INTRODUCTION

This report presents findings from a summative evaluation of *If These Walls Could Talk: The Secret Life of Buildings*, a traveling exhibition developed by the Science Museum of Minnesota, with major funding provided by the National Science Foundation. The study was undertaken to document the exhibition's strengths and weaknesses, understand its effects on visitors, and recommend improvements to this and future exhibitions. The specific goals of this summative evaluation were to:

METHODOLOGY

Three data collection strategies were employed to assess visitors' use of and experiences with *Pacific Voices*: timing and tracking observations, a standardized questionnaire, and exit interviews.

Timing and Tracking Observations

Visitors are often observed in summative evaluations because observations provide an objective and quantitative account of how visitors behave and react to exhibition components. Observational data suggest the range of visitor behaviors occurring in the exhibition and indicate which components attract, as well as hold, the most and least attention.

All visitors over the age of 4 were eligible to be unobtrusively observed as they toured *If These Walls Could Talk*. The observed individuals were selected by following a continuous random sampling method. In accordance with this method, a trained observer was stationed at the entrance to the exhibition. The first eligible visitor to enter the exhibition was observed. The observer followed the selected individual through the exhibition, recording components at which he or she stopped, time spent at individual components, and total time spent in the exhibition (see Appendix A for a sample tracking form). Upon the completion of a visit, the observer returned to the entrance to await the next visitor to enter the exhibition.

Standardized Questionnaires

A standardized questionnaire, composed of 17 semantic differential scales, a few multiple choice questions, and a couple of fill-in-the-blanks, was used to collect quantitative data about visitors' experiences in the exhibition. (See Appendix B for a sample of the survey.) A standardized questionnaire was used because it is the most efficient method for collecting experiences from a large number of visitors.

Trained staff members from the Science Museum administered the surveys. A continuous random sampling procedure was followed to select visitors for participation. According to this procedure, survey administrators approached the first eligible visitor (14 years or older) to exit the exhibition, inviting her or him to participate in the survey. When the visitor had completed the questionnaire, she or he was thanked, and the survey administrator awaited the next eligible visitor.

Exit Interviews

The purpose of conducting open-ended interviews is to encourage and motivate interviewees to describe their experiences, express their opinions and feelings, and share with the interviewer the meaning they gleaned from an experience. Open-ended interviews produce data rich in information because interviewees talk about their experiences from a very personal perspective.

After visiting *If These Walls Could Talk*, eligible visitors (13 years or older) were selected (following a continuous random sampling method as described above) and asked to answer a few questions. The interview guide was intentionally open-ended to allow interviewees the freedom to discuss what they felt was meaningful (see Appendix C for a copy of the interview guide). All interviews were tape-recorded with participants' awareness and transcribed to facilitate analysis.

DATA ANALYSIS

Quantitative data (from the observations and questionnaires) were entered into a computer and analyzed statistically. Frequencies and percentages were calculated for all categorical variables (e.g., gender). To examine the relationship between two categorical variables (e.g., whether children are in a visitor group and whether a visitor group attends the theater show), cross-tabulation tables were computed to show the joint frequency distribution of the two variables, and the chi-square statistic (X^2) was used to test the significance of the relationship.

Summary statistics, including the median (point at which half the responses fall above and half fall below), mean (average), and standard deviation (spread of scores: ±) were calculated for interval and ratio variables (e.g., time spent). To compare the means of two visitor subsets (e.g., visitor groups with children and those without), *t*-tests were computed. To compare the means of more than two groups, an analysis of variance (ANOVA) was performed. For instance, an ANOVA was used to compare the mean ratings on the semantic differential scales across three age groups. If the *F*-statistic resulting from an ANOVA was found to be significant, a post-hoc Scheffé multiple comparison test was used to determine which group mean(s) differed from which other group mean(s). For example, if the *F*-statistic indicated that the age groups had different mean ratings, the Scheffé test was used to pinpoint which age groups differed.

For the tracking and timing data, medians rather than means are typically reported in this document because, as is typical, the number of components used and the time spent by visitors were distributed unevenly across the range. For example, whereas most visitors spent a relatively brief amount of time with exhibition components, a few visitors spent an unusually long time. When a distribution of scores is extremely asymmetrical (i.e., "lopsided"), the *mean* is strongly affected by the extreme scores and, consequently, falls farther away from the distribution's central area. In such cases, the *median* is the preferred measurement because it is not sensitive to the values of scores above and below it—only to the number of such scores.

A level of significance of $p<0.05$ was used in this study. This means that when a statistical test, such as a test of a relationship, is significant at a probability level of $p<0.05$, the magnitude of the relationship being tested would occur purely by chance fewer than 5 in 100 times. Because the odds

are so low that the relationship would occur purely by chance, there is good reason to be confident that the relationship really exists. Within the body of the report, only statistically significant results are discussed. All of the statistical analyses that were run, however, are listed in <mark>Appendices D and E</mark>.

Verbatim responses to interview questions were analyzed qualitatively, meaning that the evaluator studied the responses for meaningful patterns. As patterns and trends emerged, similar responses were grouped together and interpreted.

METHOD OF REPORTING

The data presented in this report are both quantitative and qualitative in nature. For the quantitative data, tables and figures are regularly used to display the information in a manner that makes it easily accessible. Percentages within tables may not always equal 100 due to rounding. For the qualitative data, the frequency of response categories is conveyed by citing the proportion of interviewees who gave the response (e.g., one-third) when a significant number of interviewees are involved. When responses were given by a smaller number of interviewees, the phrase "a few" is used in the text to refer to 3 or 4 interviewees and "some" means that 5 to 7 interviewees gave the response. Interviewees' verbatim quotations (edited for clarity) are used to illustrate major trends in the qualitative data and to convey visitors' thoughts and feelings as fully as possible. Throughout the report, the findings within each topic are presented in descending order, starting with the most frequently occurring.

Findings are reported in three main sections as follows:
   I. Timing and Tracking Observations
   II. Standardized Questionnaire
   III. Exit Interviews

I. TIMING AND TRACKING OBSERVATIONS: PRINCIPAL FINDINGS

Unobtrusive observations were gathered to gauge visitors' behaviors in the exhibition. In total, 123 visitors (5 years and older) were unobtrusively observed as they toured *If These Walls Could Talk* at the Science Museum of Minnesota.

VISITOR CHARACTERISTICS

As shown in Table I.1, approximately half of the observed visitors were female, and half were male (52 percent and 48 percent, respectively). Nearly two-fifths of visitors were between the ages of 16 and 34 (39 percent), and nearly one-quarter were aged 9 to 15 (24 percent). Some visitors were aged 5 to 8 (11 percent), and a few were 55 or older (5 percent).

Table I.1.
Demographic Characteristics of Tracked Visitors

Characteristic	%
Gender	
Female	52.5
Male	47.5
Age	
5 –8	11.5
9 – 15	23.8
16 –34	38.5
35 – 54	21.3
55+	4.9

As noted in Table I.2., more than two-fifths of those observed were visiting as part of a group that included two adults (44 percent), and nearly one-quarter were visiting as part of a group that had one adult (24 percent). Some of the observed visitors were part of a group in which there were no adults (11 percent).

Similarly, two-fifths of those observed were part of a visitor group that included no children (42 percent), and more than one-quarter were in groups with two children (29 percent). One-third of the children in the visitor groups were between the ages of 5 and 8 (35 percent); another one-third were between the ages of 9 and 12 (33 percent). The mean age of the children in the visitor groups was 8.99 (± 3.98).
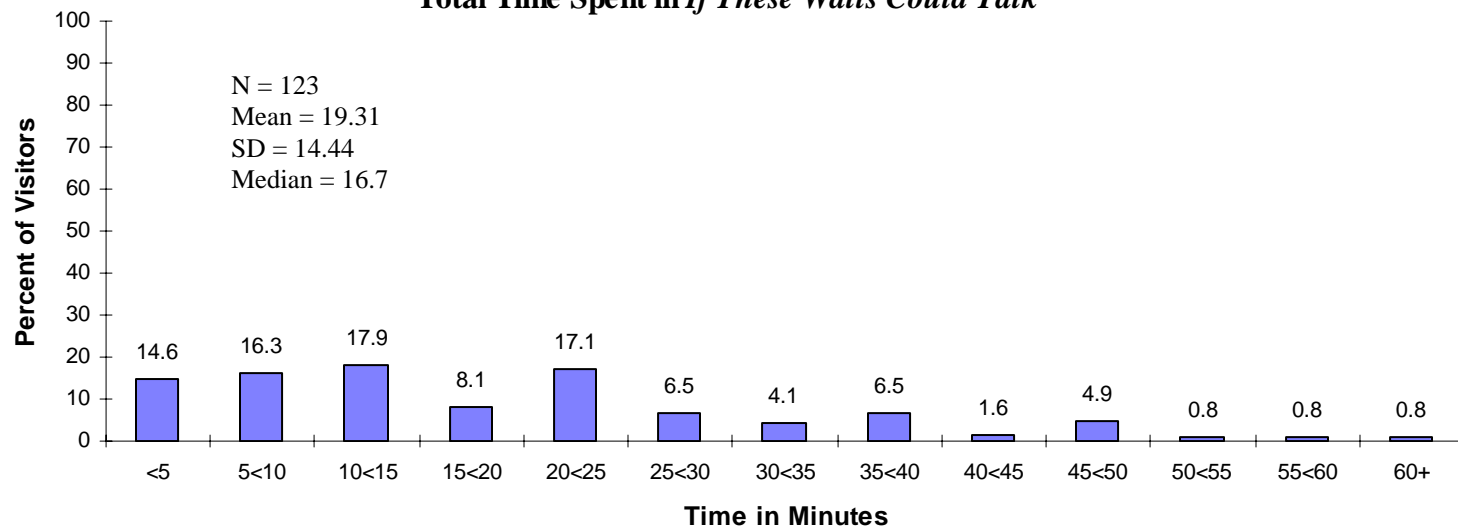
Table I.2.
Visitor Group Composition

Number of Adults in Group	%
None	10.6
One	23.6
Two	43.9
Three or four	18.7
Five or more	3.2

Number of Children in Group	%
None	41.5
One	15.4
Two	29.3
Three	9.8
Four or more	4.1

Ages of Children (in Years) (*n*=124)	%
4 and below	15.3
5 – 8	34.7
9 – 12	33.1
13 – 15	16.9

OVERALL VISITING PATTERNS IN THE EXHIBITION

Total Time (in Minutes) Spent in the Exhibition

One way to look at the visitor experience in an exhibition is to examine how much time people spend there. Figure I.1 presents the amount of time visitors spent in *If These Walls Could Talk*. The shortest amount of time spent in the exhibition was 26 seconds, and the longest was nearly 75 minutes. Half of visitors spent less than 15 minutes in the exhibition (49 percent). One-third spent between 15 and 30 minutes (32 percent), and one-fifth spent longer than 30 minutes (20 percent). The median amount of time spent in the exhibition was approximately 16¾ minutes.

Figure I.1.
Total Time Spent in *If These Walls Could Talk*

N = 123
Mean = 19.31
SD = 14.44
Median = 16.7

Percent of Visitors

<5	5<10	10<15	15<20	20<25	25<30	30<35	35<40	40<45	45<50	50<55	55<60	60+
14.6	16.3	17.9	8.1	17.1	6.5	4.1	6.5	1.6	4.9	0.8	0.8	0.8

Time in Minutes

T-tests and ANOVA were calculated on these data to determine whether gender, age of visitor, visiting with children, or stopping at the Talking Walls Theater is associated with total time spent in the exhibition. Only one relationship was statistically significant: visitors who stopped at the Theater tended to spend more time in the exhibition than did visitors who did not stop at the Theater (see Table I.3).

Table I.3.
Difference in Total Time Spent in Exhibition Based on Theater Visitation

|	Total Time in Exhibition (in Min.)	
	Mean	**±**
Theater Visitation**		
Stopped at Theater (*n*=63)	23.52	13.91
Did not stop at Theater (*n*=60)	14.88	13.75

**p<0.01*

In an attempt to allow comparisons to be made among exhibitions, Serrell (1997) defined an index that represents the amount of space-per-time used by visitors. It is known as the sweep-rate index (SRI) and is calculated by dividing the square footage of an exhibition by the average total time visitors spend in it. Because *If These Walls Could Talk* has an area of approximately 5,000 square feet and visitors spend an average (i.e., mean) of 19.3 minutes in the exhibition, its SRI is 259 (5,000 square feet ÷ 19.3 minutes). Though sweep rates vary by size and type of exhibition, Serrell found that the average sweep rate is 300 for nondiorama exhibitions and 639 for dioramalike exhibitions. Moreover, she found that large exhibitions (more than 3,900 square feet) have higher sweep rates than small exhibitions, which suggests that visitors use big exhibitions "faster" (more square feet per minute) than they do small ones. The lower the SRI, the more time visitors spend in an exhibition. Hence, an SRI of 259 suggests that visitors are spending longer than average in *If These Walls Could Talk*.

Total Number of Components Stopped At per Visitor

Another measure of gauging the visitor experience in an exhibition is to count the stops that visitors make. For the purposes of this study, a "stop" was defined as a visitor standing for 3 seconds or longer in front of a given component. If a visitor returned to a component at which she or he had previously stopped, it was not counted as an additional stop but the amount of time spent was included in the total time spent at the component. A "component" was defined as a singular exhibit component (e.g., the Dogtastrophe computer) or a tight grouping of components (e.g., Meet the Mite [three panels]).

Visitors to *If These Walls Could Talk* stopped at between 0 and 28 different components of the 44 that were identified for this study. As Figure 1.2 shows, about half of visitors stopped at between 5 and 12 components (49 percent). The median number of stops in the exhibition was 10.0.

Figure I.2.
Number of Components Stopped At in *If These Walls Could Talk*
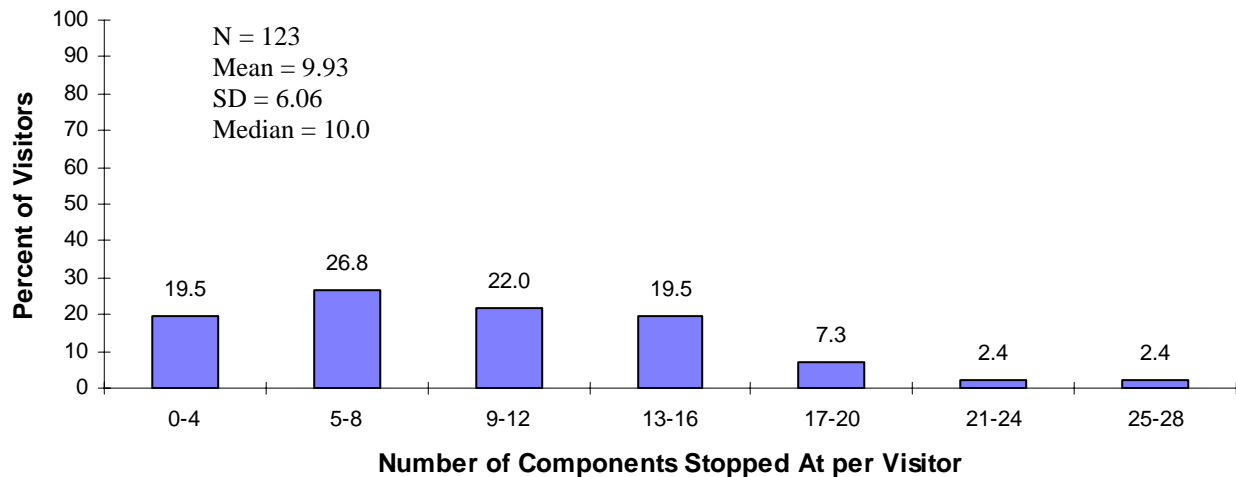
To determine whether the total number of components stopped at is associated with gender, age, visiting with children, or stopping at the Theater, *t*-tests and ANOVA were computed. The significant results are listed in Table I.4. As noted, visitor groups without children tended to stop at more components than did groups with children, and visitors who stopped at the Theater tended to stop at more components throughout the exhibition than did visitors who did not stop at the Theater.

Table I.4.
Differences among Visitors regarding the Number of Components Stopped At

	Total Number of Components Stopped At	
	Mean	**±**
Visitor Group Composition*		
With children (*n*=72)	8.93	5.25
Without children (*n*=51)	11.33	6.85
Theater Visitation*		
Stopped at Theater (*n*=63)	11.02	6.04
Did not stop at Theater (*n*=60)	8.78	5.91

*$p<0.05$

To gauge how thoroughly an exhibition is being used, Serrell (1997) identified the %DV index, representing the percentage of "diligent visitors." This index equals the percentage of visitors who stopped at more than half of the exhibition's available components. In *If These Walls Could Talk*, 4 percent of visitors stopped at 23 or more components of the 44 we identified (i.e., %DV = 4 percent). Serrell found that among various sizes and types of exhibitions, %DV averages around 27 percent, so it appears that *If These Walls Could Talk* is not being used very thoroughly by visitors.

Total Number of Interactions with Exhibits

While in the exhibition, visitors had opportunity to touch and engage in an active, hands-on manner 25 different interactive exhibit components, including 4 flipbooks. As shown in Table I.5, two-thirds of all visitors interacted between 1 and 6 times during their visit (66 percent). The median number of interactions with exhibits was 3.0. Not surprisingly, children tended to interact more frequently with the displays than did adults (see Table I.6).

Table I.5.
Total Number of Interactions with Exhibits per Visitor

Number of Interactions	Adult % (*n*=79)	Child % (*n*=43)	Total % (*n*=123)[1]
None	7.6	9.3	8.1
1 – 3	51.9	30.2	44.7
4 – 6	22.8	18.6	21.1
7 – 9	15.2	23.3	17.9
10 – 12	0.0	14.0	4.9
13 – 15	2.5	4.6	3.3

[1]The total sample size is larger than the combination of the adult *n* and child *n* due to missing age data.

Table I.6.
Differences between Adults and Children in Their Number of Interactions with Exhibits

	Mean	±
Number of Interactions with Exhibits		
Children (*n*=42)	5.64**	4.01
Adults (*n*=78)	3.77	2.89

**p<0.01

Total Number of Social Interactions

When designing *If These Walls Could Talk*, a conscious effort was made to develop and evenly disperse displays targeted at different age groups so that practically every member of a visitor group could be simultaneously engaged. One indirect measure of the effectiveness of this effort is the number of times a visitor gets "pulled away" from exhibit components by a companion who is bored and anxious to proceed. As shown in Table I.7, less than one-third of visitors were prompted to leave an exhibit display by a companion (30 percent). Further, as noted in Table I.8, children were more likely than adults to be pulled away from an exhibit.

Table I.7.
Total Number of Times Visitors Were Pulled Away from an Exhibit

Times Pulled Away	Adult % (*n=79*)	Child % (*n=43*)	Total % (*n=123*)[1]
None	78.5	55.8	69.9
One	16.5	18.6	17.9
Two	3.8	11.6	6.5
Three to five	1.3	14.0	5.7

[1]The total sample size is larger than the combination of the adult *n* and child *n* due to missing age data.

Table I.8.
Differences between Adults and Children in the Frequency with Which They Were Pulled Away from Exhibits by Companions

	Mean	±
Number of Times Pulled Away		
Children (*n=42*)	0.90**	1.25
Adults (*n=79*)	0.30	0.74

**$p<0.01$

In addition to being urged by companions to abbreviate their stops, more positive social interactions occurred as well. Table I.9 displays the total number of interactions that tracked visitors had with adults while they were stopped at exhibits. As shown, nearly four-fifths of visitors engaged in social interactions with other adult visitors (79 percent). More specifically, three-fifths of visitors interacted from one to six times during their visit (60 percent). Among those who did not interact with other adults, of course, are those visitors who were visiting alone or children who were visiting without adult companions.

Table I.9.
Total Number of Interactions with Adults While at Exhibits

Number of Interactions	Adult % (*n=79*)	Child % (*n=43*)	Total % (*n=123*)
None	22.8	18.6	21.1
1 – 3	36.7	37.2	37.4
4 – 6	26.6	16.3	22.8
7 – 9	7.6	18.6	11.4
10 or more	6.3	9.3	7.3

[1]The total sample size is larger than the combination of the adult *n* and child *n* due to missing age data.

Similarly, data collectors recorded the number of interactions that each tracked visitor had with children throughout the exhibition. As shown in Table I.10, just over half of visitors interacted with children during their visit (54 percent). Children were more likely than adults to interact with children, in part because many adults were visiting without child companions (see Table I.11).

Table I.10.
Total Number of Interactions with Children While at Exhibits

Number of Interactions	Adult % (*n=79*)	Child % (*n=43*)	Total % (*n=123*)
None	57.0	27.9	46.3
1 – 3	27.8	37.2	30.9
4 – 6	8.9	18.6	13.0
7 – 9	3.8	7.0	4.9
10 or more	2.5	9.3	4.9

[1]The total sample size is larger than the combination of the adult *n* and child *n* due to missing age data.

Table I.11.
Differences between Adults and Children in the Number of Interactions They Had with Children

	Mean	±
Number of Interactions with Children		
Children (*n=42*)	3.24**	3.38
Adults (*n=79*)	1.48	2.38

**$p<0.01$

VISITING PATTERNS ASSOCIATED WITH DISTINCT COMPONENTS

Exhibitions are free-choice environments. Most visitors do not follow a linear path through an exhibition but are drawn from one component to another according to what attracts or interests them. Tallying where visitors stop gives exhibition teams a sense of the varied attracting power of individual components. As data presented in the previous section indicate, visitors to *If These Walls Could Talk* stopped at only a portion of the components available. Hence, the stops they did make determined their experience in the exhibition.

In this section of the report, components are analyzed by type and individually. For the purposes of this analysis, the components in *If These Walls Could Talk* were classified as one of the following four component types: interactives, panels, flipbooks, and theater. Of the 44 distinct components identified for this study, 21 are interactive components (e.g., Joinery House, Tuned Mass Damper), 18 are panels, 4 include flipbooks, and 1 is a Theater. While tracking visitors, the data collectors recorded the components at which the visitors stopped, the amount of time they spent at each component, whether the visitors were "pulled away" from a component (i.e., prompted to leave by a companion), and whether they interacted with an adult or a child while at the component. In addition, when a tracked visitor was at an interactive or a flipbook, the data collector recorded whether she or he actively engaged with the exhibit display.

The relative attracting power of the various component types can be measured by comparing the number of stops visitors made and the time they spent at each type. Table I.12 lists the median stops and median time spent at each component type in *If These Walls Could Talk*. In general, visitors stopped most often and spent the most time at interactive components.

Table I.12.
Median Number of Stops and Median Time Spent at Component Types

Component Type	Total Components	Median Stops[1]	Median Time[2]
Interactives	21	6.0	6 min. 52 sec.
Panels	18	1.0	1 min. 13 sec.
Flipbooks	4	1.0	1 min. 21 sec.
Theater	1	n/a	6 min. 17 sec.

[1]*Median stops* includes all 123 tracked visitors.
[2]*Median time* includes only those visitors who stopped at the component type.

Interactives

Interactives were the most frequently stopped at component type in *If These Walls Could Talk*. Nearly every visitor stopped by at least one interactive while in the exhibition. Overall, visitors stopped at between 0 and 16 of the exhibition's 21 interactives. As shown in Figure I.3, nearly half

of visitors stopped at between 3 and 6 interactives while in the exhibition (45 percent). The median number of stops at interactives was 6.0.

Figure I.3.
Number of Interactives Stopped At per Visitor


N = 123
Mean = 6.22
SD = 3.69
Median = 6.0
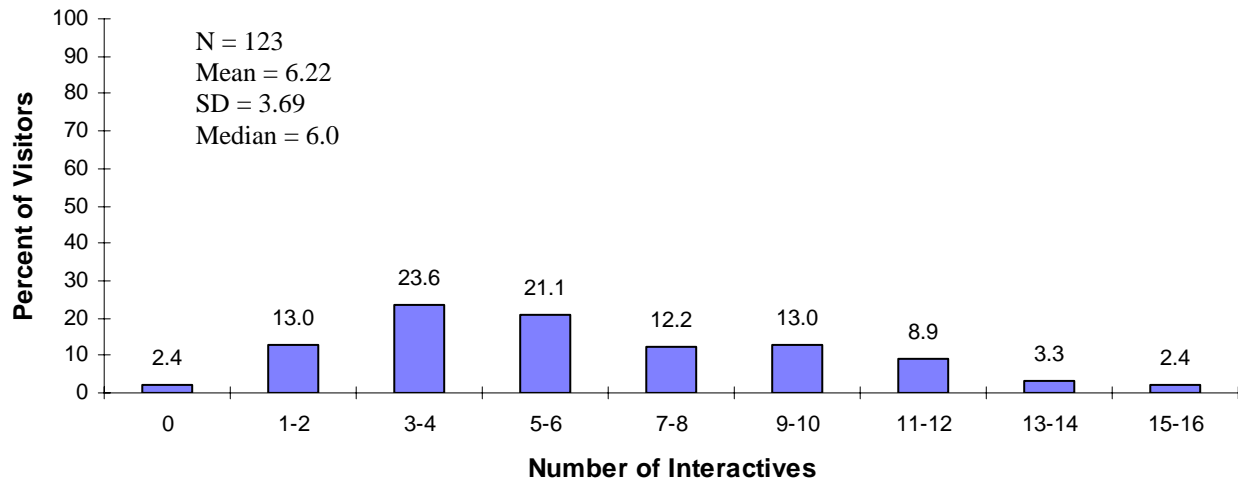
As noted in Table I.13, nearly one-quarter of all visitors who stopped at interactive components were prompted to leave at least once by their companions (23 percent). Nonetheless, visitors spent between 8 seconds and 51 ¼ minutes at interactive components while in *If These Walls Could Talk*. As shown in Figure I.4, two-thirds of visitors spent less than 10 minutes at interactives during their visit. The median amount of time visitors spent at interactives while in the exhibition was 6 minutes and 52 seconds. While at the interactives, nearly all visitors interacted with the exhibit component (93 percent), three-quarters of visitors interacted with an adult (78 percent), and half interacted with a child (52 percent) (see Tables I.14 – I.16).

Table I.13.
Number of Times Visitors Were Pulled Away from Interactives

Times Pulled Away	Adult % (*n*=77)	Child % (*n*=42)	Total % (*n*=120)[1]
None	87.0	59.5	77.5
One	10.4	26.2	15.8
Two	1.3	9.5	4.2
Three	1.3	4.8	2.5

[1]The total sample size is larger than the combination of the adult *n* and child *n* due to missing age data.

Figure I.4.
Total Time Spent at Interactives

N = 120
Mean = 10.57
SD = 10.51
Median = 6.87
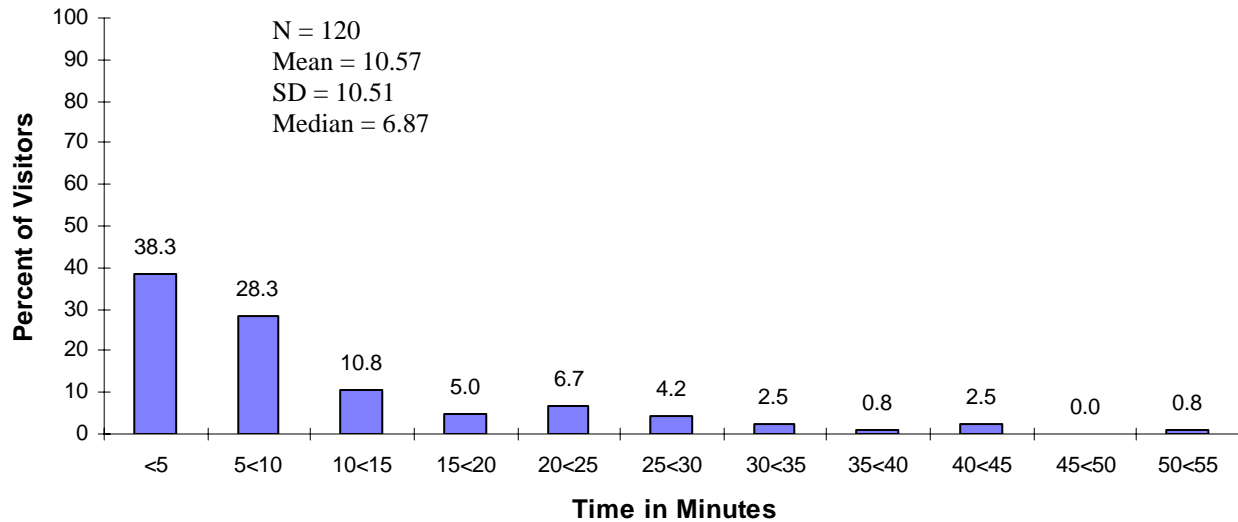
Table I.14.
Number of Interactions with Interactive Exhibit Components

Number of Interactions	Adult % (*n*=77)	Child % (*n*=42)	Total % (*n*=120)
None	7.8	7.1	7.5
1 – 2	37.7	26.2	34.2
3 – 4	32.5	19.0	27.5
5 – 6	10.4	14.3	11.7
7 – 8	7.8	9.5	8.4
9 – 10	1.3	16.7	6.6
More than 10	2.6	7.1	4.2

[1]The total sample size is larger than the combination of the adult *n* and child *n* due to missing age data.

Table I.15.
Number of Interactions with Adults While at Interactives

Number of Interactions	Adult % (*n*=77)	Child % (*n*=42)	Total % (*n*=120)
None	23.4	19.0	21.7
1 – 2	37.7	33.3	36.7
3 – 4	19.5	9.5	15.8
5 – 6	10.4	21.4	14.2
7 – 8	5.2	9.5	6.7
9 – 10	2.6	7.1	4.2
More than 10	1.3	0.0	0.8

[1]The total sample size is larger than the combination of the adult *n* and child *n* due to missing age data.

Table I.16.
Number of Interactions with Children While at Interactives

Number of Interactions	Adult % (*n*=77)	Child % (*n*=42)	Total % (*n*=120)
None	59.7	28.6	48.3
1 – 2	20.8	28.6	23.3
3 – 4	9.1	19.0	13.3
5 – 6	7.8	11.9	9.2
7 – 8	2.6	2.4	2.5
9 – 10	0.0	7.1	2.5
More than 10	0.0	2.4	0.8

[1]The total sample size is larger than the combination of the adult *n* and child *n* due to missing age data.

Table I.17 lists the number and percentage of visitors who stopped at each interactive in rank order (see the table's second and third columns from the left). The component stopped at most frequently was the Ger (63 percent of visitors), followed by the Dome (59 percent) and the Demolition Video (55 percent). Three other interactives were stopped at by more than two-fifths of visitors: the Insulation display, Tuned Mass Damper, and Earthquake Shake Table (50 percent, 45 percent, and 42 percent, respectively). The least visited interactives were the Builders Reading Corner, the Take-apart Ger, and the Buildings Reading Corner (2 percent, 3 percent, and 7 percent, respectively).

In Table I.17, the two columns on the right-hand-side provide further information about the visitors who stopped at each interactive. The first of these columns indicates the number of visitors who were "pulled away" from the component before they were ready to leave on their own. If these

numbers were particularly high, it could suggest that the tracked visitors' companions were bored and prompted the visitors to move on. For the purposes of this analysis, the times spent by visitors who were "pulled away" from a component were not included in calculating the median time that visitors spent at each component, as listed in the far right-hand column of Table I.17.

At the Joinery House and Name That Room, visitors stayed for a median time of nearly 1½ minutes. The Demolition Video held visitors for a median time of 1¼ minutes, and the Earthquake Shake Table, Dome, and Buckling Column held visitors for about 1 minute. Though relatively few visitors stopped at the Dogtastrophe Computer, those who stopped spent a median time of almost 4 minutes. Similarly, the Demolition Computer held visitors for a median time of just over 2 minutes. In contrast, the Mongolian Felt Tent Computer held visitors for a median time of ½ minute.

While at each interactive component, a visitor could have actively engaged with the exhibit display, interacted with an adult, or interacted with a child. These data are compiled in Table I.18. As shown, visitors who stopped at the Stereoscopic View, Insulation, and Name That Room were most likely to interact with the exhibit display (85 percent, 84 percent, and 73 percent, respectively). On the other hand, relatively few visitors actively engaged with the Demolition Video or Build A Truss (29 percent and 36 percent).

Interactions with adults were most likely to occur at the Dogtastrophe Computer and Name That Room (73 percent and 64 percent); they were least likely at the Downdraft House and Kapla Blocks (26 percent and 29 percent). Interactions with children were most likely to take place at the Kapla Blocks, Name That Room, Dogtastrophe, and the Joinery House (43 percent, 42 percent, 40 percent, and 38 percent, respectively), whereas they rarely happened at the Downdraft House (7 percent).

Table I.17.
Number of Visitors Who Stopped and the Median Time They Spent at Each Interactive

Interactive	Visitors Who Stopped n	Visitors Who Stopped %	Of Those Who Stopped Number Who Were "Pulled Away"	Of Those Who Stopped Median Time[1] at Interactive (in Sec.)
1. Ger	78	63.4	0	52.0
2. Dome	73	59.3	3	60.5
3. Demolition Video	68	55.3	7	74.0
4. Insulation	61	49.6	2	30.0
5. Tuned Mass Damper	55	44.7	3	40.0
6. Earthquake Shake Table	52	42.3	2	66.0
7. Buckling Column	43	35.0	3	58.0
8. Downdraft House	43	35.0	2	43.0
9. Stereoscopic View	41	33.3	1	29.5
10. Kapla Blocks	35	28.5	4	28.0
11. Joinery House	34	27.6	0	85.5
12. Name That Room	33	26.8	4	85.0
13. Triangle Towers	32	26.0	1	36.0
14. Mongolian Felt Tent Computer	27	22.0	1	30.0
15. Build A Truss	25	20.3	1	20.5
16. Demolition Computer	19	15.4	2	130.0
17. Magnet City	16	13.0	1	30.0
18. Dogtastrophe Computer	15	12.2	1	232.5
19. Buildings Reading Corner	9	7.3	0	91.0
20. Take-apart Ger[2]	2	2.9[3]	0	371.5
21. Builders Reading Corner	2	1.6	0	157.5

[1]Median time is based on only those visitors who stopped at the interactive component and were not "pulled away" before they were ready to leave on their own.
[2]The Take-apart Ger was not on display during nearly half of the observed visits.
[3]This percentage represents the number of visitors who stopped at the Take-apart Ger of those who visited while it was on display.

Table I.18.
Interactions at Each Interactive

Interactive	# of Visitors Who Stopped	% Who Interacted with Exhibit	% Who Interacted with an Adult	% Who Interacted with a Child
1. Ger	78	43.6	37.2	23.1
2. Dome	73	64.4	37.0	32.9
3. Demolition Video	68	29.4	41.2	22.1
4. Insulation	61	83.6	44.3	26.2
5. Tuned Mass Damper	55	65.5	41.8	16.4
6. Earthquake Shake Table	52	67.3	48.1	34.6
7. Buckling Column	43	65.1	39.5	23.3
8. Downdraft House	43	55.8	25.6	7.0
9. Stereoscopic View	41	85.4	43.9	26.8
10. Kapla Blocks	35	40.0	28.6	42.9
11. Joinery House	34	41.2	32.4	38.2
12. Name That Room	33	72.7	63.6	42.4
13. Triangle Towers	32	43.8	34.4	21.9
14. Mongolian Felt Tent Computer	27	55.6	37.0	18.5
15. Build A Truss	25	36.0	44.0	28.0
16. Demolition Computer	19	63.2	47.4	21.1
17. Magnet City	16	56.3	43.8	25.0
18. Dogtastrophe Computer	15	66.7	73.3	40.0
19. Buildings Reading Corner	9	77.8	33.3	22.2
20. Take-apart Ger[1]	2	50.0	50.0	50.0
21. Builders Reading Corner	2	50.0	50.0	50.0

[1]The Take-apart Ger was not on display during nearly half of the observed visits.

To determine whether the number of stops that visitors made at interactives or their behavior while at interactives was associated with gender, age, visiting with children, or stopping at the Talking Walls Theater, *t*-tests and ANOVA were run. Differences occurred between the behaviors of children and those of adults. As displayed in Table I.19, children, as a group, spent more time at interactive components than did adults; specifically, children spent a mean time of approximately 13 ¾ minutes, whereas adults, on average, spent 9 minutes. Children were also more likely than adults to be pulled away from interactive components by companions. While in the exhibition, children, as a whole, interacted with more interactive components than did adults. And, while at interactive components, children were more likely than adults to interact with children.

Table I.19.
Differences among Visitors regarding Their Behavior at Interactives

	Mean	**±**
Total Time at Interactives (in Sec.)		
Children (*n=42*)	819.98*	701.30
Adults (*n=77*)	537.96	571.42
Total Number of Times "Pulled Away" from Interactives		
Children (*n=42*)	0.60**	0.86
Adults (*n=77*)	0.17	0.50
Total Number of Interactions with Interactives		
Children (*n=42*)	5.14**	3.77
Adults (*n=77*)	3.27	2.51
Total Number of Interactions with Children while at Interactives		
Children (*n=42*)	2.81**	3.05
Adults (*n=77*)	1.19	1.95

*$p<0.05$; ** $p<0.01$

Panels

In general, visitors used fewer panels than interactives while in *If These Walls Could Talk*. As Figure I.5 shows, nearly two-fifths of visitors did not stop at any panels during their visit (38 percent). Those who did stop, viewed between 1 and 11 of the 18 panels in the exhibition. More specifically, almost half of visitors stopped at between 1 and 4 panels (46 percent). Relatively few visitors stopped at 5 panels or more (16 percent). The median number of panels stopped at was 1.0 (meaning that half of visitors stopped at 1 panel or fewer and half of visitors stopped at 1 panel or more).

[Insert Figure I.5.]

After stopping at a panel, few visitors were prompted to leave by a companion (11 percent) (see Table I.20). As displayed in Figure I.6, nearly half of the visitors who stopped at panels stayed less than 1 minute (46 percent), and about one-third of visitors spent between 1 and 3 minutes at panels (32 percent). The median amount of time visitors spent with panels while in the exhibition was 1 minute and 13 seconds. Among the visitors who stopped at panels, two-fifths interacted with an adult while at a panel (41 percent) and a few interacted with a child (15 percent) (see Tables I.21 and I.22).

Table I.20.
Number of Times Visitors Were Pulled Away from Panels

Times Pulled Away	Adult *n* (*n=57*)	Child *n* (*n=18*)	Total *n* (*n=76*)[1]	Total %
None	51	16	68	89.5
One	4	2	6	7.9
Two	2	0	2	2.6

[1]The total sample size is larger than the combination of the adult *n* and child *n* due to missing age data.

[Insert Figure I.6.]

Table I.21.
Number of Interactions with Adults While at Panels

Number of Interactions	Adult *n* (*n=57*)	Child *n* (*n=18*)	Total *n* (*n=76*)[1]	Total %
None	34	10	45	59.2
1	11	3	14	18.4
2	6	3	9	11.8
3 – 5	6	2	8	10.5

[1]The total sample size is larger than the combination of the adult *n* and child *n* due to missing age data.

Table I.22.
Number of Interactions with Children While at Panels

Number of Interactions	Adult *n* (*n*=57)	Child *n* (*n*=18)	Total *n* (*n*=76)[1]	Total %
None	48	16	65	85.5
1	7	2	9	11.8
2	1	0	1	1.3
3	1	0	1	1.3

[1]The total sample size is larger than the combination of the adult *n* and child *n* due to missing age data.

In Table I.23 are listed the number of visitors who stopped at each panel in rank order (see the table's second and third columns). The panel component stopped at most frequently was the grouping that included "Mobile Homes" and three adjacent small labels (32 percent of visitors), followed by "Sky High," "Building on a Way of Life," and "Going Up" (20 percent, 19 percent, and 19 percent, respectively). Visitors were least likely to stop at the panel entitled "Sooner or Later I'm Garbage," the Exhibit Primer, or "Building on Heritage," (4 percent, 7 percent, and 7 percent, respectively).

Table I.23 also lists the median amount of time spent at each panel. The panel at which visitors tended to spend the most time was the panel titled "Sky High," at which visitors spent a median time of 64 seconds. Though relatively few visitors stopped at the "Murrah Building" and "First Family of Implosion," these two panels, also, held visitors for longer than average (51 seconds and 43 seconds, respectively).

While at each panel, a visitor could have interacted with an adult or a child; these data are noted in Table 1.24. Overall, "Sky High" seems to have been most successful at engendering social interaction involving both adults and children.

Table I.23.
Number of Visitors Who Stopped and the Median Time They Spent at Each Panel

Panel	Visitors Who Stopped		Of Those Who Stopped	
	n	%	Number Who Were "Pulled Away"	Median Time[1] at Panel (in Sec.)
1. "Mobile Homes" & three small panels	39	31.7	1	29.5
2. "Sky High"	25	20.3	1	63.5
3. "Building on Way of Life"	23	18.7	0	28.0
4. "Going Up"	23	18.7	3	27.0
5. "Catch Us Swaying to the Beat"	21	17.1	1	25.0
6. Curtain Wall	21	17.1	0	7.0
7. St. Peter's Basilica	17	13.8	0	28.0
8. "Problem with Soaring" rail	16	13.0	0	26.5
9. Chinese Doors & panel	12	9.8	0	22.0
10. "Murrah Building"	10	8.1	2	51.0
11. Joinery House panels	10	8.1	0	25.0
12. "Powerful Symbols" rail	10	8.1	1	18.0
13. "First Family of Implosion"	9	7.3	0	43.0
14. "Buildings Speak for Themselves" rail	9	7.3	0	29.0
15. "Symbols of Power" rail	9	7.3	0	24.0
16. "Building on Heritage"	7	5.7	0	24.0
17. Exhibit Primer	7	5.7	0	5.0
18. "Sooner or Later I'm Garbage"	4	3.3	1	27.0

[1]Median time is based on only those visitors who stopped at the panel and were not "pulled away" before they were ready to leave on their own.

Table I.24.
Interactions at Each Panel

Panel	# of Visitors Who Stopped	% Who Interacted with an Adult	% Who Interacted with a Child
1. "Mobile Homes" & three small panels	39	28.2	10.3
2. "Sky High"	25	40.0	20.0
3. "Building on Way of Life"	23	21.7	0.0
4. "Going Up"	23	21.7	8.7
5. "Catch Us Swaying to the Beat"	21	23.8	0.0
6. Curtain Wall	21	9.5	4.8
7. St. Peter's Basilica	17	17.6	0.0
8. "Problem with Soaring" rail	16	6.3	0.0
9. Chinese Doors & panel	12	25.0	0.0
10. "Murrah Building"	10	20.0	0.0
11. Joinery House panels	10	20.0	10.0
12. "Powerful Symbols" rail	10	10.0	0.0
13. "First Family of Implosion"	9	22.2	11.1
14. "Buildings Speak for Themselves" rail	9	11.1	0.0
15. "Symbols of Power" rail	9	22.2	0.0
16. "Building on Heritage"	7	0.0	0.0
17. Exhibit Primer	7	0.0	14.3
18. "Sooner or Later I'm Garbage"	4	25.0	0.0

T-tests and ANOVA were performed to gauge whether various visitor subsets differed in their behavior associated with panels. The statistically significant differences that emerged are presented in Table I.25. As shown, adults made more stops at panels than did children. More specifically, visitors aged 5 to 15 stopped at fewer panels throughout the exhibition than did older visitors. Similarly, visitors who were not accompanied by children stopped more frequently at panels than did visitors who had child companions. Furthermore, among the visitors who stopped at panels, adults tended to spend more time than did children.

Table I.25.
Differences among Visitors regarding Their Behavior at Panels

	Mean	**±**
Total Number of Stops at Panels		
Children (*n*=43)	1.02**	1.73
Adults (*n*=79)	2.87	3.04
5 – 15 years old (*n*=43) [1]	1.02**	1.73
16 – 34 years old (*n*=47)	2.64	2.99
35+ years old (*n*=32)	3.22	3.13
Visitor groups with children (*n*=72)	1.26**	1.85
Visitor groups without children (*n*=51)	3.55	3.30
Total Time at Panels (in Sec.)		
Children (*n*=18)	58.28*	68.65
Adults (*n*=57)	162.79	191.53

*p<0.05; ** p<0.01
[1]Visitors aged 15 and younger stopped at fewer panels than did older visitors.

Flipbooks

Four flipbooks are available for visitor use in *If These Walls Could Talk*. As shown in Figure I.7, three-fifths of visitors stopped at a flipbook during their visit.

[Insert Figure I.7]

Of the visitors who stopped at a flipbook, few were prompted to leave by a companion (10 percent), as noted in Table I.26. Visitors who stopped at flipbooks spent between 3 seconds and 7 ¾ minutes with them. The median amount of time spent at flipbooks was 1 minute 21 seconds. As shown in Figure I.8, 85 percent of visitors spent less than 3 minutes at flipbooks while in the exhibition.

Table I.26.
Number of Times Visitors Were Pulled Away from Panels

Times Pulled Away	Adult *n* (*n*=53)	Child *n* (*n*=19)	Total *n* (*n*=73)[1]	Total %
None	50	16	66	90.4
One or more	3	3	7	9.6

[1]The total sample size is larger than the combination of the adult *n* and child *n* due to missing age data.

[Insert Figure I.8.]

As displayed in Table I.27, three-fifths of the visitors who stopped at a flipbook interacted with it (62 percent). Additionally, while at flipbooks nearly two-fifths interacted with an adult (38 percent), and a few visitors interacted with children (16 percent) (see Tables I.28 and I.29).

Table I.27.
Number of Interactions with Flipbooks

Number of Interactions	Adult *n* (*n*=53)	Child *n* (*n*=19)	Total *n* (*n*=73)[1]	Total %
None	23	4	28	38.4
1	19	10	29	39.7
2	10	4	14	19.2
3	1	1	2	2.7

[1]The total sample size is larger than the combination of the adult *n* and child *n* due to missing age data.

Table I.28.
Number of Interactions with Adults While at Flipbooks

Number of Interactions	Adult *n* (*n*=53)	Child *n* (*n*=19)	Total *n* (*n*=73)[1]	Total %
None	32	13	45	61.6
1	16	3	20	27.4
2	3	2	5	6.8
3	2	1	3	4.1

[1]The total sample size is larger than the combination of the adult *n* and child *n* due to missing age data.

Table I.29.

Number of Interactions with Children While at Flipbooks

Number of Interactions	Adult *n* (*n*=53)	Child *n* (*n*=19)	Total *n* (*n*=73)[1]	Total %
None	48	13	61	83.6
1 or more	5	6	12	16.4

[1]The total sample size is larger than the combination of the adult *n* and child *n* due to missing age data.

In Table I.30 are listed the four flipbooks, along with the number of visitors who stopped at each and the median time they spent there. As shown, Meet the Mite was the most frequently stopped at flipbook, with nearly one-third of visitors stopping there (32 percent). Following closely behind were the flipbooks associated with the Story of Concrete and with Carbon Monoxide (26 percent and 25 percent, respectively). At these two flipbooks, visitors stayed for a median time of about one minute. Visitors spent slightly less time with the Meet the Mite flipbook (median = 48 seconds). The flipbook displayed with the Damper Story attracted the fewest visitors (15 percent), and those who stopped stayed for less than ½ minute.

Table I.30.
Number of Visitors Who Stopped and the Median Time They Spent at Each Flipbook

Flipbook	Visitors Who Stopped *n*	Visitors Who Stopped %	Of Those Who Stopped Number Who Were "Pulled Away"	Of Those Who Stopped Median Time[1] at Flipbook (in Sec.)
1. "Meet the Mite"	39	31.7	3	48.0
2. "Story of Concrete"	32	26.0	0	61.5
3. Carbon Monoxide	31	25.2	1	57.0
4. "Damper Story"	19	15.4	0	25.0

[1]Median time is based on only those visitors who stopped at the panel and were not "pulled away" before they were ready to leave on their own.

While stopped at a flipbook, a visitor could interact with the book, with an adult, or with a child. The full range of interactions that took place are recorded in Table I.31. As shown, of the visitors who stopped at Meet the Mite or the Story of Concrete, more than half turned the pages of the flipbook, and between one-third and one-half interacted with an adult. Relatively few visitors interacted with children. At the Carbon Monoxide flipbook, visitors were least likely to touch the book or interact with a companion.

Table I.31.
Interactions at Each Flipbook

Flipbook	# of Visitors Who Stopped	% Who Interacted with Flipbook	% Who Interacted with an Adult	% Who Interacted with a Child
1. "Meet the Mite"	39	59.0	46.2	12.8
2. "Story of Concrete"	32	56.3	37.5	12.5
3. Carbon Monoxide	31	38.7	9.7	6.5
4. "Damper Story"	19	47.4	26.3	5.3

To uncover whether various subsets of visitors differed in their behavior associated with flipbooks, *t*-tests and ANOVA were calculated. The analyses whose results are statistically significant are presented in Table I.32. As noted, adults were more likely than children to stop at flipbooks, visitors aged 16 to 34 were more likely than younger visitors to stop at flipbooks, and visitors who were touring the exhibition without children were more likely to stop at flipbooks than were those accompanied by children. Conversely, children were more likely than adults to interact with children while at a flipbook.

Table I.32.
Differences among Visitors regarding Their Behavior at Flipbooks

	Mean	±
Total Number of Stops at Flipbooks		
Children (*n*=43)	0.70*	0.96
Adults (*n*=79)	1.13	1.04
5 – 15 years old (*n*=43) [1]	0.70**	0.96
16 – 34 years old (*n*=47)	1.34	1.11
35+ years old (*n*=32)	0.81	0.86
Visitor groups with children (*n*=72)	0.71**	0.90
Visitor groups without children (*n*=51)	1.37	1.09
Total Number of Interactions with Children while at Flipbooks		
Children (*n*=19)	0.32*	0.48
Adults (*n*=53)	0.09	0.30

*$p < 0.05$; ** $p < 0.01$
[1]Visitors aged 15 and younger stopped at fewer flipbooks than did visitors aged 16 to 34; visitors aged 35 and up did not differ from either group of younger visitors.

Talking Walls Theater

The Talking Walls Theater is a sit-down experience for visitors which is held in a space separated from the rest of the exhibition. This 10-minute show is presented about once every 12 minutes, and

there is an LED display at the entrance to the Theater indicating the amount of time until the next show begins. When the exhibition becomes fairly crowded, a line tends to form at the Theater entrance, as visitors wait their turn to go in. On the tracking form, a distinction was made between "waiting" to enter the Theater and attending the Theater performance.

Overall, 14 percent of all tracked visitors spent time outside the Theater waiting to enter (see Table I.33). Those who stood in line waited between 3 seconds and 5 1/3 minutes to get in, with the median time being about 26 seconds. Only one individual, a child, was "pulled away" from the Theater's waiting line by a companion.

Regardless of whether they waited to enter, half of the tracked visitors attended the Talking Walls Theater during their visit (51 percent), as noted in Table I.33. Those who entered spent between 3 seconds and slightly over 16 minutes in the Theater. As depicted in Figure I.9, there seem to be two distinct groups of visitors entering the Theater: (1) those who stop in to see what the presentation is about and almost immediately thereafter exit, and (2) those who stay for the entire show. Half of the visitors who enter the Theater spend less than two minutes inside (49 percent), whereas another two-fifths of visitors stay 12 minutes or longer (41 percent).

Table I.33.
Visitors Who Waited and/or Entered the Talking Walls Theater

Talking Walls Theater	Visitors Who Stopped		Median Time Spent (in Sec.)
	n	%	
Waited to enter Theater	17	13.8	25.5[1]
Entered Theater	63	51.2	238.5[2]

[1]Median time is based on only those visitors who waited outside the Theater and were not prompted to leave by a companion.
[2]Median time is based on only those visitors who entered the Theater.

[Insert Figure I.9]

To determine whether certain visitor characteristics are associated with Theater attendance, chi-square analyses were performed. As shown in Table I.34, children were more likely than adults and visitors accompanied by children were more likely than those without children to enter the Talking Walls Theater.

Table I.34.
Differences among Visitors regarding whether They Stopped at the Talking Walls Theater

Stopped at Talking Walls Theater	Yes	No
Children (*n*=43)	69.8**	30.2

Adults (*n*=79)	41.8	58.2
Visitor groups with children (*n*=72)	61.2**	39.8
Visitor groups without children (*n*=51)	37.2	62.8

Appendices removed for proprietary purposes.