

National Air and Space Museum

Milestones of Flight

December 2013 Entrance-Exit Survey



Office of Policy and Analysis
Smithsonian Institution
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Table of Contents

Table of Contents 1

Executive Summary 2

Entrance Problems..... 5

Information Needs on Entrance..... 6

Activities..... 6

Unmet Information Needs..... 7

Ratings..... 7

IPOP 9

Visitor Characteristics 11

Recommendations..... 12

Endnotes 13

Frequencies 15

Executive Summary

This short survey was designed to inform the re-installation of the entrance gallery, *Milestones of Flight*, at the National Air and Space Museum on the National Mall.ⁱ It asked about visitor problems and needs on entrance and about activities and unmet needs on exit. The survey was conducted on December 3-4, 2013 with an unbiased sample of 220 visitors entering the museum from the National Mall side of the museum and 252 visitors exiting by those same doors.ⁱⁱ This study complements the November 2013 *Milestones* observation studyⁱⁱⁱ that documented visitor behavior as they entered this space.

Entrance Problems

One in four visitors had a problem on entrance – either uncertainty regarding the entrance door, a door that would not open, or trouble locating the museum on the Mall. Two in five visitors found the entrance inviting, but one in five did not know which way to go next, one in five thought it looked too empty, one in ten couldn't see if there was an information desk, and one in ten found it confusing.

Four of these negative impressions (trouble locating the museum, confusion about the entrance door, too empty, looks confusing) had significant associations with lower ratings of anticipated experience.

Information Needs on Entrance

Entering visitors chose from seven options the information aids that they felt would be especially useful. Paper maps were chosen by three out of four visitors, and lists of highlights and lists of exhibitions were each chosen by two out of five.

Activities

Nine out of ten exiting visitors indicated that they had looked at displays in the *Milestones* gallery. Three out of four of these reported that they had also read texts for the objects that hang and three out of four said that they had read texts for objects on the floor of *Milestones*. The tracking study, however, indicated that the texts for hanging objects were not read when visitors entered the *Milestones* gallery itself. Presumably they were read later in the visit or at the railings on the second floor balcony.

Unmet Information Needs

One in five exiting visitors had wanted a paper map of the museum but thought they were not available; one in five missed having a list of museum highlights; and one in eight missed having a list of current exhibitions.

Ratings

Visitors had a good experience in the museum, as they expected they would. Overall experience ratings on exit are above the Smithsonian average and are in

line with the Spring 2013 ratings. Anticipated ratings are considerably higher now than in the last museum entrance study in 2008.

IPOP

This study also included questions to identify the experience preferences of visitors. For the past several years, researchers at the Office of Policy and Analysis have been working on a theory of experience preference known as IPOP. The theory developed out of many years of surveys, observations, and interviews in Smithsonian museums. It notes that people are drawn to **Ideas** (conceptual, abstract thinking), **People** (emotional connections), **Objects** (visual language and aesthetics), and **Physical** experiences (somatic sensations) to different degrees. The researchers developed ways to measure the extent to which individuals are attracted towards these four dimensions outside of museums, and have been investigating the ways that visitor preferences affect their behavior and responses in museums.

This study found that experience preferences for NASM visitors were fairly equally divided among the four dimensions, and that preferences influenced the following opinions, activities, and responses. Compared to those drawn to other dimensions:

- Those more drawn to the **Idea** dimension were more likely to have found the entrance inviting and were more likely to report looking at displays in *Milestones*.
- Those more drawn to the **People** dimension were more likely to be female and to be visiting with youth under 18, and were less likely to criticize the entrance.
- Those more drawn to the **Object** dimension were more likely to report that they: wanted an Air and Space app at the start of their visit, had read texts about the objects, did not take a guided tour of *Milestones*, would have liked to have had a schedule of IMAX and Planetarium times, had not needed information about current exhibitions, and were especially pleased with their visit overall.
- Those more drawn to the **Physical** dimension were more likely to be male.

Visitor Characteristics

Visitor characteristics were generally in line with data collected in Spring 2013, except that international visitors were now a much larger percentage of the audience (38% of visitors in December vs. 18% in Spring).

Recommendations

- The entrance experience should be improved, especially signs for the entrance.
- Paper maps should be readily available in multiple locations.
- Listings of highlights and exhibitions should be made easily available.
- A list of things to do with children should be provided.

- Attention should be given to more prominent presentation of key ideas, stories with emotional connections, and more physically engaging opportunities, for the benefit of those particularly drawn to those dimensions of experience.

Entrance Problems

Entering visitors were asked about three problems relating to the start of their visit. These items were based on anecdotal evidence drawn from staff observation and visitor complaints.

In coming to the museum today were any of the following true for you?

[Mark one or more]

- I had some trouble locating this museum on the Mall**
- The first door I tried to enter here would not open**
- I wasn't sure which door was the entrance door**
- None of the above**

Relatively few people (3%) had a problem finding the museum, but the problems with the entrance were more substantial: 14% tried a door that wouldn't open and 13% were not sure which door was the entrance door. There was relatively little overlap among these three items. Altogether 24% of entering visitors had at least one of these three problems.

Similarly, entering visitors were asked their first impressions of *Milestones*.

What are your opinions about this entrance area to the museum?

[Mark one or more]

- It looks too empty**
- It looks inviting**
- I don't know which way to go next**
- I can't see if there is an information desk**
- It looks confusing**
- Other**
- None of the above**

For the most part, visitors' first impressions were favorable: 40% found *Milestones* inviting, and 19% marked "none of the above." Among the 19 individuals who marked "other," six were positive ("not bad," "impressive," "looks nice and grand," "inspiring," "sense of awe," "it looks awesome"), seven found it dark, dingy ("too 70s," "outdated," "old carpet," "dirty carpet") or lacking something ("not too empty, but it is missing something"). Two cited mobility access issues, and two criticized security ("security entrances make it confusing," "too much security").

Four of the negative impressions (trouble locating the museum, confusion about the entrance door, too empty, looks confusing) had significant associations with lower anticipated experience ratings.

Information Needs on Entrance

Entering visitors were asked about information aids.

As you begin your visit to the Air and Space Museum, which of these information aids would you find especially useful [Mark one or more]

- **A paper map of the museum**
- **Staff at an information desk**
- **A schedule of times for IMAX and Planetarium**
- **A list of things to do with children**
- **A list of museum highlights**
- **Information on guided tours**
- **A list of current exhibitions**
- **A mobile website address**
- **An Air and Space App**
- **Other**

A large majority of entering visitors wanted a paper map (71%), and equal numbers wanted a list of highlights (37%) or a list of current exhibitions (37%). Fewer wanted a schedule of IMAX and Planetarium times (27%), staff at an information desk (23%), or an Air and Space app (20%). Some (15%) wanted information on guided tours or a list of things to do with children (12%). A mobile website address was least needed (8%). Overall, visitors selected an average of 2.5 items from this list of ten.

On entrance there is a pattern in the choices that divides the list into three parts: paper map, highlights/exhibitions, and everything else.^{iv} Age and visit group affected some of these choices. Those ages 32-46 were most interested in a schedule of IMAX and Planetarium times (37%). One-third (32%) of those visiting with youth wanted a list of things to do with children. Among those visiting alone, 29% wanted information on a guided tour. Younger visitors (ages 18-31) were more likely to want a list of highlights (32%).^v

Activities

Departing visitors were asked a few questions about what they had done in *Milestones* during their visit.

At any time during your visit did you look at displays in this entrance area to the museum? No Yes

If Yes,

- **Did you read any of the texts for objects that hang from the ceiling in this area?**
- **Did you read any of the texts for objects located on the floor of this area?**
- **Did you take a guided tour in this area?**

Most visitors (86%) indicated that they had looked at displays in *Milestones*. Among those who did, many (77% of them; 66% of all visitors) said they read at least one text for objects on the floor, and nearly as many (72% of them; 62% of all visitors) said that they read at least one text for hanging objects. A much smaller percentage (15% of them; 13% of all visitors) took a tour in *Milestones*.

These responses need to be considered together with the results from the observation study conducted a few weeks earlier in *Milestones*. That study found that 89% of visitors stopped somewhere in *Milestones* upon entering; this figure is in line with the 86% on the survey who said that they looked at displays in this area. However, in the observation study of 109 visitors entering *Milestones* from the Mall, only a very few (between one and four) stopped to read any of the labels that were exclusively about a hanging object. If the visitors' reports of text-reading in the survey are accurate, this means that many visitors spent more time in *Milestones* at a later point in their visit, possibly on their way out, or that they read at least one of the labels about hanging objects that are located on the balcony railing.

Unmet Information Needs

Visitors leaving the museum were asked about the same information aids that entering visitors were asked about, but this time they were asked what they missed.

**During your visit to the Air and Space Museum today, which of these information aids did you expect, but were not available?
[Mark one or more]**

The three top items that were missed were the same as the three top items that entering visitors cited: a paper map (22%), a list of highlights (28%), and a list of exhibitions (13%). On exit, those ages 32-46 missed having a map the most (30%) and having a list of exhibitions (23%). One-third of exiting visitors who were with youth under 18 missed having a list of things to do with children (32%). This was exactly the same percentage of entering visitors with youth who said that they wanted such a list.

Ratings

Overall experience ratings have been the primary performance indicators for Smithsonian exhibitions over the past ten years. Entering visitors were asked:

How do you think you will rate your overall experience at this museum when you leave?

Poor Fair Good Excellent Superior

And exiting visitors were asked:

Please rate your overall experience at this museum today.

O Poor O Fair O Good O Excellent O Superior

The difference between anticipated ratings and actual ratings in this study is not statistically significant.

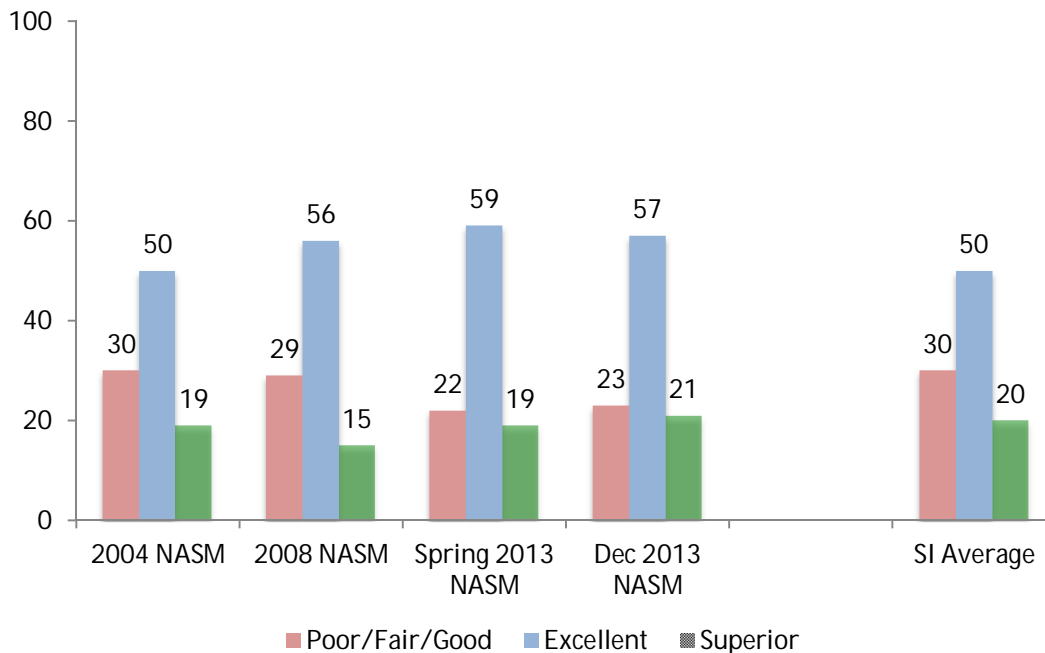
Entrance: 1% Fair, 17% Good, 56% Excellent, 26% Superior

Exit: 1% Fair, 22% Good, 57% Excellent, 21% Superior

In other words, exiting visitors had about the same quality of experience that entering visitors had anticipated.

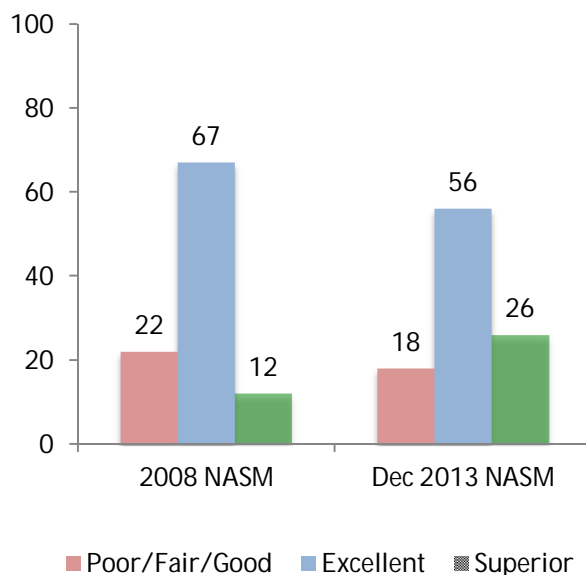
Figure 1 illustrates that exit ratings remained stable between Spring and December 2013, and that lower ratings (i.e., less than Excellent) have declined markedly since 2004, while the highest ratings (Superior) have not increased. Six to ten years ago the low ratings were 50%-100% higher than the Superior ratings. Now they are about equal, and NASM's overall experience rating is above the Smithsonian average.

Figure 1
Exit Ratings of Overall Experience
(in Percent)



A comparison of the only two data points we have for anticipated rating – 2008 and the current study – shows how far the museum has come in changing audience perceptions over the past five years. As Figure 2 illustrates, back in 2008 only half as many visitors entered the museum expecting a Superior experience, compared to today. In 2008 the actual quality of experience exceeded the expected; today the anticipated and actual quality are closely matched.

Figure 2
Anticipated Ratings of Overall Experience
(in Percent)



IPOP

IPOP is the name for a new theory of experience preference that originated with researchers in the Office of Policy and Analysis at the Smithsonian. The theory identifies four key dimensions of experience – **Ideas** (conceptual, abstract thinking), **People** (emotional connections), **Objects** (visual language and aesthetics), and **Physical** experiences (somatic sensations). Using answers to questions about self-identification with leisure activities outside of museums, the researchers can calculate a person’s scores in each of these four dimensions. These scores describe the degree to which individuals are drawn to those dimensions, in comparison with all others in the database.^{vi} Currently the full database includes 7,000 cases.

The full survey instrument contains 38 items, but the version used with visitors has only eight:

Help us to understand your interests. For each of the following items, please indicate the degree to which that activity describes you.

I like to...

...bring people together	<input type="radio"/> Not me at all	<input type="radio"/> A little me	<input type="radio"/> Me	<input type="radio"/> Very much me
...divide things into categories	<input type="radio"/> Not me at all	<input type="radio"/> A little me	<input type="radio"/> Me	<input type="radio"/> Very much me
...identify patterns	<input type="radio"/> Not me at all	<input type="radio"/> A little me	<input type="radio"/> Me	<input type="radio"/> Very much me
...jog/run for fun	<input type="radio"/> Not me at all	<input type="radio"/> A little me	<input type="radio"/> Me	<input type="radio"/> Very much me
...know how things are made	<input type="radio"/> Not me at all	<input type="radio"/> A little me	<input type="radio"/> Me	<input type="radio"/> Very much me
...play competitive sports	<input type="radio"/> Not me at all	<input type="radio"/> A little me	<input type="radio"/> Me	<input type="radio"/> Very much me
...shop	<input type="radio"/> Not me at all	<input type="radio"/> A little me	<input type="radio"/> Me	<input type="radio"/> Very much me
...spend my leisure time with other people	<input type="radio"/> Not me at all	<input type="radio"/> A little me	<input type="radio"/> Me	<input type="radio"/> Very much me

IPOP theory claims that differing attractions to the four dimensions influence what people do and how they respond. It is a predictive model that can be used not only to help explain what happens in the museum, but also to help design more effective exhibitions in the future.

The IPOP scores in this study were not significantly different between entrance and exit.^{vii} During the period of this study no one preference was drawn to NASM more than another. However, IPOP data was also collected from NASM entering visitors in Fall 2013 in connection with a study of Smithsonian visitors generally (South Mall Campus Survey). At that time Object scores at NASM were higher than the other scores. In other words, the Fall audience appears to have been more drawn to Object experiences than the December audience.

The data from this survey suggests that opinions, behaviors, and responses in NASM were affected by IPOP differences. Compared to those drawn to other dimensions:

Those more drawn to the **Idea** dimension were

- more likely to have found the entrance inviting
- more likely to have reported looking at displays in *Milestones*

Those more drawn to the **People** dimension were

- more likely to have been female
- more likely to have been visiting with youth under 18
- *less* likely to have criticized the entrance.

Those more drawn to the **Object** dimension were

- more likely to have reported that they wanted an Air and Space app at the start of their visit
- more likely to have read texts about the objects

- *less* likely to have taken a guided tour of *Milestones*
- more likely to have missed having a schedule for IMAX and Planetarium
- *less* likely to have missed having more information about current exhibitions
- more likely to have been especially pleased with their visit overall

Those more drawn to the **Physical** dimension were

- more likely to have been male.

The most striking of these findings is the relationship between Object preference and overall experience rating. The relationship between mean IPOP scores and exit ratings are shown in Figure 3.

Figure 3
Mean IPOP Scores for Overall Experience Ratings on Exit
(in standard deviations)



Note that Object scores are particularly high for those who gave Superior ratings; close to the mean of 0 for those who gave Excellent ratings; and most negative for those who marked Fair/Good. This pattern suggests that the exhibition worked best for those with higher Object scores. The other mean scores are all within 0.2 sd of the mean, which is considered in this analysis to be an insignificant difference from zero.

Visitor Characteristics

Most of the visitor characteristics were very similar to those of the Spring audience in 2013. More than half of the visitors (55%) were making their first

visit to the museum (and 41% of the repeat visitors had visited within the past year). This means that one in five visitors (18%) had been to the museum before within the past year – a substantial repeat audience. Most came to the museum in a group of adults (64%). One-quarter (24%) came alone, and only 13% came with youth under 18.^{viii} Males outnumbered females 60% to 40%, as was the case in Spring of 2013. The average age was 40.4 (median age: 38).^{ix}

Surprisingly, the sample included a large number of foreign visitors (38%, compared to 17% in Spring 2013). More than half of them (54%) were from Europe (United Kingdom visitors were by far the largest single group); 22% were from Asia (primarily Korea and Japan); 13% from Central and South America; and 10% from the Middle East and Africa.

Recommendations

Entrance signs

A substantial percentage of entering visitors had a problem with the entrance doors. Accordingly, the entrance experience should be improved, especially signs for entrance.

Information Aids

A substantial percentage of exiting visitors had wanted a paper map and listings of highlights and exhibitions, but hadn't found them. Paper maps should be readily available in multiple locations, along with information on current exhibitions and museum highlights. The highlights and exhibition list could be included as part of the map. The new map at the National Museum of Natural History (which is supported by voluntary payment) might offer a useful model.

Listings for Child Activities

One-third of those visiting with youth wanted a listing of things to do with kids. If this audience is important to the museum, such a listing should be provided.

Idea, People, and Physical Experiences

The visit was most effective for those drawn to Object experiences, but less so for those with other experience preferences. Attention should be given to more prominent presentations of key ideas, stories with emotional connections, and more opportunities for physical engagement (e.g., sound).

Endnotes

ⁱ Credits: This study was commissioned from the Office of Policy and Analysis by Beatrice Mowry, who determined the key issues of the study in consultation with other members of the *Milestones* team. Andrew Pekarik designed the study, assembled and analyzed the data, and wrote the report. Kelly Richmond managed the survey administration. The data was collected by Kelly Richmond, Benjamin Wilson, James Smith, Ikuko Uetani, Claire Eckert, Yifei Chen, Disha Gandhi, Sarah Block, and Andrew Pekarik. The report was reviewed and edited by Kathy Ernst and Whitney Watriss.

ⁱⁱ Entrance cooperation rate: 85%; Exit cooperation rate: 70%. Overall cooperation rate: 75%.

ⁱⁱⁱ Ko, Min-Cheol and A. Pekarik (2013). *Visitor Behaviors in the Milestones Gallery at the National Air and Space Museum*. Smithsonian Institution Office of Policy and Analysis.

^{iv} This result is derived from a hierarchical cluster analysis in which these three clusters appeared last.

^v In this report, associations between variables like these are cited when the chi-square test is significant at a value below .05 and the difference is considered meaningful.

^{vi} IPOPOP scores are standardized scores with a mean of 0 and a standard deviation of 1. They are calculated using a Rasch Model. For more on IPOPOP see the following:

Pekarik, Andrew J., and B. Mogel. 2010. Ideas, Objects, or People? A Smithsonian Exhibition Team views visitors anew. *Curator: The Museum Journal* 53(4): 465-482.

Leger, Jean-Francois. 2014. Shaping a richer visitors' experience: The IPOPOP interpretive approach in a Canadian museum. *Curator: The Museum Journal* 57(1). In Press.

Pekarik, Andrew J., J.B. Schreiber, N. Hanemann, K. Richmond, and B. Mogel. 2014. IPOPOP: A Theory of Experience Preference. *Curator: The Museum Journal* 57(1). In Press.

Schreiber, J.B., A. Pekarik, N. Hanemann, Z.D. Doering, and A-J Lee. 2013. Understanding visitor behavior and engagement. *The Journal of Educational Research*. Accessed Oct 2013 at <http://dx.doi.org/10.1080/00220671.2013.833011>.

A webinar by Andrew Pekarik presenting IPOPOP theory can be found at <http://adaconferences.org/ArtsnRec/Archives> under December 10, 2013

^{vii} Since IPOPOP scores are standardized scores with means of 0 and standard deviations (sd) of 1, the measure of difference here is effect size (Cohen's *d*). The standard used in this report is that two values within 0.2 sd of one another are considered equal. Differences are only reported when they equal or exceed 0.3 sd.

^{viii} The relatively low percentage of adult and youth groups was probably due in part to the fact that the study period was limited to two weekdays – Tuesday

and Wednesday – when most children are in school. In Spring 2013 20% of visitors came with youth.

^{ix} This study was limited to voluntary visitors ages 18 and over. Children and organized groups were not included.

NASM Milestones Entrance-Exit Survey Frequencies				
Entrance: 220 Visitors; cooperation rate: 85%		December 3-4, 2013		
Exit: 252 Visitors; cooperation rate: 70%				
		In Percent		
		Entrance	Exit	Total
Is this your first visit to this museum, the Air and Space museum?				
Yes		57	54	55
No		43	46	45
(if no)				
Did you visit the museum in the last 12 months?				
Yes		38	43	41
No		62	58	59
Did you visit the museum in the last 12 months? (as a percent of all visitors)				
Yes		18	19	18
No		25	27	27
How do you think you will rate your overall experience at this museum when you leave?/ Please rate your overall experience at this museum				
Poor		0	0	0
Fair		1	1	1
Good		17	22	20
Excellent		56	57	56
Superior		26	21	23
In coming to this museum today, were any of the following true for you? [Mark one or more]				
The first door that I tried to enter here would not open		14	NA	14
I wasn't sure which door was the entrance door		13	NA	13
I had some trouble locating this museum on the Mall		3	NA	3
None of the above		76	NA	76
What are your opinions about this entrance area to the museum? [Mark one or more]				
It looks inviting		40	NA	40
I don't know which way to go next		17	NA	17
It looks too empty		16	NA	16
I can't see if there is an information desk		10	NA	10
It looks confusing		6	NA	6
Other		10	NA	10
None of the above		19	NA	19

As you begin your visit to the Air and Space Museum, which of these information aids would you find especially useful? [Mark one or more]			
During your visit to the Air and Space Museum today, which of these information aids did you expect, but were not available? [Mark one or	Entrance	Exit	Total
A paper map of the museum	71	22	
A list of museum highlights	37	18	
A list of current exhibitions	37	13	
A schedule of times for IMAX and Planetarium	27	7	
Staff at an information desk	23	7	
An Air and Space App	20	8	
Information on guided tours	15	7	
A list of things to do with children	12	7	
A mobile website address	8	2	
Other	2	2	
None of these	5	46	
At any time during your visit did you look at displays in this entrance area to the museum?			
No	NA	14	14
Yes	NA	86	86
(if yes, looked up)			
Did you read any of the texts for objects that hang from the ceiling in this area?			
Yes	NA	72	72
No	NA	28	28
Did you read any of the texts for objects that hang from the ceiling in this area? (as a percent of all visitors)			
Yes	NA	62	62
No	NA	38	38
(if yes, looked up)			
Did you read any of the texts for objects located on the floor of this area?			
Yes	NA	77	77
No	NA	23	23
Did you read any of the texts for objects located on the floor of this area? (as a percent of all visitors)			
Yes	NA	66	66
No	NA	34	34
(if yes, looked up)			
Did you take a guided tour in this area?			
Yes	NA	15	15
No	NA	85	85
Did you take a guided tour in this area? (as a percent of all visitors)			
Yes	NA	13	13
No	NA	87	87

Are you visiting this museum alone or with others?	Entrance	Exit	Total
I am alone	24	23	24
With adults only	61	66	64
With youth under age 18	14	11	13
Are you male or female?			
Male	60	58	59
Female	41	42	41
Do you live in the United States or another country?			
United States	64	60	62
Another Country	36	40	38
Mall Radius			
5 mile radius	3	5	4
10 mile radius	3	3	3
20 mile radius	5	5	5
40 mile radius	7	5	6
100 mile radius	1	1	1
250 mile radius	7	7	7
Other U.S.	38	34	36
International	36	40	38
Region			
Metro Washington	8	11	10
Southeast	17	16	16
Mid Atlantic	11	13	12
Midwest	6	2	4
New England	3	2	2
Mountain Plains	7	3	5
West	9	13	11
Country other than US	36	40	38
Unspecified U.S.	3	1	2
What is your age?			
Mean age	40.6	40.2	40.4
Median age	37.7	37.8	38
Age grouped in 5-year ranges			
18 through 19	5	4	4
20 through 24	12	11	11
25 through 29	14	15	14
30 through 34	13	11	12
35 through 39	9	14	12
40 through 44	11	10	10
45 through 49	7	8	8
50 through 54	11	8	9
55 through 59	5	7	6
60 through 64	5	6	5
65 through 69	4	4	4
70 through 99	4	2	3

	Entrance	Exit	Total
Age grouped by Generations			
GI (Born before 1925)	1	0	0
Silent (Born 1925-1945)	6	4	5
Leading Boomers (Born 1946-1955)	9	12	11
Trailing Boomers (Born 1956-1964)	13	13	14
Generation X (Born 1965-1981)	34	38	36
Generation Y/Millennials (Born 1982-1995)	21	31	31
Generation Z/Digital Natives (Born after 1995)	4	2	3
Age groups into three nearly-equal groups			
Age 18-31	36	32	34
Age 32-46	29	35	33
Age 47+	35	33	34
NASM IPOP Scores (<i>Milestones</i> study December 2013)			
Mean Idea Score	-0.14	-0.1	-0.07
Mean People Score	0.05	0.02	0.03
Mean Object Score	0.19	0.06	0.11
Mean Physical Score	0.23	0.08	0.15
NASM IPOP Scores (South Mall Campus Survey - Fall 2013)			
Mean Idea Score	0.04		
Mean People Score	0.25		
Mean Object Score	0.33		
Mean Physical Score	0.21		