snake	n/a	1
No response	1	1
Total discussed	**10**	**12**

Children in the pre-exhibit sample were actually more likely to discuss aging-related changes (or life span details) than were children in the post-exhibit group. Those pre-exhibit interviewees were also more likely to interpret the question in terms of developmental or maturational changes. Even though they were less likely to mention changes in physical or behavioral

characteristics that are specifically related to aging, children who had seen the exhibition did occasionally describe other characteristics of specific animals that were clearly related to identifiable exhibit content. One child described the relationship between the rat's environment and its well being, three others identified animals that do (or do not) maintain cross-generational relationships. Table 24 contrasts pre- and post-exhibit responses to this question.

Table 24: Pre- and Post-visit Descriptions of Animals' Aging Processes with Sample Responses

	Pre-exhibit		***Post-exhibit***	
Characteristic	**N**	**Example**	**N**	**Example**
Physical changes (old age)	6	*[Dogs] tire down when they get really old. Get arthritis, get sick and slow down.* [OMSI Log #13, PRE, age 8]	3	*The dog's hair turns gray.* [OMSI Log #11, POST, age 12]
Life span	2	*This one [giant tortoise] lives over 100 years.* [OMSI Log #9, PRE, age 10]	1	*[Giant tortoise] Very long life span—over 100 years. Females in both whale and people live longer.* [OMSI Log #4, POST, age 11]
"Maturational" changes	4	*[Giant tortoise] becomes more safer. [What do you mean?] Its shell gets harder. Gets away from predators faster.* [OMSI Log #15, PRE, age 11]	0	
Cross-generational relationships	0		3	*This one [ape]—they are able to see their grandparents and other aren't. It talked about it in another exhibit, but I don't remember what they said.* [OMSI Log #21, POST, age 10]
Other behaviors	1	*I know that elephants roll in the mud to cool themselves.* [OMSI Log #2, PRE, age 11]	3	*I've got a hamster—growing old, it's like biting. It likes to bite.* [OMSI Log #15, POST, age 8]

Both groups of children were also asked whether humans experience the same kinds of changes (or exhibit the same behavior) as the animals the children had chosen to discuss. The nine children in the pre-exhibit sample who were able to discuss the aging process of a particular animal unanimously agreed that humans also experience similar changes as they age. An eleven-year-old child who had described how his own dog had gray hair under his chin responded that,

> *"Yeah—the gray hair, people get gray hair on their chin. Also with the dog, they get weaker as they get older and so do people."* [OMSI Log #6, PRE, age 11]

Since their responses to the initial question were more varied, the post-exhibit group's responses to this question were more variable as well. Those children who had focused on familial relationships agreed that humans also exhibit such behaviors. One eleven-year-old who recalled that *"orcas always stay in their pod"* noted that humans are "kind of" like that—*"people are in a family."* [Log #19] Those who originally described physical changes (e.g., gray hair, less energy) also agreed that humans were similarly affected. A ten-year-old child who recalled how the rat was better off in a more stimulating environment responded that humans were like that, too, although her explanation differed somewhat from that offered by the corresponding exhibit component:

> *"If you just sit around all day, you won't have energy. If you don't go outside, you won't get any vitamin C—your body needs that."* [OMSI Log #21, POST, age 10]

Finally, both groups of children were asked to think of someone they know who is "old," describe how that individual differs from themselves (in terms of how they look or what they can do) and then consider whether they (the children) can do anything to change what will happen to them when they get older.

Nearly all of the interviewees had their grandparents in mind as they answered these questions. In considering how they (as children) differ from "old" people that they know, children did not necessarily confine themselves to what adults might consider "aging-related" differences. For example, many children included abilities or characteristics that distinguish between one person of any age and another, or between a child and an adult. A minority of children in each group mentioned *only* such differences.

> *"I have more hair than him [grandfather] and less fat. I can run faster than him and he can drive. He wears bigger shirts and has lots of Bank of America cards."* [OMSI, Log #9, PRE, age 10]

> *"Well, first of all, she's a farmer, unlike me. She's my grandparent. She can ride horses really well. She wears glasses but not all the time. I can't really think of anything else."* [OMSI, Log #13, POST, age 10]

One-half of the children in each group mentioned at least one way in which an older person was more physically challenged by old age:

> *"Well, umm, they [people at the synagogue] can't really walk as well, or see as well. Some of them have canes or walker things. Some of them have white hair and some gray. Their skin is a lot looser."* [OMSI Log #2, PRE, age 11]

> *"She [grandmother] has trouble hearing. She has white hair and wrinkles. Walks kind of slowly. She tends to be a bit absent minded."* [OMSI Log #4, POST, age 11]

As the above answers indicate, children also tended to mention aging-related differences in appearance, such as gray hair or wrinkles. One child in each group mentioned differences in knowledge or wisdom.

> *"He's wiser than me. He [Uncle Harold] looks at stuff different. [What do you mean?] He thinks of better stuff."* [OMSI Log #15, PRE, age 11]

> *"They're bigger than I am. Their hair is gray. They know a lot more than I do. They have or had a job. They're older than I am, too."* [OMSI Log #11, POST, age 12]

Table 25: Differences that Children Mentioned between Themselves and an "Old Person"

	Pre-exhibit	Post-exhibit
Aging-related characteristics		
Debilitating physical changes (e.g., trouble hearing, mobility limitations)	5	5
Different appearance (e.g., gray hair, wrinkles)	7	8
Difference in wisdom, knowledge	1	1
Differences (not aging-related)	5	5
There is no difference	-0-	1
Don't know	1	-0-

Both pre- and post-exhibit interviewees emphasized the contributions of "healthy habits" to improving the quality of life in old age. When asked, "Do you think that there is anything that you can do to change how old age or growing old will be for you?" six children in each group mentioned exercising, eating a healthy diet, or similar behaviors.

> *"Good diet. Exercise—keep legs strong. Don't hurt yourself, don't do anything dangerous. Be careful about sun. Read a lot, keep learning."* [OMSI Log #13, PRE, age 8]

> *"Oh, I remember that! Take good care of your teeth so you can continue to eat good and healthy foods. And make sure you get the right amount of exercise. [Anything else?] Make sure I take good care of my body."* [OMSI Log #21, POST, age 10]

A small number of children in each group also added admonitions about the use of drugs or alcohol:

> *"Like exercising and having a healthy diet. Don't take drugs or don't smoke."* [OMSI Log #9, PRE, age 10]

> *"Exercise a lot. Eat healthy foods. [Why do you think that will make a difference?] Muscles won't atrophy. Don't drink alcohol, don't smoke, don't do drugs."* [OMSI Log #4, POST, age 11]

Cued Questionnaires Completed by Adults (OMSI)

Fifty adults who had seen *Amazing Feats of Aging* completed a four-item questionnaire. The recruitment procedure was identical to that described for cued interviews. A very similar questionnaire was completed by eleven children; those findings are reported separately below.

Visitor Characteristics

As Table 26 indicates, the adult questionnaire sample closely resembled those adults who completed post-exhibit interviews. Males and females were equally represented; the majority of respondents were between thirty and fifty years of age. Nearly all described themselves as non-Latino and White. Forty percent were first-time OMSI visitors.

Table 26: Characteristics of Adults Completing Questionnaires at OMSI

Characteristic		Number	Percent
Gender:	Female	24	48%
	Male	26	52%
Age	younger than 20 yrs	2	4%
	20–29 yrs	8	16%
	30–39 yrs	18	36%
	40–49 yrs	13	26%
	50–59 yrs	6	12%
	60 yrs and older	3	6%
Race	American Indian	2	4%
	Asian	1	2%
	Black	-0-	0%
	White	44	88%
	More than one race	-0-	0%
Ethnicity	Latino	4	8%
	Not Latino	44	88%
First visit to OMSI?	No	28	56%
	Yes	22	40%
Related interest or training?	Yes	14	28%

Group composition was recorded only for post-exhibit respondents. Sixty percent of these visitor groups included both adults and children and 32 percent of these adults were accompanied by just one other adult and no children.

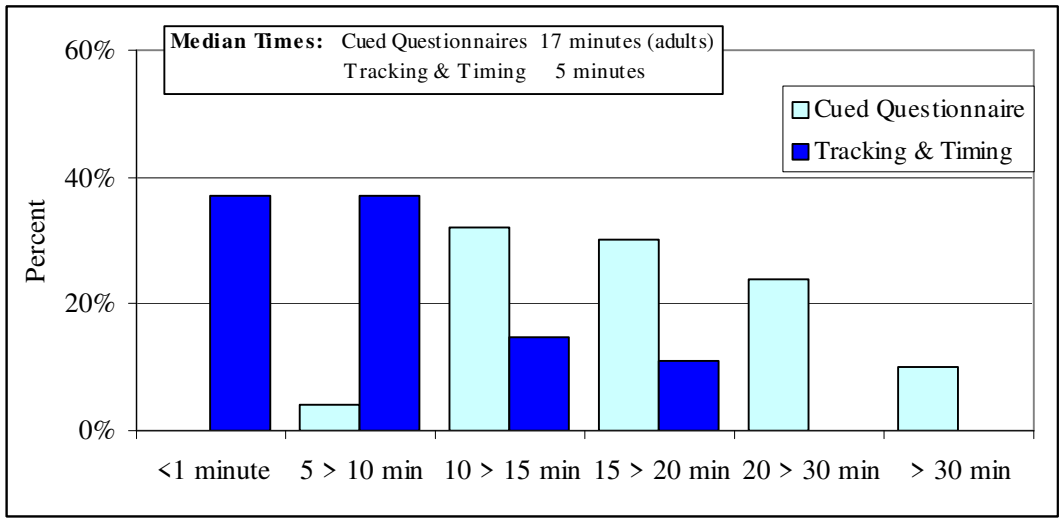
Table 27: Group Composition (cued adults completing questionnaires at OMSI)

	Adults				
Children	**One**	**Two**	**Three**	**Five**	**Total**
None	6%	32%	0%	2%	**38%**
One	30%	14%	0%	0%	**44%**
Two	0%	6%	2%	0%	**8%**
Three	4%	2%	0%	0%	**6%**
Total	**40%**	**56%**	**2%**	**2%**	**100%**

Time Spent in the Exhibition by Adults Completing Questionnaires at OMSI

The distribution of times spent by these adults closely resembled that of adult interviewees at OMSI. Again, the median time spent by the cued visitors was more than triple that of adults who were unobtrusively observed in the exhibition.

Figure 10: Time Spent in the Exhibition by OMSI Adults (cued questionnaires vs. unobtrusively observed visitors)



Concepts Addressed by OMSI Visitors

On their own, visitors described what they thought the exhibition was "about" by completing these four open-ended statements:

(1) To show ….
(2) To make people ….
(3) I never knew or never realized that ….
(4) It reminded me that ….

Since visitors' responses frequently included more than one separate idea, these unique ideas were isolated and then grouped by similar concepts. Eight concept categories were identified and examples of statements exemplifying those categories are shown in Table 28.

Table 28: Concept Categories with Sample Statements

Concept	Statement
Aging process (general)	*"[It reminded me that] aging is normal but sometimes a little scary to think that I will not remain young."* [OMSI Log #21, adult]
Changing the aging process	*"[To make people] be aware of the aging process and what things worsen or help us as we get older."* [OMSI Log #45, adult]
Aging process across different species	*"[To show] process of aging throughout the animal world; both + and – sides of it (health decline vs. experience)."* [OMSI Log #19, adult]
Causes and effects of aging	*"[To show] how our bodies look, act as we get older & how aging affects processing information."* [OMSI Log #32, adult]
Healthy aging	*"[It reminded me that] I need to take good care of myself. Eat properly, exercise the mind as well as body."* [OMSI Log #36, adult]
Life span/Rates of aging	*"[I didn't know that] women primarily live longer than males regardless of species."* [OMSI Log #23, adult]
Aging (other)	*"[To show] that aging is always around."* [OMSI Log #57, adult]
Other	*"[To show] growth & development. People and technology."* [OMSI Log #61, adult]

As Table 29 illustrates, the individual questionnaire items tended to evoke different kinds of responses/ideas. When considering what *Amazing Feats of Aging* was intended "to show," visitors were more likely to talk about causes or effects of aging, features of the aging process in different kinds of animals (including humans) or how the course of aging might be influenced by various factors. Thinking about what the exhibition was meant "to make people" do or think about, visitors were more likely to recall general messages about "having healthy lifestyles," "taking care of bodies and minds," or "taking better care of themselves." The exhibition also "reminded" visitors of very specific habits that promote healthier aging (e.g., a different diet, stimulating experiences, etc.).

Visitors were most surprised by ideas related to life span—either that women (of all species) outlive men, or that particular animals had a very long life span. Table 30 shows examples of these more common responses to different question prompts.

Table 29: Content of Statements Made by OMSI Adults in Response to Specific Questionnaire Prompts [14]

Concept	To show	To make people	Didn't know that	Reminded me
Aging/general	20%	20%	0%	6%
Changing process	18%	12%	4%	0%
Comparing species	**30%**	10%	2%	6%
Cause/Effect	**40%**	26%	16%	12%
Healthy aging	4%	**30%**	4%	**28%**
Life span/Rates of aging	4%	2%	**28%**	10%
Aging/Other	14%	10%	8%	12%
Other	8%	10%	18%	22%

Table 30: Examples of Statements Made by OMSI Adults to Specific Questionnaire Prompts

Concept category	Prompt	Verbatim visitor statement
Causes & effects	To show ….	*"information about the effects of aging in the higher animals." [OMSI Log #20, adult]*
Comparing species	To show ….	*"which animals or males/females lived longer or how they aged." [OMSI Log #4, adult]*
Healthy aging	To make people ….	*"aware of things they can do to live longer and healthier." [OMSI Log #59, adult]*
Healthy aging	It reminded me that ….	*"I should eat more vegetables and consume more antioxidants." [OMSI Log #41, adult]*
Life span	I didn't know that ….	*"a shellfish lived the longest!" [OMSI Log #60, adult]*

Reviewing adult visitors' responses to all four questionnaire prompts, visitors were most likely to discuss the concepts of "healthy aging" or the role of "healthy lifestyles" (54 percent of all respondents). At least one third of all respondents also talked about the aging process in general, mentioned that the exhibit provided information about more than one species, discussed causes and effects of aging, or commented on the life span of individual species or differences between

[14] Column totals may exceed 100 percent. If a visitor response included multiple statements, each individual statement was categorized independently.

female and male life span. Table 31 displays the percentage of all respondents who mentioned a particular concept in at least one of their answers.

Table 31: Percent of OMSI Adults Who Made at Least One Statement that Could Be Assigned to a Particular Concept Category.

Concept	Percent
Aging/general	38%
Changing process	32%
Comparing species	36%
Cause/Effect	44%
Healthy aging	54%
Life span/Rates of aging	36%
Aging/Other	40%
Other	40%

No visitor made statements reflecting all "aging-related" response categories. Twenty-five visitors (or 50 percent of the sample) made statements that addressed at least three of the aging-related categories listed above. Only two visitors failed to explicitly discuss the aging process in any of their questionnaire responses.

References to Specific Exhibit Components

Eighty-five percent of all adult questionnaires included at least one statement that clearly referenced a specific exhibit component; 46 percent made two or more such statements. Fourteen exhibit components prompted identifiable and specific recollections by visitors. Table 32 summarizes and illustrates exhibit references made by five or more visitors.

Table 32: Exhibit References Made by Adults Completing Questionnaire Statements at OMSI.

Component	Percent (Visitors)	Sample Statement
What Can We Do about Aging? (alone)	32%	*"[It reminded me that] I should eat more vegetables and consume more antioxidants."* [OMSI Log #5, adult]
Older Males/Older Females	18%	*"[I didn't know that] … female whales live so much longer than males. [It reminded me that] I should appreciate my age and my husband! 'Cause I'm going to live longer!!"* [OMSI Log #22, adult]
What Can We Do about Aging? Can Older Brains Learn New Tricks?	16%	*[I didn't know that] keeping your mind active may prevent "aging" of the brain."* [OMSI Log #34, adult]
The Age Machine	16%	*"[I didn't know that] I would look so funny @ age 77 [smiley face]."* [OMSI Log #32, adult]
A Sticky Situation	12%	*"[I didn't know that] cross linking had to do with cataracts."* [OMSI Log #49, adult]
Think Fast!	10%	*"[To make people] realize how aging changes your way of thinking and response times."* [OMSI Log #50, adult]

Other Characteristics of Visitor Responses

While the prompts "to show" and "to make people" tended to provoke discussions of the exhibition's content in impersonal terms, "I didn't know" and "it reminded me" prompted nearly

one half of the adult visitors to interpret the exhibition's content in a more personal way. For example:

> *"[I didn't know] that my brain shrinks! [It reminded me that] I need to keep active mentally + physically …."* [OMSI Log #6, adult]

> *"[It reminded me that] even though I look better with a tan, it makes my skin age more rapidly."* [OMSI Log #27, adult]

Occasionally, visitors' responses revealed more emotionally charged content. Five visitors joked about their experience at The Aging Machine, e.g.:

> *"[I didn't know] I'd look that bad in 10 years …. [It reminded me that] I should start saving up for plastic surgery …."* [OMSI Log #50, adult]

More explicit expressions of fear or anxiety associated with aging were even more rare (although such emotion might have also found expression in the jokes described above). Only two visitors made statements that reflected such outright (albeit low level) trepidation:

> *"[It reminded me that] aging is normal but sometimes a little scary to think that I will not remain young."* [OMSI Log #21, adult]

> *"[I didn't know that] I really don't like to think about aging!"* [OMSI Log #36, adult]

Cued Questionnaires Completed by Adults (LNHM)

Ten adults who had seen *Amazing Feats of Aging* in Lafayette completed a four-item questionnaire identical to that used at OMSI. Visitors were recruited as they entered the museum's first floor exhibit galleries and those who agreed to participate were escorted to the exhibition.

Visitor Characteristics

The LNHM adult questionnaire sample included more females than males but was otherwise similar to that of adults completing questionnaires at OMSI.

Table 33: Characteristics of Adults Completing Questionnaires at LNHM

Characteristic		LMNH N = 10	OMSI N = 50
Gender	Female	80%	48%
	Male	20%	52%
Age	younger than 20 yrs	0	4%
	20–29 yrs	10%	16%
	30–39 yrs	40%	36%
	40–49 yrs	20%	26%
	50–59 yrs	10%	12%
	60 yrs and older	20%	6%
Race	American Indian	0%	4%
	Asian	0%	2%
	Black	10%	0%
	White	90%	88%
	More than one race	0%	0%
Ethnicity	Latino	0%	8%
	Not Latino	100%	88%
Related interest or training?	Yes	40%	28%

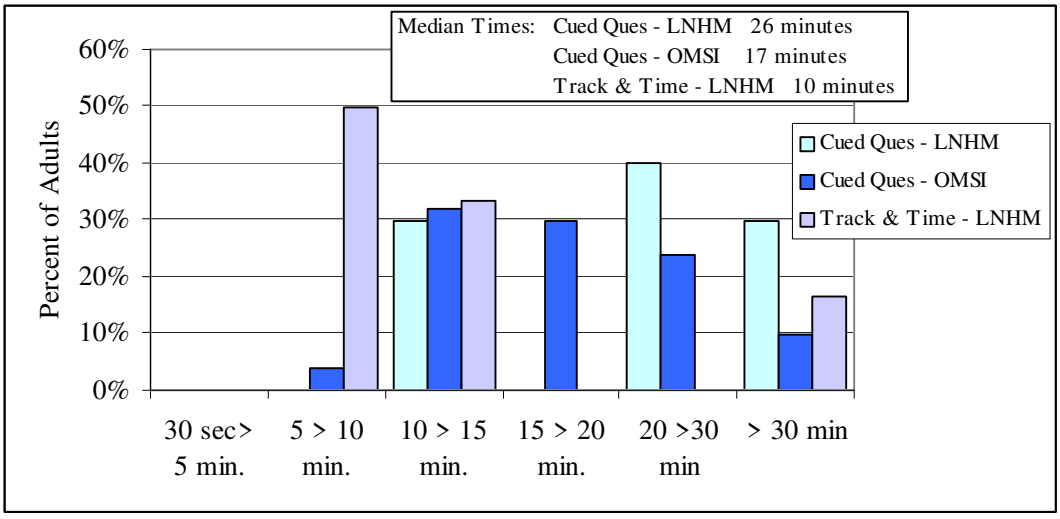
Six of these adults were accompanied by children during their visit (a proportion equal to that of the OMSI sample).

Time Spent in the Exhibition by Adults Completing Questionnaires at LNHM

Figure 11 contrasts time spent by non-cued adults and cued adults at LNHM with that spent by cued adults at OMSI. Note that cued adults not only spend more time in the exhibition than those in the LNHM timing and tracking sample, they also tended to spend more time in the exhibition than their cued counterparts at OMSI. [15]

[15] This difference must be interpreted with caution. The two samples differ in size (10 visitors versus 50 visitors) and both exhibited considerable variability with standard deviations ranging from 11 minutes for visitors completing questionnaires at OMSI to 13 minutes for those in the comparable sample at LNHM.

Figure 11: Time Spent in the Exhibition by Cued Adults at LNHM and OMSI



Concepts Addressed by Adults Completing Questionnaires at LNHM

Again, visitors were asked to describe what they thought the exhibit was "about" by completing these four open-ended statements:

(1) To show ….
(2) To make people ….
(3) I never knew or never realized that ….
(4) It reminded me that ….

The analysis strategy was identical to that followed with the data gathered at OMSI. Visitors' unique ideas were isolated and then grouped by the six concept categories defined for the OMSI data analysis (see page 31). Table 34 compares concepts addressed by adults in response to all prompts; Table 35 compares responses made to specific prompts.

Table 34: Percent of Adults Who Made at Least One Statement that Could Be Assigned to a Particular Concept Category.

Concept	OMSI	LNHM
Aging/general	46%	70%
Changing process	34%	30%
Comparing species	48%	60%
Cause/Effect	94%	50%
Healthy aging	66%	70%
Life span/Rates of aging	44%	50%

Table 35: Content of Statements Made by Adults in Response to Specific Questionnaire Prompts. 16

	To show		To make people		Didn't know that		Reminded me	
Concept	**OMSI**	**LNHM**	**OMSI**	**LNHM**	**OMSI**	**LNHM**	**OMSI**	**LNHM**
Aging/general	20%	20%	20%	**30%**	0%	0%	6%	20%
Changing process	18%	0%	12%	20%	4%	0%	0%	10%
Comparing species	**30%**	**40%**	10%	20%	2%	0%	6%	0%
Cause/Effect	**40%**	20%	26%	10%	16%	20%	12%	0%
Healthy aging	4%	10%	**30%**	20%	4%	0%	**28%**	**40%**
Life span/Rates of aging	4%	0%	2%	0%	**28%**	**50%**	10%	0%

Overall, the adults questioned in Lafayette seemed somewhat more likely to address the general aging process, note comparisons between or across species, or comment on a species' life span or rate of aging. Six of the ten visitors in the LNHM sample made statements that fell into at least three of the concept categories; only one visitor failed to discuss any aspect of the aging process in their questionnaire responses. As was true of adult visitors at OMSI, the prompts tended to evoke particular responses in the visitors. Four of ten adults in the Lafayette sample mentioned comparisons between species when considering what the exhibition was intended "to show."

> *"[To show] the process of aging for a wide variety of humans and other mammals as well."* [LNHM Log #1, adult]

The statement "I didn't know that" was even more likely to prompt information concerning life-span patterns or variations—one half of the adults interviewed in Lafayette made statements like this one:

> *"[I didn't know that] men die before women!"* [LNHM, Log #14]

> *"[I didn't know that] adult size, generally, is proportional to species longevity."* [LNHM Log #4, adult]

Amazing Feats of Aging also tended to remind these visitors about "healthy habits"—either developing them or continuing established practices.

> *"[It reminded me that] the decisions I have made about diet, exercise, etc., are good choices."* [LNHM Log #4, adult]

References Made by LNHM Adults to Specific Exhibit Components (LNHM)

All but one of the questionnaires completed by adults in Lafayette included at least one statement that clearly referenced a specific exhibit component; four visitors made two or more such statements. As Table 36 indicates, those exhibits prompting comments from approximately 20 percent or more of the OMSI visitors evoked similar comments from two or more of the LNHM sample.

[16] Since multiple statements made by the same visitor were categorized independently, column totals may exceed 100 percent.

Table 36: Exhibit Components Referenced by Two or More Adults at LNHM Compared with Similar References Made by OMSI Adults

	Number (%) of adult visitors:	
Component	**LNHM**	**OMSI**
What Can We Do about Aging? (alone)	3 (30%)	16 (32%)
Older Males/Older Females	2 (20%)	9 (18%)
Longevity Parade & misc. Posters	2 (20%)	3 (6%)

Many exhibitions prompted similar comments from visitors at the two sites (see Table 37).

Table 37: Adult Statements about Specific Exhibit Components

Older Males/Older Females	
OMSI:	**LNHM**
"[I didn't know that] …female whales live so much longer than males. [It reminded me that] I should appreciate my age and my husband!' Cause I'm going to live longer!!" [OMSI Log #22, adult]	*[Didn't know that] the projected life expectancy [sic] between males and female within a species were so dramatically different.* [LNHM Log #12, adult]
Longevity Parade & Posters	
OMSI:	**LNHM**
[I didn't know that] humans could live to 122 years. [OMSI Log #59, adult]	*[Didn't know that] humans in general have as long a life expectancy as they do.* [LNHM Log #8, adult]
The Age Machine	
OMSI:	**LNHM**
[I didn't know that] I would look so funny @ age 77. [smiley face] [OMSI Log #32, adult]	*[I didn't know that] I'd look so old at 78!* [LNHM Log #8, adult]

Other Characteristics of Adult Responses (LNHM)

The prompt "it reminded me that" was similarly likely to evoke personal reflections in both groups of adults—approximately 50 percent of each sample made at least one statement like this one:

> *[Reminded me that] aging can be an interesting experience if one stays consciously & actively involved in it. [That] at over a half century old, I can still take enjoyment in learning.* [LNHM Log #8, adult]

Cued Questionnaires Completed by Children (OMSI and LNHM)

Since the size of the children's samples at the two sites were so similar (eleven children at OMSI and ten children in Lafayette), the responses of these two groups will be displayed concurrently in this report. The very small sizes of both samples limits the generality of these results and this summary of findings is less detailed than the corresponding data summary for the OMSI adults.

Visitor Characteristics

Like children in the OMSI pre- and post-interview groups, children completing questionnaires at both sites were predominantly non-Latino White. At OMSI, boys outnumbered girls overall; the reverse was true of children completing questionnaires at LNHM. As was true of child interviewees, the majority of children completing questionnaires at OMSI were repeat museum visitors. Table 38 compares the background characteristics of children in the questionnaire samples at the two sites.

Table 38: Characteristics of Children Completing Questionnaires at OMSI and LNHM

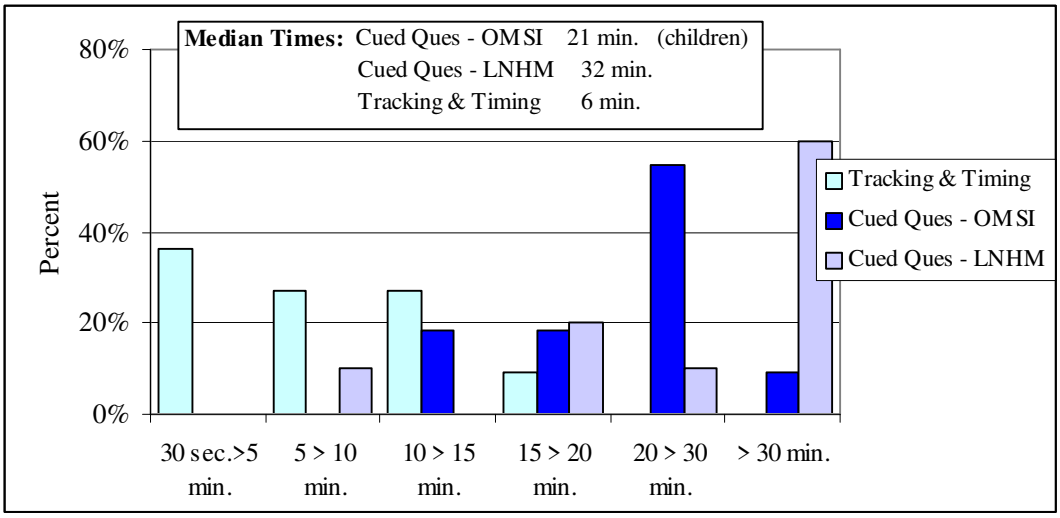
Characteristic		*OMSI* N = 11	*LNHM* N = 10
Gender:	Female	4	6
	Male	7	4
Age:	7–8 years old	-0-	1
	9–10 years old	1	3
	11–12 years old	9	2
	13 years or older	1	4
Race/Ethnicity:			
	Non-Latino White	9	6
	Latino White	-0-	-0-
	Non-Latino Black	-0-	1
	Non-Latino, more than one race	2	1
	Latino, more than one race	-0-	-0-
	Not recorded/sure	-0-	2
First Visit to OMSI?	Yes	3	not applicable

Six of the 11 children recruited to complete questionnaires at OMSI were in groups that included no other children; that pattern applied as well in Lafayette, where five of ten children were accompanied by one or more adults (but no other children).

Time Spent by These Children in the Exhibition

Figure 12 contrasts the time spent by children who completed questionnaires with that spent by children who were unobtrusively observed during the Tracking and Timing component of the evaluation (OMSI only). As was the case with all other cued visitors (including all cued adults and children who were interviewed), these children spent dramatically more time in the exhibition than those children who toured *Amazing Feats of Aging* without being cued in advance.

Figure 12: Time Spent by Cued Children Completing Questionnaires Compared with Unobtrusively Observed Children



Concepts Addressed

On their own, the children described what they thought the exhibition was "about" by completing these four open-ended statements:

(1) To show ….
(2) To make people ….
(3) I never knew or never realized that ….
(4) It reminded me that ….

Although accompanying adults were encouraged to remain with the children to clarify the questions (if necessary), the adults were requested to refrain from answering the questions themselves.

Since they prompted very similar responses in both groups of children, the responses to the first two items ("To show" and "To make people") were analyzed together. As they completed these prompts, nearly all of the children (ten of eleven at OMSI and nine of ten in Lafayette) talked about the aging process, either in general terms or mentioning specific details.

> *"[To show] you the way things happen to your body like aging."* [OMSI Log #17, age 14]

> *"[To show] what some body parts feel like, effects of aging, and how a new environment could affect middle-aged mice."* [LNHM Log #5, age 10]

The prompt "to make people" was very likely to encourage children at both sites to respond in terms of the exhibition's educational potential.

> *"[To make people] know how to live a healthy life and learn about how aging works."* [OMSI Log #3, age 11]

> *"[To make people] learn about how animals & humans are different in life span."* [LNHM Log #5, age 10]

In this respect, the children's responses were very different from those of the adults. Eighteen of the twenty-one children completing questions at both sites used words or phrases like "learn," "think," "understand," or "be aware of" in describing the exhibition's impact on visitors. In contrast, only 38 percent of all adults used such terminology in any of their responses.

The comments of three children at OMSI also suggested that young people may be more responsive to the exhibition's playful aspects than are adults. For example,

> *"[To make people] learn about the body without being boring."* [OMSI Log #17, age 14]

> *"[To make people] think. They made these so people could learn and fun [sic] at the same time, these creative games are fun for adults and children."* [OMSI Log #7, age 12]

Table 39 illustrates that, despite their overall similarities, the details of children's responses at the two sites did differ in some respects.

Table 39: Children's Completion of "To Show" and "To Make People" Prompts

	OMSI	LNHM
Number of discrete ideas mentioned	29	25
Concept:		
The aging process	**51%**	**36%**
"about aging"	0%	20%
Signs/effects of aging	10%	8%
How we age	14%	0%
People and animals aging	10%	0%
Learning/thinking about aging	17%	8%
Healthy aging	**21%**	**4%**
Life span	**0%**	**12%**
Other (aging related)	**10%**	**8%**
Other (topic other than aging)	**17%**	**40%**

Children at OMSI seemed more likely to discuss the aging process. For example, three children specifically described that the exhibition was about the aging process in humans *and* animals.

"[To show] how aging affects [sic] people and animals." [OMSI Log #15, age 12]

As was true of adults, at least three children questioned at OMSI recognized that *Amazing Feats of Aging* was also designed to encourage "healthy aging" habits.

"[To show] how to be healthy in your older age. [To make people] know how to live a healthy life." [OMSI Log #3, age 11]

"[To show] aging and how you prevent it from coming quickly. Also signs of aging and how to be healthy while aging." [OMSI Log #29, age 10]

Children questioned after seeing the Lafayette installation were more likely to include non-aging related ideas in their responses to the first two prompts, most often relating to the brain (see **other features of the children's responses** below).

Children at both sites resembled adults in their likelihood to be surprised by details of the life span of particular animals. The prompt "I didn't know that" led six children at OMSI and all ten children questioned in Lafayette to comment on the relationship between size and length of life, the remarkably long (or short) life span of certain animals or the tendency of females to live longer than males.

"[I didn't know that] some of these animals lived so long or so short. It's pretty amazing." [OMSI Log #7, age 12]

"[I didn't know that] a fish in Alaska lived to be 205 years old ….] [LNHM Log #6, age 10]

"[I didn't know that] most female animals live longer than males do." [LMNH Log #20, age 13]

Other Features of the Children's Responses

Visitor groups in the Lafayette installation were frequently observed to move between *Amazing Feats of Aging* and the adjacent *Brain Matters*. This circumstance seems to have especially affected the children's questionnaire responses. One-half of the children questioned in Lafayette mentioned the brain in one or more of their responses (none of the children questioned at OMSI

included any such mentions). Typically, these children at LNHM talked about the brain without any reference to the aging process.

> *"[To show] how the brain works."* [LNHM Log #10, age 11]

> *"[To make people] realize [sic] what your brain is."* [LNHM Log #9, age 9]

Others seemed to integrate concepts from the two exhibitions almost seamlessly (and in one case, actually mentioned ideas about the brain that were obviously prompted by *Amazing Feats of Aging*).

> *"[To show] how our brains work & it teaches about aging. [To make people] understand how our brains & parts of our bodies work. [It reminded me that] everything's brain functions almost the same & that everyone will age eventually & differently."* [LNHM Log #20, age 13]

> *"[To show] that your brain ages faster then your face shows. [To make people] understand how to take care of your brain. [It reminded me that] my brain is important to use."* [LNHM Log #9, age 9]

IV. Discussion

Amazing Feats of Aging was clearly most effective when communicating to a highly motivated audience (i.e., cued visitors who completed interviews and questionnaires). Nearly all of these visitors were very captivated and informed by the exhibition's components. Although adults may have described their reactions to *Amazing Feats of Aging* in more sophisticated terms, children's conceptions of aging obviously developed with exposure to the exhibition. Although the sample of visitors observed and questioned in Louisiana was relatively small, those visitors' reactions to the exhibition were strikingly similar to those of OMSI visitors.

The exhibition's major weakness may be its failure to maintain the casual visitor's interest (and thus time spent in the exhibition) at the level necessary to support such communication. While this study did not include interviews (or any other contact) with non-cued visitors, it is very unlikely that these adults and children left the exhibition with the same level of knowledge and interest as those visitors in the cued samples (who spent considerably more time viewing exhibition components).[17] The success with which *Amazing Feats of Aging* communicated with highly motivated visitors should, however, encourage OMSI exhibit staff to consider how the casual visitor's time in the exhibition might be increased and the recommendations that follow this discussion will include relevant suggestions.

Visitors Use of Amazing Feats of Aging

Patterns of Interaction—Time Spent and Components Attracting Attention

Adult visitors who were unobtrusively observed at OMSI spent a median time of approximately five minutes viewing *Amazing Feats of Aging* components and made a median of five stops at exhibition components. Children at OMSI spent more time (a median of six minutes) but made slightly fewer stops (a median of four).[18] It is helpful to view these findings in light of data from other exhibition studies. Organizing data from a wide variety of exhibition studies, Serrell (1997) developed two measures of visitor behavior in exhibitions:

- "Sweep Rate Index" describes the rate at which visitors move through an exhibition and is calculated by dividing the exhibition's total square footage by the average time spent by visitors. As visitors spend more time (and move more slowly through an exhibition), the Sweep Rate Index drops correspondingly.

- The "Percent Diligent Visitors Index" indicates how thoroughly visitors "use" an exhibition and it equals the percentage of visitors stopping at more than 50 percent of an exhibition's components.

Based on an approximate area of 3,000 square feet, average time spent by adult visitors at OMSI (five minutes) translates to a Sweep Rate Index of 600, higher than Serrell reports for similarly sized exhibitions.

[17] Note that since so few visitors were observed at LNHM, all discussions of non-cued visitor behavior refer only to those observed at OMSI.

[18] "Total time spent" and "number of stops" did not include stops at unrelated components or time that visitors spent in such activity. As noted previously, this discussion does not include those visitors observed at LNHM.

If one considers "posters" to be exhibit components, computations based on the current study data indicate a Percent Diligent Visitors equal to zero—that is, no visitor was observed to interact at more than twelve of the twenty-five exhibit components. Even if the posters were removed from this calculation (resulting in a total component count of twenty-one), Percent Diligent Visitors remains at zero.

These somewhat disappointing findings from the OMSI component of this study may be a product of the exhibition's configuration and location at that institution. As noted in the Introduction to this study, *Amazing Feats of Aging* is one of four exhibitions sharing the 8,000-square-foot Life Science Hall. The exhibitions' boundaries are defined by changes in design/color scheme rather than by walls or other physical barriers. Visitors were often observed to move back and forth among the different exhibitions, and, indeed, more than one-half of the adults interrupted their viewing of *Amazing Feats of Aging* to interact with nearby (and unrelated) exhibits or visit the adjacent Life Science Lab.

When evaluators asked visitors to spend time in the exhibition and answer questions following that experience, time spent in the exhibition by both adults and children more than tripled when compared with their non-cued counterparts. The Sweep Rate Index for cued visitors ranged from 136 (cued child interviewees) to 176 (cued adults completing questionnaires). It is reasonable to assume that the majority of these adults and children also stopped at more than one-half of exhibition components, although we have no actual data to support that conclusion.

Despite the fact that non-cued visitors spent relatively little time in the exhibition, data gathered during the Timing and Tracking phase of this study provided some information about the relative attractiveness of exhibit components for non-cued visitors. "Free Radical Attack" was the only component to attract stops by more than 50 percent of both adults and children. "The Healthy Aging Brain" and "Older Males or Older Females?" were also of interest to the adult visitors (attracting stops by at least 30 percent of that group). Given the small number of children observed (relative to the size of the adult sample), any comparisons of the two groups must be approached with caution. Nevertheless, "The Age Machine" did seem to draw children more strongly than adults, while "The Healthy Aging Brain" was of apparently equal interest. Note, however, that "The Age Machine" was equally effective in maintaining the interest of both children and adults (once a stop was made).

As noted above, this exhibition is located adjacent to the museum's popular Life Science Lab—indeed, visitors must walk through *Amazing Feats of Aging* to reach the Lab. Tracking and Timing data documented the Lab's powerful draw. Nearly 50 percent of the observed adults (and 30 percent of the children) interrupted their involvement with *Amazing Feats of Aging* to investigate the Lab's live animals and on-going activities.[19] If Lab activities reinforced *Amazing Feats of Aging* messages, the Lab's attractiveness might actually work to the exhibition's advantage.

[19] Cued visitors were specifically instructed to postpone a visit to the Lab until they had completed their interview/questionnaire.

Activity at Individual Components

While adults were more likely to take advantage of the full range of information and activity available at exhibition components, children were more likely to actually use interactives themselves (although they were also less likely to read explanatory text). Even so, the observed adults clearly did not just confine themselves to passive observation of children's activity (or to the "designated label reader" role). An impressive 60 percent of adults manipulated interactives (when that activity was possible) and 36 percent of children read information themselves when it was hidden by a "flip" panel. Both adults and children did spend time watching others use interactives and engaged in conversation (or other social interaction) prompted by exhibit experiences.

What Did Visitors Learn from Amazing Feats of Aging?

Although the questions posed during interviews and on the questionnaires were very different, collectively they provide a rich portrait of how *Amazing Feats of Aging* affected visitors' thinking about the aging process. Pre-exhibit interviews conducted with adults and children offer a glimpse of how typical OMSI visitors conceptualized the aging process before any experience with exhibition components. These more "naïve" views of aging will be contrasted with those expressed by post-exhibit interviewees where appropriate throughout this discussion.[20] Visitors who viewed the exhibition in Lafayette were not interviewed but did complete questionnaires. For the purposes of this discussion, questionnaire responses have been combined from the two sites; ideas expressed by adults and children will be discussed separately and compared where appropriate.

The exhibition's Big Idea expresses those concepts about aging that were uppermost in the minds of its developers—their collective answer to the same question that we posed to many visitors "What is this exhibit about?" As such it provides a good starting point for a review of the ideas that emerged as visitors discussed the exhibition:

> ***We learn about aging by studying the universal and distinctive ways that adult animals (including humans) change over time.***

Awareness of Similarities (and Differences) between Human and Animal Aging

Adults interviewed prior to any experience with the exhibition were certainly aware of similarities between human and animal aging, but they tended to limit their discussion of "animals" to those that they were most familiar with, especially those with whom they share their homes (e.g., dogs) or those they are more likely to see featured on televised nature programs (e.g., apes and elephants).

> *"There are vets that specialize in treating [dogs] like humans. [What do you mean?] Rheumatism, etc. My son's dog got old and [we] took him to the vet for medication. [They] don't reproduce when [they're] older. [They have] failing eyesight, hearing."*
> [OMSI Log #20, PRE, adult]

[20] Pre-exhibit comparisons are not possible for adults and children who completed questionnaires, since the format of those open-ended questions precluded use with visitors who had not yet seen the exhibition. Visitors at LNHM were not interviewed, but both children and adults did complete questionnaires.

"He can still put fear into people even though he is old and gray. Still dictating things. Still had power and control over his group. I learned that at the Wild Animal Park in San Diego." [OMSI Log #1, PRE, adult]

While these sources of information often provided visitors with fairly reliable information, they did occasionally produce some confusion, e.g.,

"[The ape] probably develops some kind of muscle problems like tendonitis. [Anything else?] They grow a beard, they turn gray." [OMSI Log #5, PRE, adult]

Experiences with *Amazing Feats of Aging* clearly broadened adults' familiarity with aging throughout the animal kingdom. These adults were able to describe aging across a much wider variety of animals and their discussion of more familiar ones (like dogs) often included details noticeably absent from pre-exhibit conversations. Children resembled adults in their likelihood to evidence familiarity with a wider variety of animals and in the details of animal behavior and aging that they recalled.

"[The dog] grays and grows white hair just like ours does when we age. … And the bones—I saw the aged bones there, they got jagged. [What do you mean?] Comparing old and young—older bones were looser with more space between the joint." [OMSI Log #28, POST, Adult]

"Orcas always stay in their pod." [OMSI Log #19, POST, age 11]

In their responses to the questionnaire prompt, "[this exhibit was intended] to show …," one-third of all adults included the notion of comparisons between species (or humans and animals). Approximately 20 percent of children also touched on this concept, although with much less detail:

"[To show] Processes of aging throughout the animal world; both + and - sides of it (health decline vs. experience)." [OMSI Log #19, adult]

"[To show] the process of aging for a wide variety of humans and other mammals as well." [LNHM Log #1, adult]

"[To show] how aging effects [sic] animals and humans." [OMSI Log #7, age 12]

"[To show] about aging …." [LNHM Log #5, age 10]

Kinds of Changes that Visitors Associate with the Aging Process

As noted in the Introduction, the exhibition's developers translated the exhibition's fairly broad Big Idea into four more narrowly defined messages. The first of these ("aging is a multifaceted process, small changes accumulating over time") was not fully articulated by post-exhibit visitors. Instead, the exhibition did influence visitors' notions of the *kinds* of changes they were likely to associate with the aging process.

Adults interviewed prior to any experience with the exhibition saw aging primarily in terms of debilitating changes (e.g., failing hearing, arthritis, mobility limitations). They were also likely to mention observable physical changes (such as graying hair) but more rarely considered differences in animal life span or social behaviors. While adults interviewed *after* viewing exhibit components did not ignore these more obvious correlates of aging, they were also much

more likely to mention similarities (or differences) in animal life span or social behaviors characterizing the aging process across both animals and humans.

Even though visitors did not explicitly discuss aging as a process of small, accumulative changes, 40 percent of all adults completing questionnaires (and 20 percent of all children) did include a description of causes or effects of aging in their response to one or more of the prompts. These mentions ranged from the very general to descriptions of specific changes that take place:

"[To show] various facets of what is known about aging—causes, effects, etc." [OMSI Log #48, adult]

[To show] how our bodies look, act as we get older & how aging affects processing info. [OMSI Log #32, adult]

"[To show] this display very graphically allows one to visually ascertain the process of aging. In looks, vitality, and memory." [LNHM Log #3, adult]

"[To show] about ageing [sic]". [LNHM Log #16, age 14]

"[To show] that your brain ages faster then [sic] your face shows. [LNHM Log #9, age 9]

Not surprisingly, children interviewed prior to an exhibit experience were much more likely than adults to view "getting old" as simply "maturing" or "growing," a notion largely absent from children's post-exhibit interviews.

"[The elephant's] tusks grow longer, [it] changes size." [OMSI Log #13, age 8, PRE]

It is encouraging to note that overall, children were unlikely to think of aging in terms of debilitating changes (especially in post-exhibit interviews).

Visitors' Awareness of "Unique Aging Profiles"

Again, even though visitors never actually used this specific terminology, their responses reflected awareness of specific ways in which various organisms both resemble and differ from each other. Moreover, adults often identified characteristics that differentiated among groups/classes of organisms, as well as those that apply across a wide range of organisms. Such insights were most likely to emerge in adult discussions of animal life span and social behavior in old age.

For example, more than one-half of interviewed adults, nearly 40 percent of adults completing questionnaires (and 60 percent of children) discussed animal life spans—how they are unusual (e.g., very long or very short), related to shared characteristics (e.g., size, gender), or simply how they compare with each other. Many of these comments (from both children and adults) included very specific details:

"[Whales live] about 90 years, humans 122, which I thought was interesting. I thought that whales lived a lot longer than we do. I was taught that humans live an average of 70 years. Some get lucky and live past that and some don't. I was pretty depressed on my 35th birthday that my life was half over. [OMSI Log #9, POST, adult]

"[I didn't know that] … a rockfish would live to 205 yrs; orcas live so long. [OMSI Log #19, Adult]

"[I didn't know that] the projected life expectancy [sic] between males and females within a species were so dramatically different." [LNHM Log #12, Adult]

"[I didn't know that] ginua [sic] pigs don't live long. Females live longer than males." [LNHM Log #7, age 11]

"[I didn't know that] bats live longer than tigers." [OMSI Log #12, age 11]

Note that many visitors probably entered the exhibition with some knowledge of how life span (in particular) varies across organisms—in fact, adults interviewed prior to any exhibit experience were even more likely than post-exhibit interviewees to mention an animal's life span when considering how the aging process of particular animals differs from that of humans. However, nearly all of those pre-exhibit interviewees focused exclusively on either the tortoise (unusually long life span) or the dog (life span shorter than humans). These pre-visit responses certainly do not match the post-exhibit discussion in terms of either detail or variety.

"[Tortoises] live a long long time—longer than humans." [Log #19, PRE , adult]

"Dogs don't live as long." [Log #20, PRE, Adult]

"This one [tortoise] lives over 100 years." [OMSI Log #9, PRE , age 10]

Visitors' Awareness of "Underlying Similarities"

Even though visitors were seemingly more aware of similarities in the causes and effects of aging across a wider variety of species, neither adults nor children attempted to infer parallel similarities in structure, function, or environment. Certainly, the interview protocol did not probe for such explanations, and at least a small number of the adults in that sample may have given some thought to that possibility. It is perhaps more telling that no visitor (adult or child) even suggested this relationship in response to the questionnaire's open-ended prompts. *Amazing Feats of Aging* did successfully expand both children's and adults' notion of "aging" and focused their attention on previously unnoticed ways in which the phenomenon of aging plays out across a variety of species, including humans. Those who make the study of aging their life's work moved past this stage of basic awareness very early in their careers. These experts know enough about characteristics and patterns of aging to be captivated by the search for explanations. Visitors to this exhibition, on the other hand, were surprised to find out that females (of many species) outlive their male counterparts, that some animals live so long (while others' lives are so short), that larger animals often outlive smaller ones, that even parts of our own bodies age at different rates. Having made these very fundamental observations, these visitors may now be in a better position to wonder, "why?".

Visitors' Awareness of the Relative Impacts of "Nurture" and "Nature"

Several *Amazing Feats of Aging* components were designed to communicate that "nurture has a greater impact than nature on the experience of aging." Adults were particularly receptive to this message. Such considerations of nurture vs. nature were evoked most often when interviewers asked adults to rate the level of control that they feel over their own aging process. In this context, nearly all interviewees (whether pre- or post-exhibit) discussed the role of lifestyle/environmental variables and their interaction with genetic/biological or other factors

over which we have little or no personal control. Post-exhibit interviewees were more likely to assign greater importance to the former, including diet, exercise, and mental stimulation.

Questionnaire prompts evoked very similar discussions, especially when visitors were asked to describe what the exhibit was about ("to make people …) or whether it reminded them of anything in particular. More than one-half of these respondents (and three of the children) made statements similar to these,

> *"[It reminded me that] … exposure to new experiences helps keep brains younger."* [OMSI Log #19, adult]

> *"[To make people] aware of how to take better care of themselves & live healthier lives. [Reminded me that] I need to take better care of myself if I want to live longer than my husband!"* [LNHM Log #14, adult]

> *"[To show] how to be healthy in your older age. [To make people] know how to live a healthy life."* [LNHM Log #3, age 11]

This finding is certainly encouraging, but must be interpreted cautiously. Exhortations to adopt healthier habits in general are common throughout our culture. Consider this response from one adult questioned after spending time in *Amazing Feats of Aging*:

> *"[It reminded me that] I need more exercise (but almost everything reminds me of that)."* [OMSI Log #48, adult]

The Exhibition's Impact on Children

Early in the exhibition's development process, the OMSI team expressed concern about the exhibition's potential impact on (and reception by) children. Would the topic of aging appeal to children? What could children learn about a process with which they had only limited experience? Would children's reaction to discussions of aging be more negative than those of adults?

The results of this study suggest that such concerns were not warranted. In fact, non-cued children's level of activity in *Amazing Feats of Aging* approached that of non-cued adults, even through neither group spent significant amounts of time in the exhibition. Children used the flip labels, engaged with interactives, and talked with companions about exhibit components. Highly motivated (i.e., cued) children spent a considerable amount of time in *Amazing Feats of Aging*. Median time spent by cued children ranged from 21 minutes (children completing interviews at OMSI) to 32 minutes (children completing questionnaires at LNHM).

Cued children's recollection of specific exhibition details stand out in the findings, and they were especially likely to recall details of human or animal life span. Some children were struck by the remarkable longevity of particular animals; in other cases, children recalled life span patterns highlighted by the exhibition.

> *"[Didn't know that] A fish in Alaska lived to be 205 years old …."* [LNHM Log #6, age 10]

> *"[I didn't know that] smaller dogs live longer than bigger dogs. Flying animals, though small, can live longer then [sic] bigger animals because they can avoid predators."* [OMSI Log #3, age 11]

"[Reminded me] that most human & animal females live longer than males." [LNHM Log #5, age 10]

Children's responses rarely suggested any fear of the aging process or its consequences. Like this child, they often responded positively and personally to the exhibition's "healthy aging" messages:

[To show] aging and how you prevent it from coming quickly. And how to be healthy while aging. [Reminded me that] I need to stay healthy so I don't age so fast. [OMSI Log #29, age 10]

Children were very like adults in this respect. In both cases, any negative responses reflected concern about changes in appearance that occur with aging and seem to have been prompted by the visitor's interaction with "The Aging Machine."

"[Didn't know that] I would look so bad at 80." [OMSI Log #37, adult]

"[Didn't know that] I would look bad when I get older." [LNHM Log #19, age 13]

V. Recommendations

Increasing the Exhibition's Impact on Non-cued Visitors

The exhibition's significant weakness is its apparent inability to engage the casual visitor's attentiveness for more than a very few minutes. At both OMSI and LNHM, nearby exhibitions competed for visitor time and attention. These findings have implications on at least three different levels: *Amazing Feats of Aging*'s current installation at OMSI, future exhibition installations at OMSI, and OMSI's traveling exhibition program in general.

In its OMSI installation, the exhibition will always have some difficulty differentiating itself from other nearby (and attractive) exhibitions. These competing exhibitions do more than simply take visitors' time away from *Amazing Feats of Aging*—they also make it much more difficult for visitors to maintain a "train of thought" that supports the kind of learning displayed by cued visitors. The exhibition's proximity to the Life Science Lab could be made to work to *Amazing Feats of Aging*'s advantage, however.

Rather than solely competing for visitors' attention, some portion of the Lab's displays and activities could reinforce key "aging" messages and motivate casual visitors to pay more attention to specific exhibition components. These are examples of strategies that Lab staff and activity developers might consider:

(1) Explore concepts and ideas that cued visitors found most memorable and direct casual visitors' attention to related components. Good candidates for this approach might include the relative life spans of males and females (e.g., "Older Males or Older Females?"), the incidence and importance of cross-generational relationships (e.g., "Banded Mongoose Puppet Theater" and "Animal Families" panel), and characteristics that vary widely and surprisingly across species (a strong theme throughout the exhibit, but exemplified by "Amazing Aging Animals").

(2) Provide additional context to help visitors learn more from their interaction with components that are highly attractive (but seemed to contribute only minimally to cued visitors' understanding of the aging process). The most obvious candidate for this approach might be "Free Radical Attack," a component that attracted stops from nearly one-half of adults and children in the Timing and Tracking component of this study. Of the 90 adults completing either interviews or questionnaires, only three mentioned ideas that could be easily traced to this particular component, e.g.,

> *"[I didn't know that] naturally occurring [sic] anti-oxidants [sic] are more effective than vitamin supplements."* [OMSI Log #40, adult]

> *"[I didn't know] how important antioxidants [sic] are—didn't know about damaging effects of free radicals.* [OMSI Log #46, adult]

The concept of oxidation and the role of free radicals is mentioned by at least two additional exhibition components ("What's Your Real Age?" and "The Healthy Aging Brain"); "What Can We Do about Aging?" highlights the role of diet, weight management, and exercise in countering the damage done by oxidation. Additional lab-based activities and demonstrations for both adults and children might especially help adults understand more about this phenomenon so that they

could in turn interpret these components more effectively for their children (while they learn more themselves about a complicated but important topic).

(3) Stimulate visitors' thinking about habits that promote "healthy aging." Both adults and children (in both pre- and post-visit conversations) frequently mentioned the role that lifestyle and environmental variables play in maintenance of good health. One of the exhibition's strengths is that it suggests concrete and practical habits that visitors can adopt (e.g., flossing teeth and seeking out mental stimulation) and offers a very motivating rationale for their doing that (improve their quality of life in "old age"). A number of components explore this concept to varying degrees and from a variety of perspectives; Lab activities could direct the casual visitor's attention to components that proved memorable to cued visitors (including "Can Older Brains Learn New Tricks?", "Amazing Lifelong Learning," and, obviously, "What Can We Do about Aging?").

The design of OMSI's permanent exhibition areas makes it likely that this issue will arise with future exhibitions. When two or more exhibitions must share the same space, developers might consider in advance what the "distraction potential" is likely to be and how that might be countered. Are live demonstrations a possibility to hold visitors' interest for a longer period of time and direct that interest to specific exhibit components? To what extent can neighboring exhibitions reinforce related concepts? Visitors' behavior in *Amazing Feats of Aging* suggests that developers and designers cannot rely on visual elements alone (such as color, signage, or decoration) to support visitors' sustained interaction.

Clearly, OMSI staff have far less control over exhibit installations at remote locations than they do at their own site. Nevertheless, OMSI designers, developers, and even marketing staff might consider how they might enhance any exhibition's communication success "on the road." For example, a relatively small exhibit, like *Amazing Feats of Aging*, seems ideally suited to smaller venues (like LNHM), where it will be the focus of visitors' attention and may not have to share gallery space with too many other exhibitions. Even though family groups were often observed to move between *Amazing Feats of Aging* and two nearby (and smaller) exhibitions at LNHM, tracking and timing of casual visitors in Lafayette suggested that visitors at that site interacted more intensively with *Amazing Feats of Aging* than did their counterparts at OMSI. Larger venues scheduling these small exhibitions would benefit from the same kind of enhancements that OMSI staff might develop to reinforce that exhibition's identity and impact in the more open OMSI galleries.

Implications for Future Summative Studies at OMSI

One of the exhibition's more interesting findings is the success with which it engaged children's interest and communicated detailed messages about aging. Unfortunately, a variety of different circumstances at the two sites limited the number of children who could be included in the present study. By specifically planning for the involvement of more children in future summative studies (and allocating the resources and time to make that possible), OMSI staff will add to both their own and the industry's understanding of how exhibitions engage children's attention and shape children's understanding of complex topics.

Appendices

A. Interview form

B. Questionnaire form

C. Tracking & Timing data sheet

D. Annotated list of exhibition components

E. Photographs of selected components

Appendix A: Interview forms

Pre-exhibit (Adult)
Pre-exhibit (Child)

Post-exhibit (Adult)
Post-exhibit (Child)

Date: _____ Date collector: _____ Log #: _____

a. Is this your first visit to OMSI? ___ No ___ Yes

b. Do you have any special interest, knowledge or training in medicine or biology?

___ No ___Yes: _____

1. [Lay out all cards on table.]
Please pick out one of these animals and tell something that you think it has <u>in common</u> with humans when it comes to growing old. [Anything else?] [Growing old?]

Animal:

2. Now pick out an animal and tell me something about it that differs from humans when it comes to growing old.

Animal:

3. If "1" is "no control at all" and "5" is "total control", how much control do you think you will have over how you will change as you grow old? [Show scale.]

1	**2**	**3**	**4**	**5**
no control				*total control*

4. Tell me more about why you chose "____".

5. Your age – *Please circle one:* 16-19 40's
20's 50's
30's 60+

6. Gender: Male Female

7. Please check the ethnic background that best describes you:

Latino	Not Latino	Not sure

8. Please check the racial background that best describes you:

American Indian or Alaskan Native	Asian	Pacific Islander or Native Hawaiian	Black	White	More than one race	Not sure

Date: _____ Date collector: _____ Log #: _____

Gender: M F

a. Is this your first visit to OMSI? ___ No ___ Yes

1. [Lay out pictures of animals – shuffle order each time.] **First of all, I would like you to pick out pictures of any animals that you recognize.** [Any others?]

Elephant	Rat	Mongoose	Round worm
Rock fish	Whale	Ape	Giant Tortoise
Dog	Snake		

2. [Gather up cards not selected; put aside.]
Now please pick out <u>one</u> of these animals and tell something that you know about what growing old is like for that animal. [What happens to that animal when it gets old?] [Anything else?]

Animal:

3. Are people like that, too? [Does that happen with people, too?]

4. **Now I'd like you to think about someone you know who is old … Who are you thinking about?**

   How is _____ different from you – the kinds of things that they can do, the way that they look ….

5. **Do you think that there is anything that you can do to change how old age, or growing old, will be for you?** [What?] [Why do you think that will make a difference?]

6. **How old are you?** _____

[Ask adult to assist them with the next two questions.}

7. **Please check the ethnic background that best describes you:**

Latino	Not Latino	Not sure

8. **Please check the racial background that best describes you:**

American Indian or Alaskan Native	Asian	Pacific Islander or Native Hawaiian	Black	White	More than one race	Not sure

Date: _____ Time recruited: _____ Time exited: _____

Date collector: _____ Log #: _____ Gender: M F

 # Group: 1 4 2 5 3 6+

Group type: A only
___ A + ___ K
include target in count

---

a. Is this your first visit to OMSI? ___ No ___ Yes

b. Do you have any special interest, knowledge or training in medicine or biology?

___ No ___Yes: _____

1. [Lay out pictures of animals – shuffle order each time.] **First of all, I would like you to pick out pictures of any animals that you remember seeing in the exhibit.** [Any others?]

Elephant	Rat	Mongoose	Round worm
Rock fish	Whale	Ape	Giant Tortoise
Dog	Snake		

2. [Gather up cards not selected; put aside.]
Now please pick out one of these animals and tell something that you've learned it has <u>in common</u> with humans when it comes to growing old. [Anything else?] [Growing old?]

Animal:

3. Now pick out an animal and tell me something about it that differs from humans when it comes to growing old.

Animal:

4. If "1" is "no control at all" and "5" is "total control", how much control do you think you will have over how you will change as you grow old? [Show scale.]

1	**2**	**3**	**4**	**5**
no control				*total control*

5. Tell me more about why you chose "____".

6. Your age – *Please circle one:*

16-19	40's
20's	50's
30's	60+

7. Please check the ethnic background that best describes you:

Latino	Not Latino	Not sure

8. Please check the racial background that best describes you:

American Indian or Alaskan Native	Asian	Pacific Islander or Native Hawaiian	Black	White	More than one race	Not sure

Date: _____ Time recruited: _____ Time exited: _____

Date collector: _____ Log #: _____ Gender: M F

 # Group: 1 4 2 5 3 6+

Group type: A only
___ A + ___ K
include target in count

---

a. Is this your first visit to OMSI? ___ No ___ Yes

1. [Lay out pictures of animals – shuffle order each time.] **First of all, I would like you to pick out pictures of any animals that you remember seeing in the exhibit.** [Any others?]

Elephant	Rat	Mongoose	Round worm
Rock fish	Whale	Ape	Giant Tortoise
Dog	Snake		

2. [Gather up cards not selected; put aside.]
Now please pick out <u>one</u> of these animals and tell something that you learned about what growing old is like for that animal. [Anything else?]

Animal:

3. Are people like that, too? [Does that happen with people, too?]

6. **Now I'd like you to think about someone you know who is old … Who are you thinking about?**

   How is _____ different from you – the kinds of things that they can do, the way that they look ….

7. **Do you think that there is anything that you can do to change how old age, or growing old, will be for you? [What] [Why do you think that will make a difference?]**

8. **How old are you?** _____

[Ask adult to assist them with the next two questions.}

9. **Please check the ethnic background that best describes you:**

Latino	Not Latino	Not sure

10. **Please check the racial background that best describes you:**

American Indian or Alaskan Native	Asian	Pacific Islander or Native Hawaiian	Black	White	More than one race	Not sure

Appendix B: Questionnaire forms

Adult
Child

Date: _____ Time started: _____ Time finished: _____

Date collector: _____ Log #: _____ Gender: M F

 # Group: 1 4 **Group type:** A only
2 5 ___ A + ___ K
3 6+

---

a. Is this your first visit to OMSI? ___ No ___ Yes

b. Do you have any special interest, knowledge or training in medicine or biology?

___ No ___Yes: please describe briefly:_____

---

1. What would you say is the main purpose of the displays in "Amazing Feats of Aging?"

To show: _____

_____

_____

To make people: _____

_____

_____

2. What new ideas are you taking away with you from "Amazing Feats of Aging?"

I didn't know, or I never realized that: _____

_____

_____

It reminded me that: _____

_____

_____

7. Your Age *(circle one):* 16-19 40's
20's 50's
30's 60+

8. Please check the ethnic background that best describes you:

Latino	Not Latino	Not sure

9. Please check the racial background that best describes you:

American Indian or Alaskan Native	Asian	Pacific Islander or Native Hawaiian	Black	White	More than one race	Not sure

Date: _____ Time recruited: _____ Time exited: _____

Date collector: _____ Log #: _____ Gender: M F

 # Group: 1 4 **Group type:** A only
2 5 ___ A + ___ K
3 6+

---

a. Is this your first visit to OMSI? ___ No ___ Yes

---

1. If you were going to tell a friend what these exhibits were about, what would you say?

OMSI made these exhibits to show: _____

_____

_____

OMSI made these exhibits to make people: _____

_____

_____

2. What new ideas are you taking away with you from "Amazing Feats of Aging?"

I didn't know that: _____

_____

_____

It reminded me that: _____

_____

_____

7. How old are you? _____

8. Are you …

Latino	Not Latino	Not sure

9. Are you …

American Indian or Alaskan Native	Asian	Pacific Islander or Native Hawaiian	Black	White	More than one race	Not sure

Appendix C: Tracking & Timing form

Date: _____ **Log #:** _____ **Observer:** _____ **Start:** _____ **Stop:** _____

Group: ____ Adults ____ Youth ____ Pre-school **Ethnicity: Hisp Non-H**
Race: W B Asian NatAm Other NS

Total time (min): _____ **Target:** _____ **M F**
Age

Stop #	Total Time (sec)	**Exhibit**	**Start**	**Stop**	**Read**	**Flip**	**Use**	**Wa**	**Soc**	**Comments** (record additional stop times here)
		Age Machine (Computer)					U	W	S	
		Age Machine (Monitor)			R	F		Watch Monitor	S	
		Age Machine (Poster)			R	F	U	W	S	
		Alzheimer's Disease			R		U	W	S	
		Amazing Aging Animals					U	W	S	
		Amazing Lifelong Learning				F		W	S	
		Animal Elders (Puppets)					U	W	S	Anyone there?
		Animals Elders (Poster 1)			R		U	W	S	
		Animal Elders (Panel)			R	F	U	W	S	
		Animal Elders (Poster 2)			R	F	U	W	S	
		Can Older Brains … ?			R	F	U	W	S	
		Can Older Brains (Poster)			R	F	U	W	S	
		Damage Control			R	video	U	W	S	
		Do about aging? (1-4)					U	W	S	
		Do about aging? (5-8)					U	W	S	
		Ever Changing Brain			R		U	W	S	
		Intro Panel (flips)				F		W	S	
		Older Males/Females??				F	U	W	S	
		Older Ages through …			R		U	W	S	
		Older or Younger? (left)				F		W	S	
		Older or Younger? (right)			R	F	U	W	S	
		Real Age?			R	F	U	W	S	
		Response Time			R		U	W	S	
		Sticky Situation			R	F	U	W	S	
		Which Live Longer?			R		U	W	S	Lined up?

Appendix D: Annotated list of exhibit components

Note that information about "features" is provided only to aid interpretation of behaviors recorded during the Tracking & Timing component of the study. This list does not include posters or other exhibition elements not present (or visible) during the OMSI installation.

	Component Name	**Features**	**Other**
1	Intro/Credit Panel: What is Aging?	Explanatory text "Flip" labels	Text/flips on both sides
2	Banded Mongoose Puppet Theater *(formerly Animal Elders)*	Interactive element	
3	Animal Families Flip Panel *(formerly Animal Elders)*	Explanatory text "Flip" labels	Poster 1 (Rockfish) Poster 2 (Queen Ant)
4	Older Males or Older Females?	"Flip" labels Interactive element	
5	Age Machine	Explanatory text "Flip" labels Interactive element	Computer game & slave monitor Poster (Jeanne Calment)
6	A Sticky Situation	Explanatory text "Flip" labels Interactive element	
7	Free Radical Attack *(formerly Damage Control)*	Explanatory text Interactive element Video loop	
8	Amazing Aging Animals	Interactive element	
9	Older or Younger (horse)	Explanatory text "Flip" labels Interactive element	
10	Older or Younger (otoliths)	"Flip" labels	
11	Longevity Parade *(formerly Which Live Longer?)*	Explanatory text Interactive element	
12	What Can We Do About Aging? (1–4)	Interactive element	
13	What Can We Do About Aging? (5–8)	Interactive element	
14	You Are Many Ages! (*formerly What's Your Real Age?)*	Explanatory text "Flip" labels Interactive element	
15	Longer and Longer Lives *(formerly Older Ages Through the Ages)*	Explanatory text Interactive element	
16	Amazing Lifelong Learning	"Flip" labels	
17	Think Fast! *(formerly Response Time)*	Explanatory text Interactive element	
18	What About Alzheimer's Disease?	Explanatory text Interactive element	

19	Healthy Aging Brain *(formerly Ever-Changing Brain)*	Explanatory text Interactive element	
20	Can Older Brains Learn New Tricks?	Explanatory text "Flip" labels Interactive element	

Appendix E: Photographs of Selected Components

Overview of installation at OMSI	
(2) Banded Mongoose Puppet Theater	
(4) Older Males Or Older Females?	

(5) Age Machine

(7) Free Radical Attack

(9) Older Or Younger (horse)

(11) Longevity Parade

(16) Amazing Lifelong Learning

(20) Can Older Brains Learn New Tricks?