



## Exhibition Evaluation Report

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**Rockman et al**  
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In cooperation with:

AMERICAN MUSEUM OF NATURAL HISTORY 

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## Executive Summary

Rockman et al, an evaluation firm that specializes in museum-based evaluations, was asked to conduct the summative evaluation of *Brain: The Inside Story*, an exhibition created by the American Museum of Natural History. The exhibition explores how the human brain—a product of millions of years of evolution—produces thoughts, senses, and feelings, is continually changing at different stages of life, and how new understandings of the workings of the brain may help scientists repair and reverse declines in brain function. The purpose of the Brain evaluation was to investigate how visitors understood and experienced the exhibition and its content.

Overall, visitors were highly interested in the topic of the exhibition and very satisfied with their exhibit experience, the exhibit’s educational value, and its aesthetic appeal. In fact, many visitors (67%) felt that the exhibition contained enough information and activities to warrant a repeat visit. Visitors were also likely to recommend the exhibition to friends or family members and thought that the exhibition was as good or better than other museum offerings.

Visitors spent an average of 49 minutes in the exhibition. As is typical, visitors tended to look at more exhibit elements at the beginning of the exhibition than they did toward the end, with the exception of some of the activities within "Your Thinking Brain." Visitors’ self-reported favorite activities tended to be those with interactive or major visual components (i.e. the Entrance to the exhibition, Brain Training games, Language Interactive, Brain Intro Theater). Visitors tended to overlook the following interpretation: Your Emotional Brain, Multiple Messages (near the neuron model), and Connectivity, Communication “Hubs”, and Limbic Links (three graphic panels around the Sub-cortical model).

The visitor experience in *Brain: The Inside Story* was impacted by the following factors:

- **Crowd level** – As is to be expected, when the exhibit was less crowded, visitors tended to notice more features of the exhibition; when tour or school groups were present, other visitors tended to skip whole sections of the exhibition altogether or come back to them once the groups had left.
- **Group composition** – Tour groups and school groups tended to skip the interactives and some tour group members would go back to these once the tour was over. Parents followed their children’s interests; Children were less likely to engage with an activity as the exhibit designers intended (i.e. they did not follow directions).
- **Age** – Perhaps not surprisingly, older adults (age 50+) were less likely to engage with the exhibit activities, and were often only interested in reading the exhibit interpretation. In contrast, children tended not to read or discuss the interpretation unless prompted by their parents or teachers, but would try the interactives. However, many children did not appear to understand

the activities' meaning or relevance unless prompted by their parents or teachers.

- **Amount of text** – Approximately one quarter of survey respondents (26%) felt that there had been too much text in the exhibition, while most visitors (68%) felt that the exhibition had just the right amount of text (N=262).

About 43% of visitors said they read all of the interpretation, while 39% read half of the interpretation and the rest read some of the text (N=285).

- **Personal knowledge and experiences** – Many visitors to the exhibition had above average knowledge about the brain (42%, N=296), and several anecdotally indicated that they worked in a medical field. Regardless of their knowledge of the topic, the more salient sections/activities in the exhibition were the ones that were relevant to a visitor's personal experience (i.e. having a family member with Alzheimer's, liking puzzles, etc.)

The majority of visitors (94%) felt that they had learned something new about the brain after visiting the exhibition, both about specific-brain related topics and about themselves (i.e. their own skills and thought processes). Visitors indicated that they had learned information about the parts of the brain, its operations and functions, the complexity of the brain, technology used to study the brain and treat brain injuries, diseases, and disorders, how particular activities they engage in affect the brain, brain development, and brain evolution, and their own capabilities to perform memory and planning tasks. Several visitors indicated that they wanted to learn more about specific topics highlighted in the exhibition, especially disorders like synesthesia and about cutting edge technologies. In sum, visitors at the end of the exhibition do seem to have a better understanding of the brain and its importance, purpose, and role, can identify some of the technologies used to study and treat it, and can articulate how brains change over time, both developmentally and evolutionarily.

To find out more about how visitors were using and thinking about the exhibition, the museum sought insights from those who study the brain. Two neuroscience graduate students collected data throughout the exhibition, focusing on six specific exhibit activities to try to find out more about what visitors understood about the brain. The following are some of their main findings in each of the six areas:

### **Block Stacking Activity**

-Visitors who either worked together with or competed against others (family or friends) were more likely to pay attention to the number of moves made, and were more likely to attempt the Block Stacking activity again (either to improve their score on the same activity, or to move on to the more advanced level), than those who had tried it alone.

-Younger adults and children appeared to be better at the task (i.e. faster, less number of moves needed) than older adults, likely a result of a younger brain's flexibility in problem solving and response to a challenging task. In addition, children probably view the block-stacking activity (and other interactives) as more

interesting and stimulating than simply reading the text, so they pay closer attention.

-In terms of general understanding of the purpose of the activity, most participants are able to clearly explain and convey the rules and goals when asked. However, very little about the brain areas and processes responsible for goal-oriented tasks appears to be absorbed. Here, the brain information may be overshadowed by the appeal of the activity, which is more attention grabbing than the exhibit interpretation.

-Several visitors were able to find a planning activity in their daily lives that was similar in concept to the Block Stacking activity.

### **Neurotransmitter Interactive**

-While teens and children were initially attracted to the interactive computer kiosk, they seemed to get impatient during the passive sequences between the active decision-making, leading them to quit the activity more often than any other age group, whereas older visitors were more attentive and engaged in the process. Seniors tended to skip the Neurotransmitter Interactive or would observe others using the game but rarely tried it themselves.

- Most visitors' game-playing strategy was to break the rules and disobey the mother because they wanted to see whether the mother would punish her child or not.

-Participants acknowledged the significance of the bottom left and bottom right portions of the screen describing the neurochemistry and exchange of neurotransmitters, but quickly forget the exact names and interactions that occur.

### **Language Interactive**

- English, Mandarin, and Russian were the top three languages that visitors tried. None of the visitors we observed tried more than four different languages. On average, visitors tried two languages.

- Males in their teens and twenties appeared to find the interactive slightly uncomfortable, and would often look around to see if anyone was watching or listening and were reluctant to record themselves. Young children were not embarrassed by the activity, possibly because kids are not afraid to make mistakes-something that develops as we get older.

### **Neuron Table**

- Since the activity is naturally social and requires multiple hands to create connections, participants generally worked together with others (both family/friends as well as strangers) when using the table. They also explained how the table works for newcomers who had trouble understanding.

- Although the 23 visitors who were observed all connected neurons together, several other visitors who approached the table during observation times were seen putting one hand on the table, but never connected two neurons together. These visitors did not understand the interactive because understanding it necessitates using two hands to see how the neurons relate and communicate.

- When asked the purpose of the table during interviews and the underlying theory supporting the activity, most visitors were able to describe the basic concept, although they did not go further in depth into their explanations.

### **Brain Intro Theater**

- Visitors enjoyed how the 3D model of the brain showed where specific areas were located. The explanation of certain activities (e.g. tying shoes, walking, dancing, thinking about dancing) and their subsequent brain structures/functions were useful because they explained everyday activities that are relatable across all demographics.

- The most widespread concept that was described during interviews was the notion of brain lateralization. Most people were surprised to learn that the left half of the brain controls the right half of the body and vice versa.

-There was not a particular concept or term that visitors did not understand, but visitors sometimes confused different regions and their functions when trying to explain a particular process (e.g., confusing the basal ganglia with the prefrontal cortex when comparing tying shoes with thoughts about walking).

### **Your Sensing Brain**

-Most visitors understood that the area was about the senses, with some identifying specific senses such as visual and auditory, and a few linking sensory processing and perception.

- Visitors did not appear to understand what the Mona Lisa activity revealed about the brain.

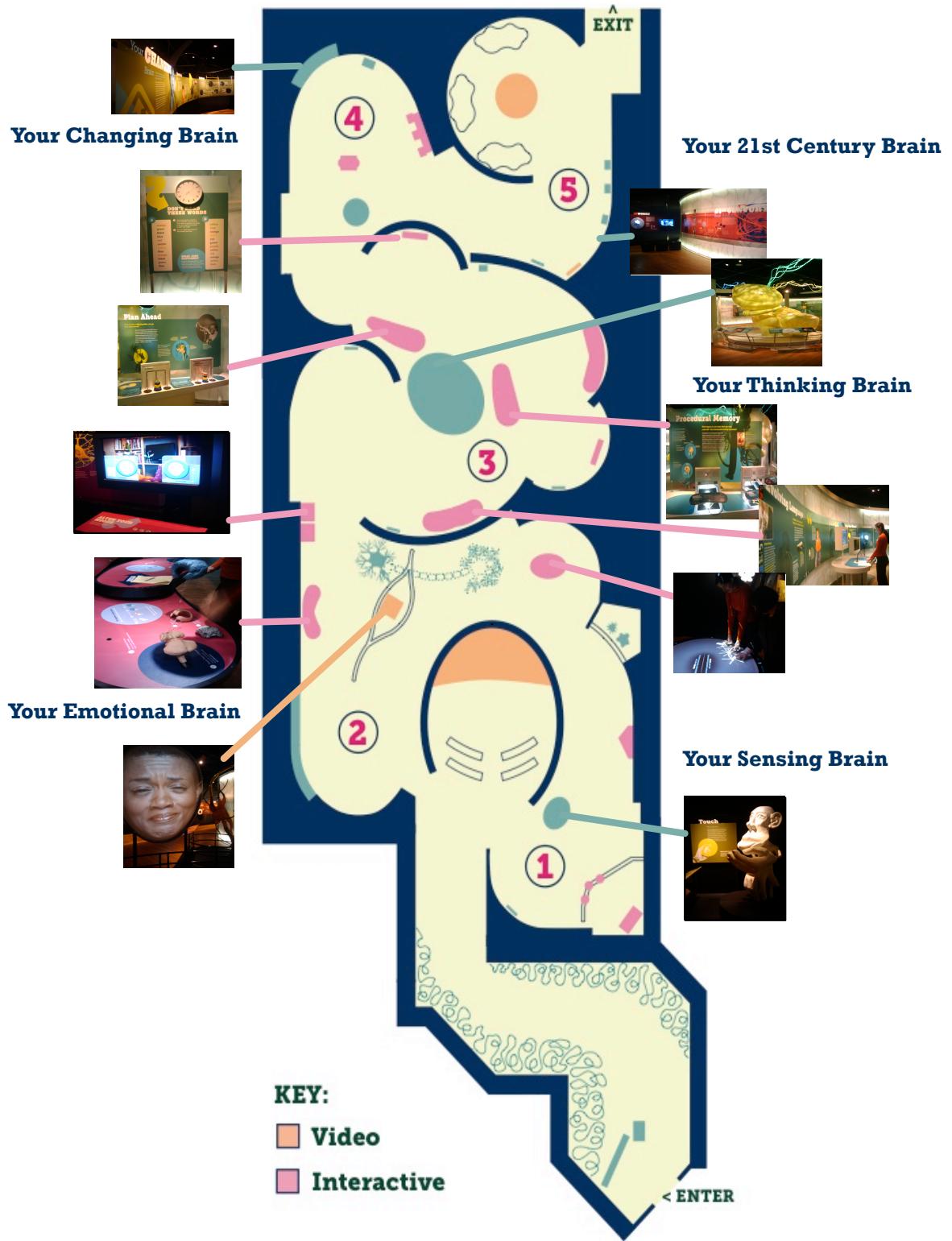
## Background

*Brain: The Inside Story*, an exhibition created by the American Museum of Natural History, opened November 20, 2011. The exhibition explores how the human brain—a product of millions of years of evolution—produces thoughts, senses, and feelings, is continually changing at different stages of life, and how new understandings of the workings of the brain may help scientists repair and reverse declines in brain function. At the entrance to the exhibition, visitors are immersed in the nonstop communication that occurs among the brain's tangled forest of 100 billion interconnected neurons, or brain cells. Throughout the rest of the show, visitors can explore how the nervous system processes information from the senses and how the brain creates perception, how brain imaging and advances in biochemistry are deepening the understanding of the emotional brain, and how the highly developed neocortex allows humans to make plans and predictions as well as engage in symbolic thought. Visitors also learn how the brain's plasticity allows changes at different stages of life and how 21st century science can repair and improve the brain. The exhibition is organized in different sections and there is extensive use of media, interactive, and immersive experiences for all different ages and interests (see Figure 1). Visitors can also challenge their brains with puzzles and games that probe neural connections and pathways.

Rockman et al (REA), an independent research, evaluation, and consulting firm based in San Francisco, worked with the museum to design and conduct a summative evaluation of the educational impact of the *Brain: The Inside Story* exhibition, on various visitor groups and selected education programs. Rockman also collaborated with two neuroscience graduate students on data collection and analysis to gain insights into how visitors were understanding and experiencing the exhibition.



Figure 1: Map of Brain: The Inside Story



# Methods

The summative evaluation of the “Brain: The Inside Story” exhibition at the American Museum of Natural History from December 2010 through March 2011. Rockman used a mixed-methods evaluation approach, combining the use of qualitative and quantitative data. Below is a brief overview of the data collection efforts. Data was also collected around the educational programming for the exhibition, but that is beyond the scope of this report.

The exhibition evaluation included:

**A) Visitor Observations:** A mix of visitor observations were collected. Observers used a customized observation rubric deployed on iPad tablets to track visitors’ progression through the exhibition including how much time they spent at each part of the exhibition, the types of comments that visitors made and discussions that took place, and specific visitor behaviors. Thirty-four followthrough observations were collected, ten of which were the focus of further analysis. In addition, more intensive observations were made in six specific sections of the exhibition: Block Stacking Activity, Language Interactive, Neuron Table, Neurotransmitter Interactive, Brain Intro Theater, and Your Sensing Brain. These intensive observations of specific sections of the exhibition occurred with a general visitor experience lens (focusing what visitors do, how engaged they were with the experience, and what impact specific interactive experiences had) and a neuroscientific and psychological lens (i.e., observations conducted by neuroscience students from NYU, trained by members of the evaluation team).

**B) Visitor Interviews:** To inform a deeper understanding of visitors’ experiences within the exhibition, a series of interviews were conducted with individuals and visiting groups who were observed either at a specific area within the exhibition or throughout the entire exhibition). Interview protocols were designed to gain information about what visitors were thinking during the exhibition or specific interactive experiences, what they learned, and what they planned to do as a result of their experience. Identical interview protocols were used with visitors who were not observed to gather additional feedback.

Short intercept interviews were also collected in other areas of the museum such as the Hall of Human Origins and Dinosaur Hall) to better understand visitors’ decision-making process for electing or not electing to buy tickets for the exhibition. Interviewers asked visitors to explain their choices.

**C) Visitor Surveys:** Rockman designed a brief post-exhibition survey to collect information from visitors at the end of their experience. The survey collected demographic data about visitors, levels of interest and prior knowledge in the subject matter of the exhibition, information about visitors’ expectations for the exhibition, information about visitors’ opinions about the exhibition, information about what visitors learned in the exhibition, and information about what visitors would continue to think about or do as a result of their experience. On both weekend and weekdays, data collectors set up a table and chairs at the end of the exhibition, and recruited visitors to take the survey. Visitors received a free pass to the museum for their participation.

# Findings

## Why did visitors decide to come to the exhibition, *Brain: The Inside Story*?

The majority of visitors (64%, N=320) came to the exhibition due to interest in the topic. Several visitors (28%) mentioned seeing advertisements for the exhibition in places like Penn Station, a mailed brochure, and on the museum website. Other reasons for attending included recommendations from friends/family members (18%), completing a class assignment (9%), coming due to others' interest in the exhibition (8%), for professional development (2%), studying or knowing someone who studies neuroscience, working with people who have brain injuries, wanting to check out the new things at the museum, and being employees of other museums or entertainment venues (i.e. *"I am a concierge at a hotel and we sell tickets to AMNH and if I want to sell tickets, I need to know what I'm selling. I wanted to see it for myself and for work."*).

Most visitors (67%, N=288) indicated that they would return to visit the exhibition again. The main reasons given for a repeat visit were that visitors wanted to read the interpretation in more depth and had not had time to try all of the exhibit activities, and that they wanted more time to absorb the content (see Table 1).

Of those who did not think that they would visit the exhibit again, most indicated that they had seen everything in the exhibit already and had gotten what they wanted out of the experience (see Table 2).

*Table 1: Reasons for Revisiting Brain: The Inside Story (N=192)\**

Reason for Repeat Visit	Number of Survey Respondents	Percentage of Survey Respondents
Not able to see everything/ To read more	29	15%
A lot to digest in one visit	27	14%
Bring family/friends	21	11%
Interesting Topic	20	10%
Fun/Great/Cool/Engaging	18	9%
Want to learn more	18	9%
Informative/Educational	11	6%
Like exhibition	10	5%
Come when less crowded	10	5%
Expecting improvement/ new features	5	3%
Interactives/Games	4	2%
Field Trip	2	1%
If visiting museum again, in general	1	1%
Love AMNH	1	1%
No reason given	37	19%

\*Some visitors listed more than one reason for wanting to revisit the exhibit

*Table 2: Reasons for Not Revisiting Brain: The Inside Story\**

Reason for Repeat Visit	Number of Survey Respondents (N=96)	Percentage of Total Visitors
Saw everything already	18	19%
Already got what I wanted out of the experience.	12	13%
Absorbed everything I could	8	8%
Know enough about the brain now	6	6%
Live out of town	6	6%
Content not deep enough for second visit	6	6%
Not interested	5	5%
Cost	4	4%
Only revisit exhibits if they change	4	4%
Wanted more interactives	4	4%
Only go to exhibits once	3	3%
Want to do something new	2	2%
Visited for school	2	2%
Did not learn that much	2	2%
Exhibit too long	2	2%
Exhibit too texty	2	2%
This was a second visit to the exhibition	1	1%
Want to check out other brain programs	1	1%
Exhibit was too overwhelming	1	1%
Did not like exhibit	1	1%

\*Some visitors listed more than one reason for not wanting to revisit the exhibit

To determine why visitors might not come to the exhibition at all, the evaluation team conducted brief intercept interviews with 80 visitors in other areas of the museum such as the Dinosaur Hall, the Hall of Human Origins, and the Food Court. Visitors were not asked any demographic information. Of the 80 visitors who were interviewed, slightly more than half did not plan on visiting the exhibition that day (see Table 3). When asked why they had chosen not to visit the exhibition that day, one quarter of the visitors stated that they did not have enough time (see Table 4).

In addition, several visitors had either already attended the exhibition, were not interested in going to the exhibition, or were not aware of the exhibition.

Interviewees were also asked whether they planned on visiting the exhibition in the future. Forty-three percent of visitors (N=80) indicated that they would probably not visit the exhibition at a later date. Of these, 14% identified themselves as out of town visitors and 4% mentioned that they had already been to the exhibition.

*Table 3: Plans for Visiting Brain: The Inside Story (N=80)*

Visiting Status	Number of Respondents	Percentage of Respondents
Had already visited exhibition that day	7	9%
Had already visited the exhibition on another day	14	17.5%
Planned on visiting the exhibition later that day	11	14%
Did not plan on visiting the exhibition that day	42	52.5%
Undecided	6	7%

*Table 4: Reasons for Not Visiting Brain: The Inside Story (N=65)\**

Reason Given	Number of Respondents	Percentage of Respondents
Had already visited exhibition	12	19%
Did not have time	16	25%
Cost	7	11%
Did not know I needed a ticket	4	6%
Tickets sold out	3	5%
Not Interested	12	19%
Not aware of exhibition	12	19%
Plan to visit in the future	4	6%
Other	3	5%

\*Eight visitors provided more than one reason.

\*\* Other reasons given for not visiting the exhibition were that visitors came to the museum with a class, thought their children were too young for the exhibition, and were still undecided.

#### Did visitors attend any other AMNH brain-related programming?

Several visitors, who were surveyed after visiting the brain exhibition, indicated that they had attended or planned on attending other AMNH programming related to the brain (see Table 5). Of these, most mentioned BRAINFest or Brain: A 21<sup>st</sup>

Century Look. However, 72% of respondents who did not go to BRAINFest (N=29) stated that they did not go because they did not know about the event.

*Table 5: AMNH Programs Visitors Had Attended Or Planned On Attending (N=91)\**

Program Name	Number of Respondents	Percentage of Respondents
BRAINFest	38	42%
Brain: A 21st Century Look at a 400 Million Year Old Organ	23	25%
Tibetan Meditation, Brain, and the Arts	17	19%
Wild, Wild World: A Dog's Mind	16	18%
Master Class: Your 21st Century Brain	15	16%
Adventures in the Global Kitchen: Wine and Aging	15	16%
Evolution of the Brain Hall Tour	14	15%
Neuroeconomics: Decision Making and the Brain	14	15%
This is Your Brain on Ping Pong	12	13%
Educators' Night	11	12%
Astronomy and Vision with Emily Rice	9	10%
Global Weekends: Brain and the Tibetan Creative Mind	7	8%
Adventures in the Global Kitchen: Smell (and Taste) the Roses	6	7%
Global Weekends: Saluting Our Jazz Elders	2	2%
Brain Educators' Workshop	2	2%
Other (Non-Brain Related Program)	3	3%
Not Applicable (Out-of-town visitor)	3	3%
Don't know yet	3	3%

What did visitors think about the exhibition in general?

The exhibition was well-received by visitors:

*Something everyone should see - it made me realize I can keep improving my brain!*

*The exhibit will explain why and how you do the things you do every day.*

*I thought it was very accessible. I thought it was very interesting to someone who didn't know that much about the brain, about neurology, stuff like that.*

Survey respondents were asked to rate their interest in the brain before visiting the exhibition, their overall satisfaction with the exhibition, as well as its aesthetic appeal and its educational value, on a scale of 1 to 10, with 1 being low and 10 being high (see Table 6). The average satisfaction rating for the exhibition was an 8.31, with half of the survey respondents giving the exhibition a 9 or higher. In terms of the exhibition’s aesthetic appeal, 58% of survey respondents rated the exhibition a 9 or higher. Sixty-four percent of respondents gave the exhibition a rating of 9 or higher on educational value. It is interesting to note here that the average level of interest in the brain before visiting the exhibition was 7.45, and that the perceived value of the exhibition was higher than their initial interest.

Many respondents (68%, N=245) thought that *Brain: The Inside Story* was better than other AMNH offerings. When compared to exhibitions at other museums, even more respondents (75%, N=238) thought that *Brain: The Inside Story* was superior.

Table 6: Visitors’ Opinions of the Exhibition

Category	1	2	3	4	5	6	7	8	9	10	Number of Visitors	Mean
Interest in the brain before visiting the exhibit	6	5	9	19	32	27	31	52	16	98	295	7.45
Overall satisfaction with “Brain: The Inside Story”	0	0	3	4	12	16	51	62	50	96	294	8.31*
Aesthetic appeal of the exhibition	1	3	1	4	6	19	33	55	59	110	291	8.49
Educational value of the exhibition	0	0	1	1	4	13	30	57	56	132	294	8.83

\*Interviewees (N=23), who were asked the same question gave a similar average rating.

Almost all respondents (98%, N=286) indicated that they would recommend the exhibition to friends or family members. When asked how they would describe the exhibition to others, most respondents indicated that the exhibit had been educational and informative, interesting, fun, and interactive. The following are some of the descriptions of the exhibition that visitors provided:

*It is a fascinating perspective on a part of the body we take for granted and know little about.*



*Really clear, concise picture of the brain and what scientists know.*

A few visitors gave less positive descriptions, which seemed to be related to the amount of text in the exhibition:

*It was very generalized and I think people are more interested in seeing more interactive and visuals than reading about the brain on clips. The brain is complicated and how it works is so big that it's hard to realize its capabilities through reading.*

Approximately one quarter of survey respondents (26%, N=262) felt that there had been too much text in the exhibition, while most visitors (68%) felt that the exhibition had just the right amount of text. When asked to approximate how much of the exhibit text they had read, most visitors indicated that they had read at least half or all of the interpretation (see Table 7).

*Table 7: Amount of Exhibit Text Visitors Read (N=285)*

Amount of Exhibit Text Read	Number of Respondents	Percentage of Respondents
Almost all	123	43%
About half	112	39%
A little bit	49	17%
None	1	0%

What were visitors' favorite and least favorite parts of the exhibition?

Visitors liked the exhibit interactives (i.e. hands-on aspects of the exhibition), Brain Training games (that challenged their thinking), exhibition entrance, Language Interactive, and Brain Intro Theater the best. The following are quotes from visitors explaining why particular areas of the exhibition were their favorites:

*The entrance sets the tone visually for the inner working of the brain.*

*I love the models as we're coming in, and all the stuff that's hanging there, all the neurons across the ceiling. I love being able to imagine that that's actually the brain.*

*[I liked the] speed and memory tests and information about Alzheimer's [because I am] getting older and want to keep [my] brain active.*

Visitors were also asked to identify parts of the exhibition that they had found challenging, confusing, or did not like. Many visitors noted that the exhibition had been crowded - especially around the interactives and Brain Training Games -making it difficult to see and do everything, and that there had been too much text to read and a lot of information to process:

*A lot of the exhibits had too many people, which was hard to take in or enjoy.*

*Being able to read all the information while keeping a steady pace to avoid holding up other viewers [was challenging].*

*A lot of explanations were very wordy. I think my middle school students would be overwhelmed.*

Some visitors mentioned specific activities that they found difficult to use or understand such as the Language Interactive (*"There were no directions,"*), Star Tracing Activity (*"There were already grooves, which made it hard to work."*), and the Neuron Table (*"The neuron connector seemed like an excuse to use some touch screen."*).

#### What did visitors do at the exhibition?

A total of 34 followthrough observations were collected to determine where visitors went in the exhibition. Ten followthroughs were analyzed more closely to identify the time visitors spent at different activities within the exhibition. Observations were often done on days when the exhibition was crowded. As a result, visitors sometimes skipped over interpretation and activities because they were being used by others.

The top five most visited areas of the exhibition were the Entrance to the exhibition, Brain Intro Theater, Homunculus, Your Emotional Brain, and the Neuron Table. The least visited areas were the Limbic Links Interpretation, London Taxi Activity, Brain Lounge, the series of Thought graphic panels, and Brain Training Games.

Visitors are more likely to pay attention to exhibit elements at the beginning of the exhibition, and the data supports this pattern, with the most-visited areas being at the beginning of the exhibition and the least-visited areas appearing towards the end of the exhibition. Exceptions to this pattern are Kiki and Booba, which had relatively low visitation compared to the other activities at the beginning of the exhibition and Your 21<sup>st</sup> Century Brain, which had relatively high visitation compared to other activities at the end of the exhibition.

Visitors spent an average of 49 minutes in the exhibition (N=10). Visitors in the ten focus followthroughs tended to spend the most time at the Your Emotional Brain interpretation (i.e. Graphic panel 3.0) and the least amount of time at the Limbic Links graphic panel and Kiki & Booba.

Different types of visiting groups used the exhibit in distinct ways. Most groups of people (4+ people, typically families, tours, or students) tended to be more hurried towards the end of the exhibition than at the beginning. Small groups with tour guides were helpful for answering visitor questions and receiving in-depth exhibit explanations. However, with larger tour groups, visitors seemed to feel obligated to passively and quietly follow the guide. For example, in one observed tour, the guide skipped the Brain Intro Theater, and the group followed. In both kinds of tour groups, the format did not really allow for visitors to interact with each other (for fear of being too loud) or try the interactive activities (because the groups often moved too fast to stop at these activities). In fact, members of one tour group were

observed going back to the beginning of the exhibition after their tour was over and trying activities they had missed. School groups also had limited time or opportunity to try activities or stop to read text. For example, one student who wanted to try the advanced part of the Block Stacking Activity had to leave the area and follow his group leader to the next area instead. Interestingly, when guided tour or school groups were present, visitors tended to skip sections of the exhibition altogether or come back to them once the group had left.

Older adults (age 50+) were less likely to engage with the exhibit activities, and were often only interested in reading the exhibit interpretation. In contrast, children tended not to read or discuss the interpretation unless prompted by their parents or teachers. They seem to be more interested in performing the activities. However, they also did not appear to be understanding the activities' meaning or relevance unless prompted again by their parents or teachers. For example, children were observed just waving their hands over the Neuron Table rather than trying to make connections, not following the instructions for the Block Stacking Activity, and being more focused on getting a better score on the Brain Training Bird Game than understanding the actual purpose of the score.

Conversations in *Brain: The Inside Story* often consisted of adults discussing the exhibit content while doing activities together with their visiting group, or first do activities alone and then teach group members. One topic that visitors seemed to discuss together at length was how their brain is often tricked when overloaded or presented with conflicting information (ex. The Stroop Test where the word conflicts with the color). Some visitors - students especially - were also overheard expressing surprise at how the brain can change so drastically over time. In addition, two different visiting groups read the information on Phineas Gage and wondered if the congresswoman who was shot experienced changes in personality as well.

## Findings From Specific Exhibit Activities

Six exhibit activities were focused on for additional data collection and analysis: The Block Stacking Activity, the Neurotransmitter Interactive, the Language Interactive, the Neuron Table, the Brain Intro Theater, and Your Sensing Brain. The following findings are drawn from those mini-studies.

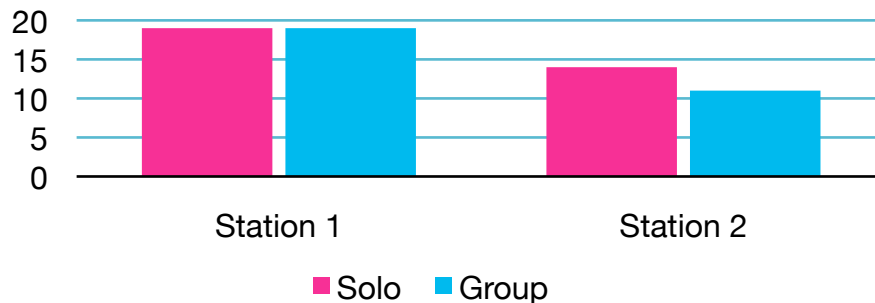
### Block Stacking Activity

A total of 27 general observations were analyzed for the Block Stacking Activity. Visitors spent an average of 3 minutes and 45 seconds at the Block Stacking Activity, with a range between 1 minute and 17 minutes. The longest interaction, was a woman who attempted to solve the second block puzzle three times before allowing her son to show her how to solve the problem correctly.

Several visitors were observed working with others, even people outside of their own group. Some visitors would try the Block Stacking Activity by themselves first,

and then show it to another person. Interestingly, an equal number of visitors tended to try the simple version of the Block Stacking Activity alone or in a group (see Figure 2). However, for the more advanced version, Station 2, visitors were more likely to try the activity on their own.

*Figure 2: Block Stacking Activity: Solo vs. Group Participation*



Very few visitors skipped this activity, had to wait, or observed others before trying it themselves. Almost all read the instructions and many visitors also read the other interpretation. However, visitors tended to pay little attention to the rules of the activity and parents were overheard telling their children the wrong rules, especially when the exhibit was crowded. For example, one grandmother read the stacking instructions out loud, and she and her grandchild still put a large block on top of a smaller one. Several visitors (at least 14 of the 34 observed groups) started out doing the activity incorrectly and those who did tended not to complete the activity. Only a few tried the activity again. Visitors seemed more confident at Station 1 and more confused by the advanced block stacking activity at Station 2.

Younger adults and children appeared to be better (i.e. faster, less number of moves needed) than older adults, likely a result of a younger brain's flexibility in problem solving and response to a challenging task. Observers also found that very young children had trouble moving the blocks from rod to rod because the blocks are attached to the table.

Crowd level within the exhibition heavily determined the likelihood of participants repeating activities, attempting to improve upon previous scores, or trying out a second block station. Light crowds made visitors feel less obligated to let someone who is waiting try. In addition, adults tended to defer to children, allowing them to try the task first. These children tended to spend more time and attention on the Block Stacking Activity, which often prevent adults from getting an opportunity to try a task due to time constraints.

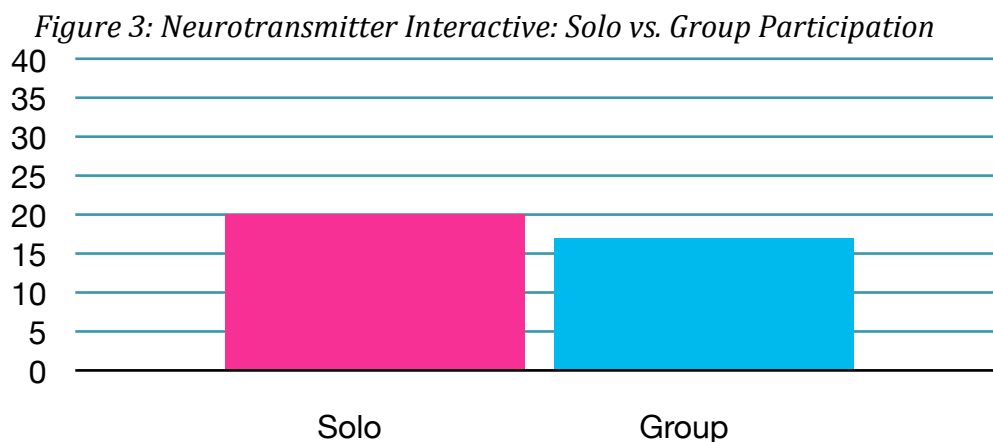
Another factor that mediated the probability of an adult repeating a Block Stacking Activity was the presence of that person's friends or family during the testing. Those who either worked together with or competed against others (family or friends) were more likely to pay attention to the number of moves made, and were more likely to attempt block-stacking again (either to improve their score on the

same activity, or to move on to the more advanced level), than those who had tried it alone. Specifically, those who worked alone generally gave up if they were not able to complete the task in three or less attempts. They tended to either walk away or watch someone else attempt it. Those who were with family or friends and did not complete it would ask others what they thought the right strategy was.

In terms of general understanding of the purpose of the activity, most participants were able to clearly explain and convey the rules and goals when asked. Several visitors also indicated that the Block Stacking Activity had taught them something about their own capabilities (“*It definitely showed me my ideas and how I visualize and spatially move things.*”). Visitors also were able to see parallels between the Block Stacking Activity and their personal experiences such as planning a trip, playing a strategy game, and organizing lists.

### Neurotransmitter Interactive

A total of 19 observations were analyzed for the Neurotransmitter Interactive. Seventeen visitors were observed from the beginning of the activity; one started in the middle and one began near the end. Visitors spent an average of 5 minutes and 20 seconds at this activity, with a range from 2 minutes to 13 minutes. Three of the four observees who spent only 2 minutes were able to complete the activity (though one started in the middle). In fact, most visitors completed the activity and read the instructions. Slightly more visitors played the game alone than played with others (see Figure 3).



Tour groups tended to skip this activity. Generally, there were no gender differences when dealing with rate of approaching and finishing the activity and the various choices of options (i.e. obey vs. disobey). However, there did seem to be a consistent age difference: Children and teens tended to get more opportunities to attempt the activity, whereas adults guided or allowed their children to perform the activity for them. This pattern was especially apparent on crowded days. When the crowd was light, more adult visitors were able to complete the activity without feeling rushed or leaving the kiosk to a younger user. Seniors tended to skip the Emotion Interactive or would observe others using the game but rarely tried it themselves. In addition,

the rate of persistence was significantly different between young and older people. While teens and children were initially attracted to the interactive computer kiosk, they seemed to get impatient during the passive sequences between the active decision-making, leading them to quit the activity more often than any other age group, whereas older visitors were more attentive and engaged in the process. During interviews and observations, older visitors tended to be more surprised with the quality of the video (ex. “This is so high tech.”).

For the most part, visitors seemed to understand what the activity was about (“*It tells me which functions of the brain or which chemicals are acting when I get a stimulus and I get distracted from what I’m doing.*”). Most participants acknowledged the significance of the bottom left and bottom right portions of the screen describing the neurochemistry and exchange of neurotransmitters, but quickly forgot the exact names and interactions that occur.

One woman liked that the game portrayed a real situation, but thought that the pace of the game was a little slow. Another appreciated gaining insight into her own children:

*I think I was trying to think of what my sons would do. With the bikes, that often happens with them wanting something and then it escalates and so I was getting a picture of what’s going on in their body when that happens.*

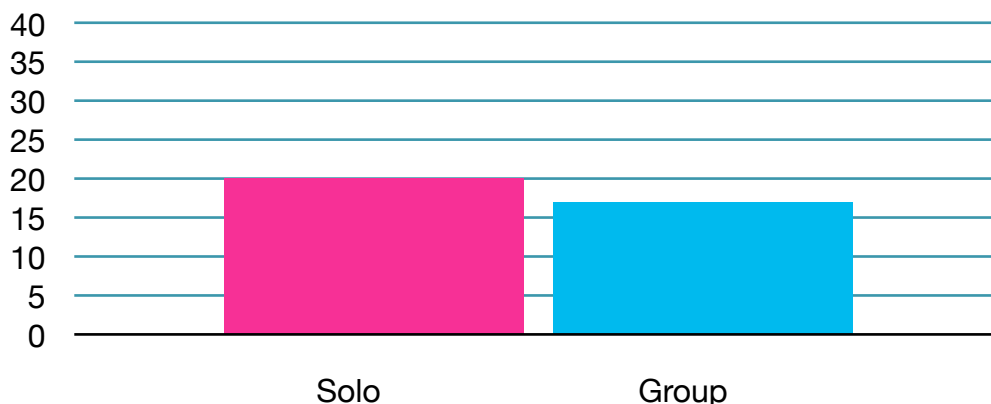
Most visitors’ game-playing strategy was to break the rules and disobey the mother: *I was picking which one would get more of a reaction so you would be able to see what goes on in the brain when the brain becomes very stressed.*

During interviews, many claimed that they just wanted to see how the mother would react (i.e. whether she would punish the child or not).

### Language Interactive

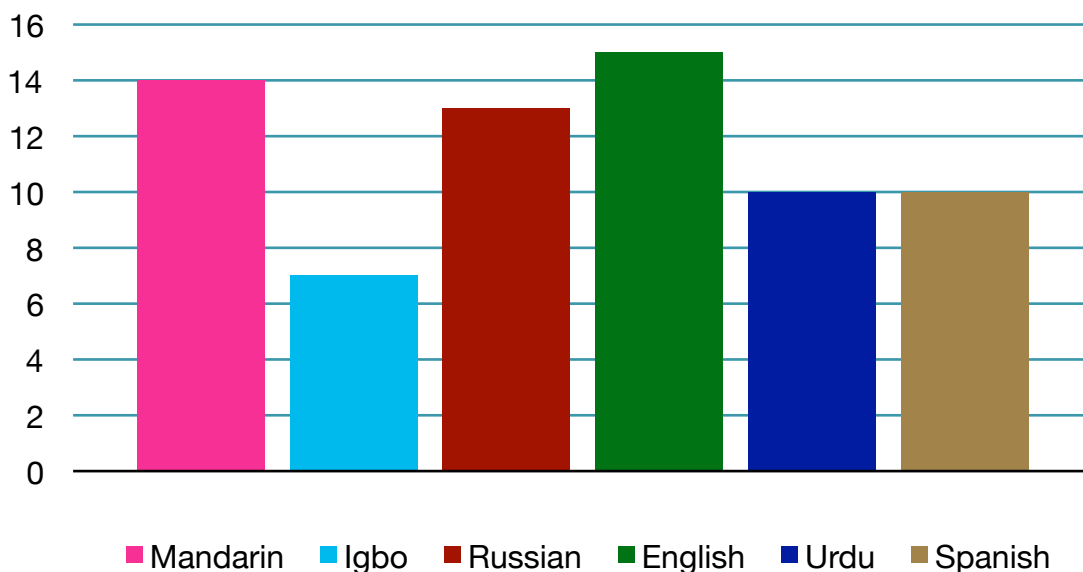
A total of 37 observations were analyzed for the Language Interactive. On average, visitors spent 4 minutes and 6 seconds there, with a range from just under 2 minutes to just over 9 minutes. Slightly more visitors did this activity alone compared to in a group (see Figure 4).

Figure 4: Language Interactive: Solo vs. Group Participation



English, Mandarin, and Russian were the top three languages that visitors tried (see Figure 5). None of the visitors we observed tried more than four different languages (see Figure 6). Two observees watched other visitors but did not try the activity on their own. On average, visitors tried two languages. All three English phrases were tried the most often (see Figure 7). After English, the top first phrase tried was Mandarin, the top second phrase tried was often Spanish and the third was Russian.

*Figure 5: Language Interactive: Language Frequency*



*Figure 6: Language Interactive: Number of Languages Tried By Visitors*

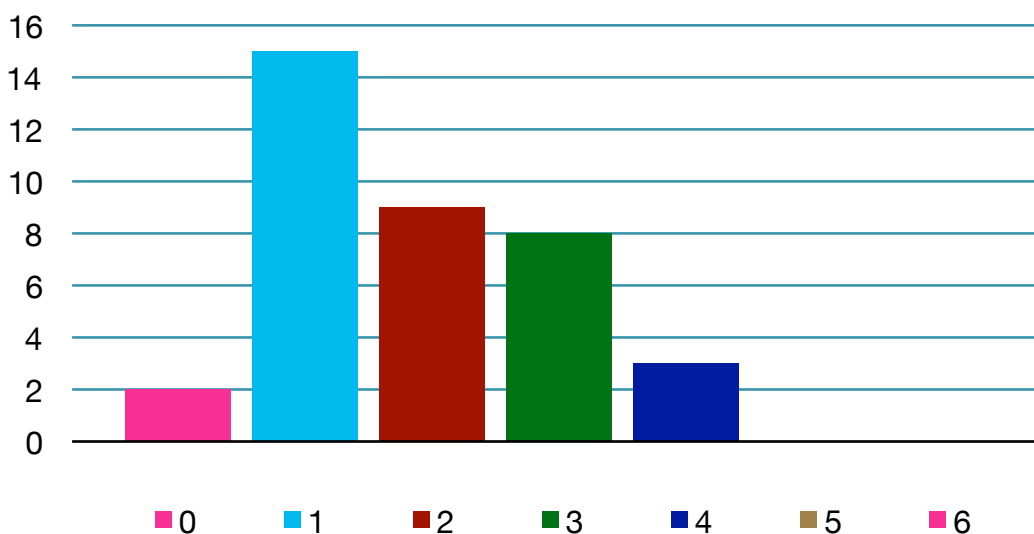
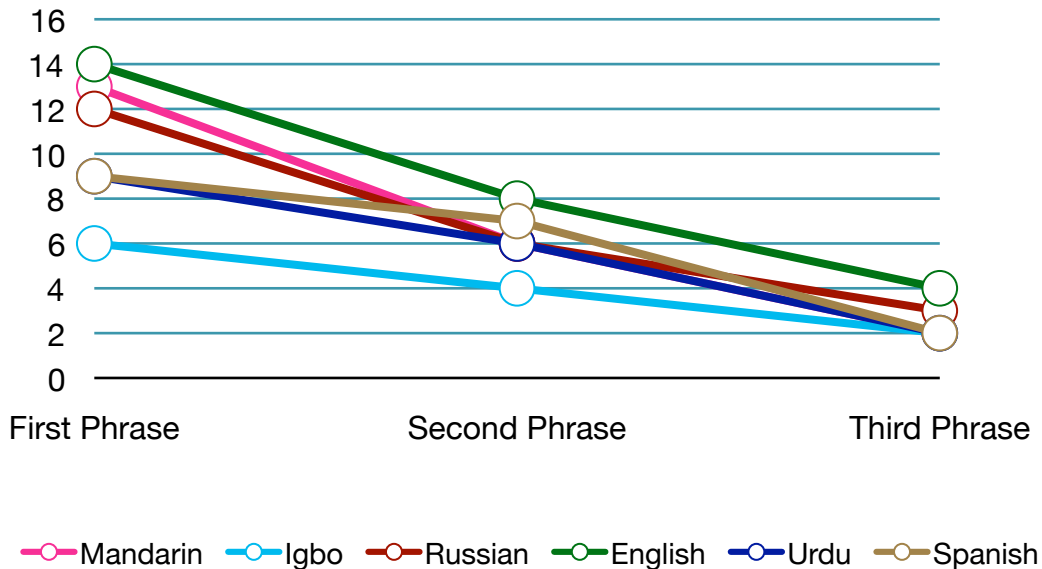


Figure 7: Language Activity Use Over Time



When visitors tried Mandarin, they tended to listen to, speak, and review the “thank” phrase. When they tried Igbo, visitors listened to, spoke, and reviewed the “antelope” phrase the most. When visitors tried Russian, they often listened to and spoke the “laugh” phrase, but were less likely to review it. When visitors tried English, they were most likely to listen to and speak the “wow” phrase, but less likely to review it. When visitors tried Urdu, they were likely to listen to and speak the “thank” phrase, but less likely to review it. When visitors tried Spanish, they listen to and spoke the “girl” phrase, but they were slightly less likely to review it.

There were a few age-related behaviors at the Language Interactive. Males in their teens and twenties appeared to find the interactive slightly uncomfortable, and would often look around to see if anyone was watching or listening and were reluctant to record themselves. Young children were not embarrassed by the activity, possibly because kids are not afraid to make mistakes- something that develops as we get older. Many children did not follow the instructions, and just wanted to hear noises and sounds they made recorded. A few children were observed singing into the microphones, making animals sounds, and saying profanities. One group of boys made nonsense sounds with the goal of trying to fill up the visual of the speech pattern so that the whole box was highlighted green. Laughter was frequently heard at this activity as visitors tried to repeat phrases.

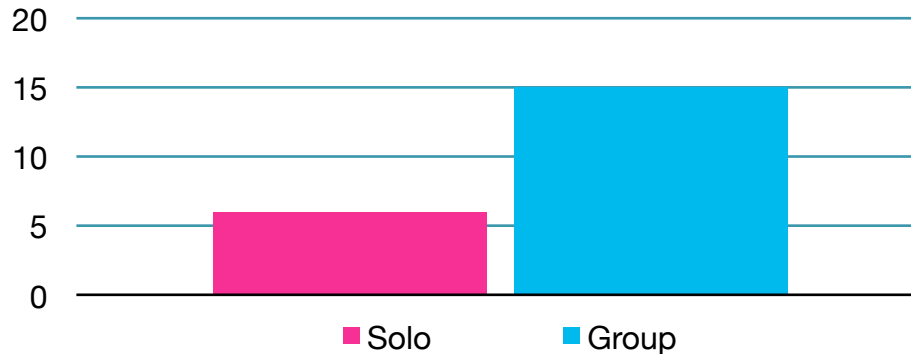
Like several other interactives, adults would leave the Language activity early if there was a line of people waiting, especially if children were waiting to use it. On crowded days, groups of people could be observed watching others try the Language Interactive.



## Neuron Table

A total of 23 observations were analyzed for the Neuron Table. Visitors spent an average of 3 minutes 14 seconds at the Neuron Table, with a range from 1 minute to 11 minutes. Since the activity is naturally social and requires multiple hands to create connections, participants generally worked together with others (both family/friends as well as strangers) when using the table (see Figure 8). They also explained how the table works for newcomers who had trouble understanding.

Figure 8: Neuron Table: Solo vs. Group Participation



Although the 23 visitors who were observed all connected neurons together, several other visitors who approached the table during observation times were seen putting one hand on the table, but never connected two neurons together. These visitors did not understand the interactive because understanding it necessitates using two hands to see how the neurons relate and communicate. One woman noted that she initially had trouble understanding the activity because her hands were full:

*I must admit that it took me awhile, because I have a coat in one hand, to see the connection and use two hands because one hand wasn't doing it.*

Overall, visitors seemed to enjoy the interactive aspect of the activity. Unlike the other activities (e.g., Block Stacking or Neurotransmitter Interactive), the crowd level did not determine the likelihood of participation as heavily, except when there was a tour group of more than 10 people attempting to make connections at once.

Age differences were evident regarding the frequency and duration of reading the material vs. trying the activity. Older adults spent less time at the table and more time reading, whereas younger adults and children spent more, if not all their time, at the table. Additionally, younger people usually did not place their hands still on the screen and try to make connections. Instead, they would often wave their hands above the table to see what the neuron would do.

When asked the purpose of the table during interviews and the underlying theory supporting the activity, most visitors were able to describe the basic concept, but did not go further in depth into an explanation of how neurons work (*"I think it's about the neurons. They like to connect to each other. They like to find their partners."*). Only one mother was overheard saying to her son, "They're sending messages." Visitors understood that the neurons (i.e., hands) needed to be close

together to create a connection, yet they often did not comment that the signal was unidirectional, or that it became stronger (i.e., brighter) when more neurons were involved in the process.

Visitors loved the simplicity of the interactive (“It’s great for kids to see how everything works in a very simplified way,” “It’s not very specific, but it is very experiential, so I liked it.”), but wanted more information regarding the specifics of how neurons operate (“*I think the interactive is great. I guess I wanted a little more information, a little more meat to it.*”)

### Your Sensing Brain

Data from 34 followthroughs was analyzed to determine what visitors did in the Your Sensing Brain area. Visitors were slightly less likely to skip the Your Sensing Brain interpretation, the Mona Lisa and the Homunculus than the other activities in this area. In terms of the interpretation, visitors were more likely to read the Your Sensing Brain panel and try to guess the pictures than read the other interpretations in the area. However, few visitors talked together about the panels.

Most visitors understood that the area was about the senses, with some identifying specific senses such as visual and auditory, and a few linking sensory processing and perception (i.e. “The example where you listen to the rain with the person holding the umbrella and it sounds like rain, but when you see the bacon frying and you hear bacon – how what you see changes how you perceive the sound.”). However, visitors did not appear to understand what the Mona Lisa activity revealed about the brain.

In the Your Sensing Brain section, visitors liked the Mona Lisa and the Frying Bacon activity the best. They liked the Mona Lisa because it was “nice to look at” and they could not tell what it was until they looked through the glass ball. They liked the Frying Bacon because they were “fooled”. A few visitors also mentioned liking the section on synesthesia because they thought it was an interesting condition and Kiki and Booba because it confirmed that the sound of the words biases the naming of the objects.

### Brain Intro Theater

Thirty-two visitors were observed watching the Brain Intro video. Most visitors sat down and watched all of the video. When there were no seats available, visitors tended to either skip the activity or only watch some of the video.

When asked during interviews what they liked about the video, the responses related to the presentation of the information. Visitors enjoyed how the 3D model of the brain showed where specific areas were located. The explanation of certain activities (e.g. tying shoes, walking, dancing, thinking about dancing) and their subsequent brain structures/functions were useful because they explained everyday activities that are relatable across all demographics:

*We thought it was very well done. Rather than just explaining things to you, they brought sort of a human element to it.*

The most widespread concept that was described during interviews was the notion of brain lateralization. Most people were surprised to learn that the left half of the brain controls the right half of the body and vice versa. Visitors also learned specific terminology:

*[I learned] the different terms. Like the prefrontal cortex, motor cortex, auditory cortex. Stuff like that. I had no idea what that stuff was.*

Most visitors wanted more information regarding specific areas/pathways that they were interested in. One common response was that the information was too wide-ranging, and that the video was attempting to describe too many brain areas in too short a time. However, the general consensus was that the length of the video was the right amount of time.

#### What did visitors learn from the exhibition?

Visitors were asked to reflect on their knowledge of the brain prior to visiting the exhibition and compare it to their knowledge of the brain after visiting the exhibition. Most survey respondents (73%) indicated that they had average or above average knowledge of the brain before visiting the exhibition (see Table 8). After visiting the exhibition, 94% of respondents indicated that they felt they knew more about the brain now.

*Table 8: Visitors' Brain Knowledge Before Visiting the Exhibition (N=296)\**

Self-Reported Knowledge of Brain	Number of Respondents	Percentage of Respondents
Nothing	8	3%
A little bit	60	20%
Average	104	35%
Above Average	111	38%
Expert	13	4%

Visitors reported that they learned about specific functions of different parts of the brain and various brain facts such as the number of neurons in the brain. They also mentioned learning about different technologies being used to study the brain, how different activities such as dancing and sleeping affect the brain, how the human brain evolved over time, how brains develop as people age, and about brain disorders. Visitors also reported that the exhibition had taught them a lot about themselves:

*The prefrontal cortex serves as the executive branch of my brain, helping me to make decisions. But when it gets too busy focusing on other things, sometimes I can be distracted so that the pleasure parts of my brain are overactive.*

The exhibition was also good at making the natural appear strange. That is, visitors learned a lot about how the brain must make generalizations and assumptions during perception. During interviews, visitors reported that they were surprised that their perception of reality was so subjective and adaptable based on how their brain interprets information. During interviews and discussions with other people, personal experience was also a significant factor. The more salient topics were the ones that were relevant to a personal experience (ex. the Brain & Aging section for a visitor who had a relative suffering from Alzheimer's).

## Recommendations From Visitors

Many visitors noted that the exhibit was often crowded, especially around the interactives (*"[The exhibit was] informative and unique, but [there was] not enough space to move around. It was crowded at the time I was there.*). Several visitors suggested placing the exhibition in a larger space and allowing less people through at one time as potential solutions. In addition, a few visitors had trouble seeing and hearing in the exhibition and recommended reorganizing the space:

*Should put installations that require more attention [and] can be isolated and put further from ones that are noisier.*

Visitors also wanted less text and more interactive elements in the exhibition:  
*It's a lot of reading, which was why I was attracted to more of the hands-on stuff.*

Some visitors felt overwhelmed by the amount of information in the exhibition:  
*It's a little overstimulating. It's a lot of information to take in. I felt like I had to take breaks just to allow my brain to process.*

During interviews, several visitors suggested that a review guide or pamphlet should be given out at the end of the exhibition stating the general topics and themes that were discussed throughout.

The following are additional recommendations made by visitors about general aspects of the exhibit:

- Several visitors noted that the exhibition lighting was very dark.
- One visitor would like the interpretations to be elevated so they can be seen/read over the crowd (i.e. tour group).
- One couple thought they were coming to see a "show." Visitors kept emphasizing they would like there to have been more indication that the *Brain: The Inside Story* is an exhibit that you walk through, not a "show" that you sit and watch.
- *"Think about making the information more accessible to children (especially non-English speakers)."*
- *"More anecdotes or video from actual people. I liked the part about Daniel Tammet, whom I have read, but feel others could have gained more given more background information."*

- *“Could have used more tests and games to show what parts of the brain you are using.”*
- *One visitor thought that the amount of time needed to go through the exhibition was misrepresented: “The man at the ticket booth said it takes about 45 minutes but it was more like 1 1/2 hours.”*

The neuroscience grad students also had recommendations for the exhibition:

- *The video at the beginning of the girl auditioning for Julliard provides a great overview, but can later be forgotten amidst the vast amount of information in the rest of the exhibit. I believe it would be helpful if each section referred back to the area of the brain that was used when the girl was nervous, using her memory, or excited over her performance. Just a short blurb in each section could assist visitors in tying all of the information together.*
- *A computer at the end of the exhibit that has a short quiz that people could choose (or not choose) to take. The computer could randomly generate 10 questions (out of 100 or so different general brain-knowledge questions raised throughout the exhibit) that would constitute the quiz. This way, the voluntary quiz is different every time. At the end of the quiz, the person’s score will be given, including the answers (and where in the exhibit to find the right answers) to the questions answered wrong. Additionally, although the quiz would be completely voluntary and anonymous, visitors could be asked to give their basic demographic information (gender, age...). This info might be helpful for understanding which parts of the exhibit were the most clear.*
- *Much of the interpretation is very vague and makes information less memorable and hard to retain. More emphasis could be placed on research or real life examples (like HM example in memory section).*
- *Perhaps at the end of certain sections, participants could be prompted to discuss how the information relates to their own lives, thereby making the information and activities more pertinent.*
- *The 21st Century Brain could be mixed into exhibit (i.e. the ‘Should we create an artificial hippocampus’ could be in memory section). This would inspire critical thinking and discussion throughout the exhibit.*

# Appendix A: Visitor Demographics

## End-of-Exhibition Survey

Two hundred ninety-eight visitors took the end of exhibition survey. Of these, 60% were female and 40% were male (N=282). Most respondents were between 19 and 29 years of age (see Table 9).

*Table 9: Age Range of Survey Respondents (N=286)*

Age Range	Number of Respondents	Percentage of Respondents
12-15	30	10%
16-18	11	4%
19-29	91	32%
30-39	44	15%
40-49	32	11%
50-59	31	11%
60+	47	16%

Most respondents were from other states or countries (see Table 10). Therefore, it is not surprising that the majority of respondents were not museum members (89%, N=264).

*Table 10: Geographic Location of Survey Respondents (N=288)*

Geographic Location	Number of Respondents	Percentage of Respondents
New York City	113	39%
NYC suburbs (NY, NJ, CT)	68	24%
Other US State	64	22%
International	43	15%

Respondents tended to come to the exhibition with their spouses or partners and their friends (see Table 11). Very few came with their grandchildren or groups of children.

Many survey respondents had either obtained a Bachelor's Degree or a Master's Degree (See Table 12). Very few had not attended college.

*Table 11: Group Composition (N=282)*

Who visitors came with to the exhibition	Number of Respondents	Percentage of Respondents
I came alone	37	13%
My friend(s)	78	28%
My spouse/partner	94	33%
My children	37	13%
My grandchildren	4	1%
Another relative	20	7%
My parents	29	10%
Group of children	9	3%
Other	25	9%

*Table 12: Survey Respondents' Highest Level of Education (N=263)*

Highest Level of Education	Number of Respondents	Percentage of Respondents
Some high school	16	6%
High school diploma	13	5%
Some college	28	11%
Associate's Degree	9	3%
Bachelor's Degree	71	27%
Some graduate school	21	8%
Master's Degree	77	29%
PhD or professional degree (M.D., J.D, etc.)	28	11%

End-of-Exhibition Interview

Twenty-two visitors participated in an end of exhibition interview. Of these, 45% were female and 55% were male (N=20). Most interviewees were between 19 and 29 years of age and reported having above average knowledge of the brain (see Tables 13 & 14).

*Table 13: Age Range of Interviewees (N=18)*

Age Range	Number of Interviewees	Percentage of Interviewees
12-15	0	0%
16-18	0	0%
19-29	9	50%
30-39	3	16.67%
40-49	0	0%
50-59	3	16.67%
60+	3	16.67%

*Table 14: Interviewees' Level of Knowledge of the Brain (N=22)*

Self-Reported Knowledge of Brain	Number of Interviewees	Percentage of Interviewees
Nothing	0	0%
A little bit	0	0%
Average	6	27%
Above Average	14	64%
Expert	2	9%



# Appendix A: Data Collection Instruments

## End of Exhibition Survey

**“Brain: The Inside Story” Visitor Feedback**      Date \_\_\_\_\_

*Please take a few minutes to share your thoughts about the exhibit.*

**1) Why did you decide to come to “Brain: The Inside Story” today? (check all that apply)**

- I am interested in the topic  
 I read about/saw it advertised  
 Other (Please specify) \_\_\_\_\_  
 It was recommended by a friend/family member  
 Another person in my group wanted to come

**2) How much did you know about the brain before visiting the exhibit?**

- Nothing     A little bit     Average     Above Average     Expert

**2a) Do you think you know more about the brain now after visiting the exhibit?**     Yes     No

**3) Did you learn anything new from the exhibition? If yes, what?**

**4) Please rate each of the following from 1 (low) to 10 (high)**

	1 low	2	3	4	5	6	7	8	9	10 high
Interest in the brain <i>before</i> visiting the exhibit										
My overall satisfaction with “Brain: The Inside Story”										
The aesthetic appeal of the exhibition										
The educational value of the exhibition										

**5) What are three adjectives you would use to describe the exhibit?**

**6a) What was your favorite part of the exhibit? Why?**

**6b) What part(s) of the exhibit did you find challenging to use or understand? Why?**

**6c) Is there a specific topic/activity in the exhibit that you want to find out more about? If yes, what topic and how do you plan to get that information?**

**7) About how much of the exhibit text did you read?**     Almost all     About half     A little bit     None

**7a.) The amount of reading in this exhibit was**

- About the right amount     Too little     Too much

*Please take a few minutes to share your thoughts about the exhibit.*

**8) Have you attended (or do you plan on attending) any other AMNH programs related to the brain? If yes, which ones? [check all that apply]**

- |   |   |
|---|---|
| <input type="checkbox"/> Educators’ Night   | <input type="checkbox"/> Adventures in the Global Kitchen: Wine and Aging     |
| <input type="checkbox"/> Master Class: Your 21 <sup>st</sup> Century Brain                      | <input type="checkbox"/> This is Your Brain on Ping Pong                      |
| <input type="checkbox"/> BRAINFest!   | <input type="checkbox"/> Neuroeconomics: Decision Making and the Brain        |
| <input type="checkbox"/> Evolution of the Brain Hall Tour                                       | <input type="checkbox"/> Global Weekends: Brain and the Tibetan Creative Mind |
| <input type="checkbox"/> Astronomy and Vision with Emily Rice                                   | <input type="checkbox"/> Tibetan Meditation, Brain, and the Arts              |
| <input type="checkbox"/> Global Weekends: Saluting Our Jazz Elders                              | <input type="checkbox"/> Wild, Wild World: A Dog’s Mind                       |
| <input type="checkbox"/> Brain: A 21 <sup>st</sup> Century Look at a 400 Million Year Old Organ |   |
| <input type="checkbox"/> Adventures in the Global Kitchen: Smell (and Taste) the Roses          |   |
| <input type="checkbox"/> Other (Please specify) _____   |   |

**9) Exhibition Comparisons**

	<b>Much Better</b>	<b>A little Better</b>	<b>About the same</b>	<b>Not as good</b>	<b>Much worse</b>
<b>Compared to other exhibitions at this museum, “Brain: The Inside Story” was:</b>					
<b>Compared to exhibitions at other museums, “Brain: The Inside Story” was:</b>					

**10) Would you visit this exhibition again?  Yes  No**

**10a) Why or why not?**

**11) Would you recommend this exhibition to a friend or family member?  Yes  No**

**11a) How would you describe the exhibit to them**

**12) Do you have any other comments or suggestions about this exhibition?**

---

**Tell us a bit about yourself.**

**13) Gender:**  Male  Female

14) Age:     12-15     16-18     19-29     30-39     40-49     50-59     60+

**15) Where are you from?**

New York City                       NYC suburbs (NY, NJ, CT)  
 Other USA State \_\_\_\_\_     International \_\_\_\_\_

16) Are you a member of this museum (AMNH)?  Yes     No

**17) Highest Level of Education**

Some high school                       Bachelor’s Degree  
 High school diploma                       Some graduate school  
 Some college                       Master’s Degree  
 Associate’s Degree                       PhD or professional degree (M.D., J.D, etc.)

**18) Who came with you today? [check all that apply]**

I came alone                       My children                       My parents  
 My friend(s)                       My grandchildren                       Group of children  
 My spouse/partner                       Another relative                       Other

19) We are interested in the longer-term impact of museum exhibitions. Can we contact you about “Brain: The Inside Story” in a few weeks? If so, please supply your email address:

\_\_\_\_\_

**Thank You!**

Followthrough Observations

**Brain Follow-Through Protocol**

**Observer:**

**Observee:**

**Start Time:**

**Exhibit Entrance:**

Skip	Watch video	Read brain display	Look art	Comment art
Read bundle of nerves		Comment bundle of nerves		

**Brain Intro Theater:**

Skip	Watch some	Watch all	Watch end first	Sit
Comment	Discuss	Broken	No seats	

**SENSE (Interpretation):**

Skip	Read Your Sensing Brain	Read HIW Senses	Read Who’s Who
Guess Pictures	Comment	Discuss	

**Mona Lisa (Read, Set, See):**

Skip	Look	Read some	Read all	Comment	Discuss	Try
Complete	Wait	Broken	Not reset			

**Homunculus:**

Skip      Read touch interpretation      Comment interpretation  
 Look statue    Comment statue      Discuss statue

**Frying Bacon:**

Skip      Look      Read some      Read all      Comment      Discuss      Try  
 Complete Wait      Broken      Not reset

**Connect (Interpretation):**

Skip      Look      Read some      Read all      Comment      Discuss  
 Try      Complete Wait      Broken      Not reset

**Kiki & Booba Activity:**

Skip      Look      Read some      Read all      Comment      Discuss      Try  
 Complete Wait      Broken      Not reset

**NEURON (area):**

Skip      Read WIA Neuron      Comment WIA Neuron  
 Read Communicating Cells      Comment Communicating Cells  
 Observe neuron table      Try table      Understand table  
 Discuss table      Table broken      Wait

**EMOTIONS (interpretation):**

Skip      Read YEB Interpretation      Comment YEB Interpretation  
 Look at face    Comment on face    Face broken

**EVOLUTION (area):**

Skip      Read some      Read Animal Passions      Comment Animal Passions  
 Read Evolving Emotions      Comment Evolving Emotions  
 Read Your Inner Mammal      Comment Your Inner Mammal  
 Read Humans      Comment Humans

**Build-a-Brain (activity):**

Skip      Look      Read some      Read all      Comment      Discuss  
 Try      Complete      Wait      Broken      Not Reset

**Neurotransmitter Interactive:**

Skip      Read How Feel      Comment How Feel  
 Read Neuron Connect Interpretation      Comment Neuron Connect Interpretation  
 Try Game      Start in Middle      Complete game      Comment game  
 Discuss game      Wait      Broken      Just watch

**EFFECT (interpretation):**

Skip      Read Love      Comment Love      Read Drugs      Comment Drugs  
 Read Health    Comment Health

**Your Thinking Brain (interpretation):**

Skip      Look      Read some      Read all      Comment      Discuss

Try      Complete      Wait   Broken      Not reset

**Sub-Cortical Model and Interpretation:**

Skip      Look Big Brain      Read Connectivity      Comment Connectivity  
Read Deep Inside Brain      Comment Deep Inside Brain  
Read Com Hubs      Comment Com Hubs

**LANGUAGE (interpretation):**

Skip      Read HIW      Comment HIW      Read Language  
Comment Language      Read Evolving      Comment Evolving

**Language Interactive:**

Skip      Observe      Try once      Try multiple phrases  
Try multiple languages      Wait      Touch screen  
Talk early      1 Broken      2 Broken      Comment      Discuss

**MEMORY (interpretation):**

Skip      Read HIW Memory      Comment HIW Memory  
Read STM      Comment STM      Try chunking numbers  
Complete chunking numbers      Wait chunking numbers  
Reset chunking numbers      Read Proc Mem      Comment Proc Mem  
Read LTM      Comment LTM      Read Super      Comment Super  
Read Limits      Comment Limits

**Star Tracing Activity:**

Skip      Observe      Read instructions      Try 1      Complete 1      Try 1 again  
Comment 1      Try 2      Complete 2      Try 2 again      Comment 2      Wait  
1 Broken      2 Broken

**London Taxi Driver Activity:**

Skip      Look      Read some      Read all      Comment      Discuss  
Try      Complete      Wait      Broken      Not reset

**Limbic Links (interpretation):**

Skip      Look      Read some      Read all      Comment      Discuss      Try  
Complete      Wait      Broken      Not reset

**Block Stacking Activity:**

Skip      Read instructions      Try 1      Wrong 1      Correct 1      Discuss 1  
Try 2      Wrong 2      Correct 2      Discuss 2      Wait      Broken      Not reset  
Just watch

**Stroop Test Activity:**

Skip      Look      Read some      Read all      Comment      Discuss      Try  
Complete      Wait      Broken      Not reset

**THOUGHT (interpretation):**

Skip      Read Reason      Comment Reason      Read Focus      Comment Focus

Read Think Comment Think

**CHANGING BRAIN:**

Skip Read Your CB Comment Your CB Look art Comment art  
Read Growing Comment Growing Read Living Comment Living  
Read Aging Comment Aging Read Adapting Comment Adapting  
Try Braille Complete Braille Comment Braille Discuss Braille  
Wait Braille Read Brain Training Discuss Brain Training

**Challenge Your Brain Activity:**

Skip Observe Read Bird Try Bird Complete Bird  
Comment Bird Read Sweep Try Sweep Complete Sweep  
Compete Wait 1 Broken 2 Broken 3 Broken Not reset

**Your 21<sup>st</sup> Century Brain:**

Skip Read Y2CBrain Comment Y2CBrain Read Hooked  
Comment Hooked Read HIW Implants Comment HIW Implants  
Read HIW Bionic Comment HIW Bionic Read HIW Wired  
Comment HIW Wired Read HIW Wireless Comment HIW Wireless  
Watch video

**Brain Lounge Video:**

Skip Sit Watch some Zaha Watch all Zaha Comment Zaha  
Watch some Landry Watch all Landry Comment Landry  
Watch some Yo-Yo Ma Watch all Yo-Yo Ma Comment Yo-Yo Ma  
Watch some Jose Watch all Jose Comment Jose Broken  
No seats

**End Time:**

**Notes:**

**Comments:**

**Interview?** (If no, why not interviewed?)

Followthrough Interviews

**Brain Follow-Through Interview**

**Interviewer:**

**Interviewee:**

This research is being conducted by an external evaluation group hired by AMNH to gather feedback about this exhibit. Your participation in this research is completely voluntary and you may opt not to participate or cease participation at any point in time. All data will be used for research purposes only. A copy of this consent form can be obtained by emailing [Jennifer@rockman.com](mailto:Jennifer@rockman.com). Thank you for your help – please sign below if you are willing to participate.

**Signature:**

**Age:** 5-7 8-10 11-13 14+

**1) Overall how would you rate the exhibit (on a 1-10 scale where 1 is low and 10 is high)?** Exhibit rating comments:

**2) How much did you know about the brain before visiting this exhibit?**  
(Choose from: Nothing, Very little, Average, Above average, Expert)

Brain knowledge comments:

**3) Why did you come to the Brain exhibition today?**

**4) Do you plan on attending (or have you already attended) any of the programs connected to this exhibit?**

**5) What did you like most about this exhibition?**

**6) What new things did you learn about the brain? (Did the exhibit lead you to think about the brain differently?)**

We are interested in learning more about this exhibition by asking visitors what they know and/or learn. More so than a test of your knowledge, this is a way to understand what people are getting from the exhibition. For each of the following questions, please indicate if this was something that you knew before or something you learned from the exhibition.

**7) Ask 2-3 of the following questions for #7:**

**a) What is the brain and why is it important?**

**b) How does your brain work?**

(PROBE: What are the different parts of the brain? What do they do?)

**c) How does your brain grow and change over time?**

**d) How does the brain vary across different species?**

**e) How do we study the brain?**

**8) Was there anything that you didn't like (or found confusing) about this exhibit?**

**9) Is there anything that you would recommend doing to improve this exhibit?**

**10) What, if anything, do you plan to do or look up as a follow-up to your experience in this exhibition?**

Do you have any other comments about this exhibition?

**Notes:**

**Research Comments:**

## Specific Activity Observations

### *Brain Block Stacking Observation*

**Observer:**

**Observee Info (age, gender, group type etc.)**

**Start Time:**

#### **Try Activity 1(Left)**

Skip    Observe                      Wait                      Comment                      Solo    Team  
Read interpretation                      Read Instructions                      Not Reset                      Try Right  
Try Wrong    Complete Right                      Complete Wrong                      Try Again  
Talk with group                      Staff Interaction                      Confused                      Confident  
Refer to prior exhibit                      Refer to prior knowledge                      Show someone  
Reset    Want solution

#### **Try Activity 2(Right)**

Skip    Observe                      Wait    Comment                      Solo    Team    Read interpretation  
Read Instructions                      Not Reset                      Try Right                      Try Wrong                      Complete Right  
Complete Wrong                      Try Again                      Talk with group                      Staff Interaction  
Confused    Confident                      Refer to prior exhibit                      Refer to prior knowledge  
Show someone                      Reset                      Want solution

**End Time:**

**Observation Notes:**

**Interview?** (Yes/No)

1. Tell me about this activity? What did you do? What was it about?
2. Did you like this type of goal-oriented activity?
3. What did you like about this activity?
4. Was there anything that you didn't like (or was confusing) about this activity?  
Prompt: How could it be improved/what would you change?
5. How much did you know about the brain before visiting this exhibit? (Choose from: Nothing, Very little, Average, Above average, Expert)
6. Did you learn anything new about the brain from this activity that you didn't know before?
7. Do you have any other comments or suggestions about this activity?

**Other comments:**

### *Language Interactive Observation*

**Observer:**

**Observee Info (age, gender, group type etc.)**

**Start Time:**

**Watch first?** (Yes/No)

**Have to wait?** (Yes/No)

**Which station?**    Right                      Left                      Both

**Solo or group?** (Solo/Group)



**Mandarin:**

Some instructions	All instructions	Listen “thank”	Speak “thank”
Review “thank”	Listen “rock”	Speak “rock”	Review “rock”
Listen “travel”	Speak “travel”	Review “travel”	Start before record
Comment	Menu	Record again	Next phrase
			Next language

**Igbo:**

Some instructions	All instructions	Listen “antelope”	Speak “antelope”
Review “antelope”	Listen “fetch”	Speak “fetch”	Review “fetch”
Listen “dance”	Speak “dance”	Review “dance”	Start before record
Comment	Menu	Record again	Next phrase
			Next language

**Russian:**

Some instructions	All instructions	Listen “laugh”	Speak “laugh”
Review “laugh”	Listen “hello”	Speak “hello”	Review “hello”
Listen “rye”	Speak “rye”	Review “rye”	Start before record
Comment	Menu	Record again	Next phrase
			Next language

**English:**

Some instructions	All instructions	Listen “wow”	Speak “wow”
Review “wow”	Listen “brother”	Speak “brother”	Review “brother”
Listen “watermelon”	Speak “watermelon”	Review “watermelon”	
Start before record	Comment	Menu	Record again
Next phrase	Next language		

**Urdu:**

Some instructions	All instructions	Listen “thank”	Speak “thank”
Review “thank”	Listen “bye”	Speak “bye”	Review “bye”
Speak “name”	Review “name”	Start before record	Comment
Record again	Next phrase	Next language	Menu

**Spanish:**

Some instructions	All instructions	Listen “girl”	Speak “girl”
Review “girl”	Listen “guitar”	Speak “guitar”	Review “guitar”
Listen “car”	Speak “car”	Review “car”	Start before record
Comment	Menu	Record again	Next phrase
			Next language

**End Time:****Observation Notes:****Interview?** (Yes/No)

8. Tell me about this activity? What did you do? What was it about?
9. What did you like about this activity?
10. Was there anything that you didn’t like (or was confusing) about this activity?  
Prompt: How could it be improved/what would you change?
11. How much did you know about the brain before visiting this exhibit? (Choose from: Nothing, Very little, Average, Above average, Expert)
12. Did you learn anything new about the brain from this activity that you didn’t know before?

13. Do you have any other comments or suggestions about this activity?

**Other comments:**

**Observer comments:**

*Neurotransmitter Interactive Observation*

**Observer:**

**Observee Info (age, gender, group type etc.):**

**Start Time:**

**Solo or group?** (Solo/Group)

**Watch first?** (Yes/No)

**Have to wait?** (Yes/No)

**Which station?** Right      Left      Both

**Where did they start?**      Beginning      MiddleNear End

**Participant Neurotransmitter Interactive Activities:**

Read instructions      “Find out more”      Discuss selections

Collaboratively make choices      Make predictions

Discuss outcomes      Mostly follow mom’s instructions

Mostly disobey mom’s instructions      Mix of obey and disobey

Complete game      Play again partial      Play again whole

Broken      End early because others waiting

**End Time:**

**Interview?** (Yes/No)

1. Tell me about this activity? What did you do? What was it about?

2. What was your strategy for selecting options? (Trying to get a specific response? Doing what you would do?)

3. How much did you know about the brain before visiting this exhibit? (Choose from: Nothing, Very little, Average, Above average, Expert)

4. What did you learn? Did you learn anything new about the brain from this activity that you didn’t know before?

5. Did you notice the displays on bottom left and bottom right of the screen? What did these help you learn?

6. Overall, what did you like most about this activity?

7. Was there anything that you didn’t like (or was confusing) about this activity?

Prompt: How could it be improved/what would you change?

8. Do you have any other comments or suggestions about this activity?

**Other comments:**

**Observer comments:**

*Neuron Table Observation*

**Observer:**

**Observee Info (age, gender, group type etc.):**

**Start Time:**

**Neuron Table Activities:**

Have to wait      Watch others      Solo      Group      Both hands

Touch neurons together      Interact with others      Unsure how to play

Discuss activity      Make predictions      Make connections to exhibit

Make connections to prior knowledge    Notice overhead neuron model  
Read interpretation                      Others waiting                      Broken

**End Time:**

**Interview?** (Yes/No)

1. Tell me about this activity? What did you do? What was it about?
2. What did you like about this activity?
3. Was there anything that you didn't like (or was confusing) about this activity?  
Prompt: How could it be improved/what would you change?
4. Was there anything else you've seen in the exhibit so far that helped you understand this activity?
5. How much did you know about the brain before visiting this exhibit? (Choose from: Nothing, Very little, Average, Above average, Expert)
6. Did you learn anything new about the brain from this activity that you didn't know before?
7. Do you have any other comments or suggestions about this activity?

**Observation Notes:**