A SUMMATIVE EVALUATION OF *BREAKING GROUND*

Prepared for
the Brooklyn Botanic Garden
and
the Brooklyn Children's Museum

By
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Part I:

Introduction

INTRODUCTION

This report presents findings from an extensive summative evaluation of the *Breaking Ground* project (*BG*) conducted for both the Brooklyn Botanic Garden (BBG) and the Brooklyn Children's Museum (BCM).

Breaking Ground is a collaborative project established between BBG and BCM. The products of the overall project include three exhibits (two at BBG and one at BCM) and a series of educational programs. Specifically, the project components are: the *Amazing Plants* exhibition and the Discovery Garden at BBG, the *Plants & People* exhibition at BCM, and Discovery Carts, along with the City Plant Adventure Guide, created for use at both institutions.

The goals for visitors experiencing *Breaking Ground* components are:

- visitors (from preschoolers to 12-year-olds, and their families) will learn about plants
- visitors will come to understand the importance of plants to human life
- visitors will develop a concern and respect for and an interest in plants and thus build the foundation for an informed environmental ethic
- young visitors will find personal relevance in subjects such as botany, ethnobotany, and urban ecology
- children will become aware of the natural environment and be motivated to protect it through specific actions, such as gardening, greening, and conservation, particularly around their own homes and communities.

The design goals for *Breaking Ground* are that each exhibition component will:

- reach visitors with varied learning styles by applying a variety of interpretive approaches
- entice children to explore and create personal connections with plants through multidisciplinary hands-on presentations
- encourage interaction among children and adults and provide activities for entire families
- help visitors to feel competent, challenged, but not overwhelmed
- offer different experiences for first-time and frequent visitors.

EVALUATION GOALS

This summative evaluation focused on understanding visitors' experiences with individual *BG* components (the *Amazing Plants* exhibition and Discovery Garden at BBG, the *Plants & People* exhibition at BCM, and the Plant Discovery Carts and City Plant Adventure Guide at both institutions) as well as determining the overall effectiveness of the components collectively. An evaluation of the collaborative process undertaken by BBG and BCM staff to develop *Breaking Ground* is also included.

The overall goals of the summative evaluation were to:

- understand both adult and young visitors' experiences in *Amazing Plants* and in *Plants & People,* focusing on knowledge gained and connections visitors made with plants
- describe the frequencies and types of interactions occurring between children and adults within visitor groups in *Amazing Plants* and in *Plants & People*
- describe the frequencies and types of interactions occurring among children, adults, and facilitators at the Discovery Carts at BBG and BCM
- understand adult visitors' experiences in the Discovery Garden, focusing on adult-child interactions, activities that encouraged children to explore independently, and learning experiences supported by the Garden
- determine whether BBG visitors and BCM visitors visit the alternate site to see *Breaking Ground* components
- determine whether visitors who were given the City Plant Adventure Guide and Activity Sheets participated in any of the activities suggested
- determine the differences between visitors who have experienced any of the *BG* exhibitions and programs and those who have not, in terms of their participation in plant-related activities
- determine the successes and shortcomings of the collaboration between BBG and BCM, eliciting suggestions for improving the management of collaborative projects and for opening lines of communication between institutions and among planning team members.

METHODOLOGY

To provide the exhibition team with the most complete picture of visitor experiences with *Breaking Ground*, three primary data collection methods were used—observations, interviews, and standardized questionnaires (see Table I.1). The research instruments associated with each methodology are presented in Appendix I.

Table I.1.
Research Methods Used To Evaluate
Breaking Ground

Component	Site	Method	Sample Size
Amazing Plants Exhibition	BBG	Tracking	50 groups
		Interviews	33 adults
			33 children
Discovery Garden	BBG	Interviews	45 adults
Plants & People Exhibition	BCM	Tracking	50 groups
		Interviews	34 adults
			35 children
Plant Discovery Carts	BBG & BCM	Focused observations	111 groups
City Plant Adventure Guide & Overall Evaluation	BBG & BCM	Standardized surveys	
		Mail-back	207 respondents
		On-site	264 respondents
Breaking Ground Collaboration	BBG & BCM	Interviews	12 staff
		Group interviews	4 groups

Observations

Visitors are often observed in summative evaluations because observations provide objective information about how visitors behave and react to exhibition components. Two forms of observation were utilized in this study: tracking and focused observations.

Tracking

At both *Amazing Plants* and *Plants & People*, 50 adult-child groups were unobtrusively observed as they toured the exhibition. The observed groups 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 group that entered composed of at least one adult and at least one child was observed. The observer followed the selected group through the end of their visit in the exhibition, recording components at which visitors stopped, interactions between adults and children, and total time spent in the exhibition (see Appendices I.1 and I.2). Upon the completion of a visit, the observer returned to the entrance to await the next "qualified" group to enter the exhibition.

Focused Observation

At both BBG and BCM, unobtrusive focused observations were conducted of adult-child groups at the Plant Discovery Carts. The observed groups were selected according to a continuous random sampling method, as described above. The observer recorded all interactions between adults and children and between cart facilitators and visitors, noting what types of interactions occurred, who initiated them, and how long visitors stayed at the cart (see Appendix I.3).

Open-ended 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. Two types of open-ended interviews were conducted as part of this evaluation: individual interviews and group interviews.

Individual Interviews

After visiting either *Amazing Plants* or *Plants & People,* individual adults and children were selected (following the continuous random sampling method described earlier) and asked to answer a few questions (see Appendices I. 4 and I.5). In the same manner, adults were asked to participate in an interview after their visit to the Discovery Garden (see Appendix I.6). Individual interviews were also conducted with twelve BBG or BCM staff members as part of the process evaluation (see Appendix I.7). These twelve individuals were selected because of the role they played in producing *BG* components. All of the interview guides were intentionally open-ended to allow interviewees the freedom to discuss what they felt was meaningful. All interviews were tape-recorded with participants' awareness and transcribed to facilitate analysis.

Staff Group Interviews

Four group interviews were conducted with staff from BBG and BCM who were involved in the *Breaking Ground* project. The four groups included two institution-specific groups (BCM administration and BBG administration) and two collaborative groups (exhibit development teams and education development teams). The discussions focused on the mechanisms and characteristics necessary for successful collaborations as well as on the ways in which the educational impact and public awareness of *Breaking Ground* could be increased (see Appendix I.8).

Standardized Surveys

Standardized surveys, which produce quantitative data are useful because: (1) they collect responses from many visitors and (2) statistics can be applied to the data allowing the evaluator to examine the data in a variety of ways.

Mail-back Surveys

As part of the overall evaluation of the *BG* project, a questionnaire was mailed to selected visitors six to eight weeks after their visit to a *BG* component. Any visitor group consisting of one or more adults with one or more children between the ages of 6 and 12 was eligible for selection. As such groups departed *Amazing Plants*, the Discovery Garden, or *Plants & People*, they were approached by a teenage employee and the adult was asked to self-address an envelope and a postcard. The survey that they were later sent asked about their use of all of the *BG* components, including the City Plant Adventure Guide, as well as the intergenerational plant-related activities in which they had participated in the last two months (see Appendix I.9). One week after the surveys were sent, postcards were mailed to the same visitors to remind them to complete their questionnaire. Visitors were asked to return their completed survey in the self-addressed stamped envelope provided.

On-site Surveys

Visitors entering BCM and visitors entering BBG were asked to complete a standardized questionnaire similar in content to the mail-back survey (see Appendix I.10). Again, any visitor group consisting of one or more adults with one or more children between the ages of 6 and 12 was eligible for selection. At BCM, incoming groups were approached by a teenage employee and asked to complete the survey. At BBG, the individuals staffing the information kiosk asked entering visitor groups for their participation. Visitors who completed on-site surveys and who had not yet seen or visited any *BG* component were intended to function as a control group for the mail-back survey findings.

DATA ANALYSIS

Quantitative data were entered into a computer and analyzed using SPSSPC+, a statistical package for personal computers. Percents and summary statistics, including the mean (average), median (point at which half the responses fall above and half fall below), and standard deviation (spread of scores: ±; SD used in graphs) were calculated for interval and ratio variables. The verbatim responses to the individual and group interview questions were analyzed qualitatively, meaning that the evaluator studies the responses for meaningful patterns. As patterns and trends emerge, similar responses are grouped together. Each grouping is then assigned a name or category that conveys the meaning the responses embody.

METHOD OF REPORTING

The data presented in this report are both quantitative and qualitative. Tables are regularly used to display the information in a manner that makes it easily accessible. Percentages within tables do not always equal 100.0 percent due to rounding. Verbatim quotations (edited for clarity) are provided where appropriate to illustrate interviewees' thoughts and ideas as fully as possible. The findings within each topic are presented in descending order, starting with the most frequently occurring.

REPORT ORGANIZATION

The remainder of this report presents the findings from this evaluation. It is organized around the six specific *Breaking Ground* components, as listed in Table I.1. Recommendations based on the findings are presented in the final text section preceding the Appendices.

- Part II: *Amazing Plants* Exhibition
- Part III: Discovery Garden
- Part IV: *Plants & People* Exhibition
- Part V: Plant Discovery Carts
- Part VI: City Plant Adventure Guide & Overall Evaluation
- Part VII: *Breaking Ground* Collaboration
- Part VIII: Discussion and Recommendations
- Part IX: Appendices

Part II:

Amazing Plants
Exhibition

EXHIBITION DESCRIPTION

Amazing Plants, a 1,000-square-foot exhibition at the Brooklyn Botanic Garden, was created to appeal to people without any special background or interest in plants. Its target audience is children between the ages of 6 and 12 and the adults who visit with them. The exhibition explores the amazing individual traits of common plants and calls attention to their spectacular features and functions. Emphasizing that plants are worth noticing, the exhibition seeks to foster an appreciation of all plants, even the most common.

Specifically, *Amazing Plants* was designed to:

- enable visitors to discover the plants that live around them
- enhance children's visits to the Botanic Garden by introducing them to new ways of looking at plants
- create a bridge between the urban environment and the Botanic Garden by offering interpretation of plants found throughout Brooklyn
- call attention to the spectacular features and functions of the most common plants alongside interesting plants from the BBG collections
- help children make personal connections to plants in their neighborhoods.

PRINCIPAL FINDINGS

TRACKING STUDY

This section of the report presents findings from the tracking study that was conducted in *Amazing Plants*. The primary goal of this study was to record all intergenerational interactions (i.e., between adults and children). These interactions appeared as either behaviors (indicating how visitors use the exhibit components), or comments (exemplifying how visitors process the exhibit information). In addition to examining intergenerational interactions, the tracking study provides a quantifiable description of visitor behavior, including number of stops made in the exhibition and length of stay. A total of 50 visitor groups were tracked during their visit in *Amazing Plants*.

Visitor Group Composition

As shown in Table II.1, over half of the visitor groups included only one child (58 percent). No group had more than four children. The ages of the children ranged from 2 to 15 years (see Table II.2). The mean age was 7.01 (not shown in the table), and nearly two-thirds of the children were 4 to 9 years of age (64 percent). The number of adults per group ranged from one to six, though groups with three to six adults were relatively uncommon (14 percent) (see Table II.1). Groups with only one adult constituted more than two-fifths of the sample, as did groups with two adults (42 percent and 44 percent, respectively).

Table II.1.
Visitor Group Composition in *Amazing Plants* Tracking Study in Percent
(n=50)

Number of Children	**%**
One	58.0
Two	22.0
Three	12.0
Four	8.0
Number of Adults	**%**
One	42.0
Two	44.0
Three to six	14.0

Table II.2.
Ages of Children in Visitor Groups in *Amazing Plants* Tracking Study in Percent
(n=50)

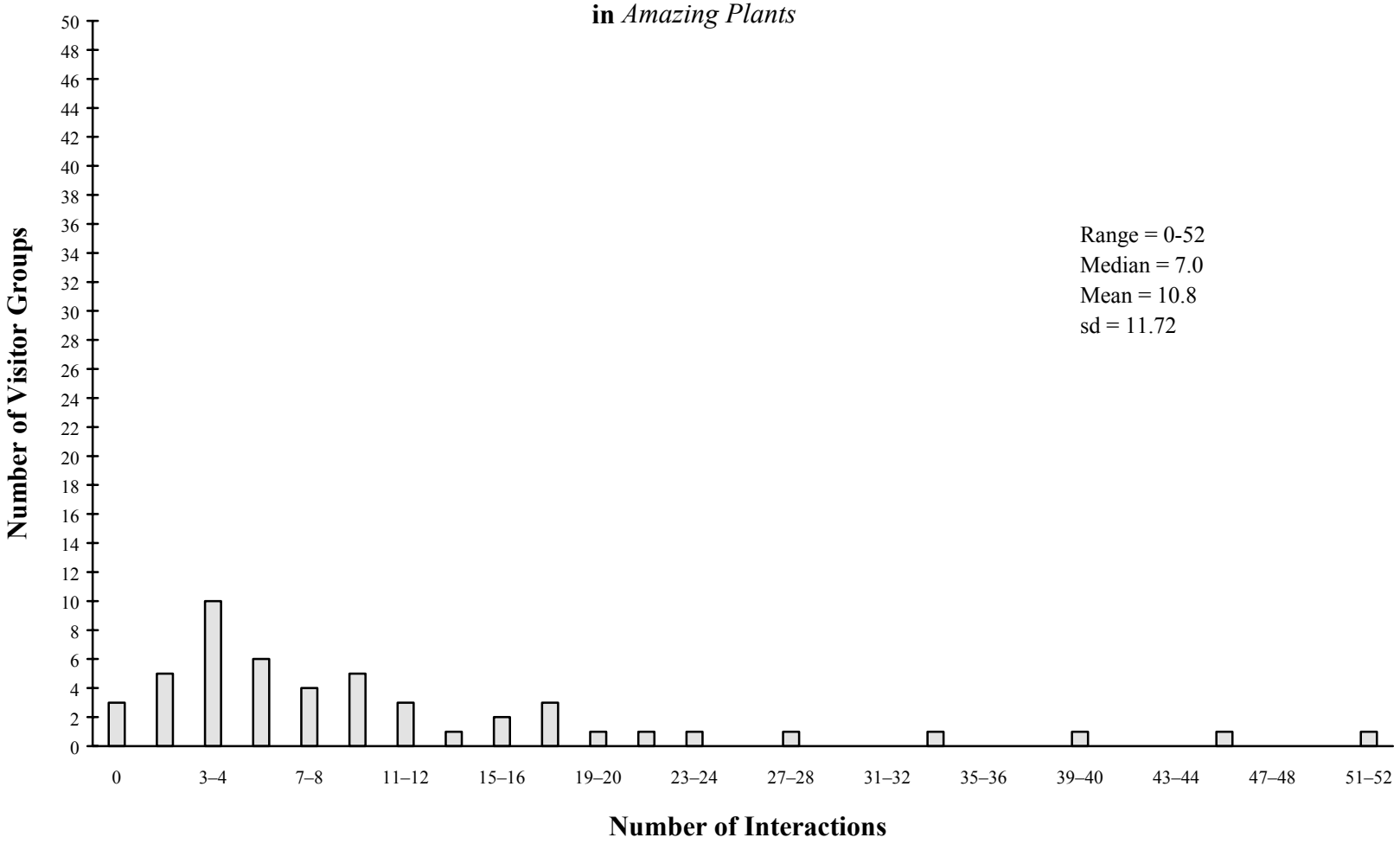
Age	**%**
2–3	16.7
4–6	26.3
7–9	38.0
10–12	16.7
13–15	2.4

Number of Interactions between Adults and Children

To assess the frequency and types of intergenerational interactions occurring in the exhibition, all interactions were recorded by the observer. As shown in Figure II.1, the number of interactions displayed by visitor groups varied extensively. Whereas the adults and children in some groups did not interact at all, one group displayed 52 intergenerational interactions. Relatively speaking, many groups displayed few interactions; few groups displayed many interactions. Due to this "lopsidedness," the median rather than the mean is the appropriate measurement.[1] The median number of interactions per visitor group was 7.0. In other words, half of the groups displayed 7 or fewer intergenerational interactions and half of the groups displayed 7 or more interactions.

[1] 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. Unless otherwise noted, the median, rather than the mean, is reported for all frequency distributions.

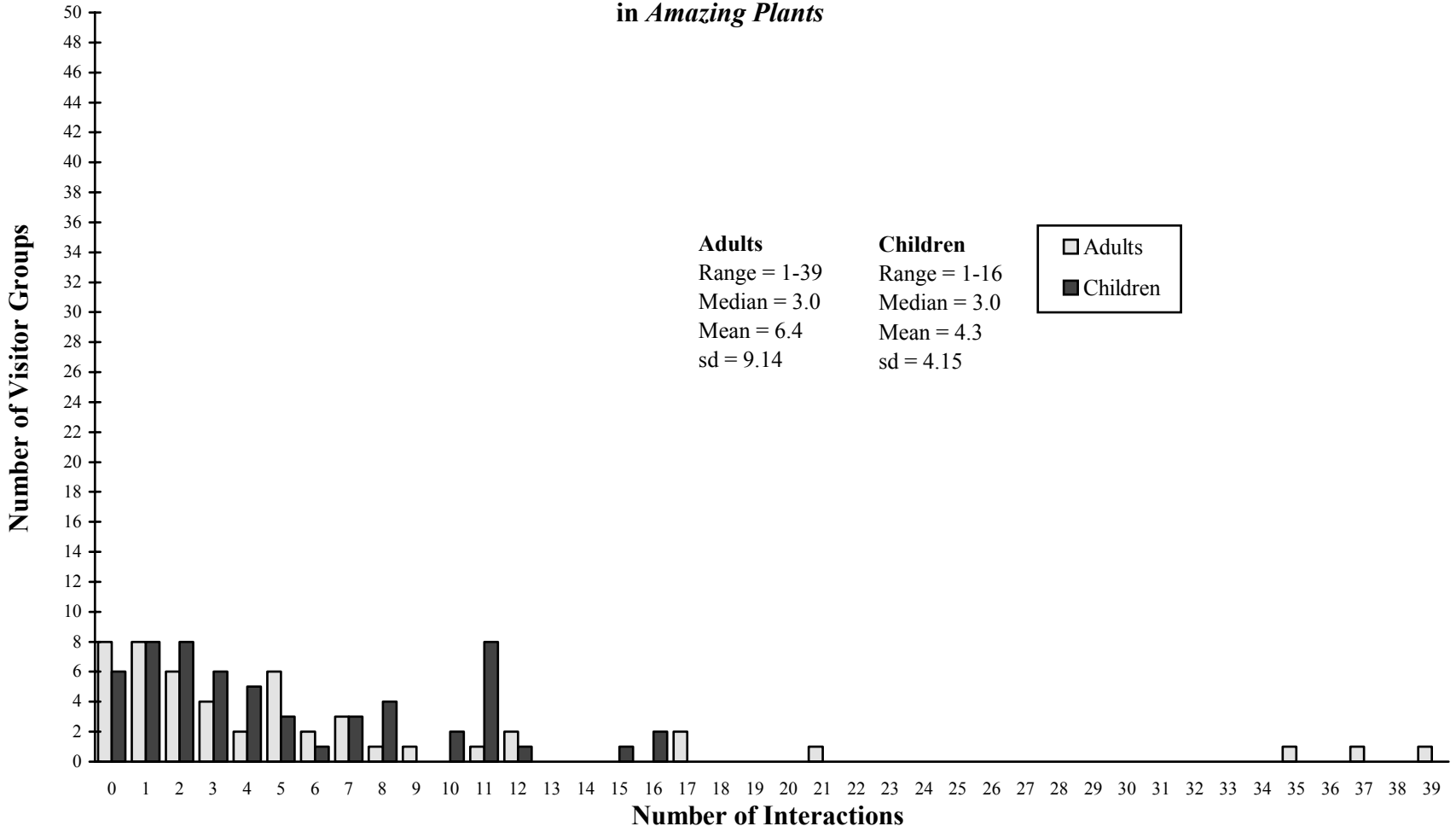
Figure II.1.
Number of Interactions by Visitor Groups
in *Amazing Plants*



Initiating Interactions

Because it is important to understand whether children or adults are acting as the impetus for the observed interchanges, the interactions were classified as either adult-initiated or child-initiated (see Figure II.2). In 16 percent of the groups, no adult initiated an interaction. In contrast, one group was observed to have 39 adult-initiated interactions. Though the range (0-39) is quite large, in two-thirds of the groups adults initiated interactions 5 or fewer times. Similarly, in 12 percent of the groups, no children initiated any interactions. The most child-initiated interactions in a group was 16. Again, despite the range (0-16), in two-thirds of the groups children initiated 4 or fewer interactions. As explained above, the median rather than the mean is the appropriate measurement under these circumstances. For both adult-initiated and child-initiated interactions, the median was 3.0. That is to say, in half the groups there were 3 or fewer adult-initiated (or child-initiated) interactions, and in half of the groups there were 3 or more adult-initiated (or child-initiated) interactions.

Figure II.2.
Number of Interactions Initiated by Adults and Children in *Amazing Plants*



Types of Interactions between Adults and Children in Amazing Plants

A variety of interactions can occur between individuals in an exhibition. In this study, the intergenerational interactions were originally classified into three types: mechanical (physical action: looking at or using an exhibit component), content (comments or actions related to the content or subject matter of the component), and relevance (comments or actions relating the content of the component to something in the visitor's past experience or everyday life). During data analysis a fourth category of response appeared: appreciation (comments expressing appreciation for something in the exhibit, e.g., "Wow!" or "This is beautiful"). Though interactions expressing appreciation occurred infrequently, they are distinct enough to warrant their own response category.

Mechanical interactions included such activities as looking at the exhibit elements, reading labels, pushing buttons, using hands-on components, and watching videos. As shown in Figure II.3, the number of mechanical interactions observed within visitor groups ranged from 0 to 30. The median number was 11.5: half of the groups displayed 12 or more mechanical interactions.

Content interactions included actions, comments, explanations, and discussions between adults and children regarding the subject matter of the exhibit component. Examples include a child explaining, "See, this is where the seed grows," and an adult discussing with a child why trees have roots. In contrast to the frequency of mechanical interactions, over three-quarters of the groups displayed 6 or fewer content-related interactions (see Figure II.4). In fact, one-fifth of the groups (20 percent) never displayed this type of interaction. The median number of content interactions observed within visitor groups was 3.0, much lower than the median number of mechanical interactions (11.5).

Relevance interactions were identified by comments and actions that demonstrated that the component related to the visitor's everyday life. For instance, when lifting the earpieces that told plant stories, children would pretend they were telephones. At the Bird's-eye View component, an adult declared, "See where you live? It's Brooklyn. I see our church." And, at the subway seats a child proclaimed, "We're on the subway, hold on!" These types of interactions were less common than the mechanical or content-related interactions. As shown in Figure II.5, of the 50 groups, over half (52 percent) were never observed interacting in this way. Of the 24 groups that displayed a relevance interaction, half (12 groups) displayed only one. The median number of relevance interactions was 0.0.

One other type of interaction—appreciation—is reported here. Though its occurrence was much less frequent (median = 0.0), there were enough appreciation responses to warrant a distinct classification. Figure II.6 shows that 7 of the 50 groups expressed phrases of appreciation, for example, "This is cool," "I've never seen anything this pretty," "This is really hands-on," and "Wow, isn't this nice!"

Figure II.3
Number of Interactions with Components by Visitor Groups
in *Amazing Plants*

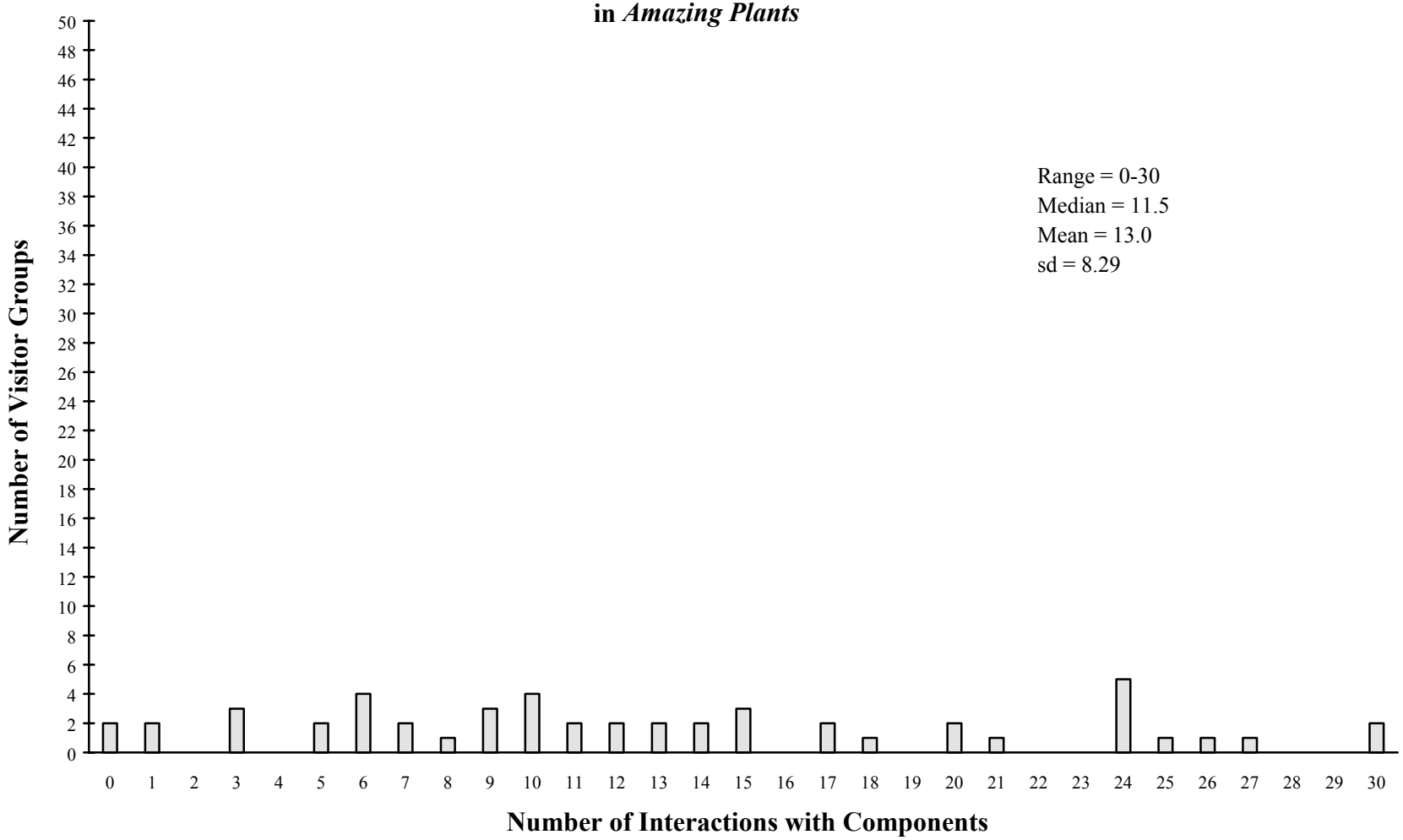


Figure II.4.
Number of Content Interactions by by Visitor Groups
in *Amazing Plants*

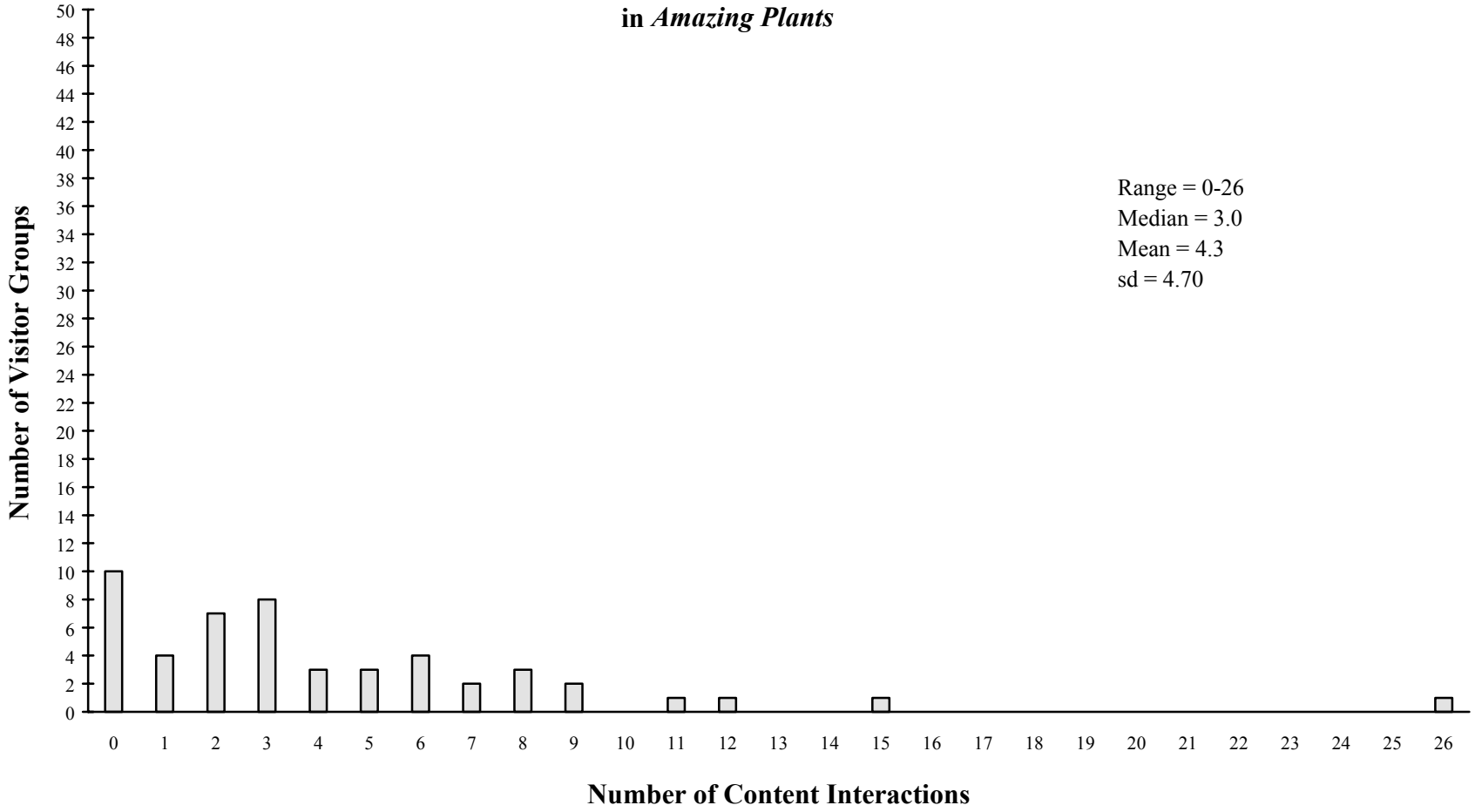


Figure II.5
Number of Relevance Interactions by Visitor Groups
in *Amazing Plants*

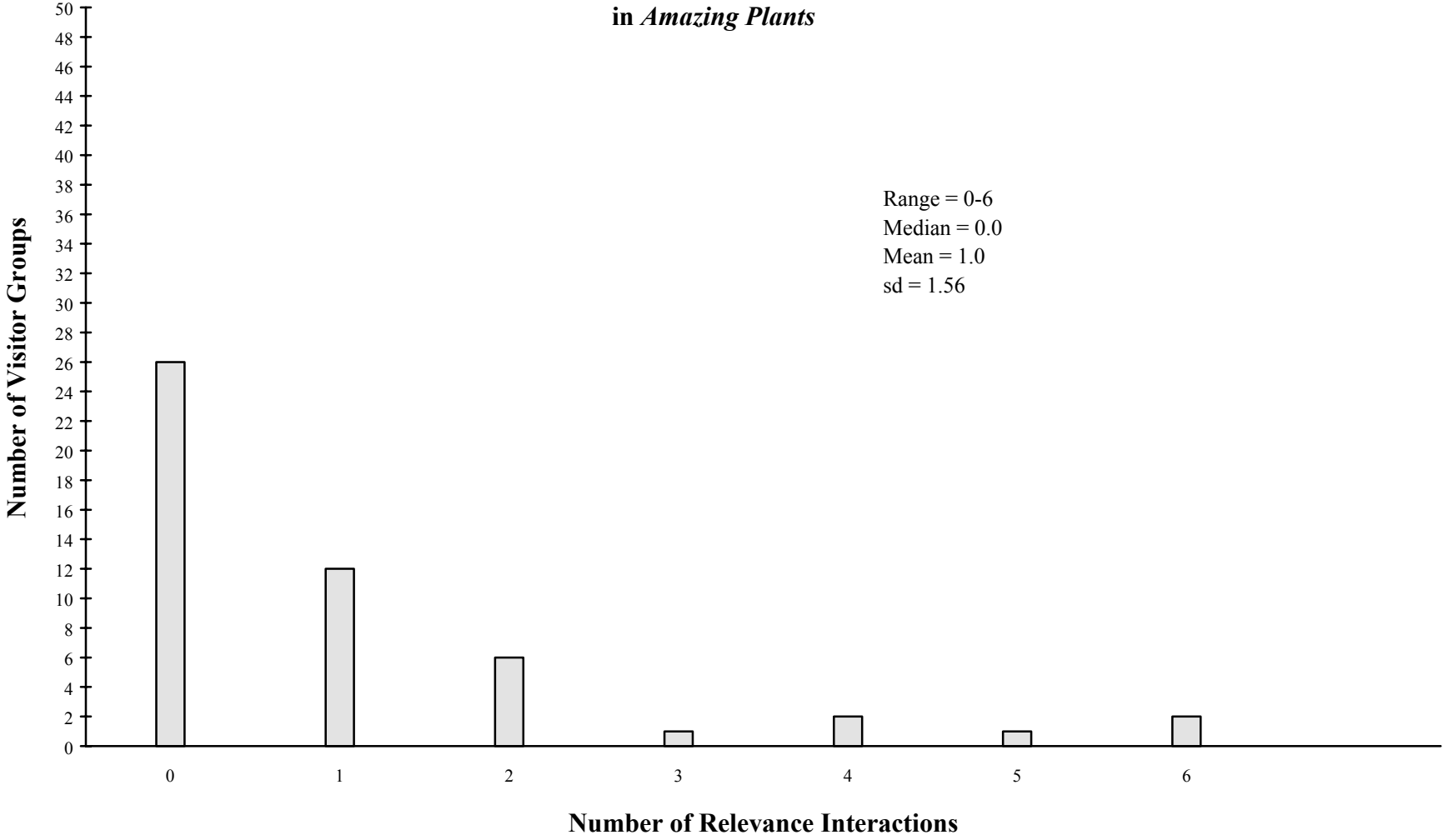
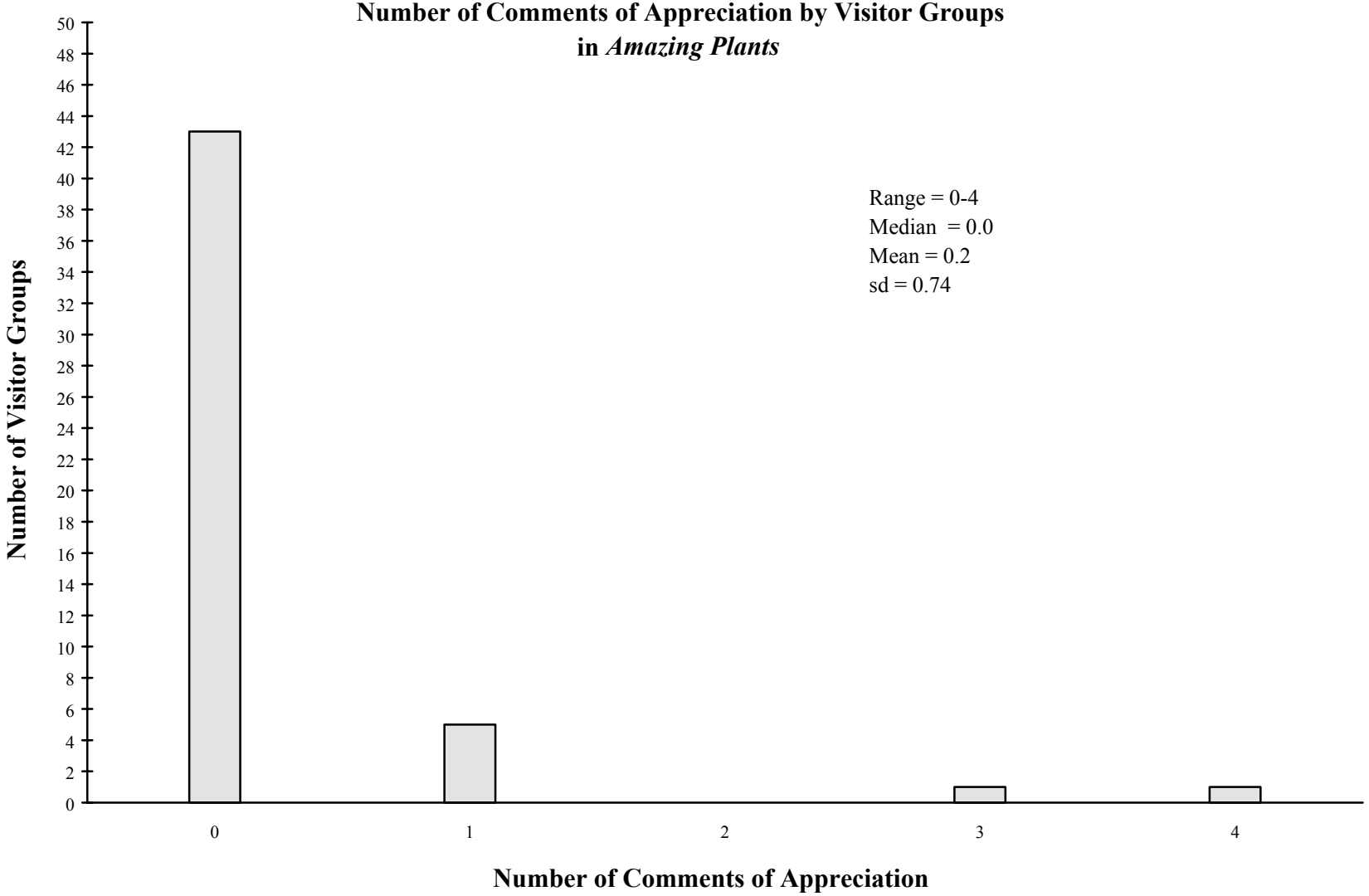


Figure II.6.
Number of Comments of Appreciation by Visitor Groups
in *Amazing Plants*

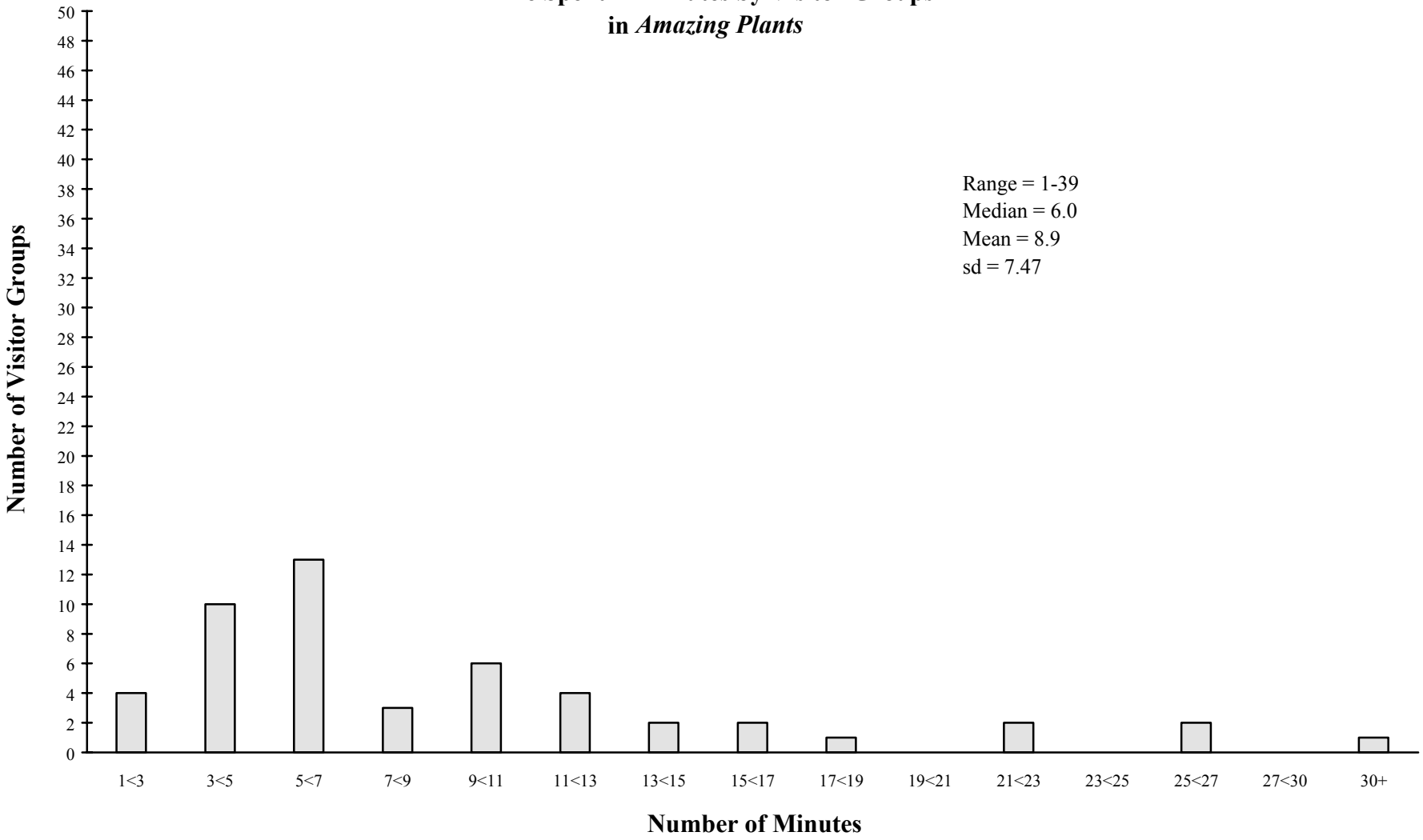


Total Time (Minutes) Spent in Amazing Plants

One measure of gauging the visitor experience in an exhibition is to examine how much time people spend there. Figure II.7 presents the amount of time visitor groups spent in *Amazing Plants*. The duration of visits spanned a broad range: the shortest visit lasted approximately 1 minute and the longest lasted 39 minutes. Relatively speaking, however, many groups spent a brief time in the exhibition, whereas very few groups stayed for an extended period. Hence, the median rather than the mean is the appropriate measurement. The median amount of time spent by visitor groups in *Amazing Plants* was 6.0 minutes, meaning that half of the groups spent 6 minutes or less in the exhibition and half stayed 6 minutes or longer.

More specifically, one-fifth of the groups spent less than 4 minutes in the exhibition (20 percent); half spent between 4 and 9 minutes (50 percent). Nearly one-third of the groups spent 10 minutes or longer (30 percent).

Figure II.7.
Time Spent in Minutes by Visitor Groups
in *Amazing Plants*

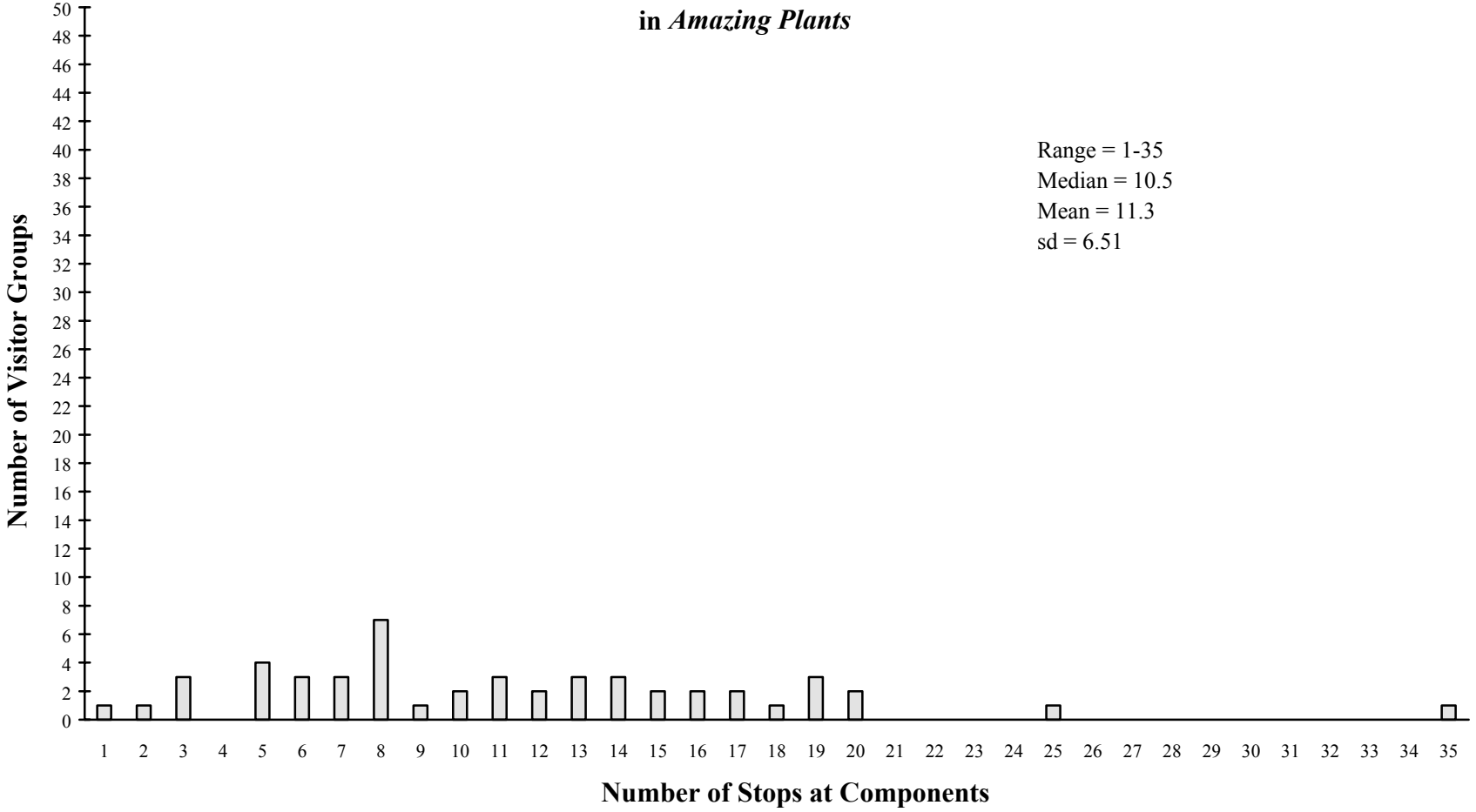


Number of Stops in Amazing Plants

Another way to assess the visitor experience in an exhibition is to count the stops visitors make. For the purposes of this study, a "stop" is defined as a visitor group standing for 3 seconds or longer in front of a given component. Each stop a visitor group made was tallied, regardless of whether or not it was the group's first stop at the particular component. In other words, if a group stopped multiple times at the same component, each return visit was counted as an additional stop. Figure II.8 shows that half of the visitor groups made more than 10 stops among the 34 components in *Amazing Plants* (50 percent). The median number of stops per visitor group was 10.5. Over half of the groups stopped at less than one-third of the exhibition components (56 percent). Only two groups stopped more than 20 times.

Figure II.8.

Number of Stops at Components[1] by Visitor Groups in *Amazing Plants*



[1]There are 34 components in the exhibition

Number of Stops per Exhibition Component

Because 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 planning teams a sense of the varied attracting power of individual components. Moreover, the stops visitors make determine, in part, their experience in the exhibition.

Table II.3 presents, in rank order, the number of stops visitors made at each of the 34 components in *Amazing Plants*. At each of eight components, more than 25 stops were made by visitor groups (see the shaded area in Table II.3). The three most frequently visited components were Push Button/See Cartoon, Hear Stories, and the Zoetrope. Fourteen components (over one-third of the exhibition) attracted less than 10 stops each. The five least-visited components were the Bouncing Balls, What's Inside the Tree Trunk?, I Get There First panel, Tank Window #3, and Look at Kite/Rooftop Garden. In fact, no group stopped to look at the Kite/Rooftop Garden.

Table II.3.
Number of Stops per Exhibition Component in *Amazing Plants*[1]

Component	n	Component	n
Push Button/See Cartoon	46	Count the Seeds	11
Hear Stories	42	Compare Your Height	11
Zoetrope	39	Clothesline	10
Exploding Seeds video	35	Look in Windows (Food)	9
Bellows/Milkweed	34	Design a City	9
Bird's-eye View	33	Sucker panel	8
Subway Seats/Tank Window #2	29	Coconut case	8
Magnifier/Compare Wind Seeds	26	Devil's Claw Seed cases	8
Wipe Glass	23	Look in Windows (Bonsai)	7
Bird Poop Corner/Light Boxes	20	Tree of Heaven Roots	7
Identify Plants/Move Beads	19	Slide Truck	6
Write/Draw Stories	18	Front of Trunk/Fruits & Seeds	6
Tank Window #1	18	Move the Balls	5
Magnifier/Compare Sticky Seeds	16	What's Inside the Tree Trunk?	5
Linden Roots	15	I Get There First panel	5
Back of Trunk/Roots	14	Tank Window #3	3
Subway Map	14	Look at Kite/Rooftop Garden	0

[1]Total number of components = 34.

Interactions at Individual Components

One way to gauge the quality of the stops is to examine the interactions that took place within visitor groups while at each component. Figures II.9–II.16 compare the numbers and types of interactions that occurred at the eight most frequently visited components. As a general trend, mechanical interactions far outnumbered content interactions which in turn, outnumbered relevance and appreciation interactions. One exception occurred: at the Subway Seats/Tank Window #2, content interactions approached the frequency of mechanical interactions, and relevance interactions occurred there more frequently than they did at any other component (see Figure II.15).

Figure II.9.
Push Button/See Cartoon

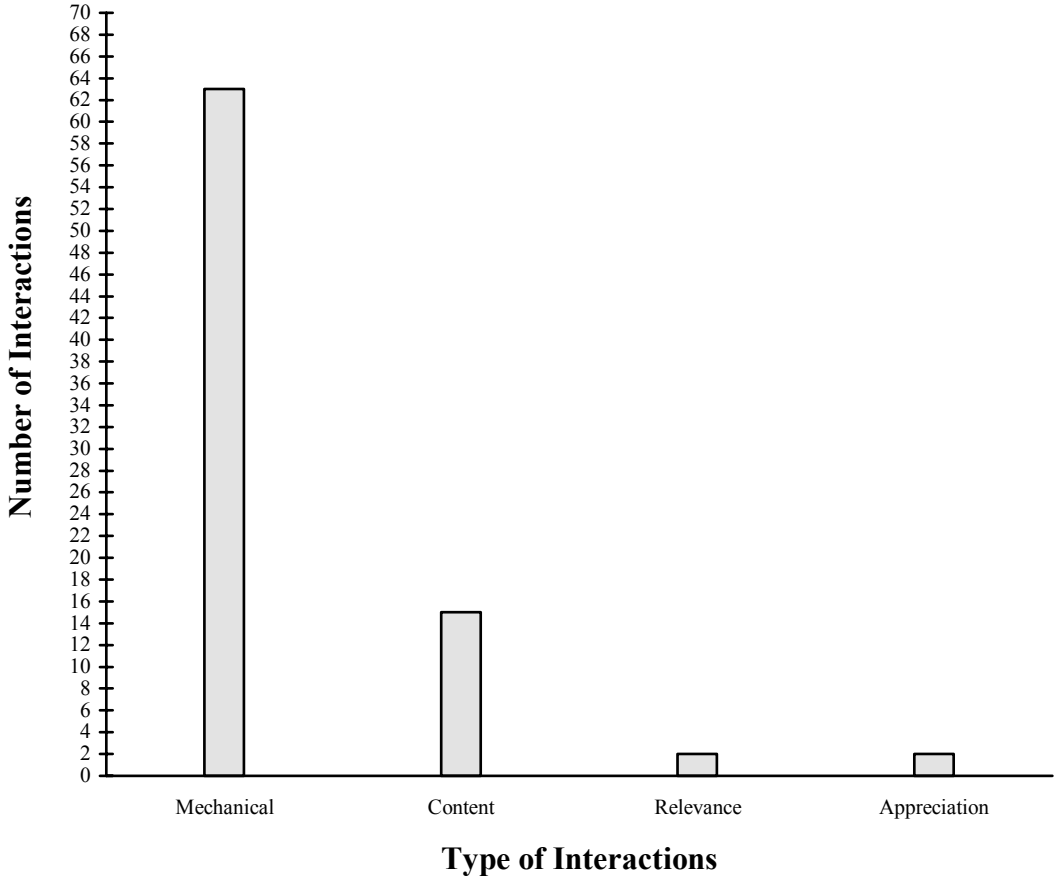


Figure II.10.
Hear Stories

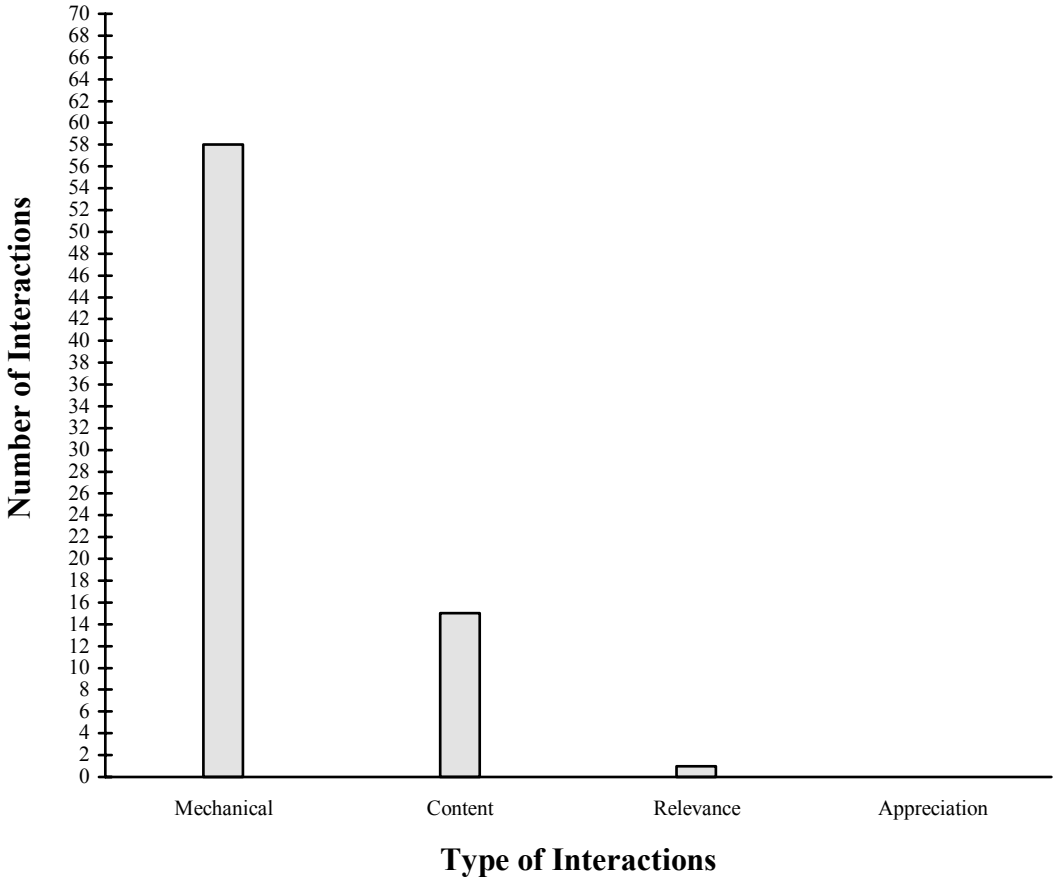


Figure II.11.
Zoetrope

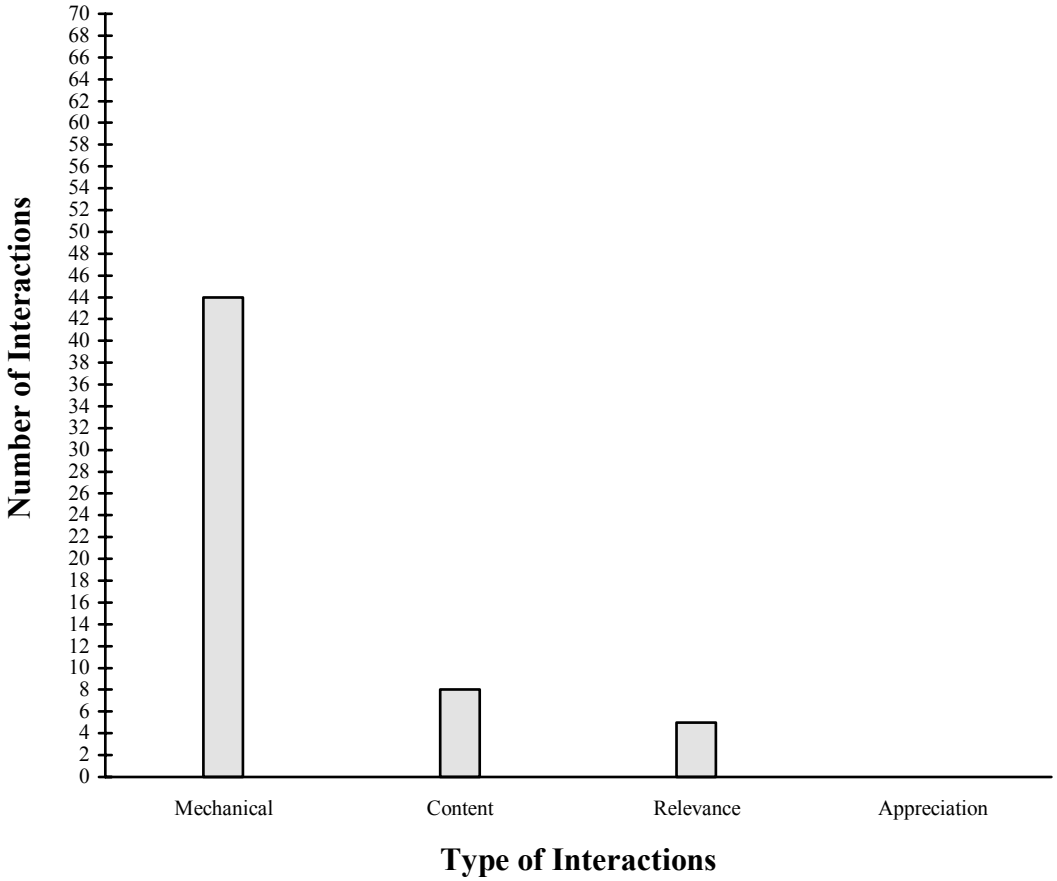


Figure II.12.
Exploding Seeds Video

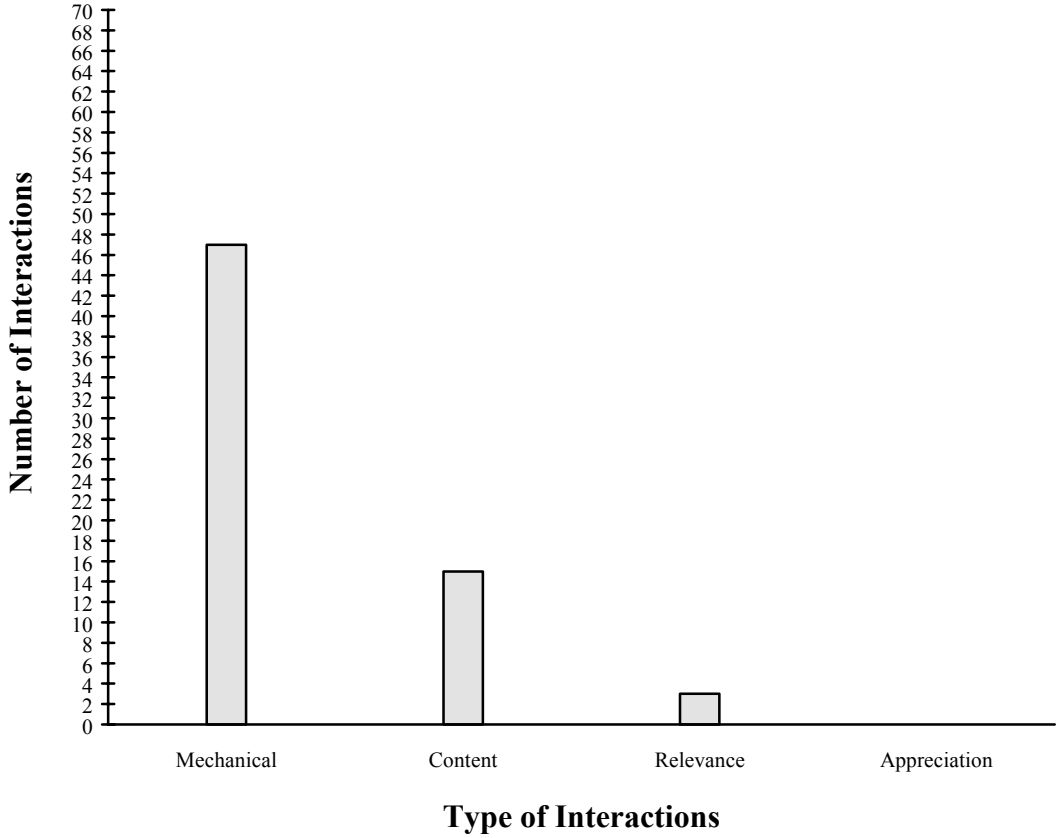


Figure II.13.
Bellows/Milkweed

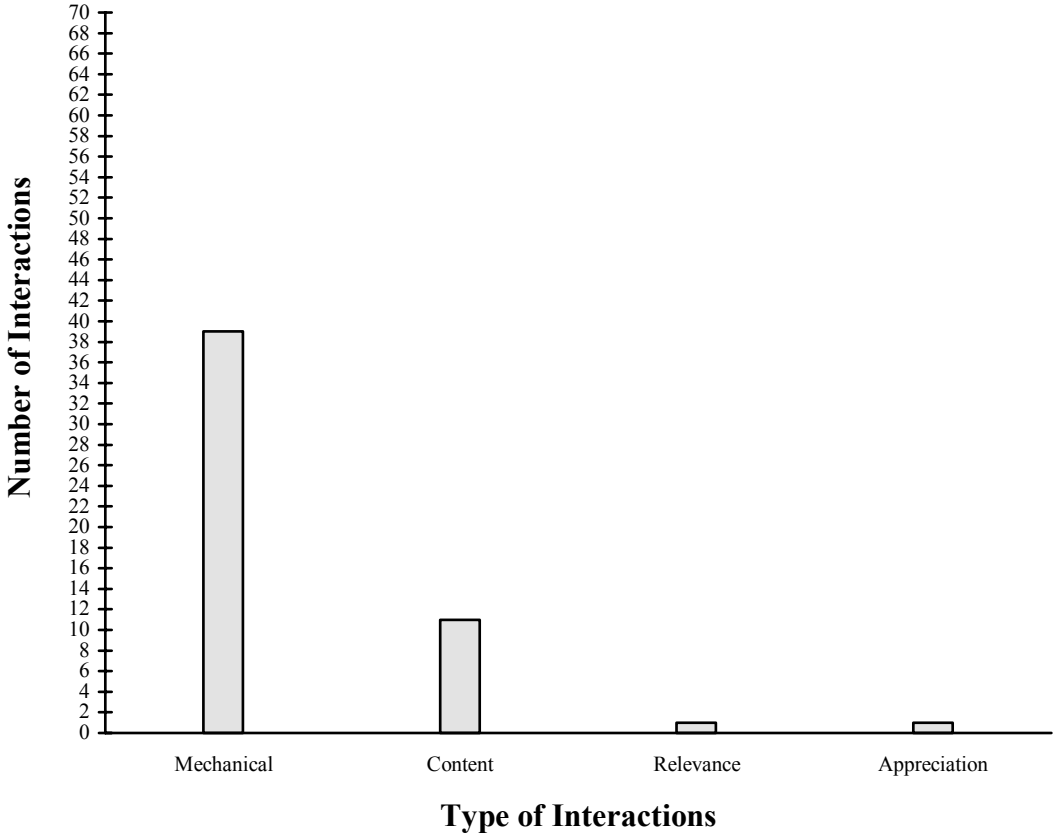


Figure II.14.
Bird's-eye View

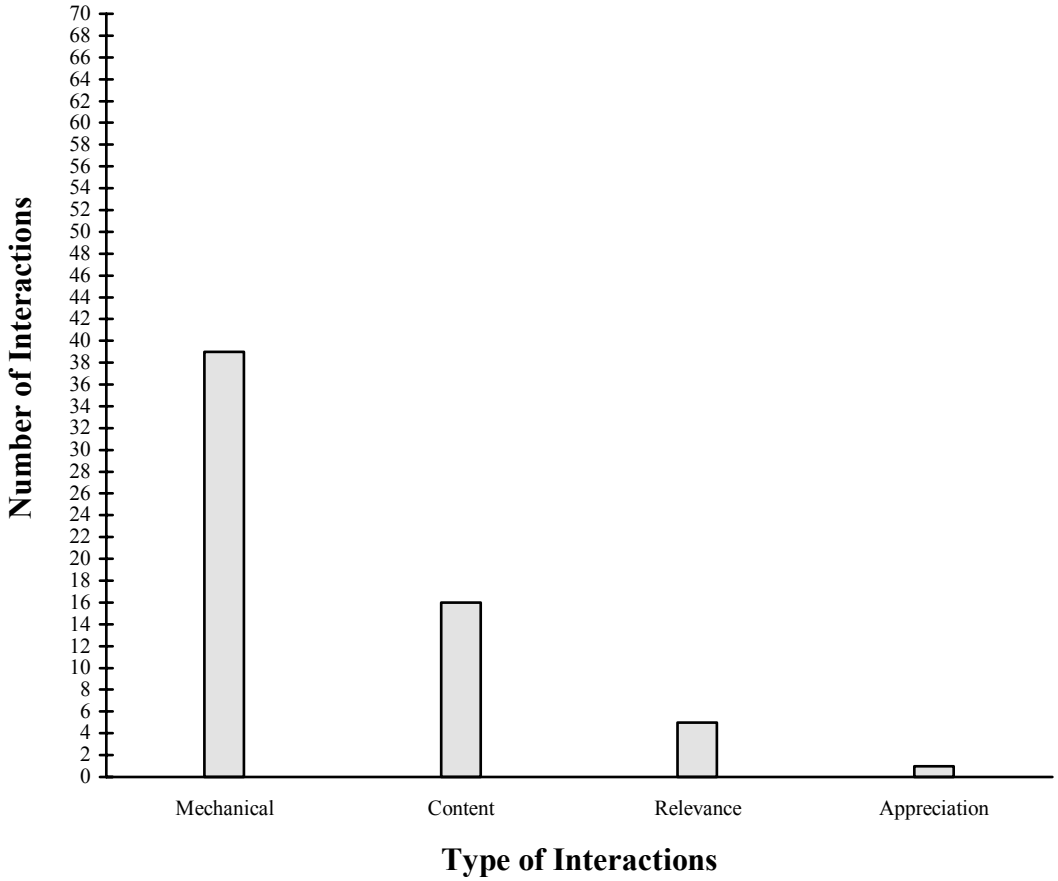


Figure II.15.
Subway Seats/Tank Window #2

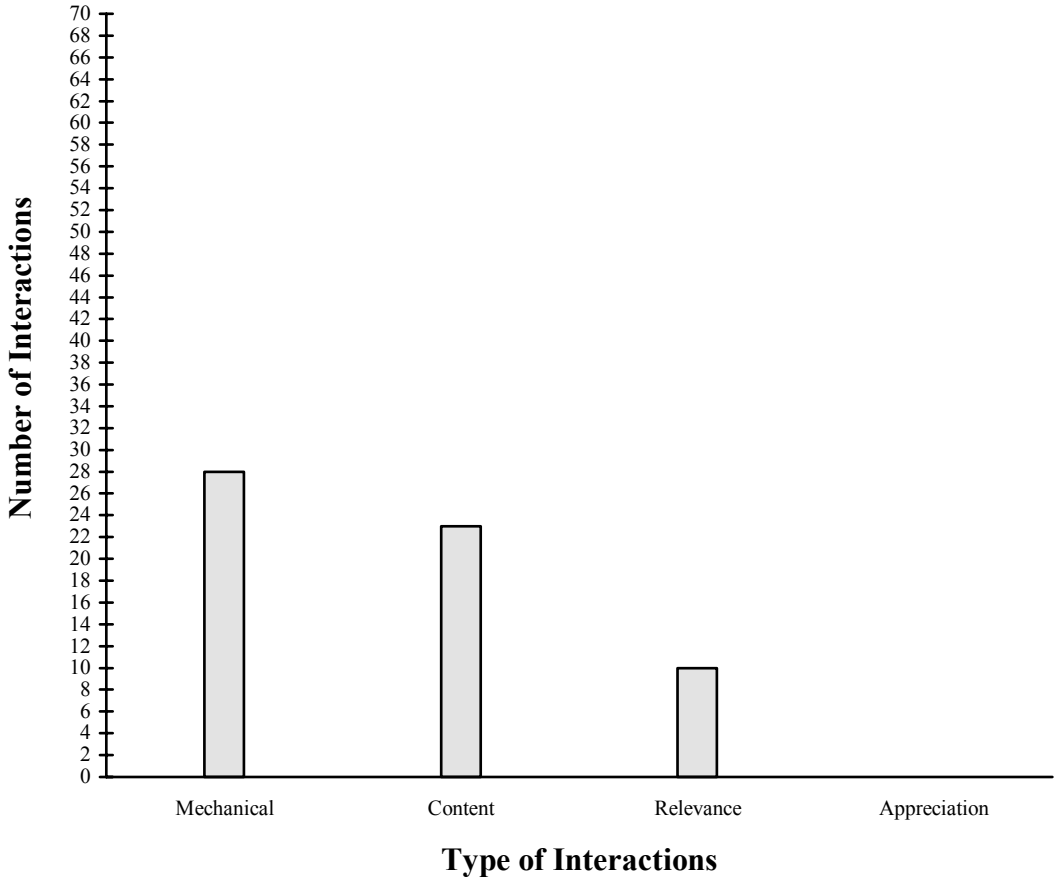
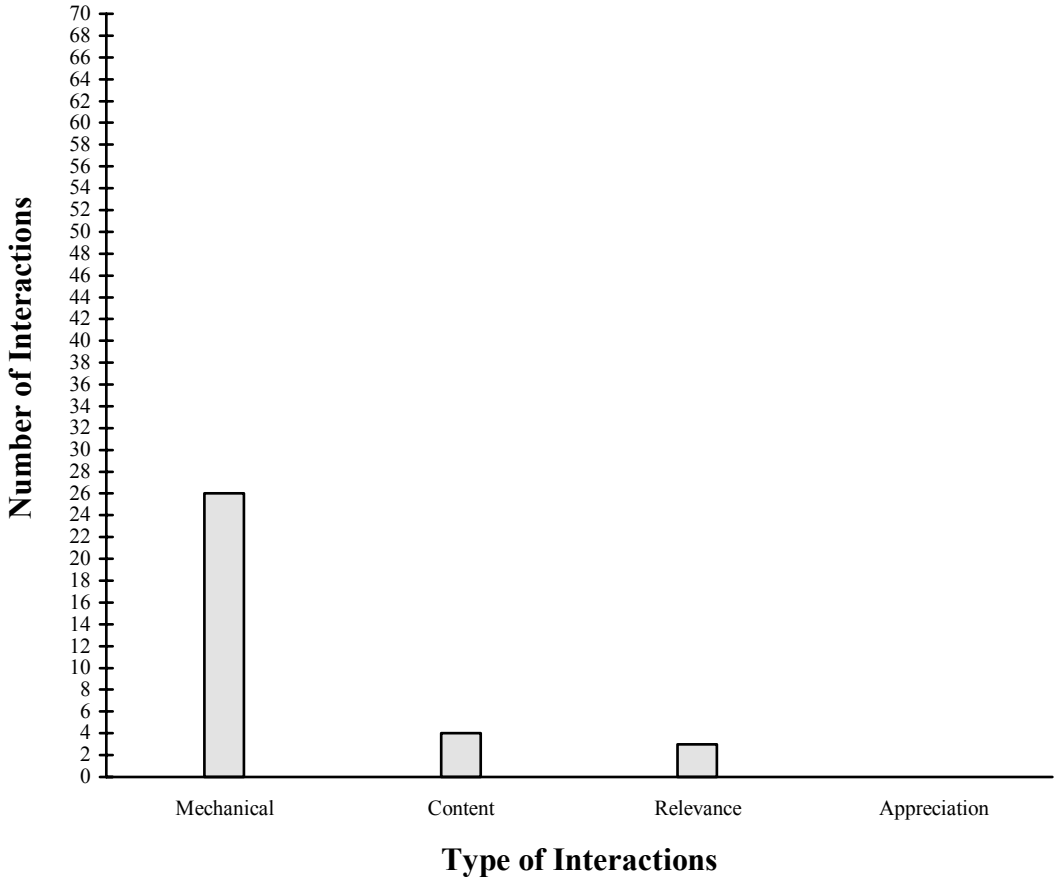


Figure II.16.
Magnifier/Compare Wind Seeds



INTERVIEWS

This section of the report presents the findings from the interviews conducted with adult and child visitors to *Amazing Plants*. The primary goal of asking open-ended questions was to allow visitors to talk about their experience in the exhibition.

During the evaluation planning meeting, the *BG* team identified five exhibition messages they hoped visitors would realize from *Amazing Plants*. They are:

- if you stop and look at the natural world in the city, you will see wonderful things
- the plants in the exhibition are street plants
- many interesting plants grow in Brooklyn
- seeds travel
- plants defend themselves.

BG team members also asked questions about visitors' experiences in the exhibition, as follows:

- what does the exhibition make visitors think about?
- what memories about plants come to mind for visitors?
- do visitors recognize the relevance of plants to their own lives?

The interview questions were written with these ideas in mind (see Appendices I.4 and I.5).

In reporting the interview data, most of the exhibition concepts and components are discussed in the terms used by interviewees rather than the specific titles used by the exhibition developers. For instance, whereas developers specified "Design a City," visitors referred to "shrubbery magnets." However, in situations where the developers' title coincided with the general idea discussed by interviewees, the predefined title is used.

Phrases such as two-thirds or one-quarter are used to express the proportion of interviewees who responded in a certain manner. Because of the open-ended interview format, interviewees often provided more than one idea in response to each interview question. Therefore, the proportions associated with the various responses may total more than 100 percent for any one interview question. In addition, the term "some" is used to convey a portion less than one-fifth; "a few" is used for numbers around 10 percent.

Adults

Thirty-three interviews were conducted with adult visitors (18 years and older) who were accompanied by children to the *Amazing Plants* exhibition. Of the 42 individuals approached, 9 declined; thus, the refusal rate was 21 percent, which is an average rate for museum surveys. Among the 9 individuals who chose not to participate in the interview were both females and males visiting with children aged 4 to 12; only one individual was visiting with more than one child.

Visitor Group Composition

Of the 33 interviewees, nearly three-quarters were female and just over one-quarter were male (73 percent and 27 percent, respectively) (see Table II.4).[2] Almost half of the interviewees were accompanied by one child (49 percent); nearly one-quarter were accompanied by two children (24 percent).

Table II.4.
Visitor Group Composition in *Amazing Plants*
Adult Interviews in Percent
(n=33)

Gender	**%**
Female	72.7
Male	27.3
Number of Child Companions	**%**
One	48.5
Two	24.2
Three	15.2
Four	6.1
Five	6.1

Familiarity with the *Amazing Plants* Exhibition

As an opening question, interviewees were asked whether they had heard of the *Amazing Plants* exhibition prior to arriving at the Garden. Five of the 33 interviewees appeared to have prior knowledge of the exhibition (15 percent). Two interviewees had visited frequently in the past and were aware of the renovation, two read about it in the newspaper, and one believed she heard about it from a mailing.

Thoughts While Going through *Amazing Plants*

Because the exhibition is designed essentially for children, interviewees were asked what they, as adults, were thinking about as they went through it. To this inquiry, visitors responded with general positive statements, mentioned specific exhibition components or themes, stated that it held children's interest, and commented on the educational or hands-on quality of the exhibition, its overall design, its focus on Brooklyn and urban plants, or the childhood memories that it evoked.

Over one-third of the visitors made a general positive statement without further explanation: for instance, "It is very interesting," "I enjoyed it," "It was a nice exhibit," and "It was fun."

[2] The ages of the adult interviewees were not collected because the evaluation and planning teams had decided that age was not of particular interest to this portion of the evaluation.

Similarly, over one-third of the interviewees named a specific exhibition component or theme that they particularly liked. The most frequently named theme was seed dispersal, which is one of the main messages in the exhibition. Other specific components and themes mentioned were the fish, videos, bird droppings, Ailanthus plants, window boxes, ponds, and tree roots.

Nearly one-quarter of the interviewees noted that the exhibition kept their children interested or held their attention (see first two quotations below). Over one-fifth referred to the educational potential of the exhibition (see last quotation).

> It kept the kids interested. It kept them inside the exhibit. They wanted to go to the next section of the exhibit rather that just give a quick look over and go out.
>
> It seemed like it held her interest. . . . That she sort of went from one display to the next, and so was eager to go through and see more.
>
> You can learn a lot from it. It is very informative—very educational.

Some interviewees appreciated the hands-on nature of components (see first two quotations below); others praised the overall design (see last three quotations).

> I especially liked the hands-on parts that he could play with because he didn't understand them all, but he got the idea that it was exciting, and that was useful.
>
> I liked that it encourages kids to touch things and to pick up things and to go through things.
>
> I like the parts of it that were low for kids to look at.
>
> It was designed well for a kid's-eye-view.
>
> I like the way they have it set out with the graphics and the arts. It pulls you in.

Indicating that two more of the exhibition's primary messages were successfully conveyed to visitors, some interviewees acknowledged their enjoyment of the references to Brooklyn (see first three quotations below), and a few noted the "city plants" theme (see last two quotations).

> I liked the Brooklyn accent.
>
> I really liked the images of Brooklyn.
>
> I liked that the kids who are used in the examples are representative of the people who live in the neighborhood around the park.
>
> I thought it was extremely useful because it had so many good examples from things that children would see in the city.

> I like the fact that it is city-oriented, so the children get to see stuff that they encounter every day which they don't usually see in small museums.

In keeping with another of its outcome goals, the exhibition elicited childhood memories for two visitors (see quotations below). Two others explained that they were thinking about how to help their children relate to or understand the exhibit.

> I enjoy looking at all the things and remembering things from being a kid.

> [I] saw some of the plants that I saw in the neighborhood growing up in Brooklyn.

There were also a few negative comments voiced by interviewees. These comments were associated with either the belief that the touchable components were not truly interactive or that the theme of city plants was unusual. Though infrequent, the negative remarks are printed below to provide a sense of what a few visitors found dissatisfying.

> I actually was a little disappointed. . . . It is almost like the last one. It doesn't quite do anything. I expected it to be slightly more interactive rather than just push the buttons and have the adult read it to you. . . . They walked in to see what would happen in the building part, and Ariel got in and said, "But there is nothing here."

> Some of it seems to be interactive just for the sake of being interactive and I couldn't quite figure out the purpose of why it was interactive. Needless to say though, she loves it. Any button to push or lever to pull she thinks is great. . . . It's nice to show them [children] that plants grow from vacant lots and stuff, [but] it seemed like kind of an odd thing to be showing. . . . Compared to the luscious beauty of everything else here, it just seems like they see it all the time. Do they have to come here to see that? It didn't seem to have a purpose.

> It wasn't that clear. I know you are trying to give it to city children. Talking about certain plants that would grow kind of wild despite the city inconveniencing. I didn't think that some of it was that clear. . . . Some of it . . . I didn't find that interesting, and I think perhaps children won't.

Parts of *Amazing Plants* That Reminded Interviewees of Everyday Life

One of the main goals of the *Amazing Plants* exhibition is to make visitors aware of the relevance plants have to their lives. When asked specifically whether anything in this exhibition reminded them of something in their everyday life, an overwhelming 32 of 33 interviewees indicated that there was something that they had seen or done before. The four most popular responses referred to plants growing from cracks in the sidewalk, plants growing from other strange places, the subway, and the whole exhibition. Numerous other responses were given less frequently.

Nearly one-fifth of the interviewees mentioned that the plants growing from cracks in the sidewalk reminded them of everyday life. Plants growing out of other strange places (see quotations below) and the subway were the next most frequent responses.

> Seeing thing growing out of all kinds of strange things in the city, where you see plants sprouting out of unlikely places—cracks in buildings or things like that.
>
> Old containers with roots growing in them and full of debris, and realizing that that's plants growing in there, and I never gave it a second thought before. Like in a vacant lot where there is some trash and stuff.
>
> The trees that you see in the cracks in the sidewalk and the wood and plants grow in Brooklyn in amazing places.

Some visitors indicated that the whole exhibition reminded them of their everyday life.

> The whole thing reminds us of our neighborhood: the sidewalk, the plants, the train, particularly the weeds coming out of the cracks.
>
> I was a science editor for years, so yeah, the whole thing.

There were numerous other responses, all given rather infrequently. Those components or topics in *Amazing Plants* that were mentioned by at least two visitors can be found in Table II.5. Unique responses included such things as "the clothesline," "houseplants," "the banana plant," "that little rooftop garden," and "how birds poop." See Appendix II.1 for a complete list of unique responses.

In addition, two visitors indicated that *Amazing Plants*, in general, reminded them of a hands-on exhibit about New York City nature located at the American Museum of Natural History.

Table II.5.
Parts of *Amazing Plants* That
Reminded Visitors of Everyday Life[1]

Component/Topic	n	Component/Topic	n
Car	3	Arch in Grand Army Plaza	2
Coconut	3	Bird's-eye View	2
Fish	3	Buildings	2
Plants/trees	3	Dirt with trash in it	2
Seeds	3	Photos	2
Ailanthus tree	2	Sucker trees	2

[1]Idiosyncratic responses (i.e., n=1) are not included in this table; see Appendix II.1.

Opportunities for Intergenerational Learning

Interviewees were next asked what components in *Amazing Plants* were good opportunities for them and their child companion(s) to learn together. Though more than one-fifth of the visitors did not provide responses associated with learning opportunities, close to four-fifths were able to name a specific component or topic. The response categories that follow and their respective frequencies were derived solely from the group of interviewees who indicated learning opportunities. In general, visitors named the fish, the seed dispersal video, Magnifiers, the seed dispersal theme, hands-on components, the Bellows, the Zoetrope, and "hitchhiker" seeds as good intergenerational learning opportunities.

The most frequently named component was the fish/aquarium, mentioned by nearly one-third of this group. The next most frequently noted components were the video of seed dispersal and the Magnifiers, each mentioned by over one-quarter of the interviewees.

> The place where the fish was: I showed my daughter how the fish was breathing—the live fish where the bubbles were coming out of the gills of the fish.

> The sprouting, spurting seeds, flinging cucumbers—they really liked that. We stood there watching it. They were amazed. The thing that plants can actually shoot things. Then they wanted to know, "Why is it doing that?" "Is it alive or something?" "Is it angry?"—that's what they said. It looks like it is spitting or shooting. I said, "No, that plants want to survive like people do and so the seeds have to go out as far as they can to hit the ground so they don't just fall on top of other plants. They can't grow like that. So nature has different ways to give them the most opportunity to grow. That's why one plant flings them and another one's shooting them, and the other ones pop out."

> The magnifying glass where you got to see them bigger. That, we enjoyed. She's allergic, so she actually got to see what she is allergic to.

Seed dispersal, in general, was named by nearly one-fifth of the interviewees (see first quotation below). Another fifth explained that hands-on components, including elements with buttons, were popular with their children, though the activities did not always promote learning (see last three quotations).

> How seeds travel: my son was interested in learning more about that, so I shared that with him.

> The fact that it is hands-on and we were both working at it and saying, "What is this? What do we do with this?" We actually worked together. (Can you remember specific times or activities?) Yeah, the magnets—I was doing the magnets. I was looking through the magnifying glass. And what else did we do? He was spinning it and I was spinning it, so we both did it.

> She also wanted to show me whatever things that were there that you had to push or pull, that's what she wanted to show me.

> It is a funny thing with kids this age [3 and 6] . . . they will just spend time pushing buttons if they can. They will just run from one stop to another and not pay a whole lot of attention to what is going on if there are buttons to push. So that's what they were doing—they were pushing the buttons.

Some interviewees indicated that the Bellows, which demonstrates seeds traveling by wind, offered an opportunity for them and their child to learn together; however, three of the four visitors mentioning the Bellows noted that it needed more seeds. Other visitors referred to the Zoetrope, and a few spoke of the "hitchhiker" seeds traveling on clothing.

> The part where we had to pump the air to make the seeds, except there were no seeds in there. We wanted to see the seeds fly up, but there weren't any seeds in there, so that was kind of neat.

> My son and I were looking at how the seed—the one that you spin the thing and the seeds show the different paths. The flight path and how they differ in the way that they move.

There were numerous other responses. Those mentioned by at least two individuals are reported in Table II.6.

Table II.6.
Intergenerational Learning Opportunities in *Amazing Plants* [1]

Component/Topic	n
Bird droppings	2
Coconut	2
Compare Your Height	2
Each thing/everything	2
Roots	2
See how plants grow	2
Seeds	2
Subway Map	2

[1]Idiosyncratic responses (i.e., n=1) are not included in this table; see Appendix II.2.

Among the unique responses were "the bird's-eye view of Brooklyn," "inside of the tree," "the clothesline," "Ailanthus tree seeds," "the Spaulding balls that were wired," and "the how many plants do you see . . . move the beads" component. The complete verbatim list of idiosyncratic responses can be found in Appendix II.2.

Over one-fifth of the interviewees did not provide responses associated with intergenerational learning opportunities. Two of these visitors explained that they did not get to do or see everything in the exhibition that day. Two others described how they did not "stick together" with their children. Other responses included that the child was "too young" and that the interviewee was in a hurry and did not have time for such a "tough question."

Things in *Amazing Plants* That Were New to Visitors

To gauge adult visitors' familiarity with the exhibition's material, interviewees were asked whether there were things in *Amazing Plants* that were new to them—that they had never before thought about or heard of. Aside from those who found nothing new, other interviewees referred to the "exploding plants," specific exhibit components, the theme of seed travel, and the fact that most of the exhibition was new to them or to BBG, along with less frequently noted ideas.

The most prevalent response—given by over one-quarter of the interviewees—was the exploding plants, referring to the video depicting plants that burst to spread their seeds.

> I saw on the video that they had these plants, I saw this cucumber that threw its seed. I never saw that before. And, another one popped its seed out. I never saw that before.

> I didn't know about those popping things either—the pods that would pop.

Nearly one-quarter of the interviewees either suggested that nothing in the exhibition was new or provided no relevant response. Two of these adults remarked that although there was nothing new for themselves, it was new to the children.

Some interviewees spoke about specific exhibit components that they had not seen before: for instance, little houses, the little theater, the listening exhibit, the tree height and age comparison, the film, and the abacus. Along these lines, one interviewee noted that the tree had changed and another mentioned that after four visits they finally realized that the plant magnets could be rearranged. Other visitors spoke in more general terms about how seeds travel.

> We learned how seeds got around and that was new, about the seeds traveling and how they travel and how some seeds can't go into the shade so they have to bloom away from underneath the tree.

A few visitors indicated that the "whole exhibit" or "most of the things" were new to them or to BBG.

> Actually, most of this is new to me. I have never seen an exhibit of this kind.

> It is something that when you are around New York City, you see in other museums or in other art shops when you walk around the village. So, they are incorporating the arts in here and it is very nice. I like it. It is very nice. It is new. I mean it is something that you will see in a modern museum of art, or maybe even the Guggenheim, where they incorporate the arts and the physical world together. They bring the two-dimensional and the three-dimensional together, so it is very beautiful.

Two interviewees explained that they did not know that coconuts float, two made comments about the fish, two noted the use of the videos, and two visitors gained a new perspective on the commonplace (see quotations).

> It did show me another way of looking at the urban setting, the trees that grow and how it is not all just urban vacant lot with rotting stuff.

> It was strange to me to see the plants that grow in the backyard that you usually cut. How nice put they are here and you know in Brooklyn and when you're home you just cut them and get rid of them. It shows you what natural resources are all about. You know that they are there for a reason—to grow.

In describing what from the exhibition was new to them, some of the visitors' responses were unique: such as "tree roots," "plants underwater," "names and explanations," "inside of the tree trunk," and "a lot of trees I was looking at."

Two interviewees made negative comments that bear consideration.

> The abacus was surprising. I question its usefulness. I don't think that has much of a point—just as counters. But maybe kids see that differently. They probably do from the way I do.

> We didn't realize until four or five visits that the plants over by the brown signs could be moved—that they are magnets, until some girl had pulled off a tree and we were like, "She broke it." And then were like, "Oh." In some of the cases there was not enough indication of what we were supposed to do.

What *Amazing Plants* Does Well

Interviewees were asked, "What are some things that the exhibition does really well?" The responses given can be broadly classified into five categories: approach to content, outcomes of the visit, specific exhibit components, exhibition design, and interpretive techniques.

Approach to Content

Nearly two-thirds of the interviewees included in their responses opinions about how the exhibition's content was presented. Over one-third of these visitors spoke about how the exhibition interests children and holds their attention. Close to one-third commented on the local emphasis of the exhibition; that is, it highlights Brooklyn, New York City, and urban environments. Some of these visitors indicated that the content of the exhibition was easily accessible; others mentioned that the different aspects of seeds are presented well.

> It captivates the kids' attention. Plants are boring to them, but here it captivates their attention. It holds them for awhile . . . it is a unique way of grabbing their attention.

> The Brooklyn part strikes me as more accessible, or more interesting to us—maybe it's just our focus. It sort of makes some of the things that she knows on a larger scale more familiar so she can understand. I think it does a good job showing you the plant life that is in your urban environment.

> It is simple and to the point. It is easy to read. I was looking at the one exhibition there that they have how the plants protect themselves. It's in big writing, and it is very simple, so that the children can read and understand what they are talking about.

> It shows a lot about seeds, the different types of seeds, and how seeds travel, because in the video you saw one seed fly out of a plant and then land in the water. And then over here you saw the hitchhikers on the clothes, and then the spinning wheel shows a plant sprouting out of a seed. It really showed them a lot about seeds and how seeds are different.

Outcomes of the Visit

The responses of over one-third of the interviewees were associated with potential outcomes of visiting the exhibition. Half of these visitors mentioned the educational benefits; the other half suggested that the exhibition makes visitors aware that plants are all around them.

> It gets kids involved in different aspects of learning about plants that they might not ordinarily do. I mean, I don't know how many kids are interested in seeds, unless they see them up close—it might pique their interest.
>
> It really explained most of the things. It is arranged really good. It is really simple. It was done professionally. The children can understand it with the parents.
>
> It integrates the plants into everyday life. Makes you think twice about the ecology around us. That's what I think it does really well. . . . It makes us aware of the ecology around us and how it affects our lives. We don't realize it. And, how much more they can become a part of our lives if we pay attention.
>
> It teaches children to respect and look around them more and see. Not to destroy plants and pick them and run through people's gardens and trees because they should have a respect for nature. Not always be pulling leaves off plants, breaking branches and stuff. . . . You don't always have to travel up to the country to see, there is a lot of stuff going on around you.
>
> [It] makes it clear that kids in New York live in nature and can look around them and observe plants any place—in a sidewalk crack, in a vacant lot, around the place that they poke in the park—all that is very good.

Specific Exhibit Components

In describing what *Amazing Plants* does well, one-third of the interviewees referred to specific components. Three individuals mentioned that the traveling seed video was done well, two noted the sights and sounds of the audiovisuals in general, two appreciated the Magnifiers, and two others liked "the place where you have to write." Other responses were idiosyncratic and included the following components: the signs, play phones, fish tank area, shrubbery magnets, the exhibit with lights, spin wheel, "part of the car sticking out of the wall," and the plants.

> That video that they showed with the sounds that the seeds [make]. I think that was really nice. The way they did everything in detail, even the splashing of the water. It is like you are really there—like you are right there a part of it. . . . You wouldn't pay any attention, but it is done in slow motion—the drop of water, the seed, the sound of the seed. You know these things happen and you sometimes wonder with your imagination, "What would it sound like?"

Exhibition Design

Over one-quarter of the interviewees made comments about the design of the exhibition. A few remarks were about the colors and aesthetics of the exhibition or the arrangement of it. Individual comments centered on the small and contained quality of the exhibition, its child-sized design, its "low-tech" nature, and the fact that it was a place for children to "run amuck unsupervised" within the more formal gardens.

> I think because of the way the colors are put together, the colors that would attract kids and the way it is segmented. I think that kids would enjoy that. Then once they gravitate to them, they can start reading it.
>
> It is very aesthetically pleasing. It is a very attractive nook.
>
> It brought everything down to their size so it is easier for them to actually play with it and do the hands-on activities. Since it is smaller, it is better. I mean, it is made for children, so it is well done in terms of size.
>
> I think the fact that it is low-tech is really impressive. It is nice to see someone bucking the trend. I really think that is the nicest thing about it.

Interpretive Techniques

A few interviewees focused on the hands-on quality of many of the exhibition components: that is, children could touch, move, and manipulate things. One individual noted the opportunity for intergenerational social interaction.

> It is hands-on, which is really nice and you don't need to do a lot of reading, for a 4-year-old it's a good thing. There is a lot of visual stuff and it is nice—a lot of things that he can touch.
>
> The ones where the children are really engaged—where they can move things and where there are surprises for them.
>
> It gives kids a chance to run from thing to thing and do things. . . . It gives kids a chance to manipulate things and that's what they want.
>
> The children can understand it with the parents. Like you could talk about things, parents and children. You don't have to read a big book.

Suggested Improvements to *Amazing Plants*

Interviewees were asked, "In what ways can the exhibition be improved?" Their suggestions can be classified into three primary categories: those concerning the hardware or design of the exhibition, those related to the interpretive techniques by which exhibition messages are conveyed, and those recommending additional content material for the exhibition. Additionally, some of interviewees suggested no improvements for *Amazing Plants*.

Hardware and Design Suggestions

Over half of the interviewees who made suggestions referred to the exhibition's hardware and design. The most prevalent suggestion in this category was to "make it [the exhibition] bigger." Next, visitors suggested that there be more real, live plants. Two interviewees described how the "left side" of the exhibition was not as appealing as the right side. Others recommended that the broken components be fixed. One visitor noted that because "some of it [the exhibition] is broken already," it "doesn't take the wear and tear." Another visitor suggested simulating part of a brownstone building with the bushes so that children could relate it to their own neighborhood. Other unique responses included adding "a place where parents can sit down," changing the location of the exhibition to "a spot where it is visible," and redesigning the exhibits so that they look less like science experiments and more like something children would want to climb into.

> I hardly have seen the left side, but I don't think there is as much going on there as the right side. And, I wish that it could be as rich and I wish it could work with a theme like seeds. . . . I would love them to take another concept and do it as richly as they have done seeds over on the left side. I don't know how much is there because I haven't really looked at it, but it didn't look immediately as rich and it looks like the kids keep coming back to this side.
>
> Fix the things that are broken. There are a few things in there that are broken. He wanted to draw but there was no paper to write a note. So the maintenance of it.

Suggestions Regarding Interpretive Techniques

Nearly half of those offering suggestions commented on the manner in which the exhibition conveys its messages. Many of these interviewees indicated a desire for more hands-on or interactive components. Some interviewees thought the exhibition "wasn't informative enough" and needed "more text" or "more explanations of what to do." One individual, in contrast, believed there should be "less print" because "there is a lot of writing and a lot of stuff to read . . . [which] slows people down." Another visitor thought that the exhibition could be made "more concrete" by incorporating "more illustrations" and things to view rather than presenting activities (e.g., pumping the bellows) that children perform without understanding what it is about. One other interviewee suggested that there be a staff explainer present "to answer kids' questions" because she "didn't know everything—like what kind of plant that is."

I just would like to see more interactive things that the kids could do without you having to sit there and read to them. And have it not just push a button. It is also that they have to hold the button. For example, in the tree where they push the buttons and they have to hold it really hard and they had to read. That is lost on them. Maybe for 13- and 14-year-olds, but I think for the younger set, which is mostly who you find coming in here, it could use that.

I am thinking more hands-on. It is nice and everything seems to be at a good size, but I think they need more things to do within the exhibit itself because the things that she got to play with, I saw her pulling on the big magnets, she enjoyed that. She enjoyed the numbers and the beads. But there didn't seem to be more. The magnets, the microscope, the magnifying glass, those are hands-on things that they actually have to do and I think that you need a little bit more over on this side. Because you have the bird's-eye view and the window, so I just think they need a little bit more to grab on there.

It would be nice to have a little bit more text, so that the adults can explain it better.

The welcome to Brooklyn—that wasn't good, because . . . I don't know if it is the pictures or everything seemed to be like one color and very not interesting, so you pass a lot of things and have to go back and realize, "Oh, there is something to touch here, there is something to pull here." It is just hard to see what there is to do. I think they could have done a better job, but the one thing I thought was really nice was the puzzle pieces where you can move the shrubbery around and put greenery. That was good, but again, it is hard for the kids to see that it is something to do. Maybe if the plants were a different color or brighter color or that there was a bigger sign [saying] "Move the pieces" or something like that, kids would get more into it. It wasn't until I noticed it and started moving the pieces around and that's when my kids looked at it.

I think that not so many people know of this. I just bumped into it because I am doing a project for school and it has to do with teaching as well. And so that is how I found out. So I don't know if there are ways to let more people know what there is. If you have that support, then maybe you could get more ideas of what you put in there.

Content Suggestions

Of those making suggestions, almost one-quarter recommended improvements concerning the content of *Amazing Plants*. Two interviewees would like to see animals incorporated into the subject matter. One visitor thought "it might be good to have something for the slightly older children" because some of the exhibits "are so low to the floor" that it is difficult for larger children to be engaged with them. Another individual recommended adding seeds that were labeled and separated by type for children to touch. One interviewee believed the aquarium needed "bigger fishes," especially a larger shark, and another suggested changing the exhibition's theme, as follows:

> I am looking at this sign and it is "Amazing Plants," and I guess what is a little off to me is that they are ordinary plants. I guess that is your point—that they are amazing because they do grow in these settings—but somehow, because it is too ordinary. I'll give a better example: at the Prospect Park Zoo there is a section of pigeons and guinea pigs. It is just too ordinary for these kids. I understand they are trying to sort of give you a context for these animals that you see all the time, but the reality is that they are things that you see all the time and it doesn't make it that interesting. The lily pads are amazing and beautiful and we stop and we look at dragonflies because it is not part of their ordinary life. And I am not sure that they get the amazing part, or what they get. As an adult, I can say, oh yeah, that's cool because that plant is a survivor. (What would you change or add?) You know, I don't know. If you want to keep the theme, I am not sure. I think you do that theme really well. What would be maybe more interesting to urban kids who don't know about plants is like farming—how carrots grow—because that is not their everyday experience. But that is not what your exhibit is about.

Miscellaneous Suggestions

There were five miscellaneous responses to the request for suggested exhibition improvements. Two interviewees indicated that publicity about the exhibitions was lacking, suggesting there be "something around here to let people know." One visitor explained that his child did not understand the "clean the glass" component. Another interviewee noted that children "miss what was in this tree with the last exhibit." Lastly, a visitor stated simply that more money be put into the exhibition.

No Suggestions

Over one-fifth of all the interviewees made no suggestions for improving *Amazing Plants.* Though two visitors indicated that they simply did not know what to suggest, the others explained that they thought the exhibition was good just the way it was.

> I think it has a lot of hands-on things. I think they are good. There should be a lot of hands-on so children can really see how things work. Not just having to read, but getting to play with stuff. (Is there anything that you would change or add to the exhibit?) No, it is good.

> I think it is pretty good. I enjoyed it. I did not know it was here, so it was really new to me and I enjoyed it. I think it is just the right size because if you have too many things, then kids may lose interest. It is just enough in that category. (Is there anything that you might add or change?) No, I like it. It was pretty good.

> There is no room for improvement. (Is there anything that you would change or add?) No. No, no, no. This is great. I love it. First time being here and I have seen it. I didn't really take much of an interest in it, when I just saw it, because I was just going to let

them alone, when I saw how each thing is set up, so I decided to go in and take a deeper look. It is great. I wouldn't change anything if it were me.

Children

To understand a child's experience in *Amazing Plants*, 33 interviews were conducted with children who had visited the exhibition. All of the children were accompanied by an older visitor (16 years of age or older). The refusal rate was 8 percent—much lower than average for museum surveys. All three of the children who chose not to participate were boys.

As opposed to interviews with adults, interviews with children tend to produce a slightly different form of information due to the manner in which children speak. The responses of children often appear as disjointed lists without much context or explanation. Because they are less adept at maneuvering language, children are less capable of expressing complete thoughts coherently. Consequently, their responses are more idiosyncratic and less classifiable. As a result, the findings that follow are often reported in table format, with fewer full quotations in the text than in the previous section reporting interviews with adults. The many unique responses are listed in appendices.

Demographics

The 33 interviewees were between 7 and 12 years of age (see Table II.7). Almost two-thirds were girls, and just more than one-third were boys (64 percent and 36 percent, respectively).

Table II.7.
Age and Gender of Child Interviewees in Percent
(n=33)

Age	**%**
7–8	30.3
9–10	48.5
11–12	21.2
Gender	**%**
Girl	64.0
Boy	36.0

Parts of *Amazing Plants* That Children Thought Were Fun

To help children feel comfortable responding to the interviewer, the initial question they were asked was, "What are some of the things you did while you were in this room that were fun?" Any responses that were obvious references to parts of the Garden other than *Amazing Plants* (e.g., the "water fountain") are not included in this report. All pertinent responses that were given by more than one individual are listed in Table II.8. All unique responses (i.e., responses given by only one individual) are listed in Appendix II.3.

Table II.8.
***Amazing Plants* Components and Themes**
Considered "Fun" by Children[1,2]

Component/Theme	n	Component/Theme	n
Fish/tank	15	Roots	3
Exploding Seeds video	13	Seeds	3
Bird's-eye View	12	Zoetrope	3
Hear Stories	5	Brooklyn	2
Magnifier[3]	5	Everything	2
Push Button/See Cartoon	5	Magnets	2
Bellows/Milkweed	4	Mirror	2
Community Garden	4	Touching	2
Bouncing Balls	3	Train	2
Growing	3	Wipe Glass	2
Plants	3		

[1]Most interviewees provided multiple responses, so the total n exceeds 33.
[2]Idiosyncratic responses (i.e., n=1) are not included in this table; see Appendix II.3.
[3]Children did not specify whether they were referring to the Wind Seed Magnifier or the Sticky Seed Magnifier.

The 6 components named most frequently by children as being fun were the fish, the video, Bird's-eye View, Hear Stories, Magnifier, and Push Button/See Cartoon. These findings corroborate the tracking data: all 6 "fun" components were among the top 10 most frequently visited components in *Amazing Plants*.

There were also a few idiosyncratic responses: for instance, "the part about the suckers," "the coconut," and "the names of the different plants, like the devil's claw thing" (see Appendix II.3 for a complete list).

Parts of *Amazing Plants* That Made Children Feel Good Inside

Later in the interview, the children were also asked, "Of all the things you did today in this room, what really made you feel good inside?" The answers given in response to this question were similar to those given in response to the question of what was fun. However, there were far fewer of these responses, and more of them were idiosyncratic. Table II.9 summarizes the responses made by two or more individuals.

Table II.9.
***Amazing Plants* Components**
That Made Children Feel Good Inside[1]

Component	n
Fish/tank	12
Exploding Seeds video	4
Hear Stories	3
Bird's-eye View	2
Plants	2
Underwater plants	2

[1]Idiosyncratic responses (i.e., n=1) are not included in this table; see Appendix II.4.

The fish were named most frequently by children as the part of *Amazing Plants* that made them feel good inside. Of the children asked to explain what it was about the fish that made them feel good, two children mentioned the appearance of the fish and two referred to "how they live." One girl suggested that "looking at all the kinds of fish" made her "feel like the fish." And, observant of the entire tank, one boy noted that it looked like "a good environment for the fish. . . . So the fish aren't dying from pollution in the water." Two children who were asked why the fish made them feel good could provide no reason.

Two children who indicated that the video made them feel good were asked why that was so. Whereas one focused on the video's content ("I know why plants exploded"), the other emphasized its interactive quality:

> The one with the TV right there that you got to reverse play, fast forward, and stop. (What about it made you feel good?) That you could do whatever you wanted with it. That it could go from end all the way back to where it started again.

Of the three children who noted that Hear Stories made them feel good, two provided reasons why. One explained that it is "just like you are talking on the phone, . . . and if you put two things together, . . . it sounds funny." The other offered, "Because I know I have done that before—it is weird."

One boy who mentioned the Bird's-eye View was asked to discuss why it made him feel good. He explained, "I wonder what it is like being a bird. . . . Trying to know how it is to be another thing, not yourself."

The plants were mentioned by two children as making them feel good, but for distinct reasons. One boy discussed "how they grow and how to take care of them" because he likes planting his own plants and watching them grow. A girl, on the other hand, referred to the plants

> because it is important to learn about [them], because we really need trees and stuff, so the rainforest and seeds are important. And some kids need help to respect it—they are like cutting things down.

Similarly, two children mentioned that the underwater plants made them feel good inside. One explained how "the plants and the water . . . help the fish." The other child referred to the "water plants . . . because you can see how life is different in the water with the fishes and plants."

There were numerous unique responses. For example, interviewees referred to Compare Your Height, seed dispersal, going "through the tree," roots, the Zoetrope, flowers, and the fact "that there are still some plants in the city growing and it is not all like nothing living" (see Appendix II.4 for a complete list).

Parts of *Amazing Plants* That Children Thought Were Not Fun

In addition to naming what parts of *Amazing Plants* were fun or made them feel good inside, interviewees were also asked what parts were not much fun. Of the 33 interviewees, nearly one-quarter replied "everything was fun" or "I don't know." Six components, on the other hand, were mentioned as being "not fun" by two or more children (see Table II.10).

Table II.10.
***Amazing Plants* Components**
Considered "Not Fun" by Children[1]

Component	n
Fish	4
Move the Balls	3
Wipe Glass	3
Zoetrope	3
Car	2
Exploding Seeds video	2

[1]Idiosyncratic responses (i.e., n=1) are not included in this table; see Appendix II.5.

Two children explained why they thought the fish were not fun. One girl was "not very interested in fish," and another girl thought that "seeing underneath" was interesting but was bothered by not knowing whether she was looking at the body of water "underneath the ducklings."

One child discussed why Move the Balls was not fun:

> I saw these balls, and they say move the balls. I didn't get what they wanted you to do. I just moved them and I pulled them up and nothing really did anything. Maybe it is supposed to do something like if you were supposed to be pulling out a weed or something.

Of the children who thought Wipe Glass or the Zoetrope was not fun, none provided explanations as to why. Regarding the video about "plants that would pop when someone touched" them, two children commented on the fact that there was no narration. One girl explained that "there wasn't that much talking so [she] didn't really like it that much." When asked what she would add or change to make it better, she suggested adding "talking about what they are doing." At the end of the interview, when asked if she had any questions, another girl wondered "why so many plants explode." She also suggested adding narration, explaining that "it would be good if they said why they did that." Dissatisfaction with the car, for one child, seems to reflect the unusualness of the sight: she would have preferred to see the plant growing out of a pot.

Idiosyncratic responses concerning what was not fun included the truck, the abacus, Bird's-eye View, Compare Your Height, sucker trees, and the Bellows (see Appendix II.5 for the complete list).

After being asked what was not fun, children were asked what could have made the exhibition component better. For instance, the girl who did not find the truck very interesting suggested that "they could let you move the truck and maybe it could do something." One girl recommended putting "more stuff" in the "buildings." Referring to Compare Your Height, one girl suggested making "a hole so people could go inside" the "tree on the wall." Because he felt that "walking through Brooklyn" was not fun, one boy would add a tunnel. And, because "when you just look at things, you are not really doing anything," another boy suggested making "more things that you can really control."

Many of the children's responses to the question of what could have made the exhibit better did not relate to what they had mentioned as not fun. Their suggestions for additions and changes to the exhibition included adding more types of roots, "more things that a kid could do" near the Community Garden, different species of plants, some animals and different kinds of fish, and "all kinds of trees and branches from a long time ago." To provide a sense of the range of children's ideas and imaginations, the following quotations are reprinted verbatim (see Appendix II.5 for the complete list):

> I would add a computer where you check out to find . . . where you can go on a tour to discover different kinds of plants that you have never seen before. . . . I would also try to

put in some unusual big plants that people can be able to think what it is like to be providing this world with plants and know . . . the importance of plants for food and oxygen.

Maybe if there was a tunnel where you go inside a tree, there would be a door and you go inside and you go through it and you look all around it, and there is different gadgets and everything. You go through a bigger tree, a smaller tree, maybe a big redwood from California. You could maybe if you wanted to, take a tour through it. . . .You could stretch the ceiling higher, and everyone could climb up there. That would be fun. If you put this tree higher, then you could climb on it.

Maybe put a little bit more things for older kids in there, like something they could relate to a little bit more. You know, not just pushing the button and the light comes on or anything. . . . Have more of those things with the tapes, and they show you how the seeds spread, and . . . you could fast forward them and everything. And maybe more things for little kids too.

I would make this ride so when we go through there would be this movie on the side, all about plants and animals, creatures. I would make this room . . . look like a real rainforest.

What Children Learned from *Amazing Plants*

As a follow-up to the interview question asking what in the exhibition was fun, the child was asked what the activity was trying to show. The interviewer was, thereby, directly attempting to elicit what the child had "learned" from the activity. In addition, indications of learning surfaced spontaneously throughout the interviews. All responses that indicated learning are presented in this section. The main topics discussed by the children include the video, Bird's-eye View, the fish, Hear Stories, Magnifiers, Push Button/See Cartoon, the Bellows, and the Community Garden. A few children also offered interpretations of the Zoetrope, magnets, train, and Wipe Glass.

Every child who named the video as being fun was asked what it was trying to show. Though most of their responses refer to the intended messages, they illustrate nuances in understanding. Nearly one-third of these children recognized that it was about "seeds coming out of plants." Close to one-quarter were aware that it showed "plants blowing out," but they did not mention seeds in their responses. Two children suggested that it was about "how plants grow," and two others thought it was about "how plants move" or travel. In addition to indicating one of the aforementioned messages, one child believed the video was about how plants react to humans and another noted that it showed "how insects and animals live." One child suggested that the video "was showing how they [plants] roll and break, and another child was "not really sure" what it was trying to show.

Most of the children who referred to Bird's-eye View during the course of the interview were aware that they were looking at Brooklyn. Two children simply referred to "seeing a city," one believed it to be "New York," and another referred to "the world." According to nearly half of

the children, Bird's-eye View focused on birds and flying. They thought it showed "how far a bird can see," "what it looks like for a bird," "how a bird looks at the city," or "if you were flying, what it would look like." In contrast, over one-third of the children recognized that it was about plants growing in the city or "all the plants in Brooklyn" (see quotation below). One child guessed that it was showing "the part of the city that has the Botanical Gardens." And another offered, "It was telling me that it was great to look at the world."

> There was a place where you looked around in Brooklyn and you saw how many green stuff you could see. I wasn't really sure I saw much green things, but I at least see what Brooklyn looks like. And I was sure, by seeing all of Brooklyn, I was seeing where all the trees and parks were.

Three children who referred to the fish as being fun talked about what they thought the fish were trying to show. One child mentioned "the different kind of fish." Another suggested how it showed that "fish eat plants." One boy, in discussing the tank, explained that "it showed you were under the water like you were a fish swimming." Interestingly, one of the most thoughtful responses came from a boy who named the fish as being "not fun":

> (What do you think they were trying to show you with the fish tank?) I think it was trying to say, by me looking at the fish tank, that plants are as important to creatures, to mammals in the water and fish as to mammals and birds and people that live on land.

With regard to Hear Stories, three children noted that the "kids were talking about plants." One of these children even mentioned that she "learned a lot about trees and different kinds of plants and was sad about how the girls . . . broke down that tree." Another girl, in contrast, suggested that Hear Stories was trying to show "friends."

Three children who considered a magnifying glass to be fun indicated that the Magnifiers showed "different kinds of plant seeds." Regarding Push Button/See Cartoon, four children provided interpretations during the interviews. Whereas two girls explained that it showed how plants "could hurt you," one girl learned that plants contain something that makes bugs stick, and another girl believed the cartoons told how animals lived.

The Bellows also elicited various interpretations. One child explained that it shows "how the seeds get spread in the air and the air blows them around." Another child had a similar idea, but the wrong words: "trying to show you how leaves move and the wind blows." Two children referred to feathers; one stating that "the air puffs to see those feathers, pieces of white things, flying." The other child's response was as follows:

> I liked this thing where you pumped air in [and] the feather blew up. It was really hard but I liked doing it. (What was that one trying to show you do you think?) How hard it is to move a feather?

Referring to the Community Garden, one child explained that it shows "what kind of buildings there are in the city." Another child suggested it showed "how the buildings were inside." And, another child noted that "when you look through a window you see some pretty plants." The

Zoetrope, otherwise referred to by children as "spinning the wheel," was interpreted as showing "how things travel" and "plants all different ways . . . like 3D."

Both children who named the magnets as being fun were asked what that activity was trying to show. One girl explained that it showed "where certain plants lived and where their habitats are." The other girl interpreted the magnets to be showing "that it is important to have the bushes and the plants around, because it makes the place look nicer and also for the oxygen."

Likewise, both children who named the train as fun were asked what it showed. One girl understood that it showed "a lot of different places in Brooklyn where you could go, like Prospect Park, Marine Park, and other parks." To one boy with a more literal perspective, it showed "how it would look like if you went in a train that was going underwater."

Both children who considered Wipe Glass to be fun were queried for their interpretation of it. One girl believed that it was showing that a plant "needs water, air, and sunshine, and sometimes . . . other people's help" to grow. The other child who was asked could provide no guesses.

The following quotations demonstrate children's understanding of other components:

> Looking at the plant's seeds. (What do you think the seeds was about?) The different kinds of seeds and how they grow and they make what kind of plants.
>
> I like it when you pushed this button and you see all the roots. And when I compared the roots, it was really cool. (When you compared the roots, what do you think that was trying to show you?) Trying to show me what kind of roots are different, and I think it looks kind of cool.
>
> I really liked the part about the suckers, the plants that have suckers and they go off the adult plants.

A few comments concerning what was learned from the exhibition as a whole and what concepts the exhibition reinforced surfaced during the interviews.

> (So what would you tell them it [the exhibition] is about? Like what did you learn here?) I learned that to read everyday, write everyday, water plants almost everyday, but not every single day. 'Cause if you just water them once, they will get enough.
>
> (The people who made this exhibit are curious to know whether you have any questions about anything in it.) I am not really sure, because most of the things I learned about plants was in science. (Were there things in this exhibit that reminded you of stuff that you had learned about science in school?) I don't really know. Well, a lot of things, like plants, sometimes the weeds.
>
> (You said something about plants in Brooklyn, so if I was your friend and I said tell me about that, what about plants in Brooklyn, what did you learn about plants in Brooklyn?) I didn't learn anything because we learned it all in science. When I looked at it, it was

> kind of interesting. (What are some things that you recognized from science class?) Like the leaves, our science teacher says that some turn different colors in different seasons. That is the thing that I really think I saw. Then I can tell the science teacher and she is going to be pretty surprised.

What the *Amazing Plants* Exhibition Is About

In addition to asking for children's ideas about the intent of specific exhibit components, interviewees were also asked, "When you go home and tell your friends about this exhibition, what will you tell them it is about?" In their responses they mentioned "plants," described specific components and themes, provided positive reviews, referred to general exhibition concepts, expressed opportunities for learning and interacting, and offered various unique ideas.

Over two-thirds of the interviewees included in their response that the exhibition was about "plants," "different kinds of plants," or "amazing plants." One interviewee said:

> [It is] about different plants and . . . amazing plants that we could find and study.

In their replies, over one-third of the interviewees included references to or descriptions of particular components. Half of these individuals mentioned the fish. Two children referred to the video, Bird's-eye View, Hear Stories, and Push Button/See Cartoon. In the case of the video, one child indicated the existence of videos in the exhibition, whereas the other noted its content (i.e., "shooting cucumbers"). Similarly, one interviewee simply stated that "you can see a bird's-eye view," whereas another explained that "they tell how Brooklyn sees through a bird's eye." In referring to Hear Stories, one child told how "kids talk to you" not "in person" but by "telephone," whereas another child recounted "a girl" who "was complaining why they cut down that tree and was sad." In reference to Push Button/See Cartoon, one interviewee explained that the exhibition was "about how plants protect themselves" and another indicated that it was "about things that would hurt, so be careful." One child, in describing the magnets, explained that "you can design your own city and see if you want to be an architect." Other components mentioned by interviewees were the Bellows, Wipe Glass, the Zoetrope, mirror, and roots.

Nearly one-third of the interviewees expressed that the exhibition was about "how plants grow." In addition, over one-fifth of the children spontaneously provided a positive review of *Amazing Plants*, using such descriptors as "fun," "interesting," and "really cool." Almost one-fifth of the interviewees referred to large-scale natural settings by suggesting that the exhibition was about "nature," "the environment," "what is going on in the wild," or "plants and animals that live in tropical rainforests, forests, and deserts."

In describing what *Amazing Plants* was about, some interviewees mentioned "trees," others mentioned "animals." A few made reference to "Brooklyn," and others referred to "cities." Three children focused on "learning," and three noted the opportunities for "doing." Three children included comments on the concept of plant travel, using such phrases as "how plants spread," "how they reproduce" and "how seeds travel." In their responses two children specified

that the exhibition was about "where certain plants live." And two children, as follows, made explicit reference to "exploring":

> It is about knowing and seeing, exploring a new place, like the fish, exploring what is underground or underwater.
>
> It is about exploring worlds and plants and knowing for once what it feels to be alive. . . . That exploring the plant world you will feel really alive with the life that plants have to offer.

The only unique responses given to describe what *Amazing Plants* is about were "the food chain of plants," "trees from a long time ago," "foods grown on trees," and "how plants feel."

Questions about *Amazing Plants*

At the end of the interview, children were asked if they had any questions about anything in the exhibition or about plants in general. Half of the interviewees offered a question, and half claimed they did not have any questions. In general, the questions presented referred to trees, Magnifiers, the video, the Zoetrope, seeds, coconuts, and the balls.

Some interviewees posed questions associated with the trees in the exhibition or trees in general.

> Is this a real tree?
>
> How come they put that fence around the tree?
>
> The tree that you walk through, I would like to know a little more about it, like I would like if they put some names of different trees inside of it.
>
> What would be nice would be how to tell the difference between an old tree and a new tree, if they cut it down.

Two children mentioned the magnifying glass, noting that it did not provide much information beyond the name and the appearance of the seeds. One child recommended the addition of more information. The other child was particularly interested in how the sticking seeds attached themselves:

> One magnifying thing, it didn't say too much about the plants, how they attached to the things, and it didn't make too much sense to me. It didn't explain too well.

Two interviewees had questions about what they saw on the video. One child wondered "how come they don't squeeze it, it just curls?" The other explained that although the video showed pictures, "it didn't have any words," so she was left wondering "why so many plants explode."

In addition, two children referred to the Zoetrope. The question of one interviewee was not interpretable; however, the other queried, "When you spin the wheel, it looks like the plant is moving. . . . Does it really move?"

Seeds were the topic of two children's comments. One interviewee wanted to know more about how to plant seeds and how they grow. The other wondered, "What kind of seeds were stuck to the clothes?" One seed in particular, the coconut, was mentioned by two interviewees. One wanted to know "how it floats." The other recounted a question he asked his father: "Why would they show a coconut?" His father explained, "It is like a seed."

Two interviewees also referred to the balls. One suggested, "Aren't there supposed to be more balls on it?" The other child asked, "When it said, 'Pull the balls,' and it got stuck, what did it mean? I really don't understand that one."

The remainder of the children's questions are idiosyncratic.

> The fish, I want to know what color they are because I can't really see colors on them. I want to know what size they are, how they get around faster, and where they sleep.
>
> I really didn't get the part where it said you pull the thing and it just showed a picture, I didn't really understand what it meant.
>
> Like that over there, that . . . what is it for? (The thing with the bird on it?) Yeah.
>
> In the tropical world over there, there is some trees with grapefruit. I wondered, if even here and far from the real tropical places that the grapefruit grow, they give the plants the exactly the same treatment that they gave in the tropical place where they really grow, which helps them to grow.

In addition to being asked for their questions, some interviewees were asked, "Was there anything else that this exhibit made you think about?" Four children gave substantive responses:

> I guess that plants are important, you know, that we have them.
>
> Wildlife and forests.
>
> Just that things were interesting.
>
> I liked how there were more things for kids than some of the other things [here], and it was hands-on.

Part III:

Discovery Garden

DISCOVERY GARDEN DESCRIPTION

The Discovery Garden, a 13,000-square-foot experiential garden at the Brooklyn Botanic Garden, is designed to be a safe natural setting in which urban children can play. It is divided into four zones: the Children's Discovery Zone, the Family Nature Trail, an orientation area, and a toddler space. More than a backdrop, the plants invite children and their adult companions to explore and enjoy using all the senses. Such experiences are intended to help visitors develop an appreciation of plants.

Specifically, the Discovery Garden was designed to:

- create a range of unique settings in which children can play, learn, and enjoy plants, either independently or with family members and companions
- offer experiences for young children that stimulate interest and aptitude in science
- offer experiences that lead to an appreciation of plants and nature
- provide children with a place designed just for them, in which they can
    - have fun
    - experience nature
    - touch plants
    - manipulate natural elements
    - use the senses
    - use the whole body
    - play privately and quietly
    - play safely
    - play independently and creatively
    - investigate nature with adult companions.

PRINCIPAL FINDINGS

INTERVIEWS

This section of the report presents the findings from interviews conducted with adult visitors (18 years and older) who accompanied children through the Discovery Garden. The primary goal of asking open-ended questions was to allow visitors to talk about their experiences in the Garden (refer to Appendix I.6 for a copy of the interview guide).

Of the interviews conducted, six were omitted from analysis either because they were incomplete or the visitor demonstrated difficulty in understanding or expressing him- or herself in English. When approached to be interviewed, six individuals declined. Thus, the refusal rate was 10 percent, which is lower than the average rate for museum surveys. Of the visitors who chose not to participate, all but one were female, and all were visiting with between one and four children aged 3 to 9.

Visitor Group Composition

Of the 45 interviewees, over four-fifths were female and nearly one-fifth were male (82 percent and 18 percent, respectively). More than three-quarters of the interviewees were accompanied by one or two children (42 percent and 38 percent, respectively) (see Table III.1). Their child companions ranged in age from less than 1 year to 12 years (not shown in table).[5]

Table III.1.
Visitor Group Composition in
Discovery Garden Adult Interviews in Percent
(n=45)

Gender	**%**
Female	82.2
Male	17.8
Number of Child Companions	**%**
One	42.2
Two	37.8
Three	11.1
Four	6.7
Six	2.2

Familiarity with the Discovery Garden

As an opening question, interviewees were asked whether they had heard about the Discovery Garden prior to arriving there. Over one-fifth claimed that they had prior knowledge of it. Five individuals had heard of the Discovery Garden by word-of-mouth. Their informants were wives, a daughter who is in the Children's Garden, a son whose class visited, a sister who is a daycare teacher, an adult companion to BBG, and neighbors. These interviewees had heard that the Discovery Garden "is great," "that it was a wonderful place," "that it was really educational," and that "babies could explore on their own."

Three interviewees had limited prior knowledge of the Discovery Garden merely because they "saw it being constructed." Two other interviewees were aware of the Garden because they visit BBG frequently. One of these visitors indicated that she knew about it because she works there

[5] The ages of the adult interviewees were not collected because the evaluation and planning teams had decided that age was not of particular interest to this portion of the evaluation.

during the week. Another visitor explained, "We come here all the time." She not only "saw it get built," but she read about it "in the flyers long before it had plants."

Thoughts While Going through the Discovery Garden

Because the Garden is designed essentially for children, interviewees were asked what they, as adults, were thinking about as they went through it. Their responses can be classified into five categories: positive reviews, design, specific components, education, and experiences.

Positive Reviews

Half of the interviewees provided positive reviews in their responses. Many expressed that the kids had "a lot of fun" or "a good time," that the Garden is "great," "very exciting," or "excellent" for children, or that "the kids love it." In addition, some of the interviewees referred to their own enjoyment, using such phrases as "I think it is very cool," "great," "wonderful," or "I had fun, too."

Design

The responses of half of the interviewees concerned the design or layout of the Discovery Garden, its appearance, or its ambiance. Many visitors mentioned that the Garden was "well-designed" or referred to "how they made it" or "how it's laid out." Some referred to the Garden's appearance or visual cues, noting the "different colors" and the beauty of the plants. A few individuals acknowledged its "quiet" ambiance, suggesting that it was "peaceful" and "very soothing."

> How beautifully it was designed. Who designed it? That was it. Fabulous design, and I am very impressed. (What sort of things were you impressed with?) The design, how it looks like a lake. How the things were going to grow as the years went by. This is going to grow with the garden, and it was just very magical. I mean, beautiful.
>
> I like it because the scale is to her size and it is outdoors and it is nature down-scaled to a child's size so I like that. (Is there anything else that you were thinking about?) How the design is good because they fit so much into such a small space and they utilize every inch and it is safe. And I like the natural wood that they used and how they seasoned it so it will last.
>
> For me the most important thing is being able to see my children, and I like the fact that all the fences are low and all the hedges are kept real low so wherever I am I can see them. They are able to run and be kind of on their own, but I can still see them. So vantage point is very important.

> It is laid out very nicely, it is very aesthetic to look at and it is designed in a way that is to sort of lead kids through so that it is interesting to them.
>
> I was thinking about how pretty the plants were and how nicely designed the whole place is.
>
> I am just amazed at how many flowers and different trees and you know, nature itself, how beautiful it is.

Specific Components

Over one-third of the interviewees mentioned specific components in their responses. The component named most frequently was the water pump, referenced by one-quarter of the interviewees. A few visitors mentioned the scales and the tadpoles, and a couple referred to the insects, the bamboo, and the paths. Unique responses included the Spider, bus, log, balance beam, rainbow, magnifying glass, trains, and Nature Trail.

Education

In describing their thoughts, one-third of the interviewees delineated various educational qualities of the Discovery Garden. Some visitors noted that there are "a lot of things" for children to learn, such as learning "about the garden, water, trees, and flowers" (see the first two quotations below). Others referred to the "things they can get their hands on" and "the way they can explore things," suggesting that "it kept them involved" and "was like an adventure for the children" (see the third and fourth quotations). A few interviewees noted the opportunities for children to be independent (see the last two quotations).

> I thought it was educational. I thought it was a good way to expose . . . my son to certain things. I thought it brought out a lot of good reactions in him, the water, the Spider, things like that.
>
> Once the kids get a little bit older I think it will be educational. Right now, I don't think that even my daughter who is about 3 is able to grasp many of the concepts. Except for the water well, pumping up the water, which she kind of understands that you are pumping something up, but that's about it.
>
> I think that it is a nice way for kids to discover certain plants and different insects, and it is, like I said, discovery.
>
> It is educational. I like the way that they experiment and they can learn. It is easy for them, even by themselves. I like that about it. Being more involved and everything. I was able to sit there and let my children explore.
>
> How the garden was suitable for young children to play unencumbered by the adults.

Experiences

One-third of the interviewees also mentioned the experiences with nature that the Discovery Garden offers. Many visitors referred to the sensory opportunities that are presented, especially those for smell and touch (see the first three quotations below). A few visitors recognized that, in the Garden, children "can experience nature." A few others noted that such a natural environment is an anomaly for city children (see the fourth and fifth quotations). Other adults seemed intent on enhancing their child's experience in the Garden (see the last two quotations).

> It is very good for them to touch the plants and smell and look at the things.
>
> To me it is very excellent for little children, because they are able to smell, to touch the flowers, to look at the flowers, and to have a little piece of nature here.
>
> I wanted to make sure that I saw things that I could point out to her. And just making sure she experienced everything that she could. Smelling stuff and touching things looking, visual eyes. Just open up her senses. Touch, smell, things like that.
>
> They have a [unintelligible] to things they normally don't have living in Brooklyn. They have flowers, they have trees, they have meadows, they have pine cones too, almost everything here.
>
> The meadow was neat because that's not something you see in New York in the parks or anywhere, you don't see what kind of plants grow in a meadow.
>
> I was trying to figure out what they were trying to get across to the children, what they wanted the children to experience, and help them experience what the exhibit was supposed to be about.
>
> [I was] looking for what might be interesting for them. I saw a butterfly over there and wanted to show it to her. That kind of thing.

Miscellaneous Responses

In addition, one-third of the interviewees included unique thoughts in their responses (see Appendix III.1 for the complete list). For instance, one visitor considered it "a very major improvement that they are catering toward children also and not just adults." Another interviewee discussed how "everything was pretty self-evident and pretty fun" except for the soil core interactive, which was "kind of confusing." Another visitor lamented:

> I am sorry they took out the sunflower maze. That was one of his favorite things, and it was so much fun to have the kids be able to run through a maze of sunflowers that were their height.

Opportunities for Intergenerational Learning

Interviewees were next asked which activities encouraged them and their child companion(s) to explore things together. The five most frequently mentioned components and activities were the water pump, weighing scales, tadpoles, Insect Sounds, and smelling. All of the responses given by two or more interviewees are listed in Table III.2. There were numerous idiosyncratic responses as well, including signs, "that little bamboo hut," "the leaves turning into soil," and instruments (see Appendix III.2 for the complete list).

Table III.2.
Opportunities for Intergenerational Learning
in the Discovery Garden[1,2]

Component/Activity	n	Component/Activity	n
Water pump	15	Sandbox	3
Weighing scales	13	Anything interactive	
Tadpoles	12	or participatory	2
Insect Sounds	8	Bamboo trough	2
Smelling	8	Being outdoors	2
Touching	6	Butterflies	2
Looking/seeing	5	Log: bugs, worms	2
Water	5	Nature Trail	2
Colors	4	Rocks	2
Telescope/scope	4	Subway train	2
Balance beam	3	Walking around	2
Everything	3	Walkways	2
Flowers	3		

[1]Most interviewees provided multiple responses, so the total n exceeds 45.
[2]Idiosyncratic responses (i.e., n=1) are not included in this table; see Appendix III.2.

The following quotations convey the range of adult–child interaction, or intergenerational learning:

> The bamboo thing where one is pumping—I am pumping and they are realigning the bamboo. We did that a lot together. Even just catching tadpoles together; we would catch the tadpoles. We may not have been supposed to, but. Walking across this pole together, to learn balance. And then not today, but yesterday, the girls were in that little bamboo hut back there throwing the vines over and we were kind of doing that together.

> I don't know. I think this is perfect for these children. It is for them, not me.

In addition to adults interacting with children, one interviewee noted the opportunities for young children to interact:

> Everything here allows you to do things together. I mean, we look at the plant together, we play in the sand, we play in the water. When the water is on she and my son can play together, which is wonderful. There aren't many place where you can take a 3-year-old and a 1-year-old that both like. When the water is on, they play in the mud, they both play together, and it is great.

Activities That Encourage Children To Be Independent

Interviewees were also asked which activities encouraged their children to be independent. All of the responses given by two or more interviewees are listed in Table III.3. The four most frequent responses were the water pump, "everything," the weighing scales, and tadpoles or the pond.

Table III.3.
Components and Activities That Encouraged Children To Be Independent in the Discovery Garden[1,2]

Component/Activity	n	Component/Activity	n
Water pump	14	Maze/Spider	3
Almost everything	10	Nothing	3
Weighing scales	6	Rocks	3
Tadpoles/pond	5	Water	3
Sandbox	4	Balance beam	2
Venturing out[3]	4	Butterflies	2
Log: bugs, worms	3	Listening/Insect Sounds	2
Looking/telescopes	3	Reading	2

[1]Many interviewees provided multiple responses, so the total n exceeds 45.
[2]Idiosyncratic responses (i.e., n=1) are not included in this table; see Appendix III.3.
[3]Included in this category are the following responses: "going up and around the trail," "walking along the paths," "run up there to explore for themselves," "walks around."

Those who indicated that "all of them [activities] encourage independence" provided the following explanations:

> All of them. Because they are very small, she thinks that they were made for her. It always encourages her to be independent.

> Mine are pretty independent, so they just took off. For 7 [years] plus, anything, everything was independent. As long as they could read.

> Just about everything there encouraged the children to be independent. Just about everything there was perfectly suited for children. . . . Even if it was above her age group [2 years old], there was something that she could get out of it.

There were also several unique responses to the question of what encouraged independence in children, such as the "rope house," "following directions," and "counting different colors" (see Appendix III.3 for the complete list).

Four individuals included in their responses comments regarding the feelings of freedom and safety associated with the Discovery Garden.

> They can run free here, and in New York City there are very few places where you can let your children run around like that. So that is a wonderful thing. It is totally encouraging to them.

> There is freedom in here. There is nothing really restrictive where she could hurt herself or anything. She can basically go on her own, which is good.
>
> Independent? Well, this little one, I was sitting down here and she was going up and around that trail, up and around the trail. She could do that by herself. That's what I like about it, everything they can do independently and I could just sit here and they were doing a lot of different things independently. And I felt secure that I could see them or get a glimpse of them because again the fencing is wide; you can see through the fence and it is nice and low. So they do most of it independently, and this is for a 2-year-old. So almost all of it is pretty hands-on and independent.

Opportunities That the Discovery Garden Provided Children

Interviewees were further asked what other opportunities the Garden provided their children. In responding, they referred primarily to experiencing a natural environment, sensory experiences, and educational experiences.

Experiencing a Natural Environment

Over one-third of the interviewees made responses related to the opportunity for experiencing a natural environment. Many indicated that the Garden allowed their children to be outdoors and to experience nature. In addition, some interviewees referred to animals that were present in the Garden that their children rarely, if ever, see. A few noted that the Garden exposed their children to things in general that they normally would not experience, given their urban situation.

> I think it opened up their eyes a little bit to the world around us. The insects. Just the feeling of the outdoors, the feeling of being among plants, things that city children really don't see every day.
>
> You don't have all this stuff in the city, like the tadpoles, they hardly see that. The natural stuff you know, they are not exposed to it everyday because they live in apartments so it is really great to go.
>
> They probably got to see some things that they wouldn't normally see living in New York. Like butterflies and things.

Sensory Experiences

Over one-quarter of the interviewees discussed the sensory experiences available in the Discovery Garden. Many spoke about the opportunities for their children to touch and feel things, especially plants and flowers. In addition, some visitors mentioned looking, particularly

at plants, and seeing "different colors, shapes, and sizes." A few interviewees noted the smelling opportunities.

> It lets them touch the flowers. We don't let them touch the flowers. We hang out in the valley a lot. I have to spend a lot of time telling them that they can't touch the flowers. This is someplace that allows them to touch.
>
> To have someplace where you don't have to worry. You can touch the flowers and the plants.
>
> The colors are very attractive and you know, looking at all the plants. There was a plant that they were allowed to touch and it felt like velvet and it was very soft, and they enjoyed feeling [it].
>
> Just basically for her to see the nature, you know. Just flowers, green, smells, touch, colors.
>
> The opportunity to smell and touch different kinds of plants. And even see tadpoles, which they never saw before, so they were excited about that.

Educational Experiences

In addition, over one-quarter of the interviewees spoke of the educational experiences offered. Some mentioned that the Discovery Garden provided learning opportunities, especially for learning about plants. Others referred to the opportunities for "adventure," "exploring," and "interaction in a new setting." Two interviewees indicated that the experience with nature made their children aware of "one more interesting thing in their life" and "showed them that they wouldn't be bored out of their minds," as they had anticipated.

> It is definitely a very good introduction to science and general info learning about plants definitely. (How do you think it did that?) Simply by presenting it to them instead, in a level that they can understand it. Like what is applicable to them.
>
> He liked best of all being able to experiment and being able to touch the stuff, play with it, and see how they work, things like that. I guess that is the best part of that for him.
>
> A sense that they can go out and not have to worry about anything, just go out and explore. I think they find new things, and then showing me the things that they found and everything that they have seen and how they can do this now. I like that because they are learning.

Independence

Four interviewees referred to their children's sense of independence in the Garden. Two of these individuals spoke of their children "running around." Another discussed the confinement of urban apartment dwelling. One man explained that the 6-year-old accompanying him "is not an independent girl" and "she always stays close." "But today," he continued, "she left me behind a lot."

> I think it is a good place where they can just run around and be loose for a little while and they have a lot of fun.
>
> I think for us, being city beings, in an apartment building in the city, the idea of where I can sit and they can go off on their own. It is seldom to never that they are by themselves. So the idea where they are somewhat independent and kind of walking around where there is not an adult within two feet of them is very important.

Design

In discussing the opportunities for their children, two interviewees commented on the design of the Garden.

> Something that was geared in size and kind of content for them so that they felt they were engaged in a garden experience that was just for them. The way that it was set up was very small and was very contained and that type of in-and-out quality that I think they like.
>
> I guess seeing things that are all at good height to be able to look at them. You don't have to go very far to see something interesting.

There were a few idiosyncratic responses to this question; they are listed in Appendix III.4.

Parts of the Discovery Garden That Provided New Experiences for Children

Interviewees were asked whether there were any parts of the Garden that provided their child(ren) with a new experience. The pump, smelling plants, touching (particularly plants), Insect Sounds, the Spider, and tadpoles were the most frequent responses. All of the components or activities named by two or more interviewees are listed in Table III.4.

Please note a few caveats associated with the categories listed in the table. The Spider received both positive and negative reviews: "he loved the Spider" and "he didn't like the Spider." The "seeing plants" classification included such phrases as "the different colors of the leaves," "new shapes," and "they haven't seen half of these botanical things." Regarding the "water" category,

interviewees noted that it was new for their children to "look through the water," touch the water, and "play in the water."

Table III.4.
Parts of the Discovery Garden That Provided New Experiences for Children[1,2]

Component/Activity	n	Component/Activity	n
Water pump	8	Everything	4
Smelling	6	Seeing plants	4
Touching (plants)	6	Water	3
Insect Sounds	5	Balance beam	2
Spider/maze[3]	5	Bee interactive	2
Tadpoles	5	Butterflies	2

[1]Many interviewees provided multiple responses, so the total n exceeds 45.
[2]Idiosyncratic responses (i.e., n=1) are not included in this table; see Appendix III.5.
[3]Only one interviewee referred to the Spider as a maze.

Nearly one-fifth of the visitors expressed that there was "nothing" that was new for their children. Some explained that their children are familiar with the Garden; others indicated that the children had similar experiences elsewhere. For instance, the following explanations were given: "we have been coming to this garden all of their lives," "he is kind of a regular here," "we try to take her in the country and stuff," "we have a backyard with a bunch of flowers," and "he didn't stay long enough." A few interviewees did not know whether the Garden provided any new experiences for their child companions.

Only a few individuals gave unique replies: for instance, the magnifier, scale, "the seeds in the shaker," and being independent (see Appendix III.5).

How the Discovery Garden Could Be Improved

Next, interviewees were asked in what ways the Garden could become a better place for adults and children to experience together. Over one-fifth of the visitors provided no suggested improvements, explaining that the Garden is "fine just the way it is." However, whereas some interviewees acknowledged the opportunities for adults and children to interact, others focused on the opportunities for children to act independently.

> First of all, I think it is perfect as it is. The kids and the adults can go around with their children and see different flowers, different things that you could teach them. Plants also. You have different things and sizes. It is a family experience.

> I really can't think of anything right now. I think it is wonderful. I think if the parents are willing to get off the bench and follow their kids around, then it is designed pretty appropriately enough. I don't think it needs to do any more.
>
> It is excellent just the way it is. I love it because even the adults, they don't have to watch the children. There is nothing that is going to hurt them here, if they fall it is nice and soft. It is wonderful for the kids because they can run around, and the adults can sit and relax and let their kids just enjoy exploring it. I wouldn't touch a thing, it is perfect.

The suggestions that were given can be classified into eight topic areas: more activity, larger, design elements, water, live animals, more educational, current components, and staff involvement.

One-fifth of the interviewees recommended the inclusion of more activities, for instance, more flowers to touch, things to climb, and "more hands-on things that they [adults and children] could do together" (see first two quotations below). Some individuals recommended simply that the Garden should be "bigger" with "more things" (see last two quotations).

> Maybe more interactive kids stuff. I mean, more things that involve hands-on doing like, I can't even think of something, but perhaps having to do with composting or even an area where someone could dig or do something involved with plants.
>
> It is like to plant seeds so we can take maybe home or maybe buy for 50 cents or something like that. So it is like garden to take something, that would be nice.
>
> It needs more space. Maybe a little bigger. (Are there other things?) Expand it.
>
> I am sure it must be crowded on the weekends. Just being bigger and more paths and just the same kind of activities.

A few interviewees recommended design changes, for example, "make the park benches wider," "it needs more shade," and add an "indoor area" for winter use (see first two quotations below). The responses of others focused on water (see the last quotation). A visitor who suggested that the Garden be larger added, "reroute the water" and include "a longer pool to explore." One interviewee would like "if the water was on more often;" another wished the "little river" was "moving."

> I think it would be nice if there were a shaded area so that we could sit down and read to our children. Seating with a back. I guess that is sort of like it, that bench there with the back, but before when you had that little platform over there, there was a little platform like a deck, and so we would lie down there and read.
>
> I know it may be difficult, but the access, at least stroll through access to the children's program gardens would be wonderful. Because that is such a beautiful section of it, and it is also the only section of the gardens that gives a more commercial, human interaction with nature rather than simply ornamental or primarily ornamental, which is what most of

this garden is. And that is almost like having a little farm in the city. Something like that would be such a welcome addition for us.

My children love all the different fountains in the garden, and if during the summertime during the warmer weather, if there could be a fountain, they have the water play here, so maybe it would be a bit redundant, but just the sound of water falling, and if there could be maybe, although again there is water there, but we're really into fountains and we love the fountains by the lily pond and also the main fountain by the main entrance watching the birds bathe in it. So maybe a fountain.

A few interviewees recommended the addition of live animals to the Garden, such as fish, rabbits, and live bugs (see the first three quotations below). Others suggested the inclusion of educational elements: for instance, more signs, things that are "more science related," and things identified "in cases" (see last two quotations).

I would like to see more live animals somehow mixed into the thing, things that are flying around, grass and flowers and natural and maybe butterflies and maybe things like that which I know children like. You know, the simple maybe even fish with the underground, underwater area, underwater plants, things like that. Because that's what children like.

We have been seeing little rabbits—maybe if they have a little rabbits in one spot that the kids could see close up instead of running away from. I think a little animal area, besides that. And maybe some fish, a little tiny minilake. The same plan, but make it a little bit bigger. It is not really like a zoo, but animals that they could see close up. Rabbits, the birds, a duck family for a little duck. Seeing how they swim by their mothers, that was adorable. Should have a little lake here, a little pond.

I guess some live bugs under a magnifying glass, maybe a beehive with bees or something. That would be interesting. Just some live things. Some live animals or something.

They should show where the seeds come from, things like that. That plants actually come from seeds and everything. A lot of little ones don't know that. They just think it just comes.

Probably more of the signs, either explaining something or elaborating, [because] some people may not be aware of how to use certain things. Even by the balancing beam, some people may not realize that's what it is for. Even though you could say you are giving the child the opportunity to discover at the same time, sometimes there is something there people would not necessarily realize there was something to do with it. The signs could help.

A few interviewees mentioned modifications or additions to existing components: for example, a clearer tube for the soil core, "more of the bamboo things," "a wider variety of insects," and "more puzzles." Others suggested greater involvement or presence of staff in the Garden for

such activities as “workshops” or “a guided tour” for children. One of these visitors recommended “having somebody in the garden at times doing projects with plants” during which “a kid could even plant something.”

Three individuals referred to BBG as a whole rather than the Discovery Garden in particular. They suggested advertising the existence of the Discovery Garden and creating “a few more like it” throughout BBG.

> I think that is a difficult question because they have it like kids here and adults on the other side, so I think they need to . . . advertise a little more.
>
> This is good, and maybe if they could have a few more, because we came on this unexpectedly, we didn't know it was here. A few more enclosed places like this because my children really seem to enjoy it. A few more like it.
>
> Maybe like one more attraction like this one would be good, like on the other side or something. So you don't have to come so far down into the garden. But it is cool.

Three interviewees were not sure what they would change about or add to the Garden, and two individuals gave responses that did not directly pertain to the survey question.

Providing Guidance for Adults as They Take Young Visitors through the Discovery Garden

Interviewees were asked how the Garden could do a better job at providing adults with guidance as they take younger visitors through it. From their responses three main suggestions emerged: no more guidance is necessary in the Garden, add more information, and provide more staff to interface with visitors.

No More Guidance Is Necessary

One-third of the interviewees reported that guidance was unnecessary or already sufficient in the Garden and nothing more was needed. Half of the individuals who responded in this manner referred to the adequacy of the signs, suggesting that they are self-explanatory, brief, and abundant (see first two quotations below). Others appeared to assume that providing “guidance,” whether it be signs, staff, or pamphlets, would be inappropriate (see last three quotations).

> No, because everywhere you go there are signs that tell you what to do and that explains a lot. I don't think you need additional help with that.
>
> I read the signs and they tell where to go and what to do. The sign was there, I read the sign, and I know what to expect, what to look for.

> Oh, this is self-explanatory. . . . There are signs everywhere. . . . I don't think a parent really needs any guidance in something like this. I wouldn't. Because when you are busy with your kids you are not reading anything you are . . . kind of distracted. You don't really take the time to read or read a pamphlet or anything.
>
> For me, it is good how it is right now. I like to come in and move around on my own, you know, looking and everything, at my own pace.
>
> No, and I don't think it should. I really think the parents should be encouraged to go through. It's wonderful, . . . all of your senses are being impacted on. I don't think anybody needs to take the parents. I think they should be encouraged to do this on their own and it does that. With all the activities that parents can do.

More Information

Over one-quarter of the interviewees requested additional information. They would like to know the names of plants, leaves, and scents. They would like more information about the trees, for instance, "from where it comes" and "when it blooms" (see the first quotation below). They would like to be told "what it's all about" and "what to look for" beforehand. One visitor even discussed making it clear that the Discovery Garden is for adults as well as children (see the second quotation). Some interviewees would like additional information in the form of signs for either children or adults, especially with graphics rather than text (see the third, fourth and fifth quotations below). Others suggested pamphlets or a "program" (see the last quotation).

> You have a little listing on trees, but maybe to go into it deeper. How old is the tree, and how did it come about. That would be nice. And what conditions do you have to maintain it. What kind of fertilizer and what kind of things you got to take care of it. That would be nice. People would be interested in it. I mean it would be educational as well. Not only for the kid, but for the parent as well.
>
> When I first looked in, I didn't know it was for adults; I thought it was only for kids, so I sat here and I didn't go in and see it. And then I saw someone and I thought okay, I can go in, too.
>
> They could have signs. Signs that are geared toward the children, and signs that are geared toward the adults, to help the adults explain to the children different features.
>
> You might have signage that is specifically directed towards adults, to help them guide their kids.
>
> Most people don't read, so it needs to be a little clearer, I think visually, because you can have a sign of instructions up there but people are too busy watching their children to sit and read and children don't get the luxury of being able to read. So maybe if there was something visually so they could look at a quick picture and figure out what to do or what it was supposed to be, that would be better.

> Maybe if they let us know what is here, so we can explain it to the children. The plants and the bugs and the well, a little history on everything as we go along. Like a little program up front that shows exactly what is here.

More Staff Interfacing with Visitors

Nearly one-fifth of the interviewees made suggestions requiring greater presence or involvement of Garden staff or volunteers. Some suggested having someone present who talked to visitors, "provided assistance," explained "how certain things work," or read to children. Others recommended having a tour or another staff-organized activity so that adult visitors could become better acquainted with the Garden and its content and activities. One visitor even referred to his enjoyable experience at a Discovery Cart (see last quotation below).

> Maybe if they had somebody who could explain, also a little . . . five-minute tour.

> Maybe a tour. 'Cause I am just coming with him the first time. If someone is trained they can point out more things.

> I haven't come for the classes at two o'clock on Thursdays because I have been at nap time. You should keep that in mind. . . .Two o'clock is a nap time. But if it was in the morning or late afternoon I think they would have better attendance. But that kind of thing would be nice because if I did something with guidance, like with a teacher, once, and then I could come back and do it with the kids alone, it might be nice.

> We were here when there were booths set up for the children and volunteers manning them—that was nice. The children got a lot out of that special occasion, and we will make an effort to come by when that happens and that certainly helped, but I think on a general day to day, I guess I am lazy that I don't make as much of an effort. We just sort of enjoy ourselves and the educational aspects are best when they are serendipitous.

Miscellaneous Suggestions

Two interviewees suggested adding activities, such as "coloring, cutting, or making pictures" for the children. Two others would like the Garden to help children gain greater appreciation for plants: for example, by teaching them to plant seeds and not destroy trees.

> Maybe the trees, I am able to stand and read and some of my children do that, but basically the children do not appreciate them as much as we do. So maybe if you write in such a way so the children will read it, maybe bigger. Write it on the trees so the children will be drawn to it. Maybe some decorations around the trees, I don't know. Because some of them just run around, they don't look at the trees.

In addition, a few interviewees did not know what to suggest to enhance the Garden's guidance.

Discovery Garden Descriptors

As the final survey question, interviewees were asked to select from a list of nine words the two that they would use to describe the Discovery Garden. The nine possibilities are listed in Table III.5. The three most frequently chosen descriptors were "exploration," "discovery," and "fun," as shown in the table. "Beautiful" and "texture" were the two least chosen words to describe the Discovery Garden.

Table III.5.
Popularity of Discovery Garden Descriptors among Interviewees in Percent[1]

Descriptor	%
Exploration garden	52.3
Discovery garden	38.6
Fun garden	27.3
Family garden	22.7
Nature garden	22.7
Learning garden	18.2
Playground[2]	15.9
Beautiful garden	6.8
Texture garden	2.3

[1]The total equals more than 200 percent because three interviewees provided three choices rather than two and one individual chose only one.
[2]In this category is also included the one interviewee who chose "play garden."

Part IV:

Plants & People
Exhibition

EXHIBITION DESCRIPTION

Plants & People, a 2,600-square-foot exhibition at the Brooklyn Children's Museum, was developed to show urban children (ages 6 to 12) and their adult companions that plants are associated with their daily lives in very basic and surprising ways. By exploring the exhibition, visitors can discover how plants grow "wild" in the city, how each person's actions affect plants, and how plants are related to numerous everyday objects, places, and people.

More specifically, *Plants & People* was designed to:

- help children discover that finding out about plants is fun
- enable children and families to learn why plants are needed to sustain their lives and satisfy daily needs
- facilitate discussion and interaction among children and adults focusing on the choices people can make regarding environmental issues and the relationships they have to the community of living organisms upon which they depend
- help children and their families identify and appreciate their urban plant neighbors and explore the effects of their actions on city plants
- engage children in the process of science exploration by encouraging their use of tools to extend the senses and words to convey personal discoveries
- nurture the foundations of an environmental ethic by increasing understanding of plants.

PRINCIPAL FINDINGS

TRACKING STUDY

This section of the report presents the findings from the tracking study that was conducted in *Plants & People*. As with the tracking study conducted in *Amazing Plants*, the primary goal was to record all intergenerational interactions (i.e., between adults and children). These interactions appeared as either behaviors (indicating how visitors use the exhibit components), or comments (exemplifying how visitors process the exhibit information). In addition to examining intergenerational interactions, the tracking study provides a quantifiable description of visitor behavior, including number of stops made in the exhibition and length of stay. A total of 50 visitor groups were tracked during their visit in *Plants & People*.

Visitor Group Composition

As shown in Table IV.1, half of the visitor groups included only one child. Only one group had more than three children. The ages of the children ranged from 1 to 15 years (see Table IV.2). Nearly three-quarters of the children were 4 to 9 years of age (74 percent). There were between one and four adults per group (see Table IV.1). Over half of the groups included just one adult (60 percent); only six groups had more than two adults (12 percent).

Table IV.1.
Visitor Group Composition in
***Plants & People* Tracking Study in Percent**
(n=50)

Number of Children	**%**
One	50.0
Two	26.0
Three	22.0
Four or five	2.0
Number of Adults	**%**
One	60.0
Two	28.0
Three	10.0
Four	2.0

Table IV.2.
Ages of Children in Visitor Groups in
***Plants & People* Tracking Study in Percent**
(n=50)

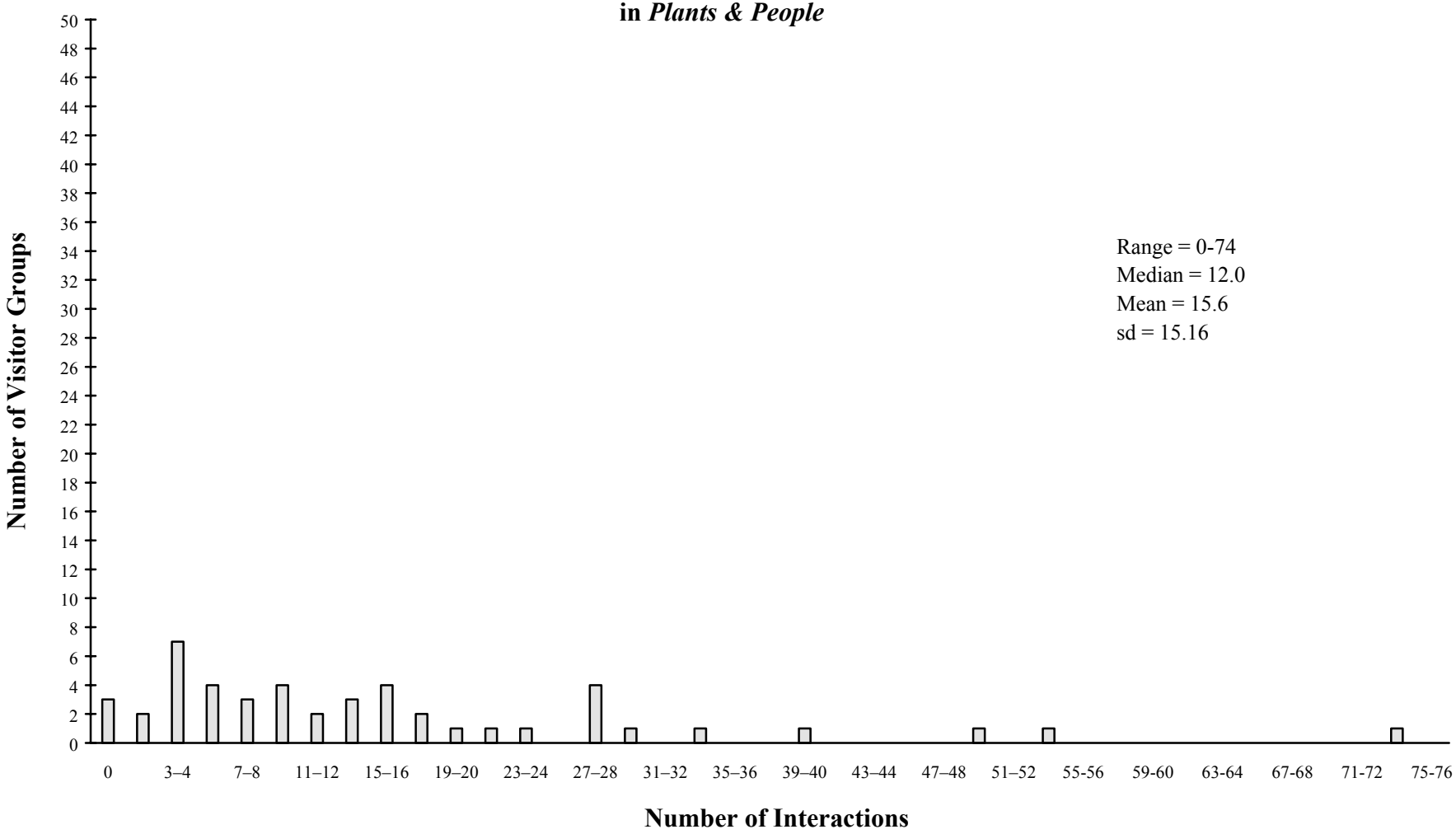
Age	**%**
1–3	11.2
4–6	36.0
7–9	38.2
10–12	11.3
13–15	3.3

Number of Interactions between Adults and Children

In order to assess the frequency and types of intergenerational interactions occurring in the exhibition, all interactions were recorded by the observer. As shown in Figure IV.1, the number of interactions displayed by visitor groups spanned a broad range. Whereas the adults and children in some groups did not interact at all, one group displayed 74 intergenerational interactions. Relatively speaking, many groups displayed few interactions; few groups displayed many interactions. Due to this "lopsidedness," the median rather than the mean is the appropriate measurement.[7] The median number of interactions per visitor group was 12.0. In other words, half of the groups displayed 12 or fewer intergenerational interactions, and half of the groups displayed 12 or more interactions.

[7]As noted in footnote 1 in the *Amazing Plants* section, 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. Unless otherwise noted, the median, rather than the mean, is reported for all frequency distributions.

Figure IV.1.
Number of Interactions by Visitor Groups
in *Plants & People*

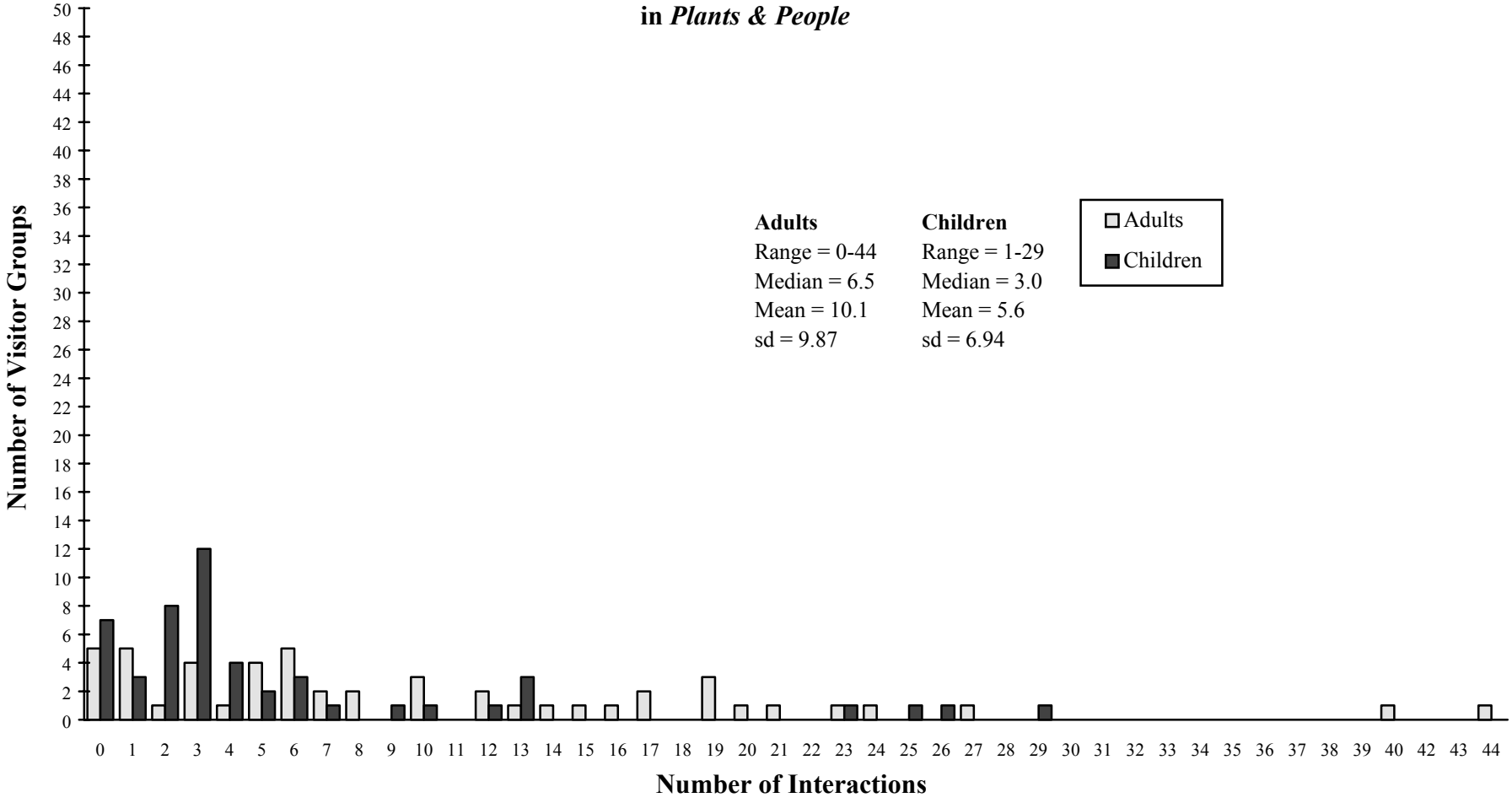


Initiating Interactions

Because it is important to understand whether children or adults are acting as the impetus for the observed interchanges, the interactions were classified as either adult-initiated or child-initiated (see Figure IV.2). In 10 percent of the groups, no adult initiated an interaction. In contrast, two groups displayed 40 or more adult-initiated interactions. Though the range (0-44) is quite large, in half of the groups, adults initiated interactions 6 or fewer times. As explained above, the median rather than the mean is the appropriate measurement under these circumstances. Among visitor groups, the median number of adult-initiated interactions was 6.5. That is, in half of the groups there were 6 or fewer adult-initiated intergenerational interactions, and in half of the groups there were 7 or more adult-initiated interactions.

Likewise, in 14 percent of the groups, no children initiated any interactions. The most child-initiated interactions in a group was 29. Again, despite the large range (0-29), in two-thirds of the groups, children initiated 4 or fewer interactions. Among visitor groups, the median number of child-initiated interactions was 3.0, half that of adult-initiated interactions. In other words, in half of the groups there were 3 or fewer child-initiated intergenerational interactions, and in half of the groups there were 3 or more child-initiated interactions.

Figure IV.2.
Number of Interactions Initiated by Adults and Children
in *Plants & People*



Types of Interactions between Adults and Children in Plants & People

A variety of interactions can occur between individuals in an exhibition. In this study, the intergenerational interactions were originally classified into three types: mechanical (physical action: looking at or using an exhibit component), content (comments or actions related to the content or subject matter of the component), and relevance (comments or actions relating the content of the component to something in the visitor's past experience or everyday life). During data analysis a fourth category of response appeared: appreciation (comments expressing appreciation for something in the exhibit, e.g., "Wow!" or "This is beautiful"). Though interactions expressing appreciation occurred infrequently, they are distinct enough to warrant their own response category.

Mechanical interactions included such activities as looking at the exhibit elements, reading labels, playing with puppets, using hands-on components, and watching videos. As shown in Figure IV.3, the number of mechanical interactions observed within visitor groups ranged from 2 to 63. The median number of interactions was 19.5: half of the groups displayed more than 20 mechanical interactions.

Content interactions included actions, comments, explanations, and discussions between adults and children regarding the subject matter of the exhibit component. Examples include a child making a crow puppet fly by walking along the edge of the stage and an adult explaining what is in a peanut butter and jelly sandwich. In contrast to the frequency of mechanical interactions, two-fifths of visitor groups displayed no content interactions and half of the groups displayed between one and five (see Figure IV.4). The median number of content interactions observed within visitor groups was 1.0, much lower than the median number of mechanical interactions (19.5).

Relevance interactions were identified by comments and actions that demonstrated that the component related to the visitor's everyday life. For instance, at the Puppet Theater a child pretended to use a rake; in Plants You Drink a child pretended to drink milk; and at Smell the Spices an adult explained, "That's how you get your chocolate candy bars." These types of interactions were less common than the mechanical or content-related interactions. As Figure IV.5 shows, 40 of the 50 groups were never observed interacting in this way (80 percent). The median number of relevance interactions was 0.0.

One other type of interaction—appreciation—is reported here. Though its occurrence was much less frequent (median = 0.0), there were enough appreciation responses to warrant a distinct classification. Figure IV.6 shows that 5 of the 50 groups expressed phrases of appreciation, for example, "That was interesting," "There's so much here to learn," and "These are my favorite."

Figure IV.3.
Numer of Interactions with Components by Visitor Groups
in *Plants & People*

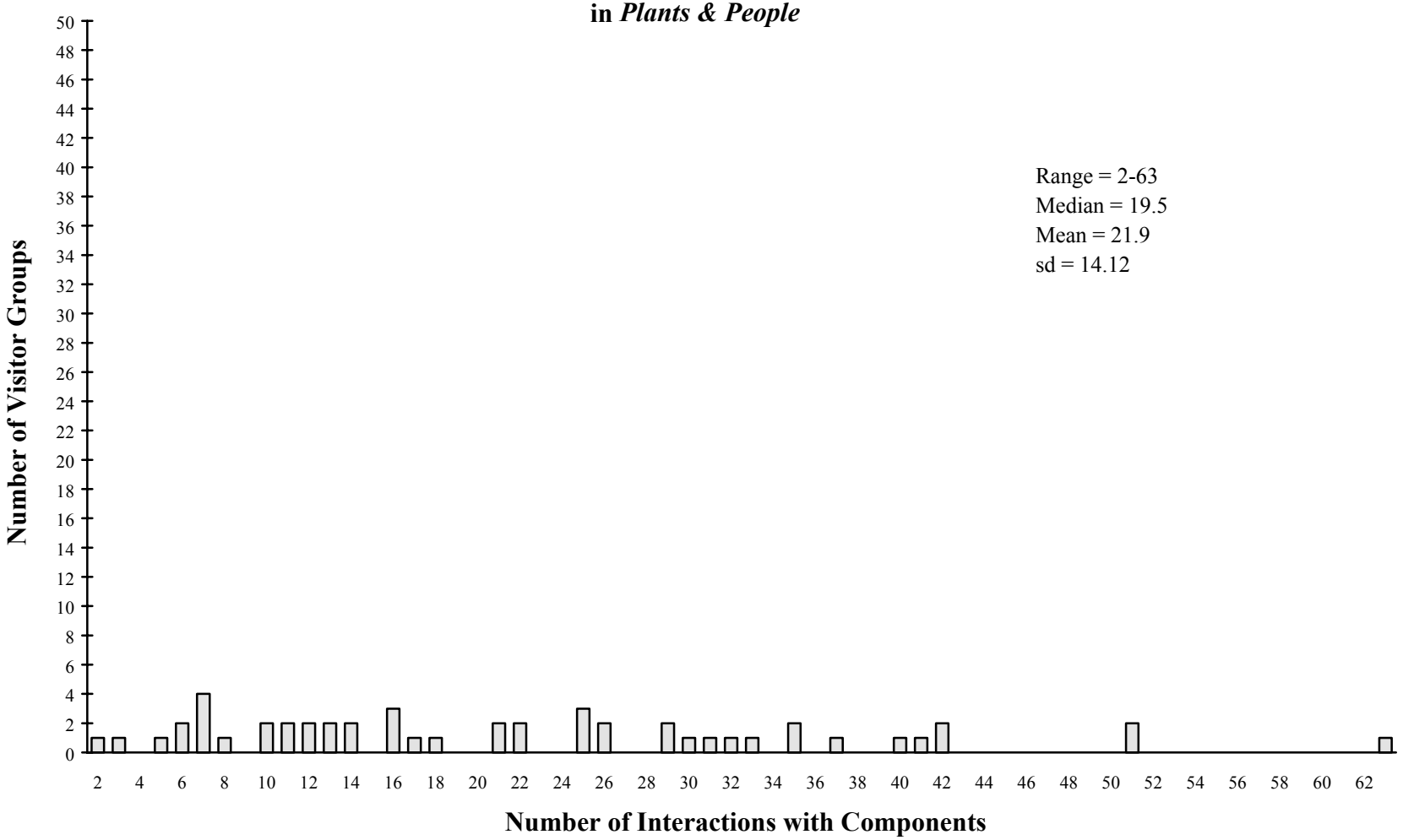


Figure IV.4.
Number of Content Interactions by Visitor Groups
in *Plants & People*

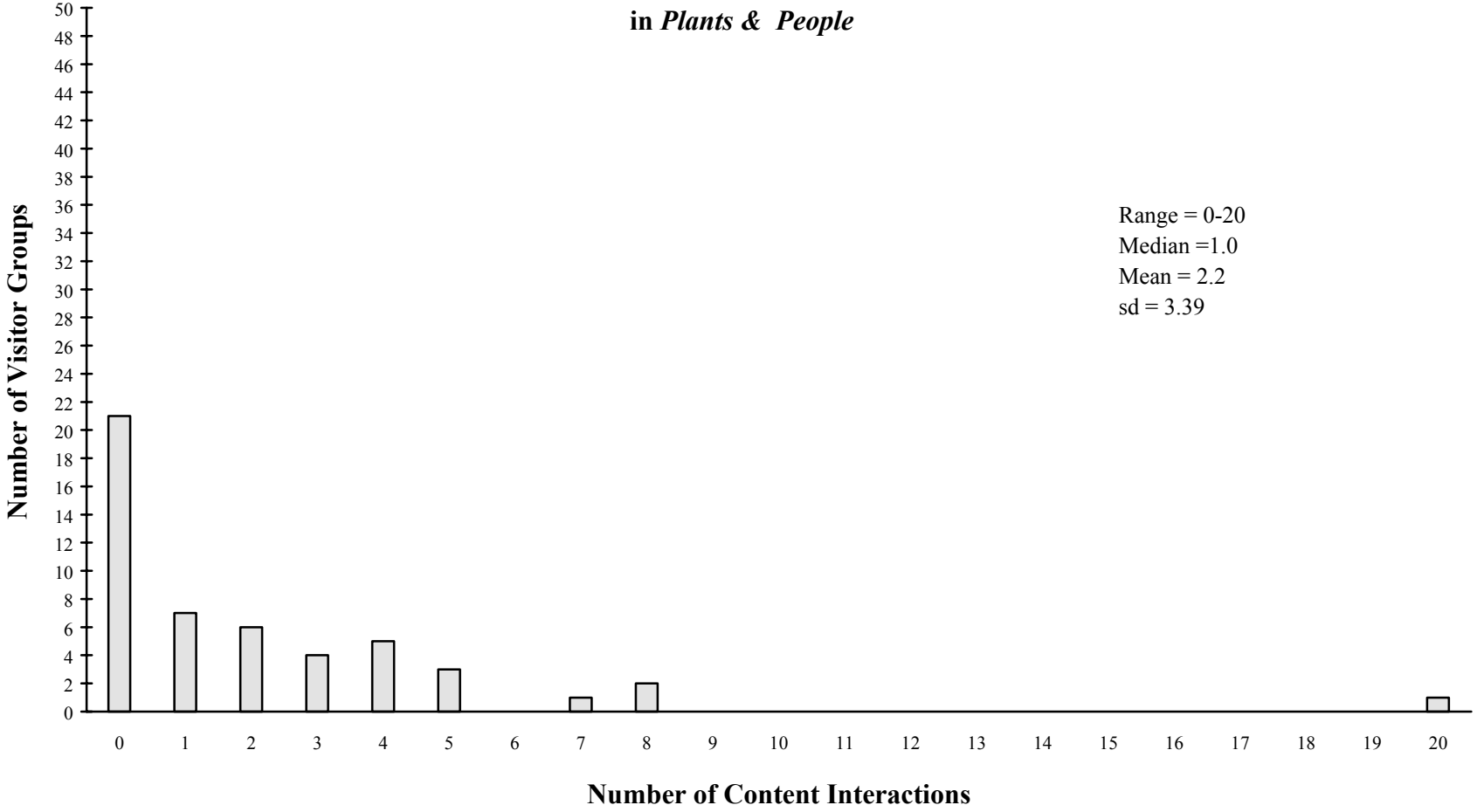


Figure IV.5.
Number of Relevance Interactions by Visitor Groups
in *Plants & People*

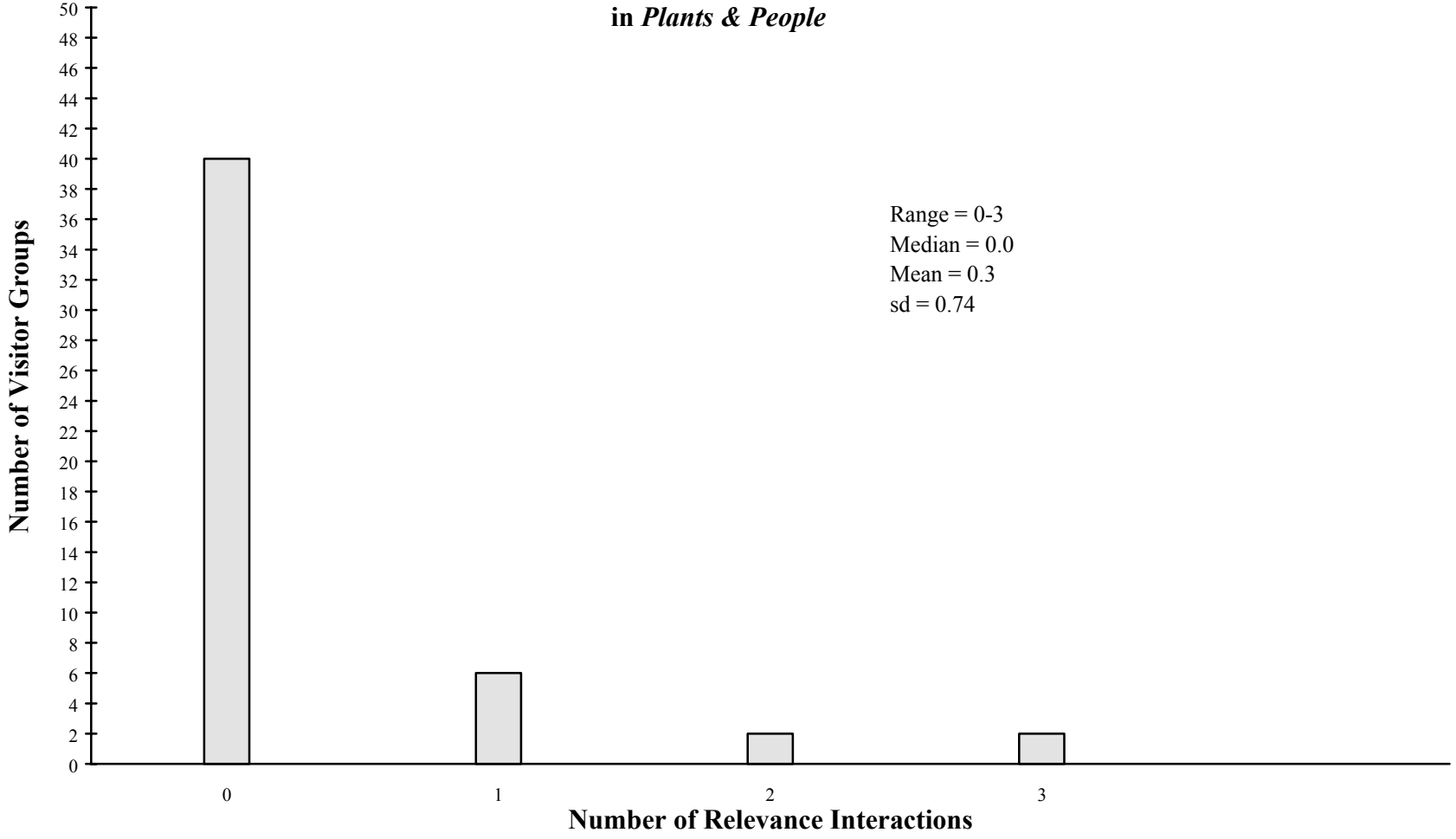
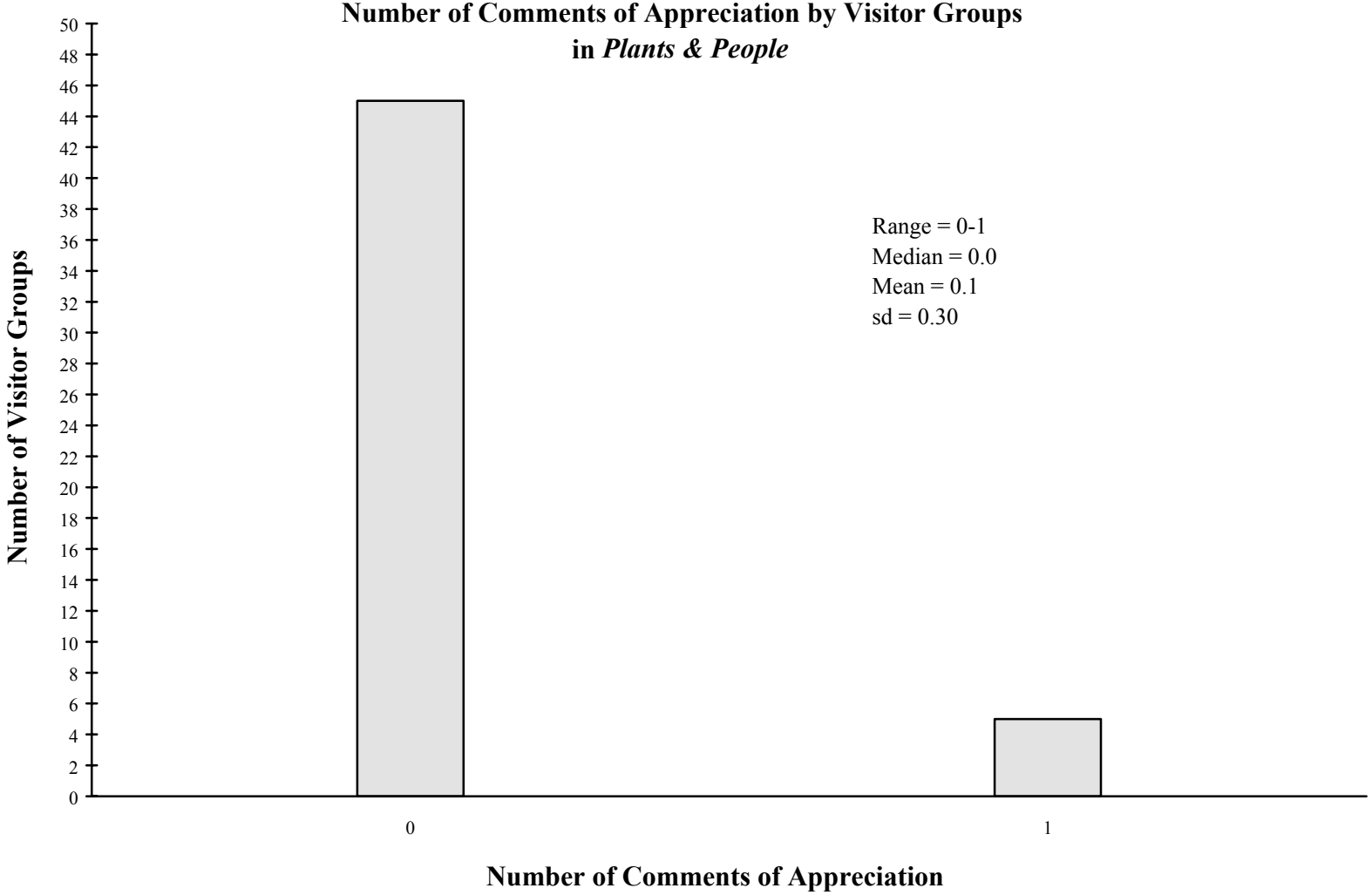


Figure IV.6.
Number of Comments of Appreciation by Visitor Groups
in *Plants & People*

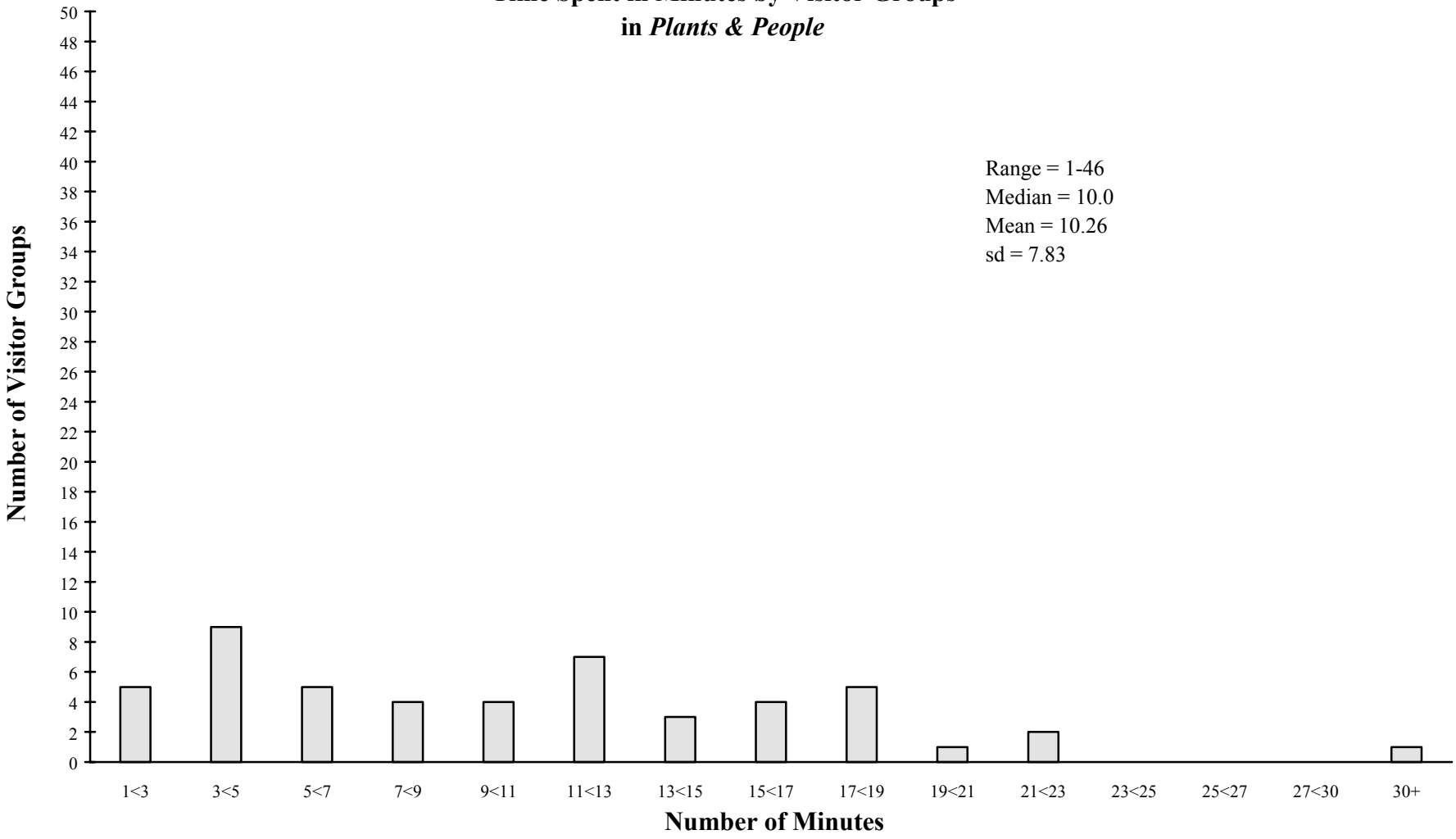


Total Time (Minutes) Spent in Plants & People

One measure of gauging the visitor experience in an exhibition is to examine how much time people spend there. Figure IV.7 presents the amount of time visitor groups spent in *Plants & People*. The duration of visits spanned a broad range: the shortest visit lasted approximately 1 minute and the longest lasted 46 minutes. The median amount of time spent by visitor groups in *Plants & People* was 10.0 minutes, meaning that half of the groups spent 10 minutes or less in the exhibition and half stayed 10 minutes or longer.

More specifically, over one-fifth of the groups spent less than 4 minutes in the exhibition (22 percent). Nearly half of the groups spent between 4 and 12 minutes (46 percent). One-third spent 13 minutes or longer (32 percent).

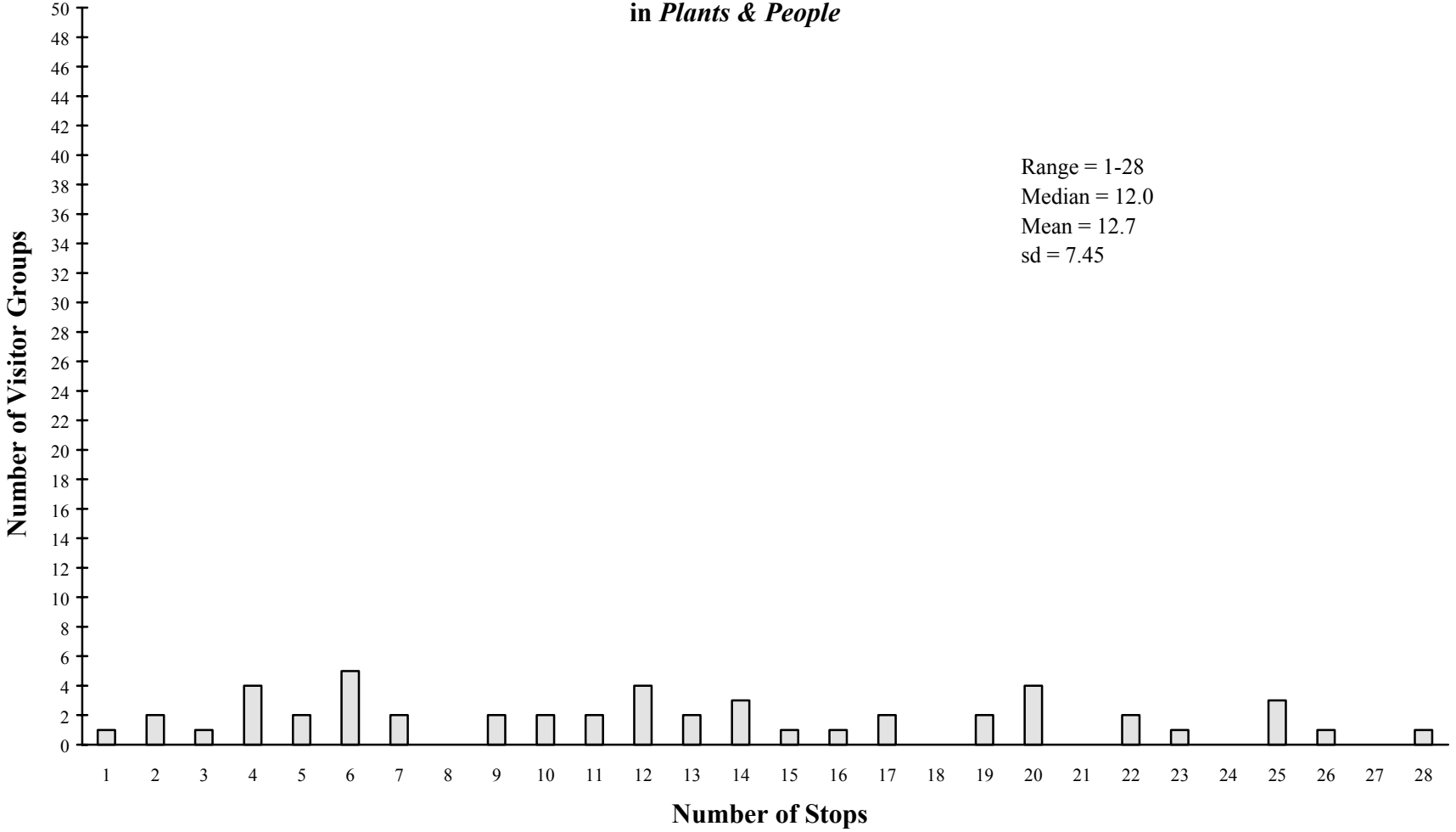
Figure IV.7.
Time Spent in Minutes by Visitor Groups
in *Plants & People*



Number of Stops in Plants & People

Another way to assess the visitor experience in an exhibition is to count the stops visitors make. For the purposes of this study, a "stop" is defined as a visitor group standing for 3 seconds or longer in front of a given component. Each stop a visitor group made was tallied, regardless of whether it was the group's first stop at the particular component. In other words, if a group stopped multiple times at the same component, each return visit was counted as an additional stop. The median number of stops per visitor group was 12.0 (see Figure IV.8). Over half of the visitor groups made 12 or more stops among the 41 components in *Plants & People* (54 percent). Conversely, nearly two-thirds of the groups stopped at one-third or fewer of the exhibition components (64 percent).

Figure IV.8.
Number of Stops by Visitor Groups at Components[1]
in *Plants & People*



[1]There are 41 components in the exhibition

Number of Stops per Exhibition Component

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 planning teams a sense of the varied attracting power of individual components. Moreover, the stops visitors make determine, in part, their experience in the exhibition.

Table IV.3 presents, in rank order, the number of stops visitors made at each of the 41 components in *Plants & People*. At each of nine components, more than 25 stops were made by visitor groups (see the shaded area in Table IV.3). The four most frequently visited components were the Puppet Theater, Plants You Eat, Plants You Drink, and Smell the Spices. Thirteen components (one-third of the exhibition) attracted less than 10 stops each. Among the least visited components were the Gourd case, the Ailanthus Tree Pull, and Discover Tools of Plant Care, each attracting only two stops by visitor groups. No group stopped at the Leaf Color Experiment.

Table IV.3.
Number of Stops per Exhibition Component in *Plants & People*[1]

Component	n	Component	n
Puppet Theater	40	Collections case: Toys	15
Plants You Eat[2]	38	Bark and Beneath/Xylem and Phloem	13
Plants You Drink[2]	38		
Smell the Spices	34	Listen to Russell Sprout/Rose Madder	13
Zoetropes	32		
Leaf Views/Microscope	30	Record Your Thoughts	11
Listen Up	29	Food and Shelter Shrub	10
Food Waste video and panel	26	Laundry Basket/Feel Clothes	10
Share Plant Stories video	26	Cubbies Introducing the Family	10
Underground View: Diorama and Roots[3]	25	Bark Damage	7
		Tree Guard Door	7
Grow Like a Seed video	24	Life Tiles of Plant Growth	7
Trace Pathways: Sauce, Cookies	24	Cane case	6
Peek at Health & Beauty Aids (Bathroom)	23	Bark and Beneath/Tree Core Pull	5
Marimba/Tree and Plant Stems	22	See Trees Fence	5
Listen to Forester Brown/Flo Fennel	19	Fruit Bowl on Counter	3
		Marvelous Plant Masterpieces	3
Aquatic Tank	18	Discover Tools of Plant Care	2
Find Fruit in the Refrigerator	17	Ailanthus Tree Pull	2
Mound Puppets (Snail/Bugs)	16	Gourd case	2
View Roots video	16	Leaf Color Experiment	0
Venus Flytrap Toy case	16	Discovery Cart[4]	0
Broom Closet	15		

[1]Total number of components = 41.
[2]These two components were always visited together.
[3]These were two separate components that were combined by data collectors.
[4]A Discovery Cart was rarely present during the tracking periods, so the fact that no stops were made there does not accurately reflect its attracting power among visitors.

Interactions at Individual Components

One way to gauge the quality of the stops is to examine the interactions that took place within visitor groups while at each component. Figures IV.9–IV.17 compare the numbers and types of interactions that occurred at the nine most frequently visited components in *Plants & People*. Two general trends are apparent. First, relevance and appreciation interactions were virtually

nonexistent. Second, mechanical interactions far outnumbered content interactions. However, at five of the nine most frequently visited components (Plants You Eat, Plants You Drink, Smell the Spices, the Food Waste video and panel, and the Share Plant Stories video), content interactions were slightly more numerous than at other components (6–11 occurrences per component).

Figure IV.9.
Puppet Theater

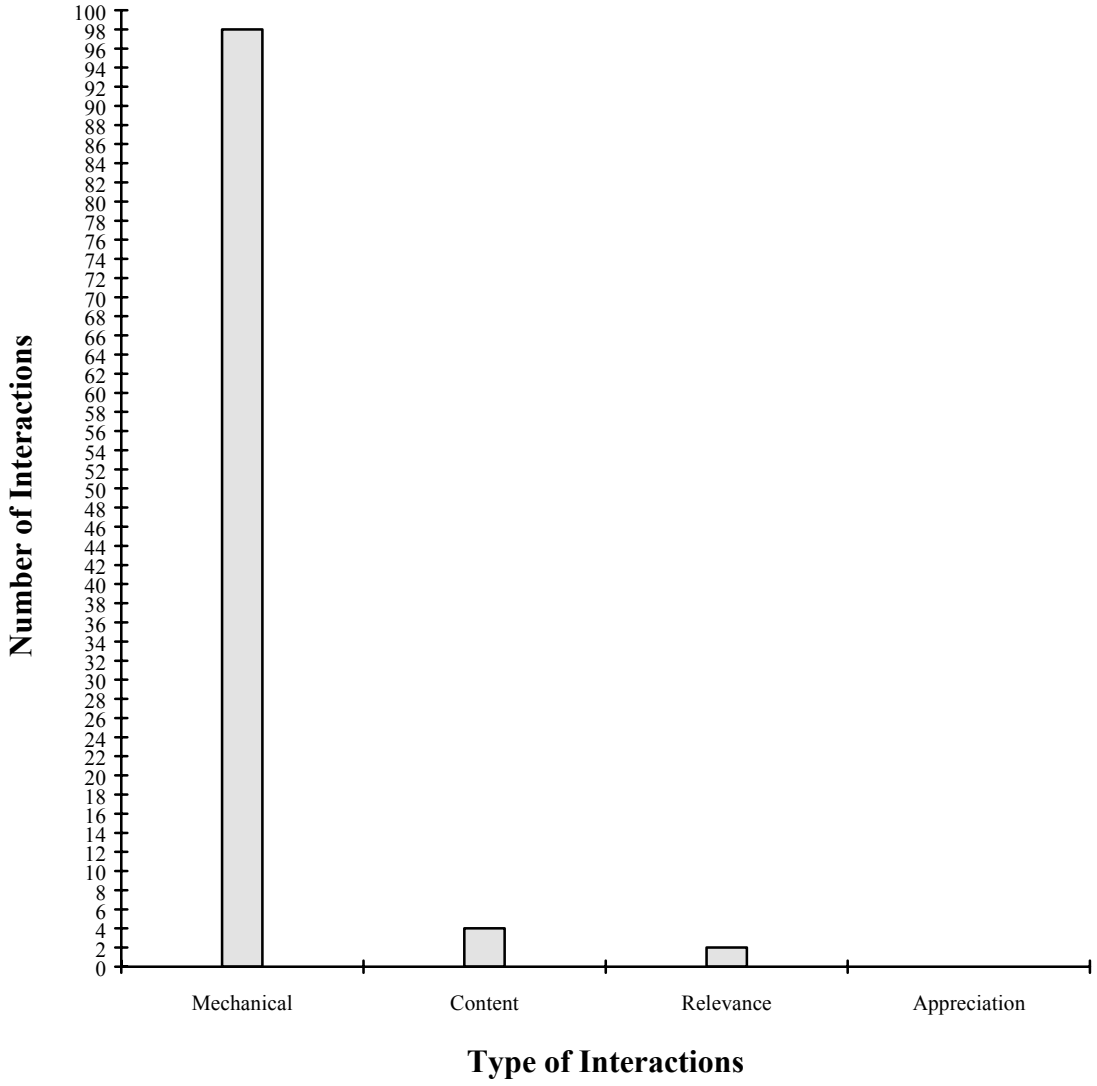


Figure IV.10.
Plants You Eat

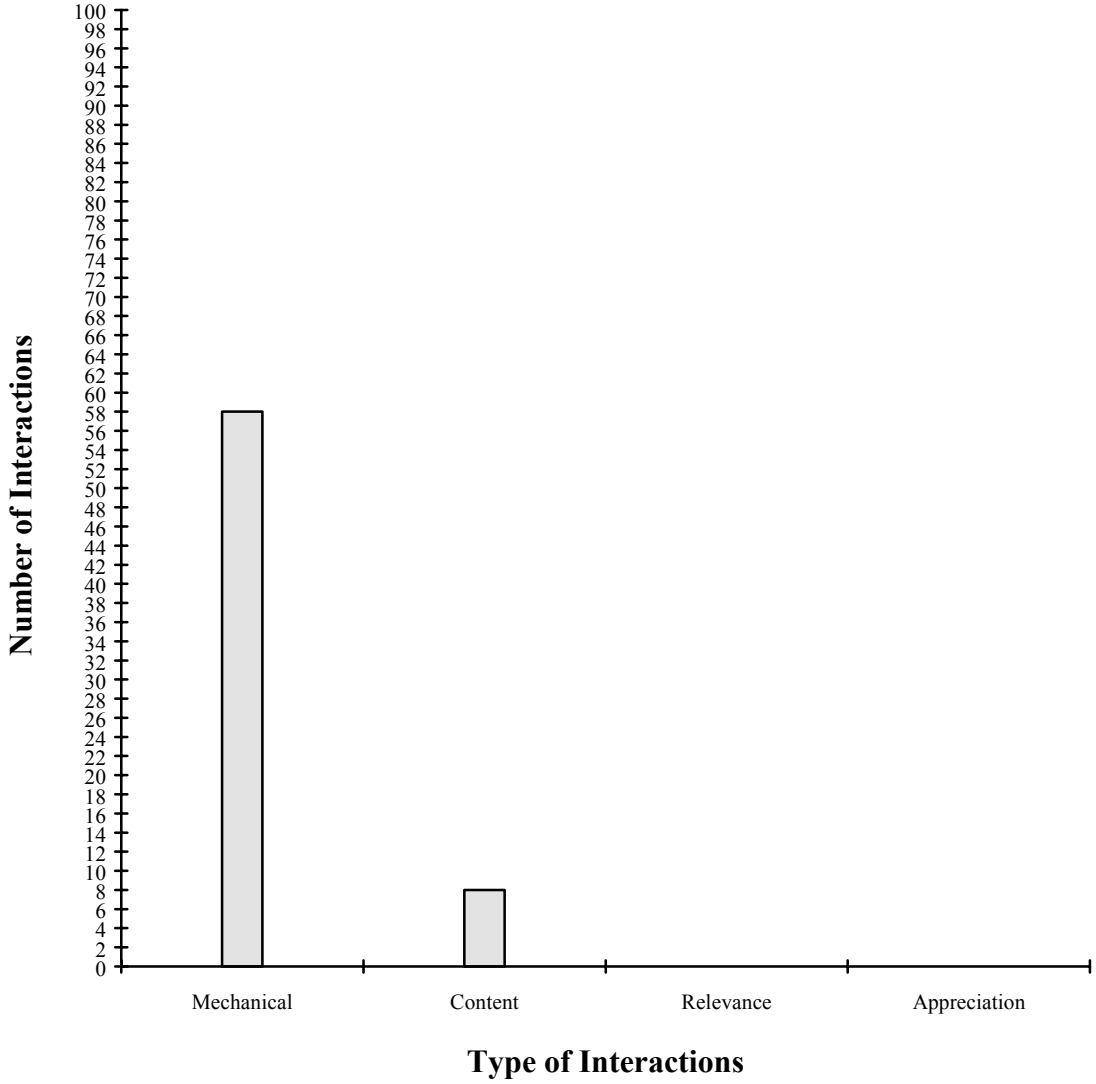


Figure IV.11.
Plants You Drink

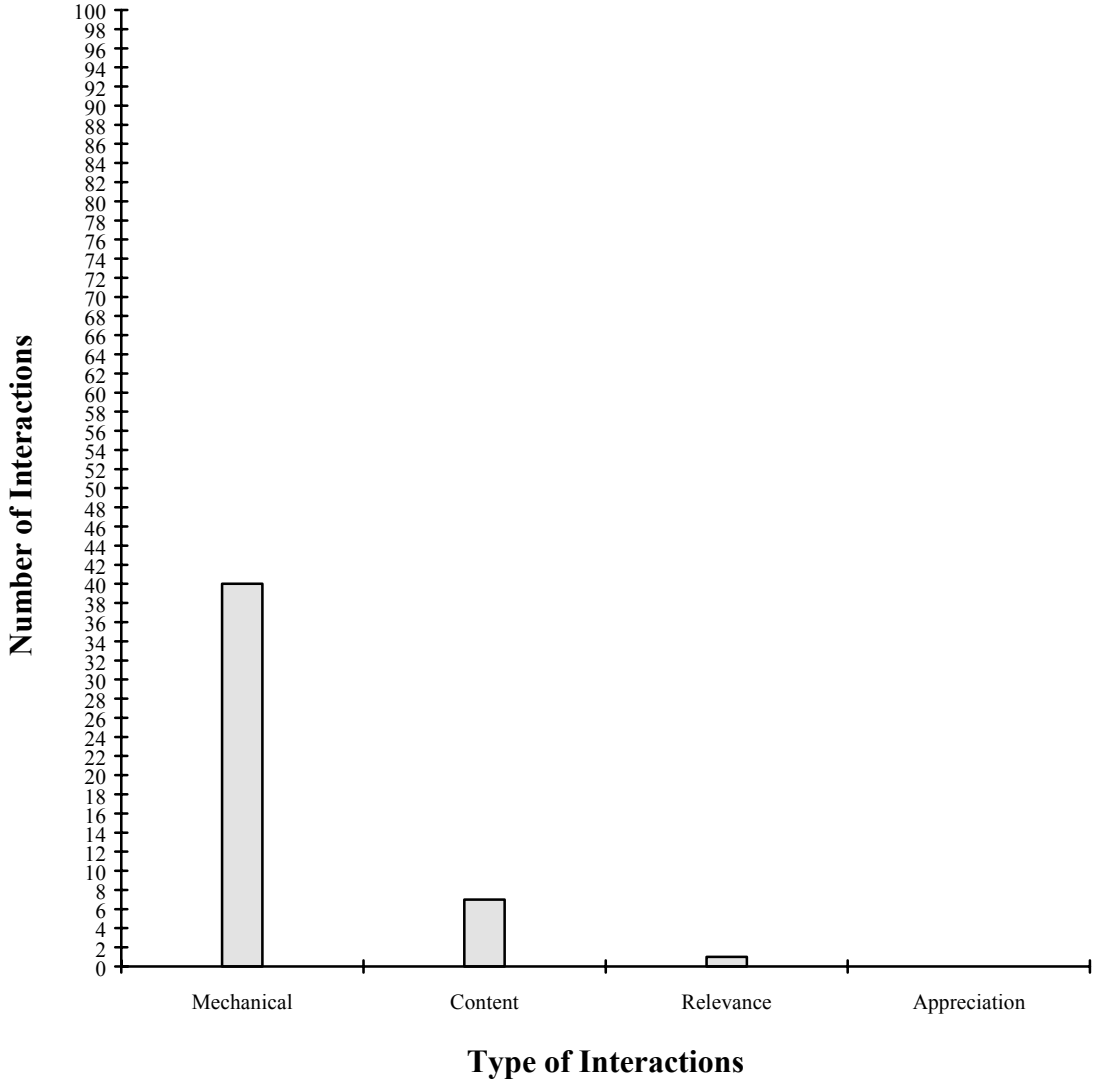


Figure IV.12.
Smell the Spices

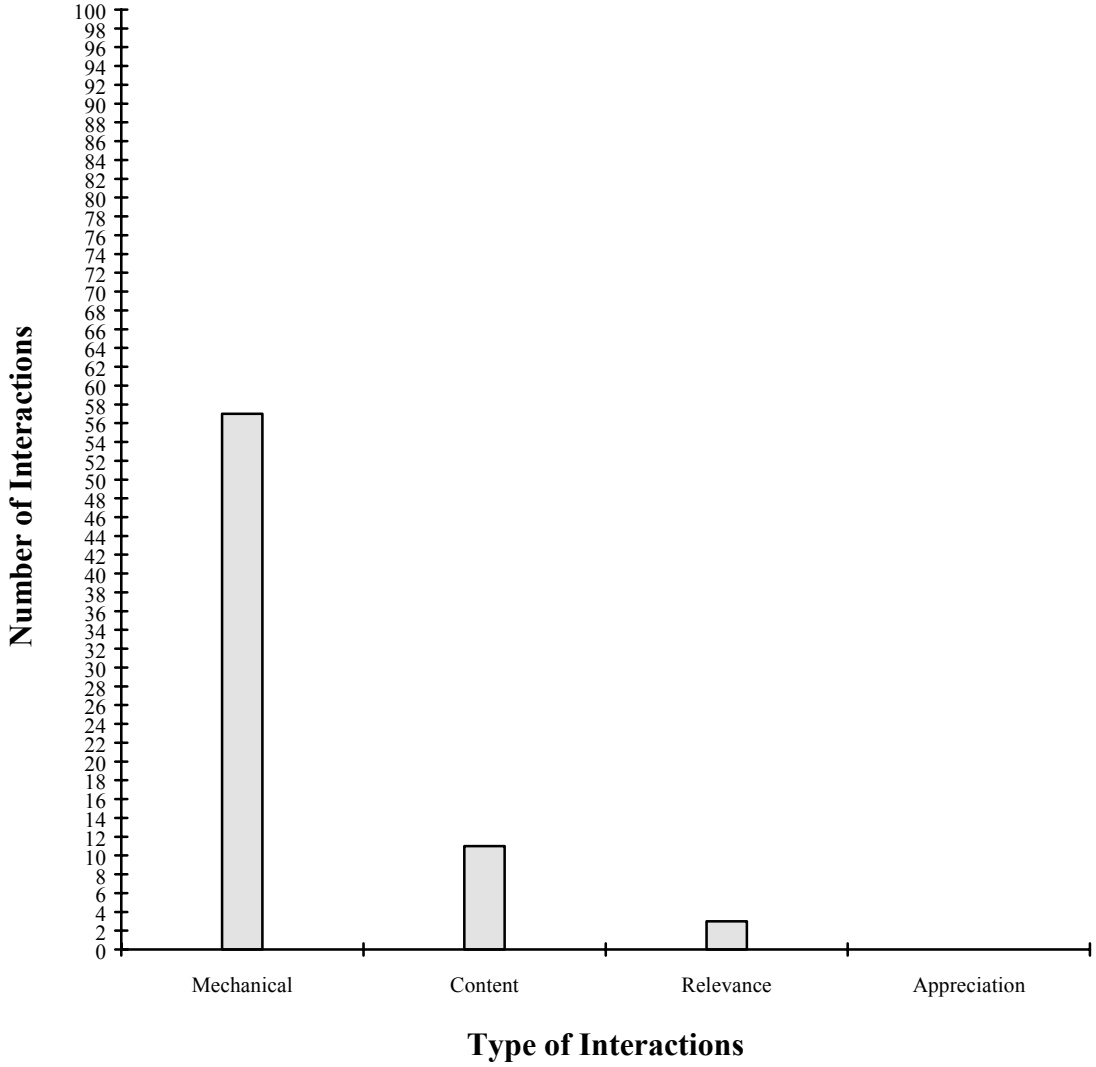


Figure IV.13.
Zoetropes

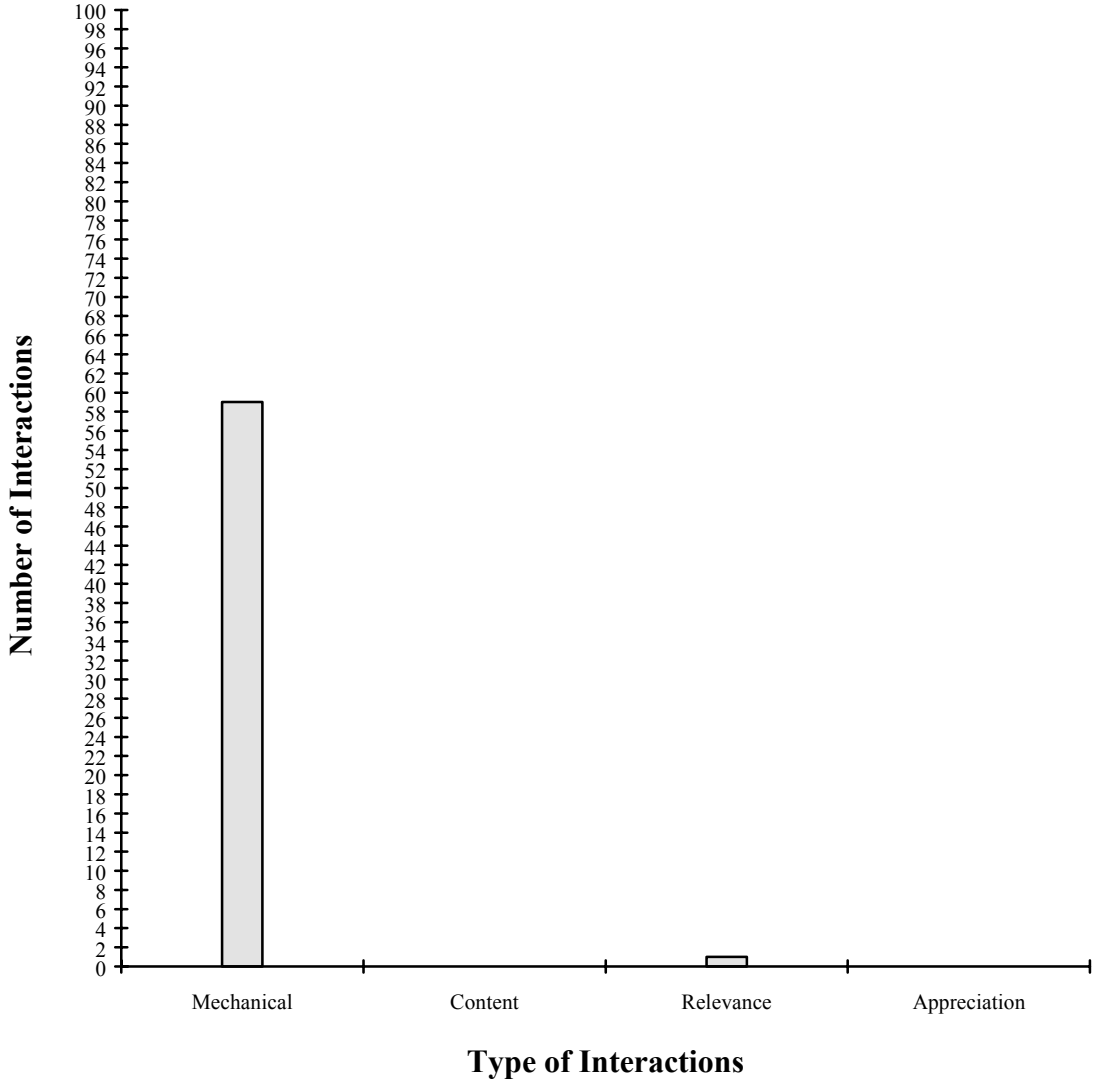


Figure IV.14.
Leaf Views/Microscope

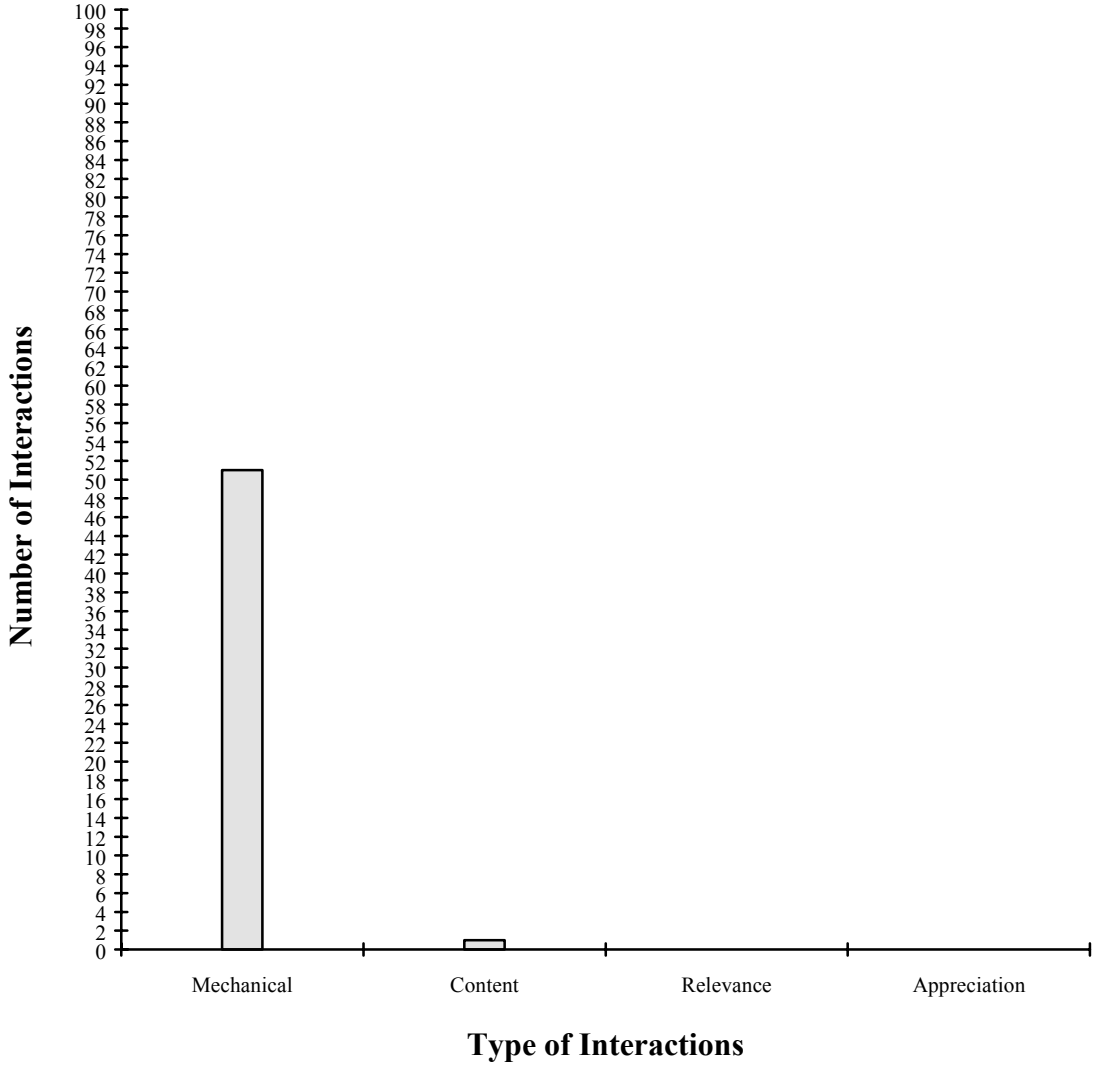


Figure IV.15.
Listen Up

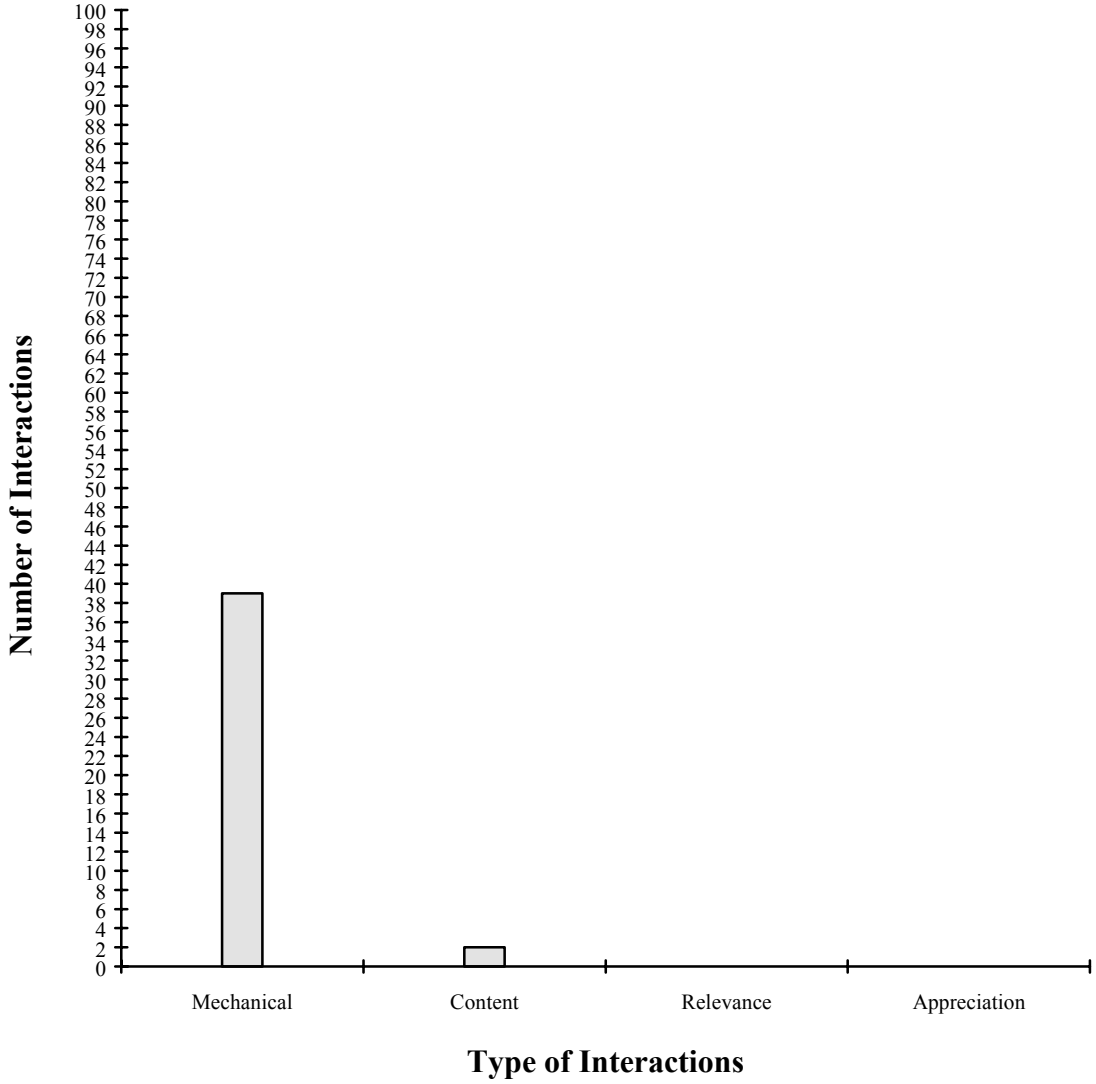


Figure IV.16.
Food Waste video and panel

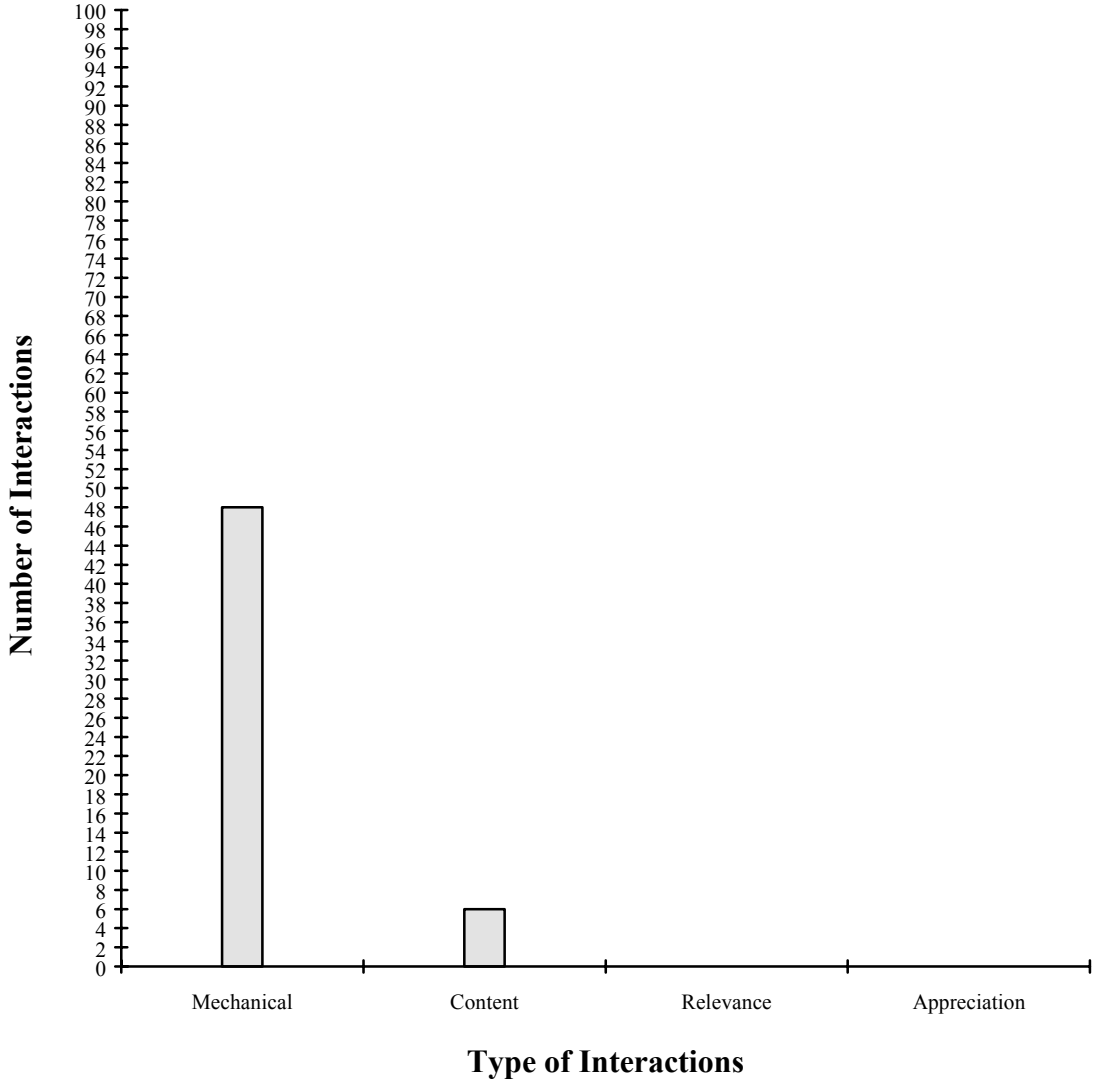
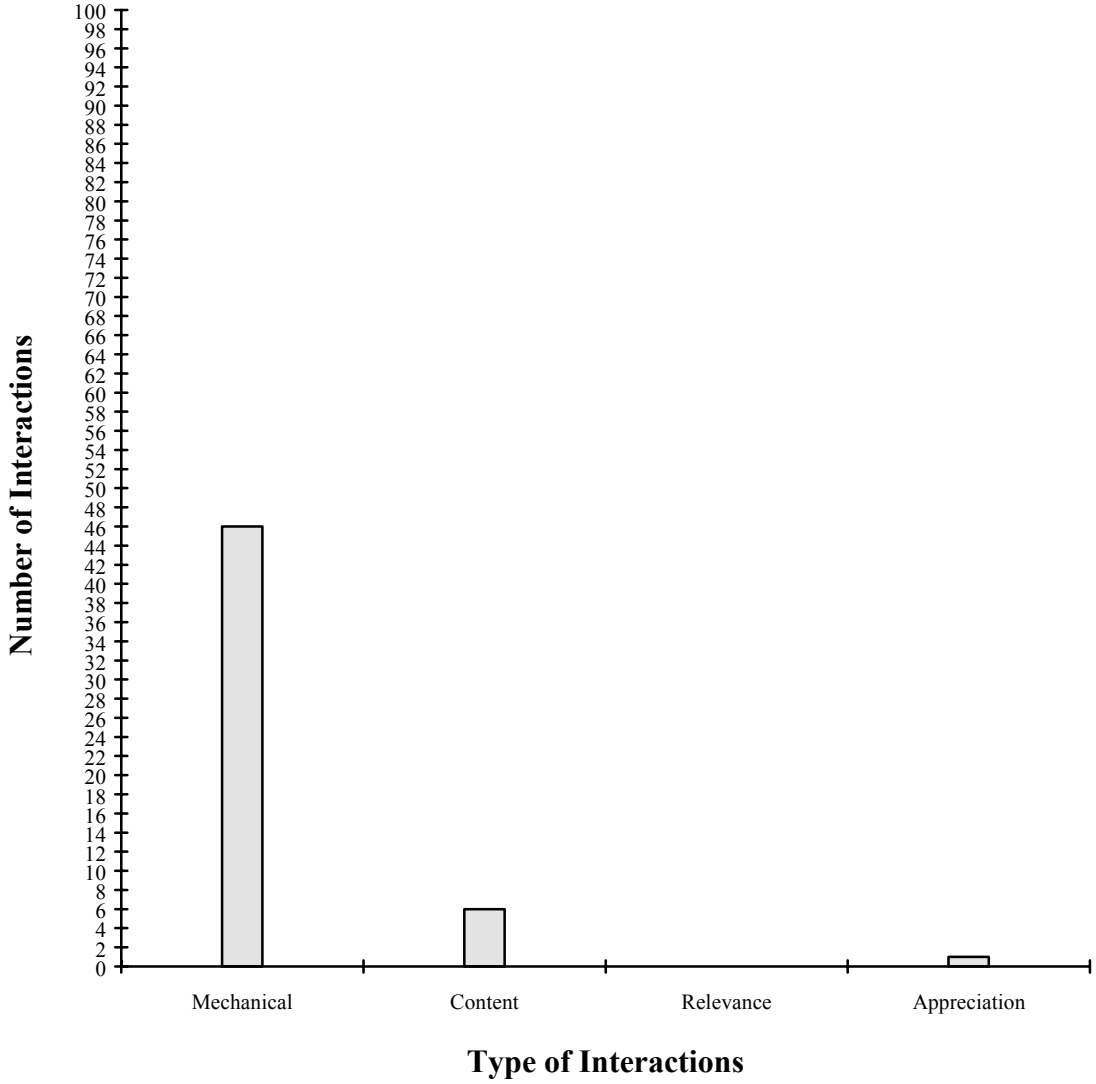


Figure IV.17.
Share Plant Stories video



INTERVIEWS

This section of the report presents the findings from the interviews conducted with adult and child visitors to *Plants & People*. The primary goal of asking open-ended questions was to allow visitors to talk about their experience in the exhibition.

During the evaluation planning meeting, the *BG* team identified eight exhibition messages they hoped visitors would realize from *Plants & People*. They are:

- people cannot live without plants
- people need plants because many foods and products are made from them
- plants have different parts and each part has a function
- plants grow from seeds
- plants grow and reproduce
- city living poses an interesting challenge for plants
- people affect plants, their green community, and the environment
- plant food wastes can be recycled.

BG team members also asked questions about visitors' experiences in the exhibition, as follows:

- what does the exhibition make visitors think about?
- what memories about plants come to mind for visitors?
- do visitors recognize the relevance of plants to their own lives?
- do visitors realize that the recreated house is inhabited by the Greene family?

The interview questions were written with these ideas in mind (refer to Appendices I.4 and I.5).

In reporting the interview data, most of the exhibition concepts and components are discussed in the terms used by interviewees rather than the specific titles used by the exhibition developers. For example, whereas developers specified "Bark and Beneath," "Xylem and Phloem," and the "Tree Core Pull," visitors simply referred to "the tree." However, in situations where the developers' title coincided with the general idea discussed by interviewees, the predefined title is used.

Phrases such as two-thirds or one-quarter are used to express the proportion of interviewees who responded in a certain manner. Because of the open-ended interview format, interviewees often provided more than one idea in response to each interview question. Therefore, the proportions associated with the various responses may total more than 100 percent for any one interview question. In addition, the term "some" is used to convey a portion less than one-fifth; "a few" is used for numbers around 10 percent.

Adults

Thirty-four interviews were conducted with adult visitors (18 years and older) who were accompanied by children to the *Plants & People* exhibition. Of the 40 individuals approached, 6 declined; thus, the refusal rate was 15 percent, which is less than the average refusal rate for museum surveys. All 6 of the individuals who chose not to participate in the interview were females visiting with one or two children.

Of the 34 interviewees, most were able to hold meaningful conversations with the interviewer. However, two female interviewees consistently provided responses with little substance. One distanced herself from the exhibition experience and provided several simple responses; the other reiterated that she was "just looking around." Their individual answers are reported, nonetheless, where appropriate. So as not to lose the context of such answers, it is important to note up-front that not all visitors are engaged with or reflective of their exhibition visits. Still, the experiences of these visitors are as real as the experiences of visitors who articulate more substantive responses to interview questions.

Visitor Group Composition

Of the 34 interviewees, nearly four-fifths were female and just over one-fifth were male (79 percent and 21 percent, respectively) (see Table IV.4).[8] More than one-quarter of the interviewees were accompanied by one child (29 percent); nearly half were accompanied by two children (44 percent). Only one interviewee was visiting with more than four children.

Table IV.4.
Visitor Group Composition in *Plants & People* Adult Interviews in Percent
(n=34)

Gender	**%**
Female	79.4
Male	20.6
Number of Child Companions	**%**
One	29.4
Two	44.1
Three	11.8
Four	11.8
Five or six	2.9

[8] The ages of the adult interviewees were not collected because the evaluation and planning teams had decided that age was not of particular interest to this portion of the evaluation.

Familiarity with the *Plants & People* Exhibition

As an opening question, interviewees were asked whether they had heard of the *Plants & People* exhibition prior to arriving at the Museum. Of the 34 respondents, only 4 claimed to have heard of it before their visit (12 percent). Of these four, each had gained knowledge of the exhibition from a different source: word-of-mouth from a staff person, newspaper, the Museum's recorded telephone message, and a previous visit to the Museum.

Thoughts While Going through *Plants & People*

Because the exhibition is designed essentially for children, interviewees were asked what they, as adults, were thinking about as they went through it. In general, their responses referred to plant products, the educational or hands-on quality of the exhibition, the exhibition's appearance, or the importance of plants to the environment.

More specifically, over one-third of the interviewees referred to the fact that numerous common household items originate from plants. These adults appreciated the way familiar products—toiletries, medicines, and especially foods—helped children to relate the exhibition to their everyday lives and to become aware of the prominent role plants play in their lives. The responses given by half of these individuals referred directly to foods.

> I enjoyed seeing the different plants and letting the children see the difference [between] what they see at home and where it comes from.
>
> It was just very cleverly put together: like with the orange juice, or the lemonade . . . you see the glass and all . . . you think about them . . . and then you pick it up and you realize, hey, you squeeze lemons or you see a glass of milk and it is very informative for a child in terms that they always see that it comes from a refrigerator, but where did it begin. So it is informative in terms of them being able to touch and feel and really see where it began.

Over one-third of the interviewees referred to the educational nature of the material and the tremendous potential for learning (see the first quotation below). In addition, more than one-fourth of the adults applauded the wealth of hands-on activities that kept children interested and engaged (see the second quotation below). These two thoughts were also intertwined, as illustrated by the last two quotations.

> I thought it was very educational. A lot of it is explained, of course, and the thing is something that the child has seen before but didn't know where it came from. Plus it gave them additional information, like the tools.
>
> I thought it was interesting because I thought there was a lot of hands-on things for the kids to play with and they really enjoyed themselves.

> I think it was very educational because a lot of things that they can do with their hands when they come here to see how things look, they work.
>
> I thought it was very hands-on, and that is good because children learn by touching and seeing and doing.

The appearance of the exhibition was also mentioned by some interviewees. Individuals commented either on its colors and brightness or on its realistic portrayal of nature.

> It is very lively . . . the colors and the brightness of it attracted us.
>
> I thought it was good because everything is handmade and very warm feeling; it is very colorful and beautiful.
>
> How peaceful . . . [it] almost captures the image of the outdoors.
>
> Everything looks as it does in a natural environment, which is very, very good for the children. It doesn't take anything away from nature.

Two interviewees acknowledged the importance of plants to the environment.

> I was thinking about the environment and what we need to do in order to keep it safe for us. We, as adults, abuse it, and we need to keep in mind that we need the trees in the environment in order for us to survive.
>
> I thought that it was very interesting, a unique way to teach children about plants, how important they are to our environment.

In contrast to the rest of the respondents, one interviewee expressed a negative opinion:

> It is simplistic but . . . quite frankly, I don't think it is really grabbing their interest. I mean they are playing. They are going from item to item without really getting absorbed in anything. It is not really interactive. They can push buttons and they can turn things, but there is not a lot they can do, and I think they want to do things.

<u>Parts of *Plants & People* That Reminded Interviewees of Everyday Life</u>

One of the main goals of the *Plants & People* exhibition is to enable children and families to learn that plants are needed to sustain their lives and satisfy daily needs. To effectively convey this message, the exhibition attempts to help visitors connect plants to their everyday activities. When asked specifically whether anything in this exhibition reminded them of something in their everyday life, an overwhelming 31 of 34 interviewees indicated that there was something that they had seen or done before. Their responses referred to food, neighborhood trees, bathroom products, common household items, the garden, or composting.

The sights and smells of food in the kitchen area were mentioned by more than half of the interviewees as the exhibit elements that reminded them of their everyday lives.

> The food exhibit where they had the drink, tea, and stuff. Sometimes they have questions like: "Mommy, where does tea come from?" or "Mommy, how does the cow make the milk?" So it is good that they saw it.

> The spices, the vanilla, the cinnamon—that smelling thing was well done. The table settings for different meals. There was something that was very much like we have at home that we can relate to.

The second most frequent response, given by one-quarter of the individuals, referred to neighborhood trees.

> The fact that we are walking around in our neighborhood and [they] explain the things that they can do with the tree—not to harm the trees, not to carve on the trees.

> The dog telling you not to let people carve into the trees or the dogs urinate on trees which everyone knows about in New York.

> It was like everything you see everyday outside on the street. The Johnny pumps and the trees and the roots coming up and where they are making the pool.

Bathroom items, including cosmetics and medicines, were acknowledged by nearly one-quarter of the interviewees.

> The bathroom scene where it has the paste and the powders—things that you don't even think about. It gives it like a homey feeling.

> It was the part with the cosmetics, the bathroom, very interesting. Didn't think about where they came from.

Other common household items, including clothing, were noted by some visitors.

> Oh yes, like that shoe horn. The mixer and gadgets that you used to see a long time ago and you are now seeing here.

> The containers, the clothing, things about where the clothes came from, the food stuff—very good I thought. . . . The child can link it to real life, plus it is teaching them.

A few visitors each said that the garden and the trash/composting unit reminded them of everyday life.

> Outside gardening, with the seeds, the shovel, and so on.

> I mean, sure, there is trash, there is composting. Yeah, it is relevant, I mean we plant seeds. He understands the whole story on garbage, recycling, and composting. . . . There are things that we certainly connect with our everyday lives.

Opportunities for Intergenerational Learning

Another of the main goals of *Plants & People* is to facilitate discussion and interaction among children and adults focusing on the choices people can make regarding environmental issues and the relationships they have to the community of living organisms upon which they depend. Therefore, adult interviewees were asked what components in the exhibition were good opportunities for them and their child companion(s) to learn together. Nearly three-quarters of the visitors were able to indicate a specific part of the exhibition. The topics discussed by these interviewees included food (by far the most popular), specific exhibit components, the hands-on nature of the exhibition, and various unique experiences.

Responses related to food and its original source were the most prevalent, given by over half of these interviewees.

> The food section and how you can use flour to make cereal and sugar to make cookies. . . . Where does bread come from. . . . You always see the final product, you don't really know where it comes from, and I think that was important. She learned a lot about that.

> They were surprised to see what some foods are made of on the table over there where you pull it up—the glasses and touch the fork. They were surprised: "We eat that?"

> You know, we eat everyday, we drink, but we don't talk about the food at home, but we can see reality or whatever. They can learn if it is from cows, this is from orange or exactly what it is made from. I thought it is great they can learn [about] nature.

Three exhibit components were named by three interviewees as being good intergenerational learning opportunities: Smell the Spices, the Bathroom scene, and the Living Room area videos (Share Plant Stories). Similarly, the hands-on quality of the exhibition was noted by three individuals. In addition, four components were mentioned by two interviewees: the tree, seeds, how a plant grows, and clothing and fabrics.

> Being able to actually pick up objects with my son, because that is the only way he can understand, and allow him to do the same following what I have just done.

> The tree, the life of a tree. And here I learned about why they put those fences around the trees in the street. It made sense and now when I see them I know why they are there. I stop myself from walking too close to the trees, too [close] to the edge. So the trees can eat and survive. So it is stuff from everyday life. You can transfer the knowledge you gather here out there. I think that is one of the things I did.

There were several unique responses, related either to a specific component or to a personal association with a component. For instance, the talking tree, the wood exhibit, instruments, brooms, the fish tank, composting, and the leaf experiment jar were named by one visitor as good intergenerational learning opportunities. Additionally, seeing activities that reminded them of their own family was noted by one interviewee. Another individual mentioned the gourd, because it reminded her of something she saw or heard about as a child. Another interviewee, from Jamaica, indicated that the video about making the Sorrel drink was good for her and the children to view.

> They liked the wood exhibit, the different things you could make out of wood. And we talked about that. They liked that.
>
> The plants growing and the composting. We talked about that while we were doing it.
>
> When we were viewing this thing, my husband was saying, "Oh, that's the way Cindy (my mother) makes that," so that it brought it home and we talked about that. My youngest son [said], "Look, Mom, they are cooking like I help you cook," so that was good.
>
> The section with the TV—people from your community doing things that they do. I thought that was good for them because our family is from Jamaica, and so when they start talking about the Sorrel drink, that was something that they could relate to. Now you know they are going to go home and make the Sorrel drink.

Over one-quarter of the interviewees were unable to associate something from the exhibition with intergenerational learning. Three interviewees claimed that their child was too young to learn or discuss the exhibition's content. In two cases, the individuals believed there were no particularly good opportunities to learn together; in two other cases, the interviewees simply responded, "I don't know." And in two groups the children were apparently "on their own," so the adults did not interact with them.

Things in *Plants & People* That Were New to Visitors

Plants & People was created, in part, to enable visitors to discover the extent to which plants are part of their daily lives. To gauge adult visitors' familiarity with the exhibition's material, interviewees were asked whether there were things in *Plants & People* that were new to them—that they had never before thought about or heard of.

Almost half of the interviewees replied that there was nothing new and nearly half expressed having "learned" something from the exhibition. Three respondents reported that the sources of the bathroom items were new to them. Because the remainder of responses were highly individualistic (i.e., they could not be meaningfully categorized), they are listed in Table IV.5.

In addition to indicating whether there was something in the exhibition new to themselves, three interviewees also offered what they thought was new to their children. For instance, the children

may not have known that worms live underground, that peppers are a fruit, or that plants are the source of clothing, medicine, bread, and corn starch powder.

Aside from those who commented on what they learned, nearly one-fifth of the interviewees interpreted the question to be asking whether they had ever seen the exhibition before, to which they all replied with items or areas that were "new" to them or that they believed were "new" to the Museum.

Table IV.5.
***Plants & People* Content**
Considered New to Adult Interviewees

Content New to Respondent	n[1]
Sources of bathroom items	3
Fibers/the making of fabrics	2
Seeds/seed dispersal	2
Difference between a beaver and a raccoon	1
Foods and drinks (sources of)	1
Gourd products	1
New way of conveying information to children	1
Plants (how they work)	1
Reminder of things learned in the past	1
Sorrel drink (how to make it)	1
Things from Panama and Africa	1
Toys made from plants	1
Tree products	1
Differences between trees/underwater plants	1
Different wood	1

[1]Some interviewees provided multiple responses.

What *Plants & People* Does Well

Interviewees were asked, "What are some things that the exhibition does really well?" Three interviewees were unable to think of anything in particular. The responses given by the other visitors can be broadly classified into five categories: approach to content, interpretive techniques, outcomes of the visit, specific exhibit components, and exhibition design.

Approach to Content

The responses of one-third of the interviewees referred to the approach taken by the exhibition. Five of these interviewees noted the way the exhibition interests children or makes the concept of plants interesting to them. Individual respondents appreciated that the exhibition "shows home life" and that it "demonstrates some of the novel things of the world." The fact that the exhibition displays diversity by depicting different cultures and the similarities between them was acknowledged by one interviewee. Another addressed the "natural progression" of the exhibition's content: it starts with seeds and how things grow and ends with how plants are used for everyday household items. Another respondent suggested that through details the exhibition does a good job of communicating on different levels, so that even nonreaders can understand the messages.

> Just a matter of piquing their curiosity. When I first came in, I [thought], "Oh, they are going to be in and out." Everything just caught their [attention]. They wanted to do everything at one time, which is really good.
>
> Details. I think that you make it very clear. I think that these children, even if they don't know how to read, they were just paying attention to the presentation. They could understand what it said. That was good that you detail. I wouldn't say a dummy could understand it, but like a child that could not read would be able to pick up most of what you are trying to display. Like my niece doesn't read that well, but she understood the presentation. And that's good, I think that is very good. You are trying to communicate on different levels.
>
> The natural progression of things: how you start with the very elementary thing, like how seeds are distributed, all the way to how plants can be used for everyday household things that you use everyday. And also how food is prepared. I think it is natural because when you come in you start with how plants grow and you end up with how we use them for food.
>
> It shows a great example of someone showing diversity, different cultures. The similarities between the different cultures, one that may call the same bark or tree by a different name but it is still the same tree. Also learning about other cultures and people and how they interact.

Interpretive Techniques

One-quarter of the interviewees applauded the hands-on design of the exhibition because it piques the interest of children, allows them to participate in an activity and observe the results, and reinforces the way they learn. In addition to hands-on interaction, one visitor also noted the "visual-type exercises" that invite children to experience plants.

> I think it engages children well. It invites them to participate and learn by participating. I think that is very important—more than just reading a book or seeing a video. There are hands-on things to do, which catch a young person's interest.
>
> It teaches the kids a hands-on concept. You know, you could tell them things and tell them things, and they will forget them. But when you teach them something and they actually have a hands-on exhibit, they will never forget that; they will always remember that.

Outcomes of the Visit

One-quarter of the individuals referred to what they believed were the outcomes of visiting *Plants & People*. Three of these interviewees suggested that the exhibition makes people aware that plants are important to everyday life. Two other visitors indicated that the exhibition helps children to think about and understand where household items originate. Other individual responses noted that the exhibition gives children an "appreciation for nature and for plants," provides children with an understanding of "how things grow" and "how things fit together," and makes children more aware of plants in their everyday lives. Referring to another outcome of the visit, one interviewee commented about the child accompanying her, "She is still talking about plants and animals."

> It gives the children an appreciation for nature and for plants. To respect it and to help to . . . promote the life of plants, the life of the planet—our lives. The interrelation between our lives and theirs. The interconnection. I think it is great. It is a valuable lesson that they can learn while having fun.
>
> I think it really gets the kids interested and since they are interested they are going to learn. It explains about seeds and plants and how important they are in our everyday life. I think that some kids, if they went through it slowly, would start to think about all of those things in a different way and be more aware of them in their everyday life.

Specific Exhibit Components

One-quarter of the interviewees named specific components in their responses. Two respondents mentioned the table setting and food unit, and two indicated that they enjoyed the videos. Other components, each specified by one individual, included the animals (e.g., earthworm, insect),

cosmetics, garbage area, garden, growing plant video, hand puppets, parts with the stories, "spinning wheels," and "tunnel."

Exhibition Design

Responses related to the design of the exhibition were offered by some interviewees. Two interviewees mentioned the "natural light" flooding into the area: one in relation to the nature-like quality of the exhibition and the other in terms of the exhibition's layout. In further commenting on the layout, this visitor mentioned the exhibition's three-dimensionality and the way sound effects and differential scaling direct attention. Other individual responses noted that the exhibition is "clean," it has a "very nice friendly atmosphere," and it is at a height such that children can easily reach and touch.

> I think it [the design] moves people along well. Activities are spread out and interesting. . . in the way they use the sound effects with the different scales of the things. . . . Some things that are very small and focused, where others are big and kind of draw you in from a distance, like the wall. The way that it is so three-dimensional takes up a lot of space and makes it very interesting. . . . The natural light makes it a totally different area from a lot of it. It is good for this type of display.

Suggested Improvements to *Plants & People*

Interviewees were asked, "In what ways can the exhibition be improved?" One-third of the respondents offered no suggestions, each insisting, "I don't know," "I can't think of anything," or "It is fine the way it is." The suggestions that were offered can be categorized into four main topics: exhibition hardware and design, live plants, interpretive techniques, and additional content material.

Hardware and Design Suggestions

Of the interviewees making suggestions, nearly half commented on the hardware or design of *Plants & People*. Three of these visitors recommended that the "out-of-order" components be repaired. The other seven responses were unique. One respondent thought that the sound effects, recordings, and videos were difficult to hear. Another believed that certain buttons in the exhibition needed clear instructions regarding what to do. A bench or sitting area for parents was suggested by one individual, as were chairs so that children could sit and look at the exhibition. One visitor mentioned that the exhibition was "smallish," though consistent with the scale of the museum, and "a little more spacing in the greenhouse" was suggested by another. One interviewee explained that "if you could make that area a little more attractive people would actually sit there and listen"; however, the "area" she is referring to is uncertain.

> A couple of the items were not in working order, so that once they got excited—"Oh well, this doesn't work." So that kind of turned them off a little bit.

> Some of the sound effects were a little low, like the things with the video and some of the other recordings. With all the excitement going on around here it is real hard to hear that.
>
> Maybe I am missing it, but I don't see clear instructions about what to do with the buttons there. I think that would be helpful.
>
> Maybe a little sitting area here for the parents. You only can sit on that couch and this is a large area to explore and the kids are running all around and the parents can't be in every spot. Maybe a little sitting area, a bench here or something.

Add More Live Plants

Among the interviewees who made suggestions, over one-third would like to see more real, live plants in the exhibition.

> You have a lot of great artificial exhibits; I think the real thing would bring it home.
>
> Maybe if there were . . . some real things. Everything here is pretend, and they [the children] know it. I think it makes a real difference to them.

Suggestions Regarding Interpretive Techniques

Of the interviewees making suggestions, one-third referred to the manner in which the exhibition expresses its messages. Three respondents recommended the incorporation of truly interactive activities, such as actually planting seeds in a pot that the children could take home and watch grow or participating in the activities of a real garden. Two interviewees were less specific, suggesting merely that there be more hands-on exhibit elements. Including computers in the exhibition to reinforce learning was mentioned by one visitor. Having a museum explainer on hand to answer children's questions was suggested by another.

> I would like to see them actually do some planting with the inside. It is a very simple way for them to see planting where they put seeds in a pot. And, maybe they could take it home with them and be able to see it sort of progress as it goes along. Like you see a lot of that in here and it would be nice if they could do a little hands-on type thing. I think the seed exhibit that they had over here does a lot about, What are these different types of seeds? How do they grow? Planting would be a way for them to take it back with them.
>
> If they could [do] something that is a little more interactive, more than just pushing a button and seeing things light up and words come on the screen. I mean, these two are only 4 and 5½. They can't read—the videos are one thing. Maybe it is not working properly, but I don't think even looking at the video, if I hadn't stood there and explained what was going on, I don't think they would have gotten it.

> Probably if there was any kind of a computer-type program, where they can actually see with that technology plus also learn about plants or food, whatever. But at least to have that technology there to assist with their learning capabilities, and also using that technology. You know, to reinforce it. Anything that you can get on CD-ROM. Anything that would use that type of system.
>
> Maybe if there is somebody here to explain to the children what exactly they are seeing or what they are going through, that might be even better. Because if she asks me a question, I won't know. But if somebody from the museum says this is this is that, then it will be better—more educational.

Content Suggestions

Nearly one-quarter of the interviewees who made suggestions recommended additional content for *Plants & People*. Two of these individuals would like to see more microscopes with cross-sections of dissected plants and animals (e.g., earthworms, frogs), because "it promotes . . . [children's] curiosity to explore life and plants and animals." Other suggestions were completely idiosyncratic, for instance, include more displays about fish, showing exactly what they eat, more about seeds, more about the "different cultures," and "more displays on the senses" of sight, smell, and sound. Taking the exhibition's content to a more personal level, one respondent suggested that it should "show the kids not to litter" and to "make up their beds."

> More microscopes. Maybe some cross-sections, some dissections of an animal, like a frog or something. . . . Microscopes, they love that. . . . [It] would be fantastic if you could have some microscopes, not just the plants, but they could look at some animal life and plant life. Some beautiful aspects of it, not just the mundane like the leaf. In microbiology there are really some magnificent plant and animal life that you could see on the microscope. . . . Kids could see that sort of thing, life, on the microscope, but really it promotes their growth, intellectually, everything. Their curiosity to explore life and plants and animals, that kind of thing.
>
> They are interested in the fish tank there. They like to see fish, maybe a few more displays of fish, showing exactly what they eat.

Use of the Discovery Carts in *Plants & People*

On days when the Discovery Carts were out at the Children's Museum, interviewees were asked whether they had used the carts that day. Of the 17 respondents who were asked, more than three-quarters replied that they had not used the carts. The three interviewees who visited the carts spoke positively about their experiences there. All three visitors referred to learning: the children "really learned a lot," "how you can make use of trees and plants for musical instruments like that rain stick," "it was a nice way of teaching how seeds travel and how animals participate in that process." Two respondents mentioned how the woman at the cart caught the attention of and engaged children. The other respondent indicated that although he and his child were encouraged to touch plants and smell spices, there was little talk about the plants themselves or about the reasons for the plant's unusual characteristics. Nonetheless, he reported that the experience at the Discovery Cart "definitely encouraged conversation" because the child he was with asked him "a few questions about seeds and things that were over there," so they talked "a little bit about them."

Children

To understand a child's experience in *Plants & People*, 35 interviews were conducted with children who had visited the exhibition. All of the children were accompanied by an older visitor (16 years of age or more). Members of Kids Crew were ineligible to be interviewed. The refusal rate was 16 percent—slightly lower than average for museum surveys. Six of the seven children who chose not to participate were boys.

As opposed to interviews with adults, interviews with children tend to produce a slightly different form of information due to the manner in which children speak. The responses of children often appear as disjointed lists without much context or explanation. Because they are less adept at maneuvering language, children are less capable of expressing complete thoughts coherently. Consequently, their responses are more idiosyncratic and less classifiable. As a result, the findings that follow are often reported in table format, with fewer full quotations in the text than in the previous section reporting interviews with adults. The many unique responses are listed in appendices.

Demographics

The 35 interviewees were between 7 and 12 years of age. As shown in Table IV.6, 21 interviewees were girls and 14 were boys (60 percent and 40 percent, respectively).

Table IV.6.
Age and Gender of Child Interviewees in *Plants & People* in Percent
(n=35)

Age	**%**
7–8	45.7
9–10	37.1
11–12	17.1
Gender	**%**
Girl	60.0
Boy	40.0

Parts of *Plants & People* That Children Thought Were Fun

To help children feel comfortable responding to the interviewer, the initial question they were asked was, "What are some of the things you did while you were in this room that were fun?" Any responses that were obvious references to parts of the Museum other than *Plants & People* (e.g., the "waterfall") are not included in this report. All pertinent responses that were given by two or more than one individual are listed in Table IV.7. All unique responses (i.e., responses given by only one individual) are listed in Appendix IV.1.

The 5 components named most frequently by children as being fun were the Plants You Eat and Drink, puppets, microscopes, television, and the underground tunnel. These findings corroborate the tracking data: all 5 "fun" components were among the top 10 most frequently visited components in *Plants & People*.

Of course, there were several idiosyncratic responses: for instance, the closet, "cartoons showing frogs and bugs," "garbage can with leaves in it," drums, "how vegetables grow," "old books," stories, music, the faucet, the "building thing," "traveling seeds," African plants, foods, and instruments, and the laundry basket (refer to Appendix IV.1).

Table IV.7.
***Plants & People* Components and Themes**
Considered "Fun" by Children[1,2]

Component/Theme	n	Component/Theme	n
Plants You Eat and Drink[3]	18	Globe/map	3
Puppets[4]	16	Instruments	3
Microscope	8	Record your Thoughts	3
Television	7	Smell the Spices	3
Underground tunnel	5	Touching/pressing buttons	3
Bathroom	4	Videos (plant, tree)	3
The House	4	Zoetrope	3
Learning about plants	4	Garden	2
The tank	4	Looking at/watching plants	2
Tree	4	Sorrel	2
		Worms	2

[1]Most interviewees provided multiple responses, so the total n exceeds 35.
[2]Idiosyncratic responses (i.e., n=1) are not included in this table; see Appendix IV.1.
[3]Children did not always distinguish between solid food and drinks in the meal setting.
[4]Because references to puppets were indistinct, both the puppet theater and the mound puppets are included here.

Parts of *Plants & People* That Made Children Feel Good Inside

Later in the interview, the children were also asked, "Of all the things you did today in this room, what really made you feel good inside?" The answers given in response to this question were similar to those given in response to the question of what was fun. However, there were far fewer of these responses, and more of them were idiosyncratic. Table IV.8 summarizes the responses made by two or more individuals.

Table IV.8.
***Plants & People* Components and Themes**
That Made Children Feel Good Inside[1]

Component/Theme	n
Puppets	6
Plants You Eat and Drink[2]	5
Bathroom	2
Drums	2
Piano[3]	2
Plants	2

[1]Idiosyncratic responses (i.e., n=1) are not included in this table; see Appendix IV.2.
[2]Children did not always distinguish between solid food and drinks in the meal setting.
[3]The marimba was referred to as a piano by children.

The puppets were named most frequently; yet in each case it was something different about the puppets that made the child "feel good." One child said he "put a show on," whereas another indicated that he "didn't do any puppet show"; rather, he "watched them." One girl who played with the puppets explained that she likes "to see people laugh and enjoy it," whereas another focused on her own enjoyment, stating simply "Because they were fun." Providing a response related more to the social atmosphere than the exhibitry, one child explained, "The puppets because I was playing with my cousin."

The Plants You Eat and Drink was the second most frequently named component that made interviewees "feel good inside." In this case, the reasons for the good feelings were less individualistic. The responses of three of the five children referred to the source of foods: e.g., "they showed how they made the food," "knowing what is in the juice and stuff that I eat," and "it tells you where the food comes from."

Four other components were named by two interviewees. In all four cases, when reasons were given, they were distinct. Regarding the marimba, for instance, one girl said that when she grows up she wants to play the "piano," whereas the other girl emphasized that it was "playing the African music" on the "drum and piano" that made her feel good.

With respect to what in the exhibition made interviewees feel good inside, there were innumerable idiosyncratic responses, including the following: the cartoons, tank, microscope, arts and crafts, the house, old tree, insects, tree video, world map, learning new things, listening to stories, touching buttons, having fun, picking up the big bush, and making a kite (see Appendix IV.2). The following quotations are reprinted verbatim to illustrate some of the more thoughtful responses:

> I liked how they wanted the kids to help understand how important it is to take care of the things around you, like the earth. And it is good that they were showing healthy foods

and things that you need to take care of your body. It made me feel good that a building could be so heartwarming to help even children understand some of the hardest things. They shrunk it down so it is easy for them to understand and to learn and to enjoy.

The house. (How did it make you feel good?) Like it was my own. The food looked real, the garden looked real, and the garbage can.

Every time I ever came here, my brother came. He showed us. It made me feel good in a special kind of way.

Parts of *Plants & People* That Children Thought Were Not Fun

In addition to naming what parts of *Plants & People* were fun or made them feel good inside, interviewees were also asked what parts were not much fun. Of the 35 interviewees, over one-quarter responded that "there was nothing that was not fun" and, hence, provided no suggestions for exhibition improvements. Five components, on the other hand, were mentioned as being "not fun" by two or more children (see Table IV.9).

Table IV.9.
***Plants & People* Components**
Considered "Not Fun" by Children[1]

Component	n
Video/movie/television[2]	4
Refrigerator	3
Tank	3
Snail	2
Underground tunnel	2

[1]Idiosyncratic responses (i.e., n=1) are not included in this table; see Appendix IV.3.
[2]Because the responses are vague, all references to videos are included here.

Four interviewees referred to videos that were "not much fun," each offering a different perspective. One child thought "the video took a long time"; another suggested that a cartoon or animation might make it more fun; a third believed that having "more people in it" could make it better. In contrast, all three of the children who mentioned the refrigerator had similar reasons for not liking it: they could not feel or see inside the food. Of the three individuals who named the tank, one offered a suggestion to improve it: put animals, such as goldfish, in it. Two children indicated that looking at the snail was not much fun; one suggested that it could be made better, however, if she could "watch a fish gobble it up." The underground tunnel was considered "really gross" by a girl who does not like worms and another girl believed the hole would be more fun if there were things to pull down and see bugs inside.

All of the idiosyncratic responses are listed in Appendix IV.3. Interestingly, each of the top five most frequently named "fun" components was also mentioned as being "not fun." One girl did not like the food on the table. To improve it, she would put the food on a plate, "set it in a telescope," and "put napkins on the table." Another girl did not like "the play," explaining, "it wasn't that fun because no one else was there and my parents were forcing me to go there because they liked it and I didn't like it." One child thought that the mound puppets were not much fun, recommending that it be a "big mountain with more little puppets." Another child, not liking the microscope, suggested that it could be improved by putting more things in it and "not like all this [that] looked like fatty tissue." Comments about the videos (or television) and the underground tunnel are presented above.

What Children Learned from *Plants & People*

As a follow-up to the interview question asking what in the exhibition was fun, the child was asked what the activity was trying to show. The interviewer was, thereby, directly attempting to elicit what the child had "learned" from the activity. In addition, indications of learning surfaced spontaneously throughout the interviews. All responses that indicated learning are presented in this section. The main topics discussed by the children include Plants You Eat and Drink, the Living Room TV, microscope, puppet show, and Bathroom.

Thirteen interviewees were asked what the food on the table was trying to show. Nearly two-thirds of these children expressed an understanding of the intended message: that is, plants are important because they are the source of our food. Two of the more articulate responses follow:

> They also have another kitchen area where [they] have drinks that when you pull them up, you see what made the drinks, and when you push the fork, you see what the main vegetables and fruits were to make the meal that is shown in the plate.
>
> Plants are important because they give you food. If you didn't have plants you hardly would have anything to eat 'cause like the meat even has to, like cows and all have to eat grass and if there is no grass you couldn't get any meat and you could die.

Six interviewees were asked about or made mention on their own of what the television was showing them. Two-thirds of these interviewees spoke accurately about what they learned from the TV. Two children learned about the sorrel drink, one noting that the sorrel comes from Jamaica and the other describing "a lady who was making a special Christmas juice out of a plant." Another learned about instruments and "decomposing garbage." One girl indicated that she learned "that you are supposed to eat healthy food." The other two children appeared to confuse what they watched on the TV with other parts of the museum.

In contrast to the food on the table and the TV, the microscope was not so well understood. Six interviewees were asked what they saw when they looked through the microscope. Two children thought they were looking at germs. Other responses ranged from bacteria, to patterns, to tiny animals.

Some interviewees were asked what the puppet show was about. Three children spoke of the general themes supported by the puppet theater: "how plants grow," "how they get along," and "about gardens and flowers." Two talked of the shows they put on: one made a caterpillar turn into a butterfly, and the other was weeding the garden and found that bugs were eating her plants so she had to stop them. One child, who had played with the puppets along with her cousin, guessed that the activities were trying to show them how to "have fun."

A few interviewees indicated what they thought the bathroom component was about. Three children grasped the message that "medicine" and "toothpaste and powders and stuff" are made from plants. One child talked of "allergies," and another believed that the sink area showed "what you have to do [when you wake up]."

When asked to explain what a particular activity or exhibit component showed them, children provided many unique responses. Some responses indicated that the child had understood the message (see the first two quotations below); others suggested that the exhibition content had been misinterpreted (see the last two quotations).

> I liked where you got to talk into the trees, so you could see if you were a tree, how you felt. And, I liked how seeds can get all over places so they can make plants.
>
> They was trying to teach us something about how a plant grows and what they need to grow.
>
> I smelled the cinnamon, the vanilla, and . . . the cocoa. (What was that trying to show you?) I think it is trying to make me smell so if I have like a contest of smelling things, I'll know.
>
> [The Zoetrope was] trying to show you about information about how, what they do, and all that. (What kind?) Like I don't really know what kind of information—about dogs.

Statements regarding learning surfaced spontaneously at other points during the interviews. Again, some unsolicited comments indicated that one of the exhibition's many messages was received (see the first four quotations below); others suggested that the visitor had misinterpreted the exhibition's intent (see the last three quotations).

> I learned about the trees, like they are just like us, and I learned that they cut down trees, and . . . that trees are very important.
>
> Learning new things. . . . (*referring to Bathroom*) I didn't know that you could [make] powder of the trees.
> Learning how the trees is just like us is very, very important.
>
> When you looked at the plants that were made all around the world. It made me feel good because people were noticing that plants are really part of your life.

> When I was listening to the [tree], . . . it tells us . . . how many dogs mess all over the planet and it tells me that no one cares for the dogs, [and] doesn't clean their dogs or keep the dog in the house. Or taking care after the dogs, so he wouldn't bite anyone.
>
> Those many cartoons. . . . It showed me that plants eat some things and we some things. Other plants eat chicken, other animals eat chicken. Sometimes other animals eat stuff; other kinds of animals like that thing that eats that butterfly—a fly.
>
> That thing was the real interesting thing—the table. Because now I am learning how to do things. It teaches you how to bake.

What the *Plants & People* Exhibition Is About

In addition to asking for children's ideas about the intent of specific exhibit components, interviewees were also asked, "When you go home and tell your friends about this exhibition, what will you tell them it is about?" Their responses referred to specific exhibit components or content ideas, general observations or themes (including "plants," "trees," "learning," "fun," plant products, environmental ethics, and nature), and the exhibition's overarching messages.

In response to this inquiry, over half of the interviewees named specific content ideas or exhibit components. Among this category of response, the two specific ideas cited most frequently were that the exhibition was about "food" or about "animals." Other specific responses included the "puppets," "seeds," "vegetables," "gardens," "underground," "houses," "the bathroom," "the dinner table," "a cow," "people telling what they do," "a video," "a TV," "music," "arts and crafts," "telescopes," "fish," and "the bird."

In addition to listing specific ideas or components, many interviewees made a more general observation. Almost half of the children stated that the exhibition was about "plants," and one-quarter mentioned that it was about "trees." One-quarter of the children referred to the opportunities for "learning," whereas nearly one-quarter proclaimed that the exhibition was "fun." Some children noted that the exhibition was about plant products; for instance, "how you make things from plants," and "what things food are made out of." The responses of others hinted at the environmental ethics message (see sample quotations below). Three interviewees stated simply that the exhibition was about "nature" or "Mother Earth."

> How people treat trees.
>
> How to save the trees.
>
> About saving the plants . . . could you help them out because the plants are dying, most of them. And, if we don't have plants we ain't got no oxygen.
>
> It has to do with the earth, sort of like cleaning up the earth.

Three other children seemed to grasp the exhibition's overarching messages: that is, plants are important and people need plants. Their responses follow:

> Plant life and why plants are important and what can help the plants, what you can make with plants and stuff like that.

> It was usually about the trees and the plants, how they grow, and if everybody keep on throwing the garbage all over the ground, the plants won't be able to grow because it is going to be very dirty and the plants need very fresh air to grow, so that is what I would tell them. So they won't have to throw any garbage on the floor because there is garbage on the street, and the trees are very important to us and they are just like us too.

> It was about plants and how we need them and everyday we eat plants and we don't know it. Like if we are eating a peanut butter and jelly sandwich, you are eating plants right there. Or if you are eating something, like drinking milk—probably got it from cows and cows eat grass to make the milk from. You are like eating grass then.

There were only three miscellaneous responses regarding what the exhibition was about, including "your everyday stuff," "computers," and treating the world and things that people need nicely, because "it takes lots of time to make them."

Questions about *Plants & People*

At the end of the interview, children were asked if they had any questions about anything in the exhibition or about plants in general. Over one-third of the interviewees asked no questions when given this opportunity. One girl stated:

> (Do you have any questions about what you saw today?) No, because another thing I like about this . . . is that if you have a question, just open your eyes and look, and they practically answer it for you, without even you asking.

The questions that were asked covered a variety of topics, including plants and trees, specific components (such as the microscope, foods, smells, tank, and instruments), and exhibition construction.

A few children asked about plants or trees.

> How do plants grow on trees; when they fall off, how do they grow back on? How do the trees grow?
> Is that tree about us? I learned more about it—that's like us. That is what I would like to learn about it.

> I want to know more about how the plants grow and the sequels of it in a book or something.

> Maybe about when the tree and cells going up into the tree. I don't understand, How do cells go up into the tree?
>
> Why do leaves have different colors?

A few had questions or wondered about particular exhibit components, such as the microscopes (see the first two quotations below), foods (see the second, third, and fourth quotations) or the smells (see the last three quotations).

> I wasn't really sure what everything was—like how it really was in real life and how it didn't look in the microscope.
>
> I wanted to know more about germs and more about food.
>
> What kind of places the ingredients grow in.
>
> I have a question about the milk and the juice. It looks real but it is not real, but how did they do that? It is like real ice and real milk and it looks like real spoons and fork, real silverware. And, over at the cocoa and the cinnamon and the vanilla, how do they make it smell so good. It don't even look like there is anything in there.
>
> In the one where you smell, did you grow all of it by yourself and then bring it in, or did you find it from other gardens?
>
> How do they make cocoa?

A few interviewees asked about exhibit construction, for instance: "How did they make the place?" "How you put TVs into the trees?" and "How did they tape the people in the video?" The tank and the instruments were each the subject of two questions.

> How come there is no fish in the tank?
>
> I really want to know about the instruments—the African instruments, like what they show right now. What other things can they do to make African instruments?

The remainder of the children's questions are idiosyncratic.

> Over there where you crawl through the hole, were those real bugs?
>
> Why do allergies grow sometime in light places and sometimes in dark places?
>
> I didn't really know why they had dogs.
>
> About vegetables, orange seeds, watermelon seeds.
>
> The music.

Why did they put cement on clothes?

I want to know how to keep the world clean.

Part V:

Plant Discovery Carts

PLANT DISCOVERY CARTS DESCRIPTION

Intended to encourage visitors of all ages to learn about plants in an active way, these colorful mobile carts are situated within the *Plants & People* exhibition and on the grounds of the Botanic Garden. Each cart has both protected storage spaces for objects and artifacts and work surfaces so that visitors can use their senses and available tools to explore plants. Facilitators (trained volunteers) use a variety of interpretive techniques, including question-asking, activities, games, props, specimens, and graphics to inspire visitors to learn about one of four primary themes: plants are alive, natural cycles, humans' impact on the environment, and people's relationships to plants. The topics conveyed by the carts are linked to ideas presented in *Breaking Ground*'s three exhibitions and activity sheets associated with the City Plant Adventure Guide.

Specifically, the Plant Discovery Carts were designed to:

- encourage families to have fun learning about plants together
- promote intergenerational involvement in plant education for 6- to 12-year-olds and their adult companions through hands-on activities with natural objects and artifacts
- encourage casual visitor participation and inquiry
- engage first-time visitors, as well as frequent visitors, with activities that have depth and variety.

PRINCIPAL FINDINGS

OBSERVATIONS

This section of the report presents findings from the unobtrusive focused observations that were conducted at the Plant Discovery Carts located either at BBG or at BCM. The primary goal of this study was to observe and record all interactions between adults and children and between facilitators and visitors. These interactions appeared as either behaviors (indicating how visitors use the carts) or comments (exemplifying how visitors process the information presented at the carts).

Three carts were observed at BBG (Pollinators, 911 Rescue Trees, and Plant Expressions), and two carts were observed at BCM (Sense-sational Plants and Seeds on the Go). The data were analyzed two ways. First, because the number of visitor groups observed at each individual cart was relatively small, all of the BBG carts were combined and all of the BCM carts were combined to obtain valid statistical analyses. In all, 59 visitor groups were observed at BBG carts, and 52 groups were observed at BCM carts, for a total of 111 groups. For findings that are similar at the two locations, the results are reported for all the groups as a whole. Any differences between the two locations are highlighted. A second form of analysis compared and contrasted the five individual carts regarding the interactions taking place at each.

The majority of the data is presented in medians, rather than means, because the distribution of interactions is quite "lopsided." In other words, many visitor groups displayed few interactions and few groups displayed many interactions. Therefore, the median is the appropriate measurement.[11]

Visitor Group Composition

As shown in Table V.1, three-quarters of all observed groups included one or two children (75 percent). The median number of children per observed visitor group was 2.0 (not shown in table). The number of adults per group differed between the two locations. At BBG, less than half of the groups contained only one adult (42 percent); the median number of adults per group was 2.0 (not shown in table). At BCM, nearly two-thirds of the groups contained one adult (65 percent); the median number of adults was 1.0 (not shown in table). The distribution of boys and girls at the two locations was similar, except that more groups at BBG contained girls than did groups at BCM (78 percent and 64 percent, respectively) (refer to Table V.1).[12]

[11] 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.

[12] The gender of the adults was not collected because the evaluation and planning teams had decided that it was not of particular interest to this portion of the evaluation.

Table V.1.
Children and Adults at Plant Discovery Carts in Percent

Visitor Group	% at BBG Carts (n=59)	% at BCM Carts (n=52)	Total % (n=111)
Number of Children			
One	30.5	41.2	35.5
Two	42.4	35.3	39.1
Three	8.5	11.8	10.0
Four	8.5	9.8	9.1
Five or more	10.2	2.0	6.4
Number of Adults			
One	42.4	64.7	52.7
Two	33.9	15.7	25.5
Three	13.6	15.7	14.5
Four or more	10.2	4.0	7.3
Number of Girls			
None	22.0	36.5	28.8
One	44.1	32.7	38.7
Two	22.0	23.1	22.5
Three	10.2	5.8	8.1
Four or more	1.7	1.9	1.8
Number of Boys			
None	37.3	38.5	37.8
One	39.0	38.5	38.7
Two	15.3	19.2	17.1
Three	3.4	3.8	3.6
Four or more	5.1	0.0	2.7

The children ranged in age from 1 to 15 (see Table V.2). For both locations, over two-thirds of the children were between the ages of 4 and 9 (68 percent). The mean age for all of the children was 6.36 (not shown in table).[13]

Table V.2.
Ages of Children in Visitor Groups
at Plant Discovery Carts in Percent

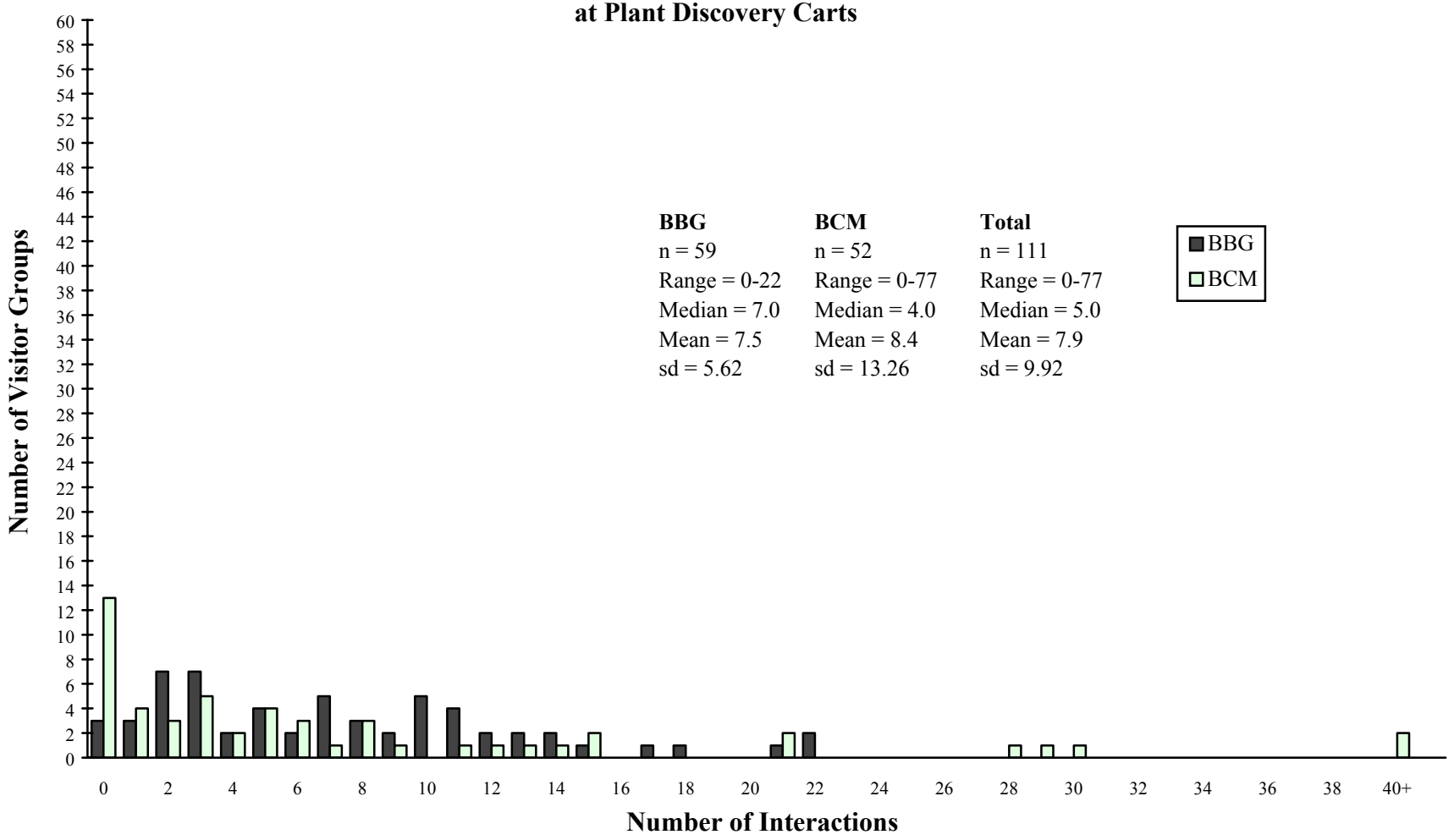
Age	BCM % (n=98)	BBG % (n=130)	Total % (n=228)
1–3	21.5	14.6	17.5
4–6	32.6	38.5	36.0
7–9	29.5	33.9	32.1
10–12	14.3	10.8	12.3
13–15	2.0	2.3	2.2

Number of Interactions between Children and Facilitators

As shown in Figure V.1, the number of interactions that occurred between children and cart facilitators differed between the two locations. At BBG, the number of interactions ranged from 0 to 22; the median number of interactions per group was 7.0. Children in only three groups did not interact with the facilitator. At BCM, on the other hand, the number of interactions ranged from 0 to 77; however, children in one-quarter of the groups did not interact with the facilitator (25 percent). The median number of interactions at BCM was 4.0, lower than the 7.0 median at BBG.

[13] The ages of the adults were not collected because the evaluation and planning teams had decided that adult age was not of particular interest to this portion of the evaluation.

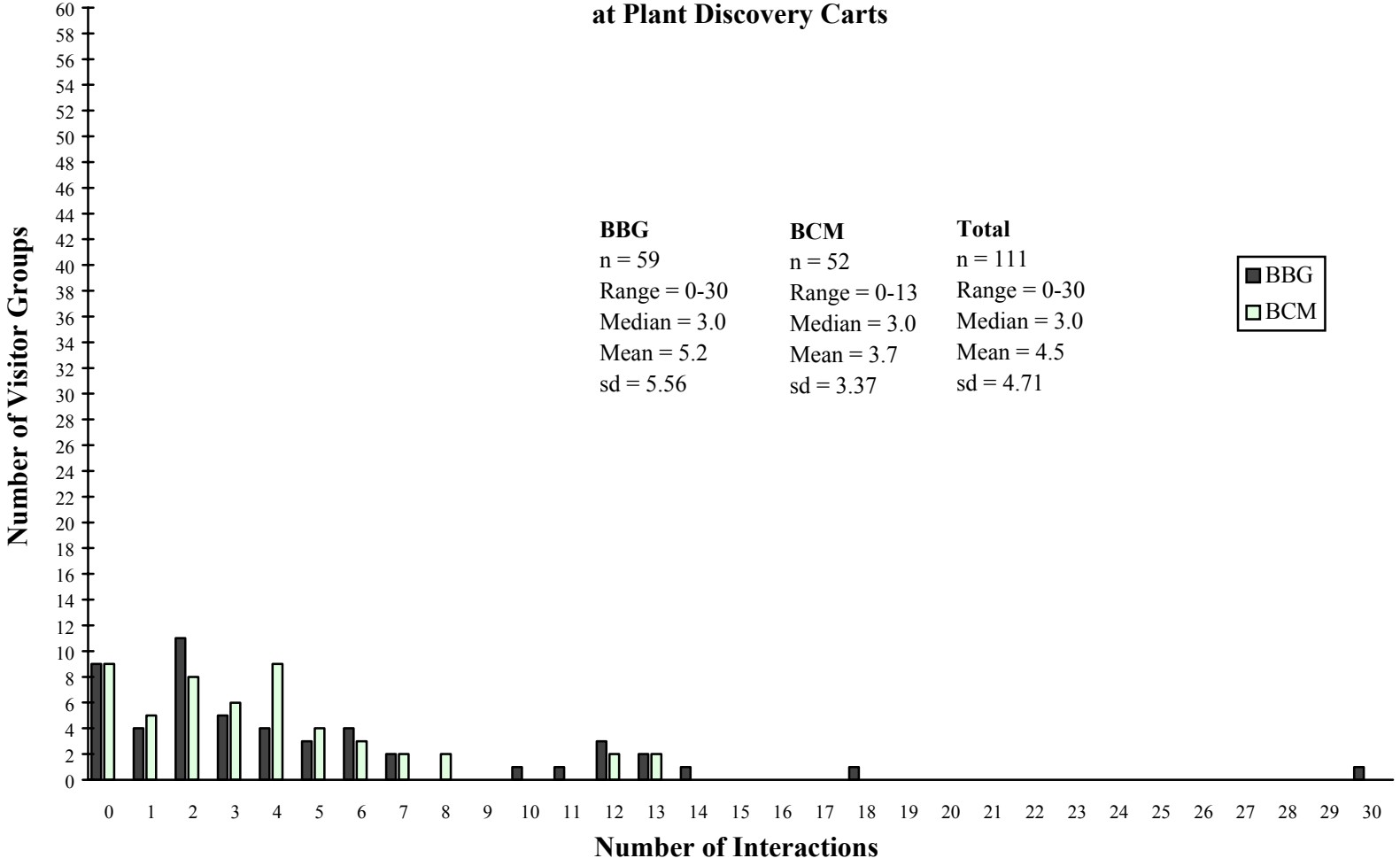
Figure V.1.
Number of Interactions between Children and Facilitators at Plant Discovery Carts



Number of Interactions between Adults and Children

Though the range of interactions occurring between adults and children at BBG (0-30) was much larger than the range at BCM (0-13), the number of interactions that occurred in general was actually quite similar (see Figure V.2). The median number of interactions between adults and children in both locations was 3.0, meaning that adults and children in half of the groups interacted 3 or fewer times and in half of the groups they interacted 3 or more times. In less than one-fifth of the groups the adults and children did not interact (16 percent).

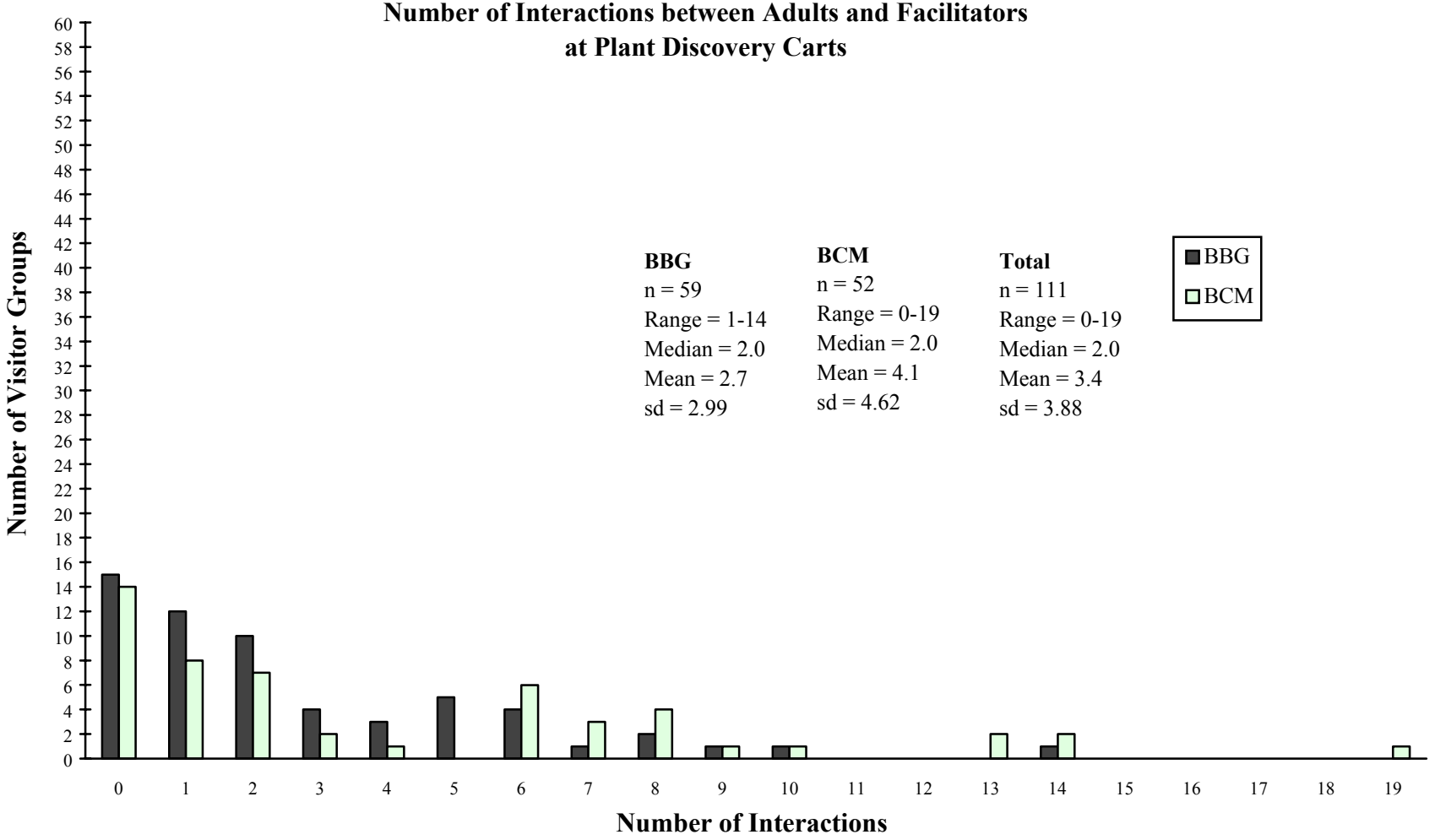
Figure V.2.
Number of Interactions between Adults and Children at Plant Discovery Carts



Number of Interactions between Adults and Facilitators

The number of interactions that occurred between adults and facilitators was also similar for the two sites, so the results from all the visitor groups are reported here. As depicted in Figure V.3, the number of interactions ranged from 0 to 19. The median number of interactions was 2.0, meaning that the adults in half of the visitor groups interacted with cart facilitators 2 or fewer times and half interacted 2 or more times. The adults in one-quarter of the groups did not interact with the facilitators at all (26 percent).

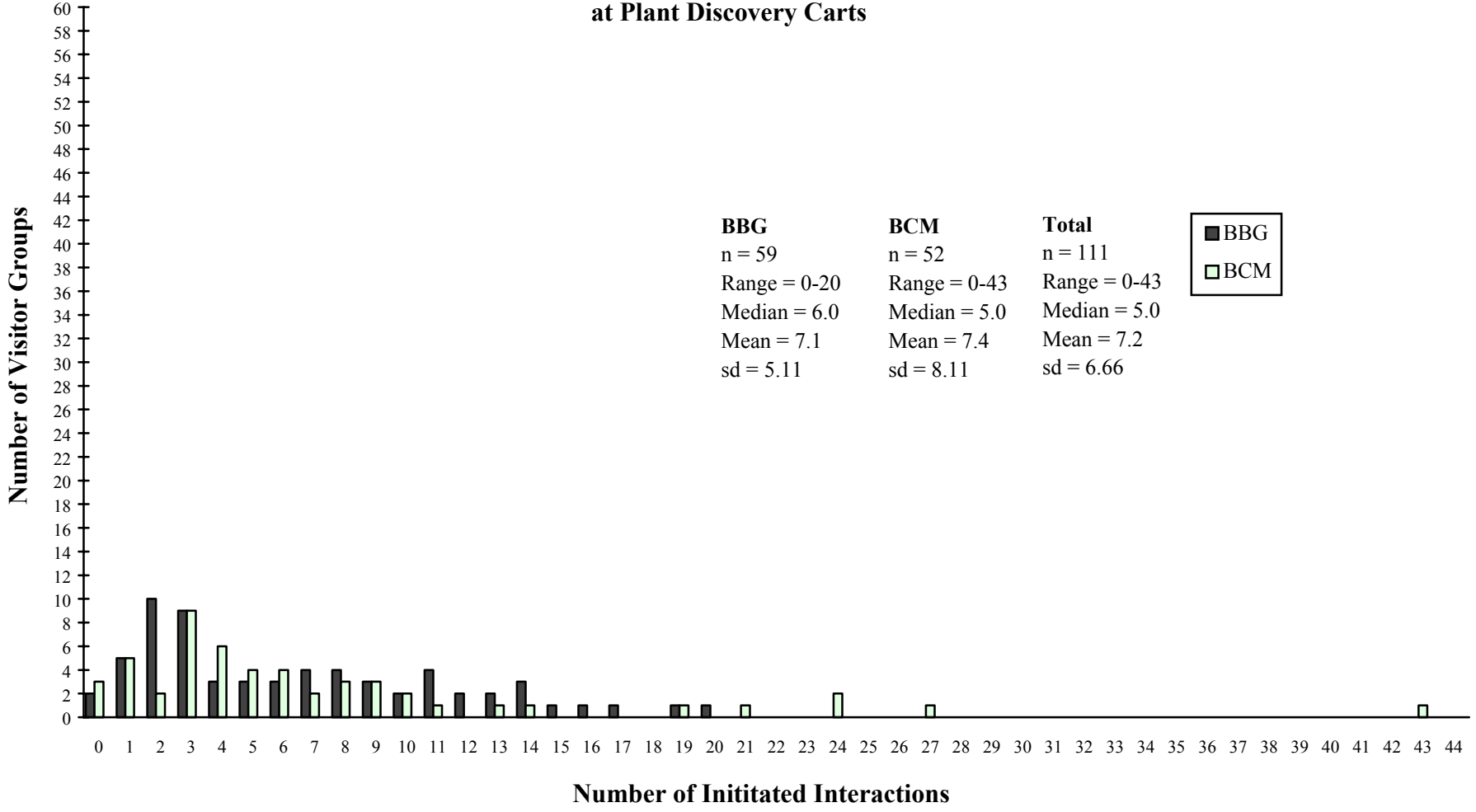
Figure V.3.
Number of Interactions between Adults and Facilitators at Plant Discovery Carts



Facilitator-Initiated Interactions

The number of interactions initiated by facilitators differed slightly between the two sites (see Figure V.4). At BBG, the number of interactions ranged from 0 to 20; the median number of interactions was 6.0. That is, with half of the groups, the cart facilitator initiated 6 or fewer interactions, and with half of the groups the facilitator initiated 6 or more interactions. With two groups the facilitator did not initiate interactions. At BCM, the number of interactions initiated by the cart facilitator ranged from 0 to 43; the median number of interactions initiated by the facilitator per visitor group was 5.0. With three groups the BCM cart facilitator did not initiate any interactions.

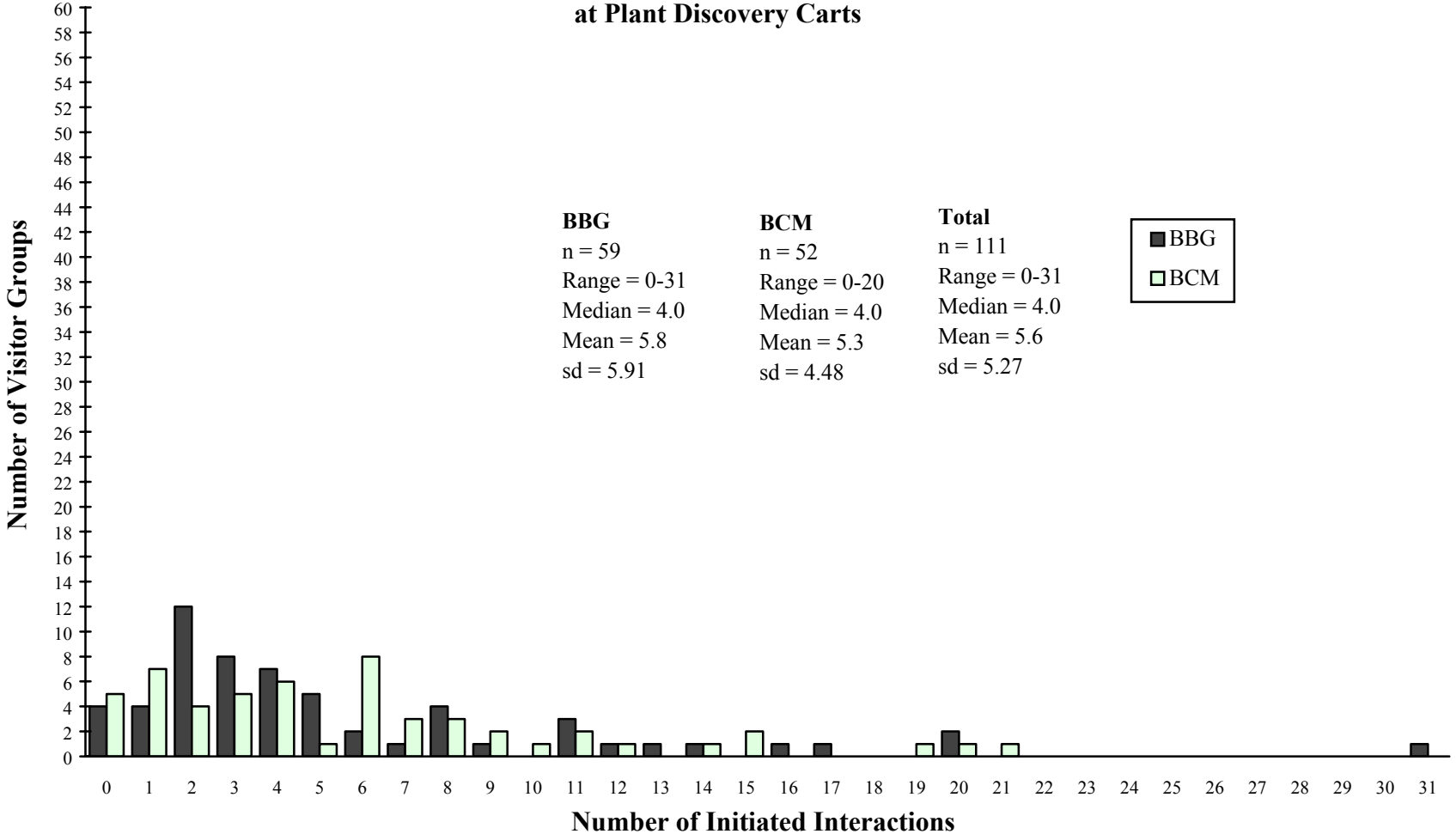
Figure V.4.
Number of Interactions Initiated by Facilitators at Plant Discovery Carts



Adult-Initiated Interactions

As illustrated in Figure V.5, the number of adult-initiated interactions was similar at the two sites. Across all of the visitor groups, the number of adult-initiated interactions ranged from 0 to 31, with the median number of interactions being 4.0. In other words, in half of the groups, adults initiated interactions 4 or fewer times, and in half of the groups adults initiated interactions 4 or more times. In less than one-tenth of the groups the adults did not initiate any interactions (8 percent).

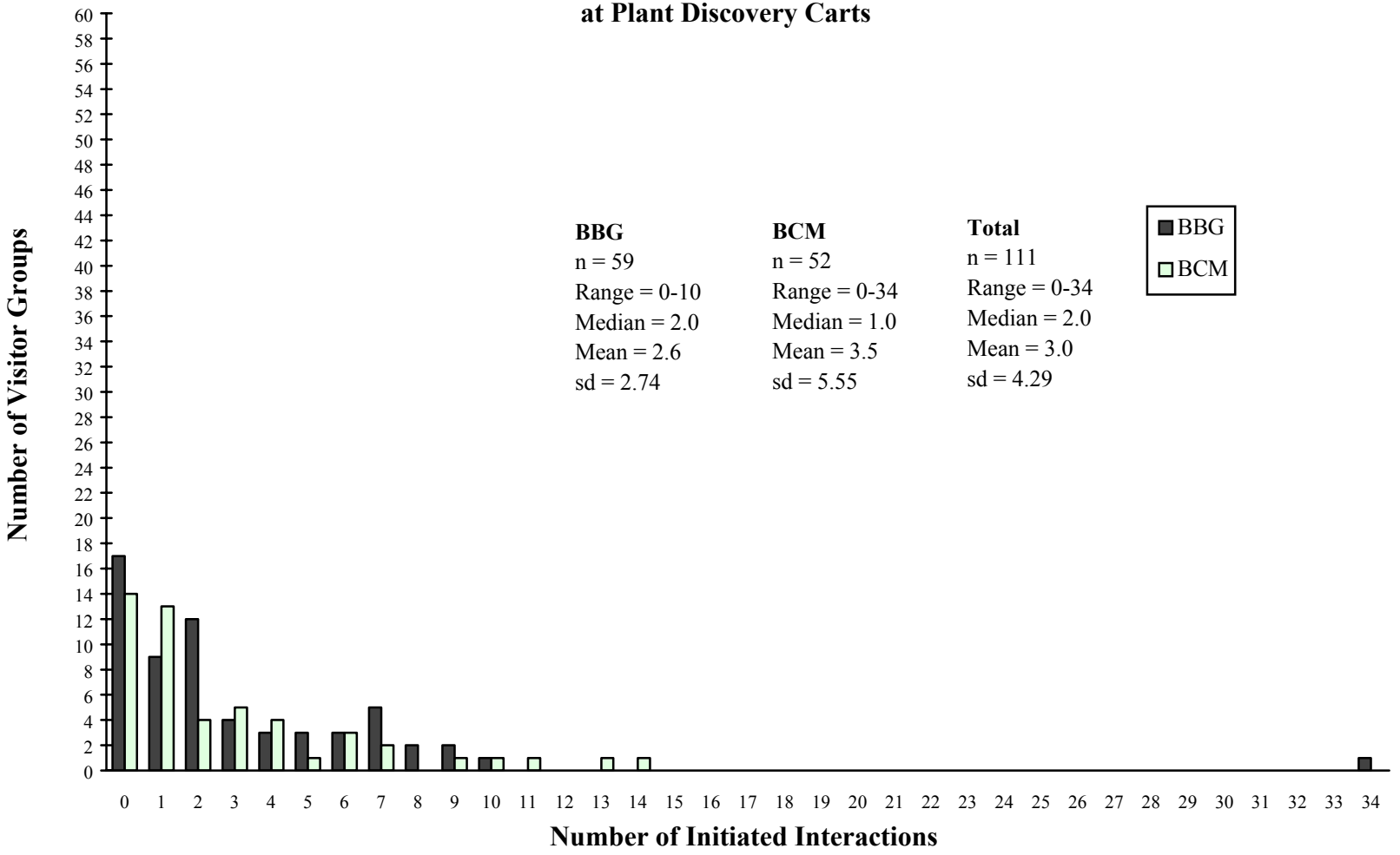
Figure V.5.
Number of Interactions Inititated by Adults
at Plant Discovery Carts



Child-Initiated Interactions

The number of interactions initiated by children differed between the two locations (see Figure V.6). At BBG, the number of child-initiated interactions ranged from 0 to 10. The median number of interactions was 2.0, and in over one-quarter of the groups the children did not initiate any interactions (29 percent). In contrast, at BCM the range of interactions was between 0 and 34, with the median being 1.0. Again, in over one-quarter of the visitor groups, the children did not initiate any interactions (27 percent).

Figure V.6.
Number of Interactions Initiated by Children at Plant Discovery Carts



Types of Interactions Occurring at the Plant Discovery Carts

In this study, as with the tracking studies conducted in *Amazing Plants* and *Plants & People*, the interactions that were observed were classified into four types: mechanical, content, relevance, and appreciation. Mechanical interactions included such physical actions as looking, touching, smelling, drawing, playing games, reading, and pretending. Content interactions included talking, discussing, questioning, explaining, making comparisons, and drawing distinctions about the subject matter, objects, or activities associated with the cart. Relevance interactions refer to comments or actions relating the content of the cart to something in the visitor's past experience or everyday life. Examples include one child who explained, "My mom's afraid of bees; she got stung once," and an adult who asked, "See the peas? Just like you ate last night." Appreciation interactions include comments or actions that express appreciation for the cart's topics, objects, or activities: for instance, "I like this, Mom" and "There are so many things in each cart."

Because there were slight differences between the types of interactions that occurred at each site, the BBG and the BCM carts are discussed separately below.

Types of Interactions at BBG's Plant Discovery Carts

Mechanical interactions were the type that occurred most frequently. Within visitor groups, mechanical interactions were observed to occur between 0 and 17 times (see Figure V.7). The median number of mechanical interactions engaged in by groups was 5.0; only one group did not display a mechanical interaction. The number of content interactions ranged from 0 to 8, with a median of 2.0 (see Figure V.8). Nearly three-quarters of the groups engaged in content interactions (71 percent). The number of relevance and appreciation interactions each ranged from 0 to 3 (see Figures V.9 and V.10). Over one-third of the groups engaged in a relevance interaction, and over one-quarter of the groups displayed an appreciation interaction (36 percent and 27 percent, respectively).

Types of Interactions at BCM's Plant Discovery Carts

As at BBG, mechanical interactions outnumbered the other types of interactions at the Plant Discovery Carts in BCM. The number of mechanical interactions ranged from 1 to 13, with a median of 4.5 (see Figure V.7). All of the groups engaged in at least one mechanical interaction while at a cart. The number of content interactions ranged between 0 and 10; the median was 2.5 (see Figure V.8). Nearly all of the groups displayed content interactions (88 percent). The number of relevance interactions ranged from 0 to 6, with a median of 1.0 (see Figure V.9). Over half of the visitor groups engaged in a relevance interaction (54 percent). Appreciation interactions, however, were observed in only three visitor groups (see Figure V.10).

Figure V.7.
Number of Interactions with Components by Visitor Groups at Plant Discovery Carts

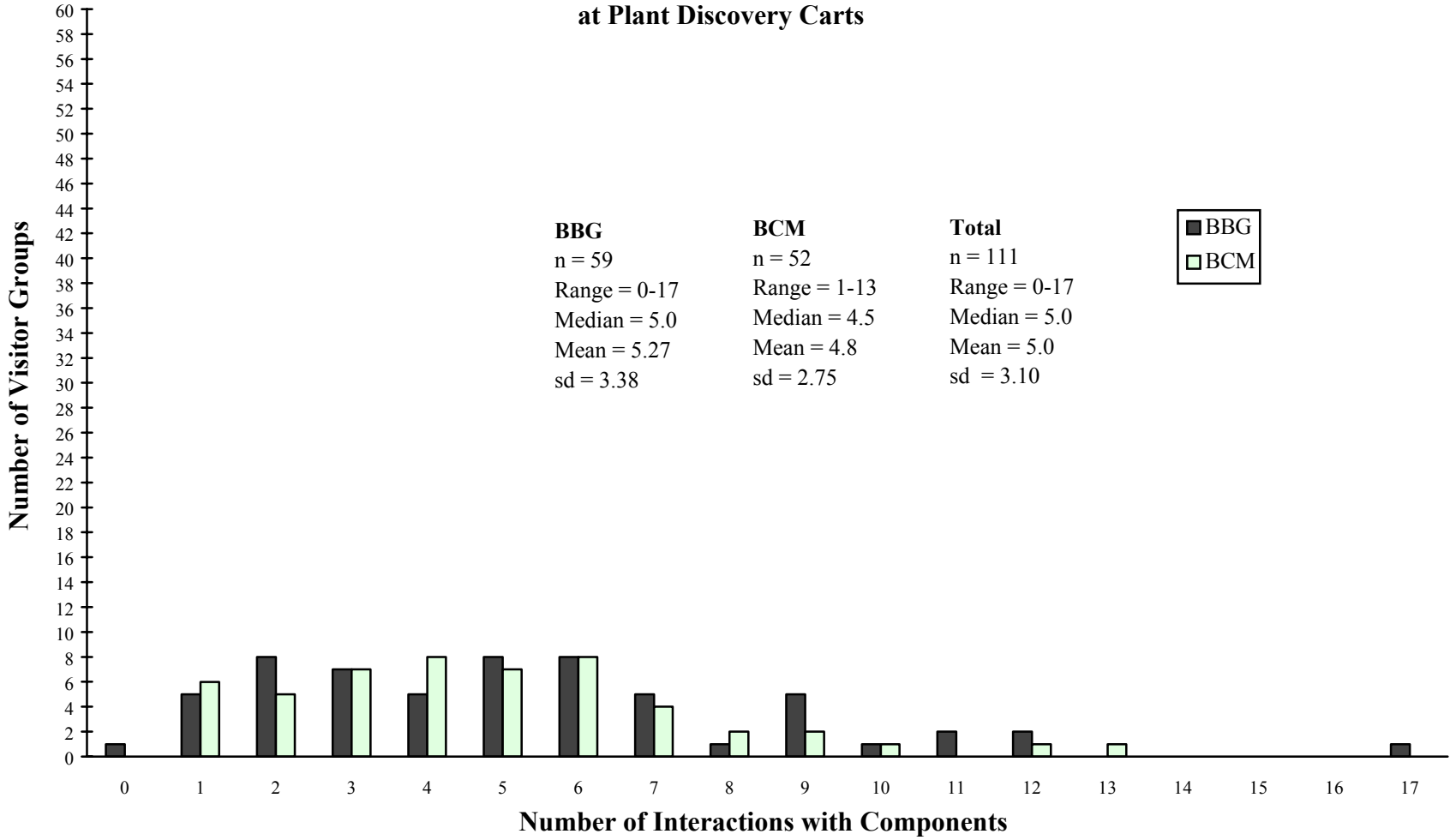


Figure V.8.
Number of Content Interactions by Visitor Groups at Plant Discovery Carts

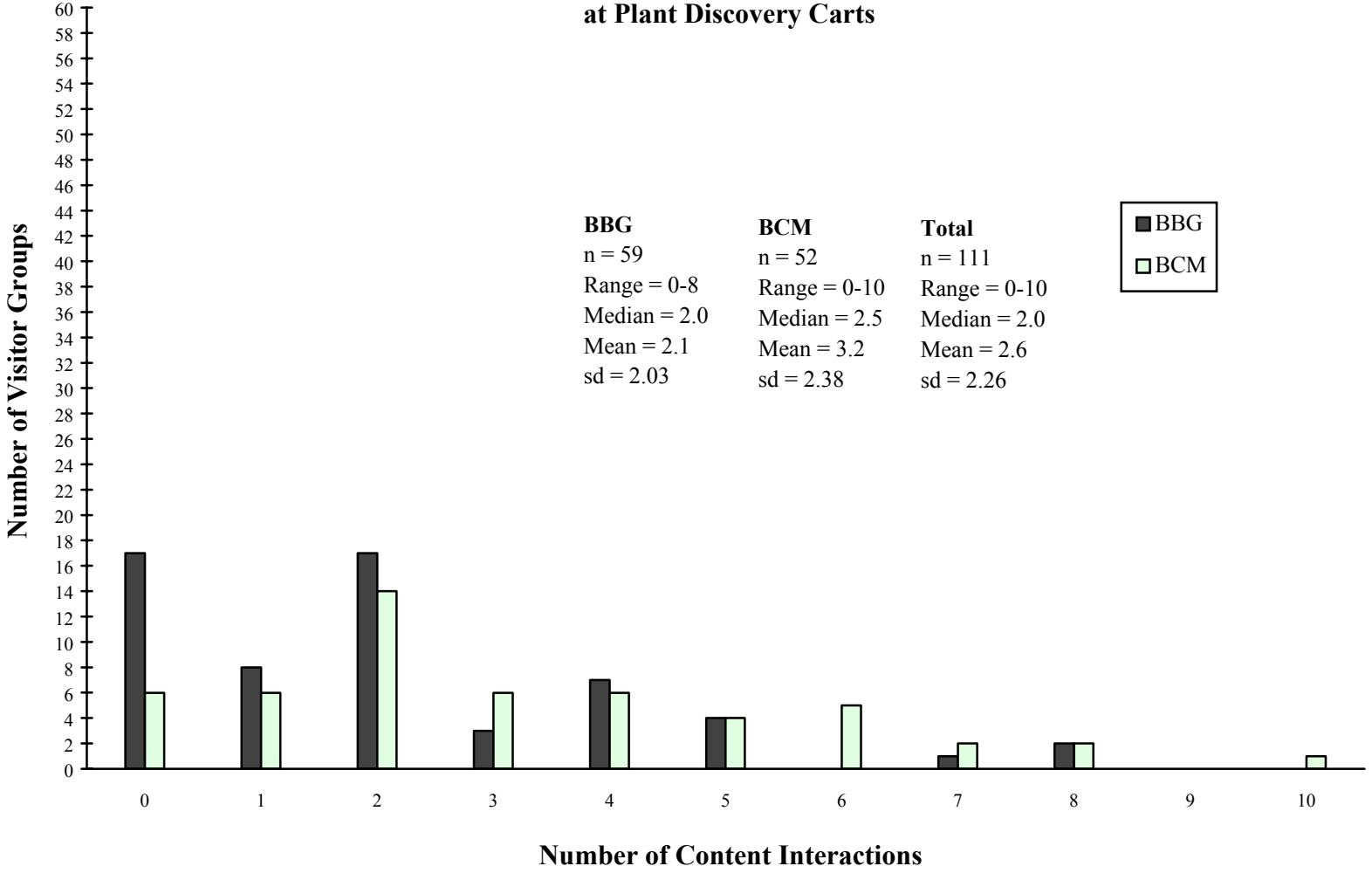


Figure V.9.
Number of Relevance Interactions by Visitor Groups
at Plant Discovery Carts

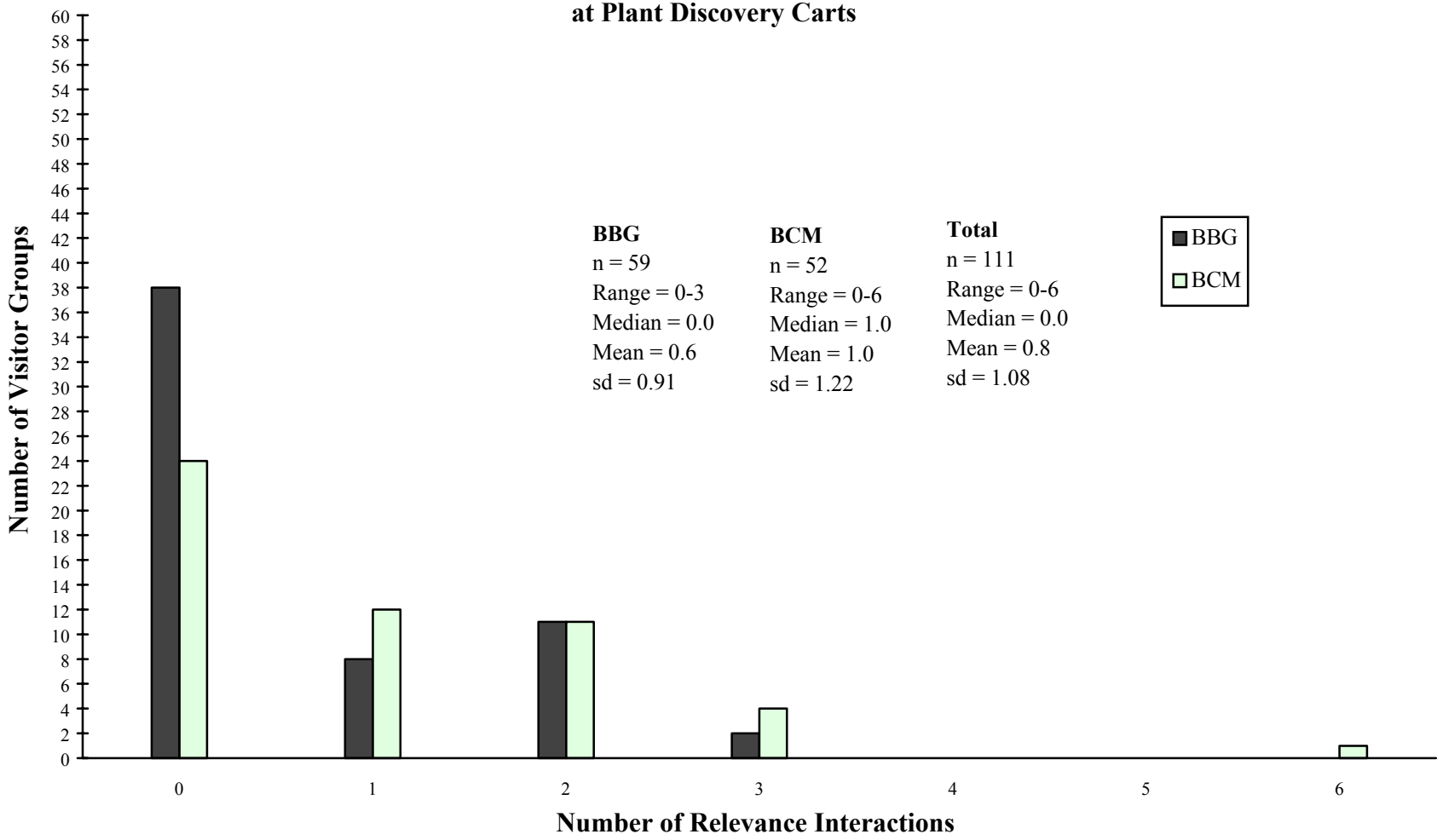
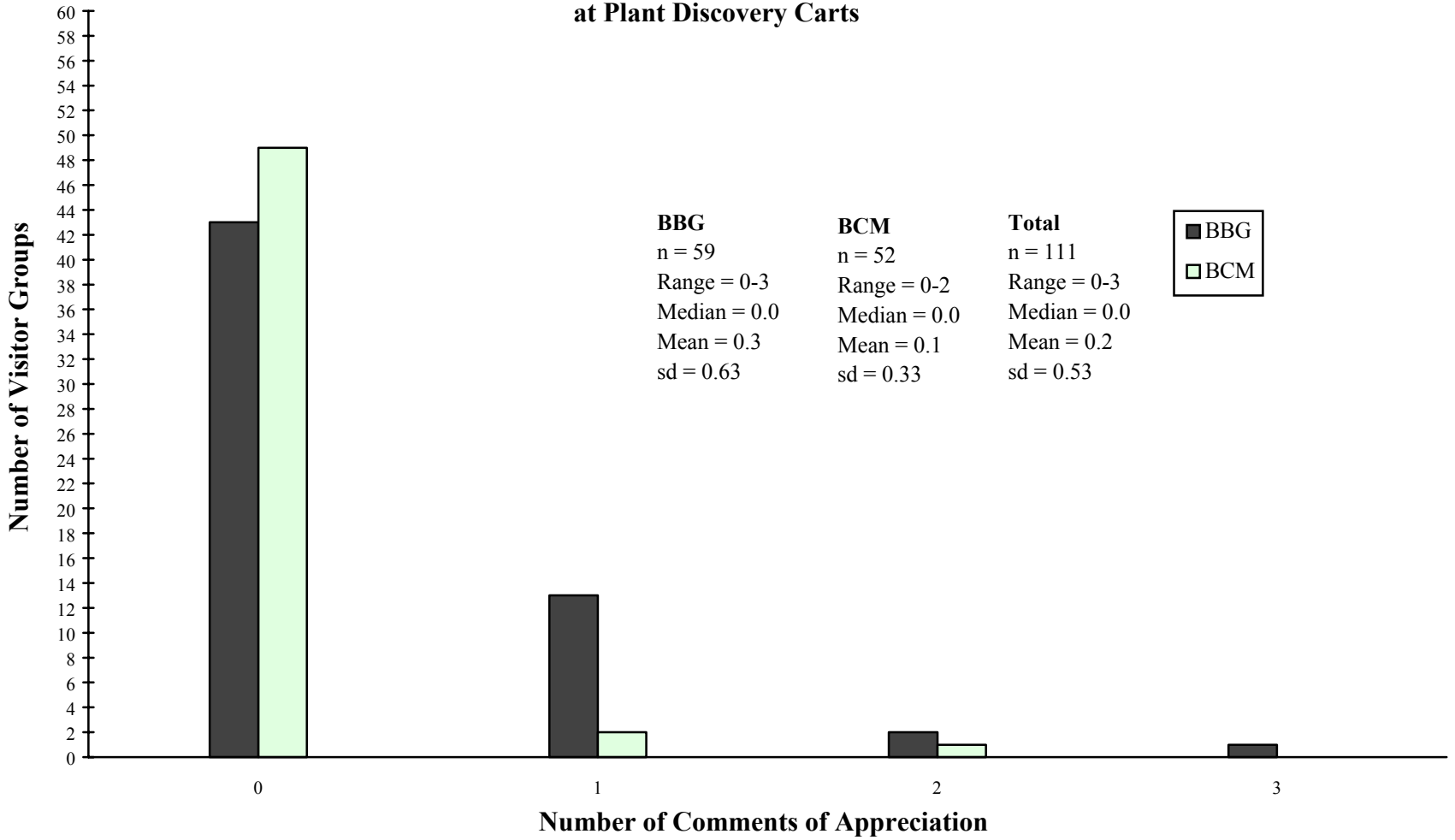


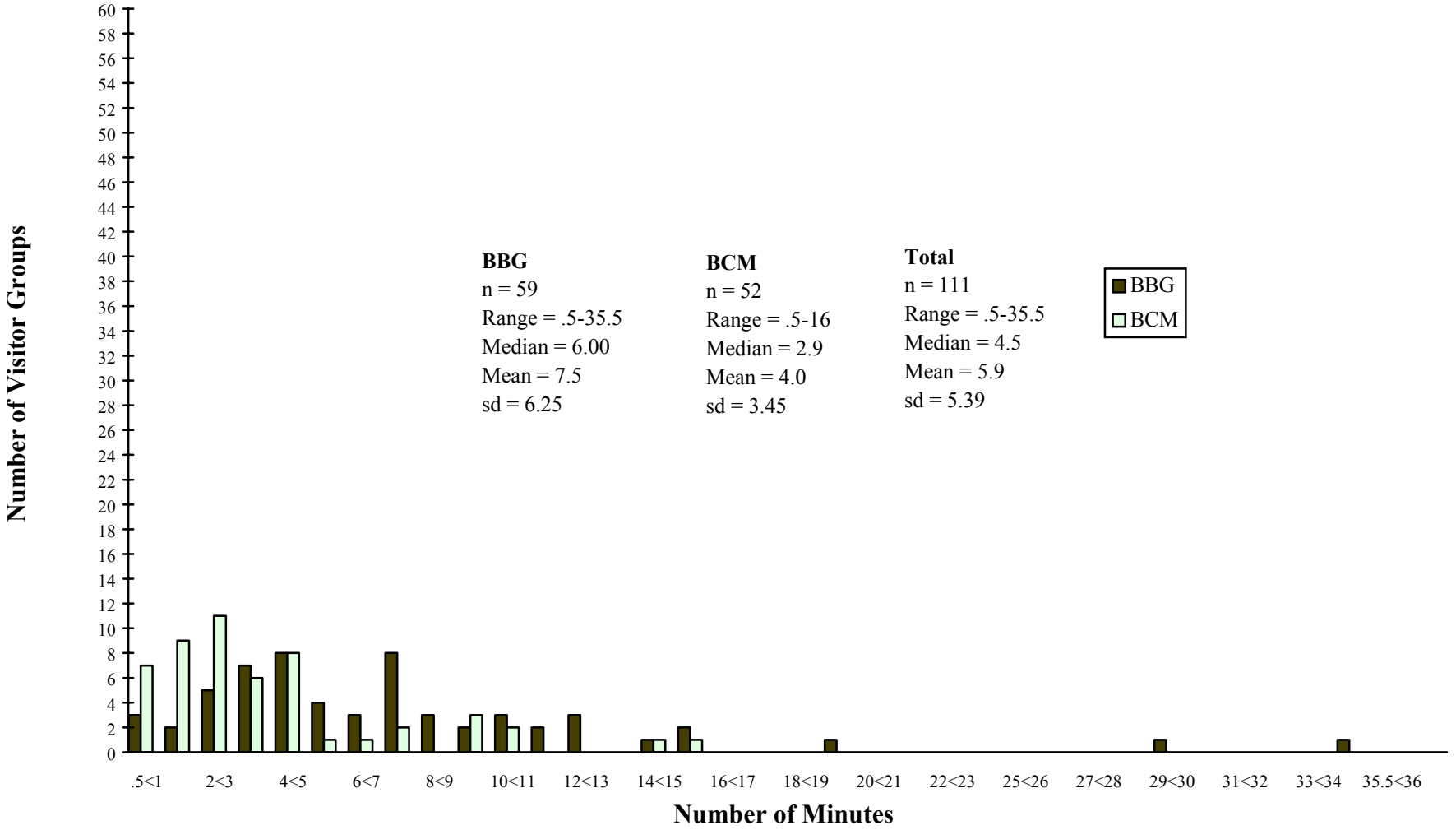
Figure V.10.
Number of Comments of Appreciation by Visitor Groups at Plant Discovery Carts



Total Time (Minutes) Spent at the Plant Discovery Carts

The amount of time spent by visitor groups at the Discovery Carts differed greatly between the two sites. As illustrated in Figure V.11, visitor groups at the carts in BBG spent anywhere between .5 and 36 minutes. Over one-quarter of the groups stayed less than 4 minutes, and over one-quarter stayed more than 9 minutes (27 percent in each case). The median time spent at the carts in BBG was 361 seconds, or 6 minutes. In contrast, visitor groups who stopped at the carts in BCM spent between .5 and 16 minutes (see Figure V.11). Over one-quarter of the groups stayed less than 2 minutes, and one-quarter stayed 5 minutes or longer (29 percent and 25 percent, respectively). The median time spent at the carts in BCM was 173.5 seconds, or nearly 3 minutes.

Figure V.11.
Time Spent in Minutes by Visitor Groups
at Plant Discovery Carts



Interactions Occurring and Time Spent at Each Cart

The following discussion examines the interactions that occurred at each cart, as well as the amount of time visitors spent there (see Table V.3).

Pollinators

Of the five carts, Pollinators elicited the greatest percentage of mechanical interactions and the least percentage of content interactions (68 percent and 23 percent, respectively). Children interacted nearly as much with adults as they did with facilitators (36 percent and 44 percent, respectively). Likewise, adults initiated almost as many interactions as did facilitators (40 percent and 43 percent, respectively). Visitors spent anywhere from ½ minute to over 35 minutes at Pollinators—the largest time range of all the carts.

911 Rescue Trees

This cart also evoked a relatively high percentage of mechanical interactions (61 percent). Two-thirds of the interactions, a relatively high percentage, occurred between children and facilitators (66 percent). At 911 Rescue Trees, more interactions were initiated by the facilitator than at any other cart (57 percent).

Plant Expressions

Of the five carts, Plant Expressions elicited the highest percentage of relevance and appreciation interactions (14 percent and 8 percent, respectively). Adults and children interacted more here than at any other cart (42 percent). Adults initiated slightly more interactions than did the facilitators (45 percent and 41 percent, respectively). The median amount of time visitors stayed at this cart was over ten minutes, longer than at any other cart. Keep in mind, however, that only ten visitor groups were observed at Plant Expressions.

Sense-sational Plants

A relatively high percentage of relevance interactions occurred at Sense-sational Plants (13 percent). Compared to the other four carts, the highest percentage of interactions between facilitators and adults and the least percentage of interactions between children and facilitators took place here (40 percent and 31 percent, respectively). Adults initiated slightly more interactions than did the facilitators (44 percent and 41 percent, respectively). Visitor groups tended to spend less time at Sense-sational Plants than they did at the other carts: the median amount of time was less than three minutes.

Seeds on the Go

Of the five carts, Seeds on the Go evoked the highest percentage of content interactions (42 percent). It had the highest percentage of interactions between children and facilitators (73 percent) and, conversely, the lowest percentage of interactions between both adults and children and facilitators and adults (17 percent and 11 percent, respectively). In comparison to the other carts, children were more likely to initiate an interaction here and adults were less likely (28 percent and 21 percent, respectively).

Table V.3.
Interactions and Time Spent at Each of the Plant Discovery Carts

Interactions	Pollinators (n=37)	911 Rescue Trees (n=12)	Plant Expressions (n=10)	Sense-sational Plants (n=35)	Seeds on the Go (n=17)	Total (n=111)
Mechanical	67.6	60.6	50.0	54.3	50.0	58.3
Content	22.9	30.3	27.8	31.7	42.3	30.1
Relevance	5.7	7.3	13.9	13.0	7.1	9.1
Appreciation	3.8	1.8	8.3	1.0	0.6	2.5
Children & Facilitators	43.7	65.7	40.0	31.1	73.0	50.2
Adults & Children	36.4	20.8	41.9	29.2	16.5	28.4
Adults & Facilitators	19.9	13.6	18.1	39.8	10.5	21.4
Facilitator-initiated	42.6	57.1	41.4	41.2	51.2	46.1
Adult-initiated	40.0	26.2	45.2	44.1	21.0	35.1
Child-initiated	17.5	16.7	13.4	14.7	27.8	18.8
Time Spent at Cart						
Range	:28–35:14	:30–8:48	1:15–19:06	:29–9:00	:35–15:42	—
Median	5:38	5:51	10:43	2:50	3:32	—

Part VI:

City Plant Adventure Guide and Overall Evaluation

CITY PLANT ADVENTURE GUIDE DESCRIPTION

Distributed to visitors at the Plant Discovery Carts at BBG and BCM, the City Plant Adventure Guide is a colorful folder that opens up to display a plant-filled urban neighborhood. Each cart also offers a unique activity sheet, or Plant Adventure, that is inserted in the folder. Besides being a souvenir, the Guide presents in-depth plant-related activities that adults and children can do together at home and in their own neighborhood to enhance the topics they explored on site. It is hoped that the lure of collecting all 10 Plant Adventures will encourage repeat visits to both BBG and BCM and help visitors discover more about plants and the relevance of plants to their everyday lives.

Specifically, the City Plant Adventure Guide was designed to:

- promote continued family involvement in exploration of *Breaking Ground* subjects at home
- encourage intergenerational interaction
- encourage repeat visitation to both BBG and BCM.

OVERALL EVALUATION DESCRIPTION

The *Breaking Ground* project (*BG*) consists primarily of three exhibitions (*Amazing Plants*, *Plants & People*, and the Discovery Garden), Plant Discovery Carts, and the City Plant Adventure Guide. One way of evaluating the entire project is to determine visitor use of all *BG* components and to describe the effects that visits to BBG and BCM have on the everyday lives of visitors. To gather this information, a standardized questionnaire was developed and mailed to visitors six to eight weeks after their visit. As a control group, visitors were also surveyed on site prior to their visit to a *BG* component (see Appendices VI.9 and VI.10 for samples of the questionnaires).

The primary goals of the mail-back and on-site studies were to:

- determine overall use of all *Breaking Ground* components
- assess cross-visitation patterns among BBG and BCM visitors
- describe use of the City Plant Adventure Guide
- examine visitors' participation in intergenerational plant-related activities.

PRINCIPAL FINDINGS

This section of the report presents findings from the mail-back and on-site surveys that were conducted by both BBG and BCM. The surveys were identical except that the mail-back survey included three additional questions.

VISITOR GROUP COMPOSITION

There were 471 surveys in the total sample; 207 were mailed back and 264 were collected on site. Of the mail-back survey respondents, over half were recruited at BBG; just under half were recruited at BCM (58 percent and 43 percent, respectively). Of the on-site surveys, nearly three-quarters were gathered at BBG, and just over one-quarter were collected at BCM (73 percent and 27 percent, respectively).

As displayed in Table VI.1, over two-thirds of all of the respondents were female; just under one-third were male (68 percent and 32 percent, respectively). Table VI.2 shows that over half of the sample was composed of White or European Americans (52 percent). Multiethnic individuals and African Americans were the next two most prevalent ethnic groups in the sample (16 percent and 13 percent, respectively).

Table VI.1.
Gender of Survey Respondents in Percent

Gender	%
Female	67.7
Male	32.3

Table VI.2.
Ethnicity of Survey Respondents in Percent

Ethnic Group	%
White/European-American	52.1
Multiethnic	16.4
Black/African-American	12.7
Caribbean	5.7
Latino/Hispanic	4.8
American Indian	3.3
Other	2.6
Asian/Pacific Islander	2.4

Survey respondents ranged in age from 15 to 79. The mean age was 39.17 years (not shown in table). As shown in Table VI.3, the largest percentage of respondents were 35 to 44 years of age

(43 percent). Few respondents were under 24 or over 55 (7 percent in each case). The ages of their child companions ranged from 1 to 17. The mean age of the children was 6.68 years (not shown in table). Nearly two-thirds of the children were 4 to 9 years of age (61 percent) (see Table VI.3).

Table VI.3.
Ages of Survey Respondents and
Their Child Companions in Percent

Age of Respondent	%
15–24	7.2
25–34	22.9
35–44	43.0
45–54	19.9
55 +	7.0
Age of Child Companions	**%**
1–3	18.5
4–6	31.8
7–9	29.2
10–12	16.5
13–17	4.0

NUMBER OF VISITS TO BBG AND BCM

Respondents were asked how many times they had visited BBG and BCM during the last two months. As Table VI.4 shows, nearly half of the respondents had made two or more visits to BBG, whereas just over one-quarter had made no visits during the last two months (46 percent and 27 percent, respectively). In contrast, just over one-quarter of the respondents had made two or more visits to BCM, and over one-third had made no visits during the last two months (27 percent and 39 percent, respectively).

Table VI.4.
Survey Respondents' Number of Visits to BBG and BCM during the Last Two Months in Percent

Number of Visits to BBG	%	Number of Visits to BCM	%
None	26.6	None	39.1
One	27.6	One	34.2
Two	16.8	Two	10.5
Three	10.3	Three	6.1
Four or more	18.7	Four or more	10.1

NUMBER OF TIMES VISITORS SAW, USED, OR EXPERIENCED *BREAKING GROUND* COMPONENTS

Breaking Ground consists of seven distinct components. Four are located at BBG (*Amazing Plants*, the Discovery Garden, Plant Discovery Carts, and the City Plant Adventure Guide), and three can be found at BCM (*Plants & People*, Plant Discovery Carts, and the City Plant Adventure Guide).

Overall Experiences with BG *Components*

Survey respondents were asked to indicate the number of times they had seen, used, or experienced each of the *BG* components at BBG and BCM. As shown in Table VI.5, nearly one-third of the respondents had experienced a *BG* component only at BBG, and close to one-third had experienced a *BG* component at both institutions (31 percent and 30 percent, respectively). Slightly over one-fifth had not experienced any *BG* component at either site, and slightly less than one-fifth had experienced one only at BCM (21 percent and 17 percent, respectively).

Table VI.5.
Survey Respondents' Experiences with *Breaking Ground* Components by Institution in Percent

Experienced a *BG* Component	%
At BBG	31.4
At BCM	17.4
At both sites	30.1
At neither site	21.0

As Table VI.6 shows, nearly four-fifths of the respondents had experienced at least one *BG* component. More specifically, almost one-fifth of the respondents had experienced two *BG* components (20 percent). A total of three components and only one component were experienced by a similar proportion of respondents (18 percent in each case). Though much less frequent, there were respondents who had experienced all seven of the *BG* components (4 percent).

Table VI.6.
Number of *Breaking Ground* Components Experienced by Survey Respondents in Percent

Total Number of Components	%
None	21.0
One	17.6
Two	19.5
Three	17.8
Four	11.9
Five	5.1
Six	3.2
Seven	3.8

Experiences with Specific BG *Components*

The frequency of visits to the two exhibitions (i.e., *Amazing Plants* and *Plants & People*), as well as to the Discovery Garden, was comparable (see Tables VI.7 and VI.8). In each case, nearly two-thirds of the respondents had never visited, and over one-quarter had visited once.

Table VI.7.
Number of Survey Respondents' Visits to *Breaking Ground* Exhibitions in Percent

Number of Visits to *Amazing Plants*	%	Number of Visits to *Plants & People*	%
None	62.6	None	57.5
One	27.0	One	32.5
Two	6.2	Two	6.6
Three or more	4.2	Three or more	3.4

Table VI.8.
Number of Survey Respondents' Visits to the Discovery Garden at BBG in Percent

Number of Visits	%
None	61.8
One	28.0
Two	4.7
Three or more	5.5

Frequency of visits to the Discovery Carts did not differ between BBG and BCM (see Table VI.9). Moreover, frequency of visits to the carts was not much different from frequency of visits to the exhibitions. That is, at BBG and at BCM, roughly two-thirds of the respondents had never visited the Discovery Carts, and nearly one-quarter had visited once.

Table VI.9.
Number of Survey Respondents' Visits to Plant Discovery Carts by Institution in Percent

Number of Visits to Carts at BBG	%	Number of Visits to Carts at BCM	%
None	67.1	None	66.5
One	24.6	One	24.0
Two	4.2	Two	5.9
Three or more	4.0	Three or more	3.6

The City Plant Adventure Guide, in comparison with the other *BG* components, was experienced less frequently (see Table VI.10). Three-quarters of the respondents had not seen or used the Guide at BBG; even more had not seen or used it at BCM (75 percent and 81 percent, respectively). Relatively few respondents had seen or used it more than once at either site (less than 5 percent in each case).

Table VI.10.
Number of Survey Respondents' Experiences with the City Plant Adventure Guide by Institution in Percent

Number of Experiences at BBG	%	Number of Experiences at BCM	%
None	74.7	None	80.7
One	20.4	One	16.3
Two	2.3	Two	1.3
Three or more	2.5	Three or more	1.7

INTERGENERATIONAL PLANT-RELATED ACTIVITIES

On a list of 23 items, respondents were asked to indicate those in which they had participated with a child during the last two months. In addition, they were given the opportunity to describe any other activities that they had done together. The far right-hand column of Table VI.11 lists the total percentage of respondents who reported having done each of the activities. During the last two months, more than half of the respondents had noticed that a plant had changed, visited another botanic garden, museum, or science center, and noted how much plants need sun, air, soil, and water (68 percent, 62 percent, and 55 percent, respectively).

Statistical analyses were run to determine whether participation in any of the activities was correlated with[17] visiting *BG* components. Attempts were made to distinguish the effects of each individual component. The results, however, showed that the components are not, in fact, separate but rather highly intercorrelated. In other words, the effects of one cannot be separated from the effects of the others; they operate as a whole. Therefore, the following two analyses were run, examining the *BG* components together.

Number of BG *Components Experienced*

Recall that there are seven distinct *BG* components. A statistical analysis was conducted to compare participation in each activity by the following four groups of respondents: those who had not experienced a *BG* component, those who had experienced one or two, those who had experienced three or four, and those who had experienced five or more. Participation in seven activities was associated with the number of *BG* components experienced (see bold type in Table VI.11).

The more components respondents had experienced, the more likely they were to go to the library to learn about plants and to rent or borrow computer software or videos about plants. In comparison to respondents who had experienced two or fewer *BG* components, those who experienced three or more were more likely to have used a reference book to look up an unfamiliar plant, watched a television program about plants, grown plants from seeds or cuttings, and noted how plants adapt to their environment. Lastly, respondents who experienced five or more *BG* components were least likely of the four groups to notice that a plant had changed (e.g., leaves changed color or new growth).

Location of Experience with BG *Components*

Respondents had no experiences with *BG* components, or they encountered them only at BBG, only at BCM, or at both sites. A statistical analysis was carried out to compare participation in each activity by the location at which *BG* components were experienced. This analysis was conducted to distinguish differences among visitors who visit different institutions. Participation in six activities was associated with the location(s) visited (see bold type in Table VI.12).

Respondents who experienced *BG* components at BCM only were less likely than the other three groups to have identified places in their neighborhood where plants grow, used a reference book to look up an unfamiliar plant, and visited other botanic gardens, museums, or science centers. Further, respondents who experienced *BG* components at BCM only were less likely than those who experienced them at BBG only to compare plants that they had seen in other places with plants in their own neighborhood. Respondents who experienced *BG* components at both sites were most likely to have rented or borrowed computer software or videos about plants. Lastly,

[17] Please note the use of the phrase "correlated with" rather than "caused by." From the survey data gathered, it is possible to distinguish measures that are related to one another; it is not possible, however, to establish cause and effect. Therefore, the findings presented must be interpreted cautiously: a multitude of factors other than experiences with *BG* components (e.g., interest, education, and ethnicity) may have contributed to a respondent's participation in any one activity.

respondents who had not experienced any *BG* components or had experienced them only at BBG were more likely than the other two groups to have noticed that a plant had changed.

Table VI.11.
Activities Done by Survey Respondents and Their Child(ren) during the Last Two Months According to Number of *BG* Components Experienced in Percent[1]

Activity	Number of *BG* Components Experienced				Total
	0	1–2	3–4	5–7	%
A: Noticed that a plant had changed	**76.8**	**64.6**	**73.6**	**50.9**	**68.2**
B: Visited other botanic gardens, museums, or science centers	65.7	56.6	65.7	61.4	61.8
C: Noted how much plants need sun, air, soil, and water	54.5	53.7	57.1	54.4	55.0
D: Purchased live plants at a store	54.5	42.9	50.0	42.1	47.3
E: Identified places in our neighborhood where plants grow	45.5	43.4	50.7	43.9	46.1
F: Grown plants from seeds or cuttings	**43.4**	**36.6**	**54.3**	**56.1**	**45.6**
G: Talked about how animals and birds use plants to make homes	44.4	41.1	50.7	47.4	45.4
H: Talked about plants in our home and neighborhood with our family or friends	44.4	39.4	50.7	52.6	45.4
I: Thought about plants we might grow	47.5	40.6	48.6	45.6	45.0
J: Realized there were interesting plants in and around our home	39.4	44.0	45.0	45.6	43.5
K: Noted how plants adapt to their environment	**38.4**	**35.4**	**51.4**	**42.1**	**41.6**
L: Pointed out where plants were used as decoration	40.4	36.6	45.0	47.4	41.2
M: Included plants in our play, acting, drawing, or singing	36.4	39.4	41.4	42.1	39.7
N: Bought an unusual vegetable or fruit	42.4	32.6	36.4	40.4	36.7
O: Noted in conversation that we were cooking with plants	35.4	32.0	35.0	38.6	34.4

[1]Bold type signifies statistically significant differences among the four groups of respondents. The significant chi-square values are as follows:

A: $X^2 = 14.151$; df = 3; p = 0.0027 F: $X^2 = 12.746$; df = 3; p = 0.0052 K: $X^2 = 8.737$; df = 3; p = 0.0330

table continues

Table VI.11 Continued.[1]

Activity	Number of *BG* Components Experienced 0	1–2	3–4	5–7	Total %
P: Compared plants that we have seen in other places with plants that we have in our neighborhood	30.3	34.9	35.0	36.8	34.2
Q: Watched a television program about plants	**31.3**	**27.4**	**37.1**	**47.4**	**33.5**
R: Read ingredient labels on food packages looking for plant ingredients	36.4	30.9	30.0	33.3	32.1
S: Used a reference book to look up an unfamiliar plant	**21.2**	**20.6**	**29.3**	**38.6**	**25.5**
T: Went to the library to learn more about plants	**15.2**	**16.6**	**20.7**	**35.1**	**19.7**
U: Noticed that many of the things we use everyday have plants in them and pointed it out to a friend	18.2	14.9	20.7	26.3	18.7
V: Helped a sick tree or plant in our community	12.1	15.4	20.7	19.3	16.8
W: Rented or borrowed software or videos about plants	**5.1**	**6.9**	**10.0**	**21.1**	**9.1**
X: Other	–	–	–	–	8.3

[1]Bold type signifies statistically significant differences among the four groups of respondents. The significant chi-square values are as follows:

Q: $X^2 = 8.857$; df = 3; p = 0.0313 S: $X^2 = 9.403$; df = 3; p = 0.0244 T: $X^2 = 10.981$; df = 3; p = 0.0118 W: $X^2 = 12.970$; df = 3; p = 0.0047

Table VI.12.
Activities Done by Survey Respondents and Their Child(ren) during the Last Two Months According to the Institution(s) at which *BG* Components Were Experienced in Percent[1]

Activity	Neither Site	BBG Only	BCM Only	Both Sites	Total %
A: Noticed that a plant had changed	**76.8**	**77.7**	**61.0**	**56.3**	**68.2**
B: Visited other botanic gardens, museums, or science centers	**65.7**	**67.6**	**45.1**	**62.7**	**61.8**
C: Noted how much plants need sun, air, soil, and water	54.5	59.5	48.8	54.2	55.0
D: Purchased live plants at a store	54.5	50.7	36.6	45.1	47.3
E: Identified places in our neighborhood where plants grow	**45.5**	**54.1**	**31.7**	**46.5**	**46.1**
F: Grown plants from seeds or cuttings	43.4	45.3	42.7	49.3	45.6
G: Talked about how animals and birds use plants to make homes	44.4	45.3	41.5	48.6	45.4
H: Talked about plants in our home and neighborhood with our family or friends	44.4	46.6	39.0	48.6	45.4
I: Thought about plants we might grow	47.5	46.6	43.9	42.3	45.0
J: Realized there were interesting plants in and around our home	39.4	48.0	40.2	43.7	43.5
K: Noted how plants adapt to their environment	38.4	47.3	36.6	40.8	41.6
L: Pointed out where plants were used as decoration	40.4	38.5	43.9	43.0	41.2
M: Included plants in our play, acting, drawing, or singing	36.4	43.2	39.0	38.7	39.7
N: Bought an unusual vegetable or fruit	42.4	34.5	31.7	38.0	36.7
O: Noted in conversation that we were cooking with plants	35.4	36.5	29.3	34.5	34.4

[1]Bold type signifies statistically significant differences among the four groups of respondents. The significant chi-square values are as follows:

A: $X^2 = 20.682$; df = 3; p = 0.0001 B: $X^2 = 12.415$; df = 3; p = 0.0061 E: $X^2 = 10.630$; df = 3; p = 0.0139

table continues

Table VI.12 Continued.[1]

Activity	Neither Site	BBG Only	BCM Only	Both Sites	Total %
P: Compared plants that we have seen in other places with plants that we have in our neighborhood	**30.3**	**43.2**	**22.0**	**34.5**	**34.2**
Q: Watched a television program about plants	31.3	33.1	26.8	39.4	33.5
R: Read ingredient labels on food packages looking for plant ingredients	36.4	33.1	30.5	28.9	32.1
S: Used a reference book to look up an unfamiliar plant	**21.2**	**31.8**	**12.2**	**29.6**	**25.5**
T: Went to the library to learn more about plants	15.2	19.6	14.6	26.1	19.7
U: Noticed that many of the things we use everyday have plants in them and pointed it out to a friend	18.2	14.9	17.1	23.9	18.7
V: Helped a sick tree or plant in our community	12.1	14.9	24.4	17.6	16.8
W: Rented or borrowed software or videos about plants	**5.1**	**6.1**	**8.5**	**15.5**	**9.1**
X: Other	–	–	–	–	8.3

[1]Bold type signifies statistically significant differences among the four groups of respondents. The significant chi-square values are as follows:

P: $X^2 = 11.522$; df = 3; p = 0.0092 S: $X^2 = 12.899$; df = 3; p = 0.0049 W: $X^2 = 10.609$; df = 3; p = 0.0140

QUESTIONS SPECIFIC TO THE MAIL-BACK SURVEY

The mail-back survey included three questions that did not appear in the on-site survey.

Purpose of Visit

Mail-back survey respondents were asked whether the purpose of their visit to BBG or BCM was to see exhibits or programs specifically associated with the *Breaking Ground* project. As shown in Table VI.13, the number of respondents who intentionally visited either BBG or BCM to see *BG* components was relatively small (10 percent and 8 percent, respectively).

Table VI.13.
Purpose of Visits to BBG and BCM
(n=207)

To See *BG* Component	BBG %	BCM %
Yes	10.1	8.2
No	89.9	91.8

Who Keeps the City Plant Adventure Guide

Mail-back survey respondents were also asked whether they possess a City Plant Adventure Guide and, if so, who in their household has it. As Table VI.14 shows, over three-quarters of the respondents reported that they do not possess a Guide. In nearly half of the households that have one, an adult has it. In almost one-third of the households, the Guide is kept by a child. Nearly one-quarter of the respondents who possess Guides were not sure who in the household had it.

Table VI.14.
Survey Respondents' Possession of the
City Plant Adventure Guide in Percent

Possession of Guide (n=180)	%
We have a Guide	23.9
We don't have one	76.1
Who Keeps Guide (n=43)	**%**
One of the adults	46.5
One of the children	30.2
Not sure who has it	23.3

Where the City Plant Adventure Guide Is Kept

In addition, respondents of the mail-back survey were asked where in their house the City Plant Adventure Guide is kept. Nearly one-third of the respondents reported that their Guide is displayed on a shelf, desk, or counter (33 percent) (see Table VI.15). In contrast, one-quarter indicated that they kept their Guide in a pile of papers (25 percent). In fact, the number of respondents who reported that their Guide was displayed on a shelf, on a bulletin board, or on a refrigerator equals the number of respondents who indicated that their Guide could be found in a pile of papers or in a drawer (43 percent in each case). A few respondents noted that they had "other" places for keeping their Guides.

Table VI.15.
Where Survey Respondents Keep
the City Plant Adventure Guide in Percent
(n=40)

Where Guide Is Kept	%
Displayed on a shelf, desk, or counter	32.5
In a pile of papers	25.0
In a drawer	17.5
Other	15.0
On a bulletin board	7.5
On the refrigerator	2.5

Part VII:

Breaking Ground Collaboration

INTRODUCTION

This section of the report presents findings from the process evaluation for *Breaking Ground.* To determine the successes and shortcomings of the collaboration between BBG and BCM, and to elicit suggestions for improving the management of collaborative projects, group and individual interviews were conducted with all *Breaking Ground* team members.

Two interview guides were used—one for the group interviews and one for the individual interviews (see Appendices I.8 and I.7, respectively). A notetaker was present during the group interviews recording participants' remarks, and conversations with individuals were tape-recorded. Thus, two forms of data constitute the data set. The data collection process (the experience with the group versus the experience with an individual) and the form of the data (notes versus verbatim transcriptions) affect the reporting of the data. Specifically, the experience of facilitating the group interviews left a strong impression of differences and similarities among the four groups that can only be explained in narrative form. Additionally, since the data from the group interviews are in the form of notes as opposed to full quotations, they, too, suggest that a narrative-style presentation be used. The individual interviews, on the other hand, provide in-depth remarks about *BG*, in particular, and require a more traditional style of reporting qualitative data, as was done with adult interviews cited earlier in this report.

Beginning with general remarks about collaborations, findings from the group interviews are presented first, followed by findings from the individual interviews.

PRINCIPAL FINDINGS

GROUP INTERVIEWS

Four groups were convened: two in the morning and two in the afternoon. The two morning groups were comprised of administrative team members, one group exclusively from BBG and one from BCM. The two afternoon groups included staff from both institutions. Of the two afternoon groups, one afternoon group was comprised of exhibition team members, and the other was comprised of education team members. Interestingly, the attitudes expressed by administrators were different from those expressed by exhibition and education specialists. Administrators, regardless of their institutional affiliation, were quite pleased with the collaborative process and the products that it generated. Although some spoke of rough spots that their teams encountered (e.g., coping with staff changes at BBG, simultaneously managing the renovation and *BG* at BCM), all in all, administrators spoke positively about and were proud of *BG*. They felt their institutions had grown considerably from the collaborative experience and hoped more collaborations would likely happen in the future.

Exhibition team members portrayed a different experience. These individuals described the work process as difficult, stressful, and disorganized. In general, they felt the project could have been better managed. They wanted someone with a clear vision to lead them through the process, and they wanted that person to bridge the two institutions. Additionally, they wanted each institution to have an on-site manager who would have the authority to make decisions. A

few were troubled by having to make big decisions that would greatly affect their institution, and others would have appreciated knowing that their institutional leaders supported *BG* and their work. Comparing the administrator's conversations to this group's conversation suggests that there was a lack of connection between top-level staff members and those charged with creating the products.

Educators at each institution valued the *BG* experience because of the professional sharing and mutual respect that grew from working together. The process of creating the Discovery Carts especially energized them and helped them overcome the feeling that they had been misled about the role they would play in *BG*. They initially thought they would be consulting on the project—not doing all of the work. They felt that the grant proposal had omitted an important component—an educator's position. Although both institutions found a way to hire an educator, the fact that the position was omitted from the proposal spoke volumes to the team educators. Nevertheless, the educators are proud of their achievements. They believe that the Carts and the City Plant Adventure Guide emerged from a truly collaborative effort, which they describe as a successful, positive experience.

Details from the four group conversations are presented together below. They are presented under topics that follow from the group interview guide. Brief narratives describe specific qualities and characteristics that team members believe are important for collaborations to be successful. Although team members were asked generic questions about collaborations, responses are based on team members' experiences with *BG* and represent personal opinions. They are not meant to be the final word on managing successful collaborations.

Before Engaging in the Collaborative Process

According to team members, a successful collaborative project is defined within the context of the collaborating institutions and reflects their individual missions. Project goals must be shared; they must not represent just one institution's agenda. Even when there is a relationship between missions and project goals, team members noted that collaborative efforts can be difficult if the structure necessary to create the products of the collaboration are not in place. For example, team members felt that management of the project should be the project director's sole responsibility, and he or she should be neutral, not aligned with either institution. As much as possible, during the proposal-writing stage collaborators should conceptualize the process needed to complete the project successfully and on time, so they can evaluate project needs in light of staff expertise and workloads. Such an assessment will indicate whether additional project personnel are needed to make the project a reality. Team members also suggested that prior to engaging in the collaborative process, staff from each institution must jointly examine institutional strengths and weaknesses and outline a plan for working together.

In spite of disparate organizational cultures that might exist at the collaborating institutions, team members agreed that collaborators must be open to learning new ways of working and problem solving, as teamwork and consensus building will replace independent decision making.

Characteristics of Good Collaborators

Team members indicated that for collaborations to be successful, the administrations at the collaborating institutions must fully support the joint venture—not just with words but in actions. Such a commitment provides the strength for collaborations to withstand internal disruptions such as staff turnover even among staff members closely tied to the project. Good collaborators are also open-minded and flexible so the two collaborating institutions can create a joint vision for the project. However, if the cultures of the two institutions do not mesh, and if the institutions do not share a common vision, the collaboration will be strained. Though team members said that trust and respect were characteristics of good collaborators, they also acknowledged that these qualities may not exist initially but should emerge as the collaboration grows strong.

Being a Better Collaborative Partner

Staff from both institutions took responsibility for not planning carefully enough for the *BG* collaboration. Not having worked on a project of this magnitude before, they overlooked many important issues, such as fund raising and the handling of finances. Team members observed that the project needed a manager who could work with team members from both institutions. Having a project manager early in the collaborative process would have improved communication among team members and between institutions, streamlined decision making and review (seen as cumbersome by most team members), publicized *BG* to nonteam members at both institutions, and moved the project along at an even pace. Some team members said they would have been a better partner if they had been given the resources needed to balance their current workload with the demands of *BG*.

Advice for Those Thinking about Collaborating with Another Institution

A collaboration can work, according to team members, if there is a good reason for two institutions to collaborate. Botanic Garden staff have subject matter expertise and the Children's Museum staff have exhibition development expertise. Each institution offered something of value to the other. In addition to there being a good reason to collaborate, high-level staff at each institution must support the effort. Team members also believe that all those involved in the collaboration must understand, support, and respect clear project goals. Prior to agreeing to collaborate, team members suggest examining staff skills and availability in light of project goals to determine if the collaborative plan is realistic. If there is a gap between what staff are able to produce and project demands, funds for additional staff must be budgeted and secured.

Increasing the Awareness and Educational Impact of BG

Team members would like to see *BG* be the centerpiece of an advertising campaign. They feel that the project has not been adequately promoted and that both institutions should have a well-conceived plan to encourage cross visitation. A few see the name *Breaking Ground* as problematic from a marketing point of view and suggested that a new, more descriptive name may be needed to sell the idea and *BG* components to the public. Publicity is important, especially to the education and exhibition teams, because the public's use of and response to *BG* are their reward. The Discovery Carts were specifically mentioned as one component that team members would like to see better utilized and promoted. Some suggested training teachers and additional staff to facilitate the carts, and others suggested that the Carts be taken off-site and utilized beyond the Garden and Museum walls.

INDIVIDUAL INTERVIEWS

In-depth interviews were conducted with all 12 team members of the joint planning team. The purpose of these conversations was to encourage planning team members to reflect on the collaborative work process and discuss how *BG* affected their institution and may have changed the way they approach a collaborative project.

BG's *Effect on Their Institution*

Several team members believe that the collaboration had a positive effect on their institution. *BG* gave BBG an opportunity to build a new public image as staff realized that they can serve children and families without losing their adult audience. BBG staff also learned the value of creating audience-driven programming. Some BCM team members spoke about being challenged to approach a problem in a different way, and others spoke about realizing their institution's strengths and weaknesses after seeing them against the backdrop of another institution's strengths and weaknesses. All these positive experiences suggest that both institutions benefited from the joint venture. Team members from both institutions cited the Discovery Carts as the success story of the collaboration. Still, one team member suggested that her institution might hesitate before embarking on another collaboration of this magnitude, although she continued to think that collaborating with neighboring institutions is a good idea in the abstract.

> It challenges you to say, "We are not going to do the same thing that we used to do, we are going to try to develop something collaboratively." It challenges you to take a new look at how you do things. Based on what we both do, hopefully we'll come up with a new way of doing it, whether it is education programs, which I think happened with the Discovery Carts because it was so jointly done [or something else]. . . . The collaboration brings in two points of view plus another joint goal which forces you to do something different.

> I think it was important for BBG because we have not traditionally looked outside our gates for help. We've been, I think, historically, a very self-reliant institution, and that has its great merits, but sometimes one doesn't always get the benefit that you can get from talking and working with other people. So I think it helped to open up the institution more to collaborating with other places, locally or even further afield.
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> You need to firmly define who you are in relationship to someone else. I think it allowed us to be more specific about what niche we [want to] play. Other times we responded by saying, "Oh, they're doing it, we have to do it, too." And this allowed us to say, "Okay this is what we bring to it." I mean, it was always trying to decide, do you do it? Do we do it? Do we both do it? I think we got more of a sense of what our strengths are, and a willingness to say to someone, "You guys do it better, can you help us with it?" Early on in the project . . . we were less willing to do that. Where now, three years down the road, we're much more open about considering, "Oh, you're doing that. That sounds interesting. Let's see how what you're doing can work for us."
>
> I think it opened their eyes to a new realm of educational philosophy and practice. . . . In terms of *Breaking Ground*, the whole notion of presenting carts, exhibits, and a Discovery Garden where the audience can bring their experience to the Brooklyn Botanic Garden, interact, and build on their knowledge, it looks like the opposite approach of the premise of how these museums were originally functioning. . . . It's not like lecturing has no use in education . . . or a teacher or a lesson plan, but there are many, many other ways to help people value knowledge and build on it. The whole audience-driven piece was very new. . . . I would quite honestly say that the Garden is still wrestling with trying to understand it. But the door is open. And instead of people saying, "Oh, what are those pretty-looking carts on the grounds." I think they now understand what is really going on in terms of [visitor] interaction and participation.
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> I think there might be a little more hesitance to engage in huge-scale collaborations. . . . But overall, I think there's a little more readiness on the part of the staff to seek professional input from neighboring institutions, and that's really positive.

BG's *Effect on Each Institution's Visitors*

Many team members felt that they could not respond to the question about how *BG* affected visitors and their experiences because, being administrators, they rarely have time to observe visitors at their institution. However, a few provided descriptions of informal observations or anecdotes that they had heard from others. Other team members spoke of the success of the Discovery Carts, presented positive reactions to the interactive exhibits, including the Discovery Garden, and described how the interactive exhibitions at BBG, the Discovery Garden in particular, appeal to families. The Discovery Carts and Discovery Garden are the two *BG* components that received the most praise from team members.

> The Carts feel like they added a new piece for us, and that seems to be something that the public has found really great. And in a certain way, it's there consistently, which is

something that we've been striving for. So that feels like it's a piece that works really well. That kids and families come away from it usually talking about something related to the Cart. Sometimes it's, "Oh, that was fun," but there's usually a response to it, which I don't necessarily see around all of our exhibits. But I haven't done that much informal observing.

When I went by the Discovery Garden, there were 10 kids at the waterway watching things go down the water channel. I watched them for 20 minutes and they didn't move. They were just so engaged. I suspect maybe some people do that with the stream going through the Garden, but they do not spend so much time just being caught in the moment. When I go by, there is always someone there, and kids are doing something and both adults and kids are having a great time. Feedback I've received from adults and families has just been overwhelmingly positive, and they are relieved that there's a place that they can go and do things. . . . From a child's point of view, it's a very phenomenal thing. When in the city, you're told not to touch most things because it's not safe or it's an unknown.

I have overheard visitors, and they love the Discovery Garden and Discovery Carts. They just think that this informal learning is wonderful. They're the ones who lead the way. They're the ones who get to say what happens, instead of having a structured class. Just the opportunity to play, explore, and to do their own thing really makes a difference. With the exhibits, I don't think they have really changed the visitor experience, other than they got information about plants and they got the content messages. Both of them are exhibits, [and] I think people see [them] that way. They are great to go in, but they're traditional exhibits and I haven't seen as much impact on the visitor experience. . . . They don't stand out from the institution as much.

Well, the opening of the two exhibits at the Botanic Garden makes it much more of a place that welcomes children. I think that's really obvious. There's a place specifically for young kids, which to me seems like a community resource. It seems more like they're reaching out to the community because they built this place for parents to take their young kids.

BG *Successes*

Some team members viewed the collaboration itself as one of the successes of *BG.* Learning from colleagues, mastering project management, building teamwork and consensus, and feeling fully engaged in the creative process are the nontangible products of the *BG* collaborative. Joint planning team members feel proud of their cooperative work and see personal as well as institutional growth. As noted several times in this section of the report, the Discovery Carts and the Discovery Garden are the two greatest *BG* successes. The interactive qualities of *Plants & People* were also noted, as was the fact that BBG has opened its gates to children and that audience-driven programming is the new teaching paradigm at BBG.

The collaboration itself. The notion of learning from other colleagues from a comparable institution. We all had different strengths and expertise, but there was a tremendous amount of learning about each other and building on each other's knowledge. The meetings, all of them were very challenging, and fun, hysterical—you know, there was a lot of grappling. . . . The food, there was always food, but the most tremendous thing about it was that there was a consensus. Project team management in and of itself was a paradigm shift for both institutions. And one of the biggest challenges was learning how to step into a consensus model and then to step out of it when you're working in your institution in other roles. Different styles of management are being stressed at the Garden all the time, and staff in both institutions really rose up to the plate and figured out how to create a new way of operating and not be schizophrenic about it.

Just the fact that it was a collaboration. I remember Bobye List saying that there are people in our Rolodexes that are from the Botanic Garden who we almost consider to be on staff. Meg calls up Mark Fisher over at the Botanic Garden like he's on staff. She's got a question, she calls him up. You know, that real genuine sharing of knowledge between the two. So, for me, the most successful part was that level of collaboration. . . . People collaborated, and they are going to continue to collaborate beyond this, when things are in place. I would say that the most successful component is definitely the Discovery Garden because it's so loose, so easy-going. It doesn't have that institutional feel to it.

Making BBG more kid friendly. The outside perception is that this is a place where we want kids to come—that we, in fact, are committed to introducing children to the environment at a very young age. I think the greatest success of *Breaking Ground* is the Discovery Garden. And maybe it's because it's what I have personal experience with, but I think it's really an exceptional area within the Garden.

Plants & People is a fabulous exhibit. It's very theatrical, commanding, and demanding. You walk in and feel like you're in a special place—the plants, environment, and nature that surround you. To me, the major success is probably just the presence of the exhibit, the dramatic presentation. . . . Long-term for the Museum, this exhibit will represent a very pivotal point in the Museum's history because the Museum is moving into a whole new level of existence as a result of the renovation, of becoming more sophisticated about looking at our role beyond the community.

BG *Shortcomings*

Among the shortcomings that joint planning team members discussed, three topics were repeatedly mentioned. A few members cited the length and breadth of the project, noting that

BG went on for too long and was too big. A few indicated that up-front planning was shortsighted because staff involvement was underestimated. And a few discussed the lack of project management.

> I think the collaboration was defined as an animal of a certain size right from the outset. It had all these big pieces. It had all these big parts. It had this administration, this administrative structure. It was defined in an ambitious way, because the size of that ambition was enough to encompass all the people who were involved in it. . . . And so I think one of the things that could avoid [that happening] in the future would be to look at a slightly tighter, smaller way of defining a project, knowing that it's going to grow, knowing that you can't anticipate all the potential within an idea. . . . We were just brainstorming . . . and out of that, there were going to be these great ideas that we would want to move on. But if you've defined it so large that you can't possibly move outside of it.
>
> I would say, without a doubt, the greatest shortcoming was severely underestimating the amount of time, workload, and stress. . . . If I were ever to do something like this again, or initiate it, I would certainly go into it with a whole pre-assessment phase before I even took on a project of this magnitude. And when I say pre-assessment, I say evaluating what is existing at the institution, Who's doing what? How overloaded are they already? Are the expectations realistic given existing conditions? I don't believe that a pre-assessment was done at BBG, and from my understanding, it wasn't done at BCM.
>
> As I mull over the whole process and the sequence of things, and how things either worked or didn't work in the formulation, execution, or installation phases, I think that we should have gone into the whole project with a clearer understanding of deadlines and [we] needed closure on different pieces throughout the planning process. It's tempting to always want to rethink, restudy, and redo until something is perfect, but at some point you have to just make a decision and go with it, otherwise you never have an end product. I think it would have been better and less painful for people involved if we had known up-front that we had to be clearer about that. It would have been less painful.
>
> I think the internal management and the workings of the groups and how it was structured and managed wasn't very successful. At least for some groups within it. (Do you care to be specific?) I think that we had a tremendous amount of turnover on staff throughout the project, and that was hard. But I also think that the joint planning team didn't seem to have a clear role and function at various points in the process, and the roles and information getting around to all the key members didn't happen very well. . . . I just think that there was a lot more attention paid to the politics and the external relations than to the internal workings of the teams, and I think that was weak in terms of process.

Institutional Interference

Several issues were mentioned regarding institutional operations interfering with the working process of *BG*. Of course, the recent renovation at BCM was mentioned, as were the staff changes at BBG and *BG*. It was easy for team members to isolate these two issues as they were

very disruptive to the work process of *BG*. In addition, several team members noted that the administrative review process was cumbersome and needed to be simplified, and others mentioned that the staff were overburdened because they had *BG* responsibilities in addition to their daily responsibilities. Finally, some BBG team members indicated that staff at BBG were unaccustomed to the kind of exhibits they would be producing for *BG*, so time had to be taken to educate senior administrators about current museum exhibition practice.

> There were a lot of staff changes in both institutions along the way. That really brought a lot of gaps in information transfer. And the changes were not just in education, but there were also changes in the development area—there were many more of them at the Children's Museum, but we had our own share of them here at BBG—and that would naturally cause some disruptions. But the scope of the changes were so great that it's probably a miracle that it all came together.

> All the people who left *Breaking Ground*. That did disrupt things. Losing a designer for eight months definitely disrupted me a lot. But on an institutional level, the renovation was a real factor. I think it really drew off a lot of the resources. It's hard to have two major initiatives happening at the same time. What were we thinking of? Well, I guess we weren't actually planning to do that, originally, in that time frame. . . . The only [other] thing that I can think of is, if you look at the organizational structure of *Breaking Ground*, there's a tremendous emphasis on the administrative side. There were as many administrators as there were people executing. . . . I think the fact that there was this in-house process and a parallel process for the project—I think that really could have been streamlined. There were dual reviews between our own program steering committee and the joint planning team, even though the exact same people were on the joint planning team as were on the program steering committee. It could have been simplified.

> Some people on the teams had other jobs, other responsibilities, and there might have been a more specific effort or commitment to making them available, truly available to the project. . . . When you say that this person's going . . . to spend 30 percent of his time on the project, he needs 30 percent of his other roles alleviated so he will have the time.

> From the Garden's perspective—not having a professional museum exhibit background, institutionally—I think there was a lot of education that needed to be done on the part of the exhibit-development staff and the project people. They really needed to educate our senior administration on the theory behind exhibiting and what the project was about. Not content-wise, necessarily, but the theory behind reaching casual visitors with an exhibit and how that needed to be done, how it was going to be different from other displays that have always existed at the Garden, and how it meant that we needed to really broaden our own view of what we do and how we do it. The Garden is a very traditional institution, and it's evident when you walk around outdoors that there's a timeless quality to the Garden. And this exhibit is not timeless. It's very current and playful, and we tend to be much more understated.

How BG *Changed the Way Joint Planning Team Members Think about Collaborations*

Responses to this question varied widely. Some individuals reiterated that the project was too big and that although it was a good experience for them, they would approach a similar project with caution. Also reiterated was how difficult it was to do the work required in addition to other job responsibilities. The lack of connection between the administration and the other *BG* personnel, as noted earlier, was evident in some of these responses. A few individuals also realized that these types of projects require careful planning and commitment from both institutions. Clearly, the *BG* experience was difficult for some team members and very invigorating for others.

> I guess I learned how hard it is to do a really equal collaboration. . . . It takes so much planning, structure, time, and money. . . . It made me think that in future collaborations I would be more cautious in selecting partners. Not because they weren't [a good partner], this was an incredible experience, but we have had other experiences where we made too many assumptions about the kind of commitment or the resources that would be available. I would be more careful and cautious about getting to know the organization much better.

> Well, this is the only collaboration that I've been involved in, so it's hard for me to say. I would just make sure that, as much as is possible, all of the details be worked out in advance, that all parties involved in the collaboration agree on what their responsibilities are and [agree on] how they will work together at every level, not just the exhibit-development level or the program level, but the administrative pieces as well.

> I think it [my feeling about collaborations] is potentially less enthusiastic, but more reality-based. If I were in a situation where I was giving my opinion on whether a collaboration should happen, I would make sure that there was real commitment on both sides and a real sense of what it might take to do this, or I wouldn't recommend that institutions do it. I think from the outside you can say incredibly positive things about it in terms of making the institutional connections—there are some really wonderful things that happened around it. . . . But I have some concerns about what we were actually able to produce and the cynicism that has developed on the staff's [part] because of it. . . . We should be addressing that. It is important to reduce the cynicism because it is not good for the institutions or the profession. Collaborations are potentially positive if done well, and we should talk about what went wrong and retain some of that optimism about what could happen in the future.

> I think that it made me realize that collaborations are logistically very difficult. It's hard when there are different interests at institutions. For example, at BBG, it [the Discovery Garden] was a new area in the Garden, but it wasn't the sole project most of us were working on. Unless there's a team that's specifically working on *Breaking Ground* and nothing else, something else is going to suffer because you're splitting your time. Collaborations need a core staff that get things done, and then they pull in outside resources. It's always hard when people split their time between a collaboration and a regular job. I know that's not possible, so I think, in general, that's a major difficulty.

The Next Step after BG?

The near completion of *BG* components does not necessarily mean that team members see *BG* coming to an end. There is interest among several team members to make sure that *BG* components are better utilized, not only by the casual, walk-in visitor, but by teachers. A few team members have ideas for using the Discovery Carts for school groups, and a web site project is already in progress. There is agreement among several team members that the collaboration between the two institutions will be different in the future, although no formal steps have yet been taken to redefine the collaboration.

> We need to acknowledge or decide formally that we want to continue working together, which we haven't done yet. We have all these individual project opportunities, and we could deal with things either as individual projects that one, the other, or both take the initiative on, or we could get together and say we want to build upon *Breaking Ground,* or maybe [collaborate] in some other totally different way, but formally agree that we want to take what we have done together further. . . . The education group was really looking at taking the Discovery Cart family-oriented piece and trying to get support from different sources for structural materials or teacher training. This new technology piece has just come into play, too. . . . I am particularly interested in museum-school partnerships. I don't think we have leveraged this project enough to provide extensive opportunities for teachers. Teachers are not aware of what they could access through the collaboration; they still see us as separate institutions. It is the same with families. Maybe it has to do with promotion and marketing, too. You can create these multiple site projects, but if people don't go, what do you do? It is not just that you make them, it is that you have to market and promote. . . . But I think we could do a lot more to jointly promote school or family programs.
>
> We've got some great content. We've got the exhibit now. We've got the Carts. And so we need to look at how we can broaden the audience. . . . How are teachers going to deal with it? Not so much the exhibit, because I think we've already got that under control, but, do we want to do more with the carts? And do we want to package it or publish it? . . . I'm not sure of what the next steps are. I know that it just seems like there are so many things that we haven't answered for ourselves, like some of the legal things, some of the follow-up things are brand-new discussions at this point. So, I think it seems like having those discussions is the next step.
>
> The thing that I hope happens, and it's happening now in this pilot that I am doing with PS 321. I had thought that carts would be a great introduction to inquiry-based learning, where a school group would come to a park, have a little warm-up, and then start a whole series of inquiry-based lessons on pollination, for example. What I've learned over the summer working with PS 321 is that to really be true to inquiry-based learning, the students have to come up with their orientation of interests and observations, and the carts would be something . . . they'd come back around to, after they decide they want to learn more about pollination—because the carts are very influential, they're very theme-

related. So basically, 321 has been coming to the Garden, and they've used the c arts, but they also are coming and they're bringing their questions about how plants grow.

Well, we're doing the development now for the traveling exhibit. That's taking the collaboration to a new place because you've got to determine how to attract sponsors [and how to] talk about what you're going to be doing. . . . And also ownership shifts because this [the traveling exhibit] is something that you really don't own in terms of having experienced it here. So that creates a whole different way of looking at how you take your collaboration forward. I think it also . . . affects how you look at your funding sources. . . . I think it makes two institutions work with each other a little differently, and not better or worse, it's just that you try to think of other ways to build on your resources and to connect to each other. Frankly, it takes you to the next level of trust.

Part VIII:

Discussion and Recommendations

DISCUSSION AND RECOMMENDATIONS

This section of the report includes a general discussion of each *Breaking Ground* component, with recommendations inserted where appropriate. The components are discussed in the order in which they appear in the report.

AMAZING PLANTS EXHIBITION

Amazing Plants, a 1,000-square-foot exhibition at the Brooklyn Botanic Garden, seeks to foster an appreciation of all plants, help visitors discover and make personal connections to plants in their neighborhoods, and create a bridge between the urban environment and the Botanic Garden by offering interpretation of plants found throughout Brooklyn.

Use of the Exhibition

Only a few interviewees had knowledge of the exhibition before they arrived, and few visited BBG intentionally to see the exhibition. But, once in *Amazing Plants*, visitors spent a median of six minutes, a relatively long time given the size of the exhibition. According to Serrell (1996), visitors travel at an average rate of 300 square feet per minute in museum exhibitions, slightly slower in small exhibitions. The average rate traveled through *Amazing Plants* was 167 square feet per minute, a rate that is substantially slower than average. However, it must be noted that unlike the exhibitions in Serrell's research, *Amazing Plants* is a "stand-alone" exhibition (i.e., there are no exhibitions nearby competing for visitors' attention and urging them to quicken their pace). During their stay, visitors made a median of 10 stops among the 34 components, thereby experiencing nearly one-third of the total exhibition. This proportion is typical for visitor experience in an exhibition (Serrell, 1996). Therefore, visitors in *Amazing Plants* are spending longer than would be expected at individual components, indicating that the components are doing an exceptional job of holding the attention of visitors.

- Develop an advertising program for all *Breaking Ground* components to make the public aware of the existence of the *BG* project.

Learning Experiences

Something in the exhibition reminded almost every adult of everyday life, for instance, plants growing from cracks in the sidewalk. Their responses indicate that the exhibition is succeeding in making visitors aware of the plants in their urban environment. Besides the commonplace, most adults also encountered something new, for example, exploding plants. This finding implies that another of the exhibition's goals is being accomplished—that of introducing visitors to spectacular features of common plants.

These spectacular features, however, may remain too vague for some visitors, especially children, to grasp. For instance, though many children who viewed the seed dispersal video

were able to comprehend what was being shown, many referring to Bird's-eye View discussed birds or flying. Other components, such as the fish, Push Button/See Cartoon, and the Bellows, also elicited a variety of misinterpretations among children.

In addition to the primary messages of the components, visitors appear to be searching for further implications and details. A few children voiced questions related to the video or the Magnifiers, such as "Why do so many plants explode?" and "How do the seeds attach to things?" Adults also expressed a desire for more information, either through additional text or a staff explainer, so that they could answer their children's questions (e.g., "What kind of plant is that?") and provide more informed explanations.

- Provide one-liners with interactives to reinforce the point of each and to promote accurate interpretations and, thereby, satisfaction among users.

- Offer narration in the video, more information on the magnifiers, plant identification labels, textual panels for adults to read, and one-liners for children to provide additional information for both children and adults.

Intergenerational Interactions

Adults and children interacted approximately seven times, both adults and children initiating about three of the interactions. Most of the interactions were mechanical (i.e., involving physical activity), such as watching a video, reading text, or manipulating an interactive.

Adults identified the fish, the video, magnifiers, and the seed dispersal theme as providing good opportunities for intergenerational learning, primarily because they prompted dialogue. One visitor even recounted all the questions her children asked to which she responded while watching the video.

- To encourage more interaction between adults and children, place guiding prompts for adults throughout the exhibition, or develop a parent's brochure describing optimal use of the exhibition.

- For those children not accompanied by a knowledgeable adult and for those adults attempting to answer their children's questions, provide adequate explanations of the exhibition components, including the seed dispersal video. Ambiguity does not prompt interaction; both children and adults need something concrete to spark their interest and, thus, their desire to share.

Overall Satisfaction with the Exhibition

Adults thought that *Amazing Plants* did a good job of holding the attention of children, emphasizing the local urban neighborhood, educating, and making visitors aware that plants are all around them. Visitors spontaneously mentioned that the exhibition "integrates plants into everyday life" and "makes it clear that kids in New York live in nature and can look all around them and observe plants." Again, these responses suggest that the goals of enabling visitors to discover the plants that live around them, helping them make a personal connection to the plants in their neighborhoods, and creating a bridge between the urban environment and the Botanic Garden are being accomplished.

Children, for their part, thought the fish, video, Bird's-eye View, and Hear Stories were fun and made them feel good. On the other hand, a few children thought that the fish, Move the Balls, Wipe Glass, and the Zoetrope were not fun, in some cases because they did not understand them.

A couple of adults noted specifically that the "left side" of the exhibition was not as appealing as the right side. Adults also indicated that there were broken components (i.e., no postcards were available and the Bellows was not working or needed more seeds).

- Again, providing one-liners to reinforce the point of an interactive will promote accurate interpretation, as well as satisfaction among users.

- If possible, incorporate into the left-hand side of the exhibition hands-on or participatory activities to rival those on the right-hand side, so that no "bottleneck" occurs in visitor traffic and no distinction is perceived by visitors.

- Annually, allot funds specifically for maintenance of the exhibition. And each morning, before the Botanic Garden opens, make certain that every component is fully operational.

Visitors' Suggested Improvements

Reflecting on improvements, adults recommended adding more live plants and more explanation about what to do or how to do it. For instance, one visitor mentioned that after four visits the family finally realized that the plant magnets could be rearranged, explaining, "In some cases there was not enough indication of what we were supposed to do."

Though they noted that all hands-on components were popular with children, adults distinguished among them regarding the quality of interaction involved. Some hands-on components, such as the magnets, the Magnifiers, and the Zoetrope, were credited with fostering intergenerational interaction. Other components, including the Bellows and elements with buttons, elicited concerns that rather than promoting learning, they were distracting children. In the words of visitors:

> Some of it seems to be interactive just for the sake of being interactive and I couldn't quite figure out the purpose of why it was interactive.

> It doesn't quite do anything. I expected it to be slightly more interactive rather than just push the buttons and have the adult read it to you.
>
> I question the usefulness of the abacus. I don't think that has much of a point—just as counters.
>
> I don't particularly care for things like the pumping . . . because most kids will just pump and not really understand what it is about. . . . It is like doing stuff but you don't really learn anything.

Adult visitors suggested adding more activities that are truly interactive; otherwise, they explained, children spend their time running around pushing buttons and pulling levers wherever they are available without pausing to understand the message.

- Provide adequate explanation and instruction so that an innovative interactive is not lost to the guesswork of visitors. Accompany each interactive, such as the Design a City magnets, with a brief directive so that visitors understand immediately what can be done and how to do it.

- Hands-on elements function most effectively when they are means to an end rather than ends in and of themselves. Hence, include them only where they can contribute to the exhibit message or enhance social interaction. Otherwise, they may be distractions.

All in all, *Amazing Plants* appears to be accomplishing its stated objectives. It offers visitors new ways of looking at plants, makes them aware of plants in their urban neighborhood, and introduces them to the spectacular features of common plants. Aside from their suggested improvements, visitors enjoyed their experience and departed having gained a new perspective on plants.

DISCOVERY GARDEN

The Discovery Garden, a 13,000-square-foot experiential garden at the Brooklyn Botanic Garden, is designed to be a safe natural setting in which urban children can play, learn, and enjoy plants. It seeks to engender an appreciation of plants by offering opportunities in which children can use their senses, manipulate natural elements, and investigate nature independently or with companions.

Use of the Garden

Most interviewees had no prior knowledge of the Discovery Garden, and few visitors arrived at BBG intentionally to visit it. After experiencing the Garden, one-third of the interviewees believed that it already provides sufficient guidance to adults for taking children through it. However, one-quarter of the interviewees requested additional information, such as plant identification labels, more graphics, and conceptual pre-organizers so they know what to look for and what to expect. Others believed that greater staff presence, in the form of explainers, guided tours, and staff-organized activities, would benefit the visitor experience. As the Discovery Garden is a new type of garden, some visitors were unsure about what was considered acceptable behavior. For example, some visitors mentioned catching tadpoles or "playing" with them, yet wondered if they were allowed to do this.

- Advertising can help make the public aware of the existence of the *BG* project and its associated components.
- For those visitors craving guidance, provide a parent's brochure suggesting how the Discovery Garden can be optimally experienced.
- Add plant identification labels with bits of trivia.
- Organize volunteers to demonstrate activities, offer brief tours, and answer visitor questions.
- Provide an indication of what is acceptable behavior and what is not (e.g., if it is acceptable, invite visitors to catch and play with tadpoles).

Learning Experiences

Interviewees recognized the wide variety of learning experiences available in the Discovery Garden. They believed the Garden offered their children a chance to experience nature, noting that it was a unique opportunity for many urban children. They also appreciated the sensory experiences available in the Garden, especially the opportunity for their children to touch plants. They even referred to opportunities to learn about plants, explore, and be independent. In addition, over three-quarters of the interviewees stated that the Garden provided their children with a new experience. The water pump, smelling plants, touching, Insect Sounds, the Spider,

and tadpoles were the components and activities named most frequently as the parts of the Garden that presented their children with new experiences.

Various goals of the Discovery Garden are being accomplished: children have encountered a place in which they can experience nature, touch plants, use their senses, and have fun. All such experiences evoke appreciation of plants and nature.

Intergenerational Interactions

Garden components and activities that interviewees thought encouraged interaction between adults and children were the water pump, weighing scales, tadpoles, Insect Sounds, and smelling. Interestingly, the water pump, weighing scales, and tadpoles were also among the most frequently mentioned components that adults thought encouraged children to be independent. In fact, many adults indicated that all the components in the Discovery Garden encouraged independence among children. A few individuals commented on the feelings of freedom and safety pervading the Garden, without which children would not be allowed to act independently.

Again, the discussions with visitors indicate that the following goals of the Garden are being reached successfully: children are playing, learning, and enjoying plants both independently and with family members or companions, they are being introduced to the topics and processes of science, and parents perceive the Garden as a safe play space in which children can freely investigate and manipulate natural elements.

Though some adults were actively involved in their children's experience of the Garden, others considered it to be less of a collaborative venture. Some explained that they enjoyed being "able to sit there and let the children explore" or allow the "young children to play unencumbered by the adults." One visitor even sat outside at first, not realizing that adults could go in. Whether it be disinterest or misinterpretation, the degree of involvement by adults may be less than optimal.

- In addition to children, make adults feel equally welcome so that the Garden is perceived as an intergenerational space, not a children's play space. On signs or banners, indicate that everyone is welcome.

- To encourage more interaction between adults and children, place guiding prompts for adults throughout the Garden to help them participate, whether actively or by encouraging independence, in their child's experience.

Overall Satisfaction with the Garden

Half of the interviewees, when asked what they were thinking about as they went through the Garden, spontaneously responded that the children had "a lot of fun," that the Garden is "excellent" for children, or that they think it is "wonderful." Many commented on how "well-designed" the Garden is, and some described the educational opportunities available, often referring to the Garden's hands-on and exploratory qualities. Others discussed the experiences

with nature that the Garden offers, often citing the sensory opportunities presented. The most popular components were the water pump, weighing scales, and tadpoles.

When asked to select from a list of phrases the two that they would use to describe the Garden, over half of the visitors chose "exploration garden." "Discovery garden" and "fun garden" were the second and third, respectively, most frequent choices.

As intended, the Discovery Garden invites children and their adult companions to explore and enjoy using all their senses. It is perceived as a special place designed just for children, in which children can have fun, manipulate and explore natural elements, and play independently and creatively.

The extensive focus on children, however, may create difficulty for adults as they attempt to decipher their own role in the Garden.

- Provide prompts for adults so that they recognize the role they can play in enhancing their child's experience of the Garden.

Visitors' Suggested Improvements

Interviewees recommended the inclusion of more activities, for instance, more flowers to touch, things to climb, and hands-on elements that children and adults could do together. They also suggested that the Garden be made larger, with wider park benches and more shade. Others focused on water, suggesting "a longer pool to explore," making the "little river" move, turning the water on more often, and adding a fountain. A few interviewees recommended adding live animals, such as fish, rabbits, and live bugs. Others suggested including more educational elements: for instance, more signs to provide further explanatory information as well as instructions on how to use the interactives. To the existing components, visitors suggested adding a clearer tube for the soil core, a wider variety of insects, and more puzzles.

- Accompany each interactive, such as the weaving wall and the balance beam, with a brief directive so that visitors understand immediately what can be done and how to do it.

- Consider changing the tube of the soil core so that visitors can clearly see into it.

- Adults especially appreciated the opportunity for their children to touch plants and flowers, something children are rarely allowed to do elsewhere. If possible, offer more of these touching experiences.

- Provide additional water play activities throughout the Discovery Garden.

PLANTS & PEOPLE EXHIBITION

Plants & People, a 2,600-square-foot exhibition at the Brooklyn Children's Museum, encourages visitors to discover the prevalence of plants in their daily lives and in their urban environment. It

seeks to engage children in the process of science exploration, facilitate intergenerational interaction, and increase visitors' understanding and appreciation of plants.

Use of the Exhibition

Only a few visitors had knowledge of the exhibition before they arrived, and few visited BCM intentionally to see the exhibition. However, once in *Plants & People*, visitors spent a median of 10 minutes, approximately the amount of time that would be expected for an exhibition of this size. Visitors in *Plants & People* were traveling at a rate of about 260 square feet per minute, just slightly slower than the average of 300 square feet per minute found in exhibitions in museum environments (Serrell, 1996). During their stay, visitors made an average of 12 stops among the exhibition's 41 components, thereby experiencing nearly one-third of the total exhibition. According to Serrell (1996), this proportion is typical for visitor experience in an exhibition. Given the mass of competing stimuli available at BCM, *Plants & People* is doing a fine job of holding the attention of its visitors.

- Advertising can help make the public aware of the existence of the *BG* project and its associated components.

Learning Experiences

Something in the exhibition reminded nearly every adult of everyday life, for instance, the sights and smells of food, neighborhood trees, and health and beauty aids. Their responses indicate that the exhibition is succeeding in making visitors aware of the role of plants in their daily lives, Additionally, when asked to describe what they were thinking about as they went through the exhibition, over one-third of the interviewees spontaneously referred to the fact that numerous common household items originate from plants.

Only half of the adults claimed to have learned something new, such as the source of health and beauty aids, the making of fabrics, and processes of seed dispersal. Children, on the other hand, learned that plants are the source of food, including the sorrel drink, and that trees "are just like us." Similarly, they tended to grasp the message that cosmetics and medicines are made from plants.

Other components, however, were less successful in conveying their messages. Through the microscope, for instance, children tended to believe they were looking at germs. The name of the viewing instrument itself caused difficulty, as children stumbled frequently when referring to it (e.g., "telescope," "that thing over there by the tank that you look through"). Looking at the Zoetrope and listening to the tree also caused some confusion. Some children interpreted the message at each component to be about dogs. The questions asked by children indicated their lack of understanding as well as their inherent curiosity. For instance, children asked, "How come there is no fish in the tank?" "Were those real bugs?" and "Why do leaves have different colors?"

- Include a brief video presentation about microscopes to introduce children to their proper use, or have a staff person available to assist.

- Provide one-liners with interactives to reinforce the point of an interactive and to promote accurate interpretation and, thereby, satisfaction among users. Using formative evaluation techniques, improve the design of the manipulatives of individual components so visitors will automatically know what to do.

- Offer additional information where appropriate without overwhelming visitors. For example, visitors would welcome a label explaining why the tank has no fish. Experiment with providing short audio messages to explain some exhibition components.

Intergenerational Interactions

Adults and children interacted with each other approximately 12 times, adults initiating more than twice as many interactions as did children. By far the most prevalent interactions were mechanical (i.e., involving physical activity), such as watching videos, reading text, or manipulating an interactive element.

Nearly three-quarters of the adults were able to associate a specific part of the exhibition with intergenerational learning. They indicated that the section on food sources, Smelling the Spices, the Bathroom scene, and the Living Room videos offered opportunities for them to learn with their children, basically because these components presented familiar items with an interesting twist. In addition, the hands-on quality of *Plants & People* was credited with facilitating intergenerational interaction.

- To encourage more interaction between adults and children, place guiding prompts for adults throughout the exhibition, or develop a parent's brochure describing optimal use of the exhibition.

- To promote more child-initiated interactions, staff should experiment with various design strategies and interpretive techniques.

Overall Satisfaction with the Exhibition

Adults thought that *Plants & People* did a good job of holding their children's attention, offering hands-on interaction, and making visitors aware that plants are important to everyday life. Hence, the exhibition appears to be accomplishing its goals of engaging children, encouraging them to explore, and promoting awareness of the importance of plants to daily life.

Children thought Plants You Eat and Drink, the puppets, microscope, and television were fun, and reported that the puppets and Plants You Eat and Drink made them feel good. The puppets were enjoyed for a variety of reasons: children liked both putting on shows and watching them. Plants You Eat and Drink evoked a more consistent positive response by children: they liked knowing how their food was made. In contrast, children thought the videos, the refrigerator, and the tank were not fun. Though their reasons for disliking the videos varied, their dislike of the refrigerator centered on their inability to feel or see inside the food.

- Because it is not known which video each child was referring to, it is difficult to recommend modifications. The children suggested that one video was "too long," one could be improved by adding animation, and another would be better if there were "more people in it."

- Since the time of the evaluation, the refrigerator has been modified so that children can touch the food items inside, just as they had wanted.

Visitors' Suggested Improvements

Two-thirds of the visitors to *Plants & People* offered suggestions on how the exhibition might be improved. Above all, they recommended adding more live plants. They further suggested including interactive activities, such as actually planting seeds in a pot that children could take home and watch grow or participating in the activities of a real garden. The soon-to-be-open greenhouse will provide visitors with these types of hands-on planting activities.

Though a few adults requested more hands-on exhibit elements, others specified that the existing interactives be truly interactive, "more than just pushing a button and seeing things light up." Additional microscopes with various cross-sections were suggested, as were computers or a museum explainer, to act as informational resources.

Regarding the current hardware of *Plants & People*, visitors recommended that the components which were "out-of-order" be repaired. One visitor thought the sound effects, recordings, and videos were difficult to hear, given the ambient noise level. Another believed that certain buttons in the exhibition needed clear instructions regarding what to do.

- In addition to the hands-on planting activities that the greenhouse will offer, provide BCM visitors with take-home brochures about BBG offerings, including information about classes, membership, and programs.
- Annually, allot funds specifically for maintenance of the exhibition. And each morning, before the Museum opens, make certain that every component is fully operational.

- Certify that all audio recordings can be heard above the din of a typical crowd.

- Provide adequate explanation and instruction so that an innovative interactive is not lost to the guesswork of visitors. Accompany each interactive with a brief directive so that visitors understand immediately what can be done and how to do it.

All in all, *Plants & People* is successful in conveying to visitors the messages that plants are important to people because they are the source of numerous household products, that plants are part of the urban environment, and that the choices people make affect plants. Moreover, the exhibition encourages children and adults to interact and enables them to discover that plants are interesting and fun.

PLANT DISCOVERY CARTS

These colorful mobile carts are situated within the *Plants & People* exhibition and on the grounds of the Botanic Garden. Staffed by facilitators who were trained to use a variety of interpretive techniques, the carts are intended to encourage visitors of all ages to learn about plants in an active way and to promote intergenerational interaction through hands-on activities.

Three carts were observed at BBG (Pollinators, 911 Rescue Trees, and Plant Expressions), and two carts were observed at BCM (Sense-ational Plants and Seeds on the Go).

Use of the Carts

The amount of time spent by visitor groups at the Discovery Carts differed greatly between the two sites. The median time spent at the carts in BBG was six minutes, whereas the median time spent at the carts in BCM was only three minutes. This time difference is most likely the result of two very significant factors extraneous to the carts themselves: the surrounding environment and visitor self-selection.

The carts located in BBG are encountered as an unusual feature within a serene environment. Hence they automatically attract visitors' attention and are able to hold it extensively because there is nothing in the immediate setting to prompt visitors to leave. At BCM, on the other hand, the Plant Discovery carts are surrounded by a mass of visual stimulation, uproar, and commotion. The carts must compete with other exhibit elements to attract and hold visitors' attention—not an easy task. Given that there is so much pulling BCM visitors in other directions, it really is no surprise that visitors do not stay as long at BCM carts as they do at BBG carts.
In addition, the self-selection factor is no doubt significant. That is, visitors to a botanic garden are predisposed to taking a greater interest in plants than are visitors to a children's museum. Therefore, it would be expected that visitors interested in plants would spend more time learning about them.

Interactions among Children, Adults, and Facilitators

A median of two interactions occurred between adults and facilitators and a median of three interactions occurred between adults and children at the carts at both BBG and BCM. The

number of interactions that took place between facilitators and children at the carts differed, however, between the two sites. Whereas a median of seven interactions occurred between facilitators and children at BBG, only four interactions took place between facilitators and children at BCM. This difference could be a result of the fact that children spent less time at the carts in BCM because of the competing exhibitions.

Regarding the individual carts, Plant Expressions and Pollinators had the highest percentages of interactions between adults and children; Seeds on the Go had the lowest. Conversely, Seeds on the Go and 911 Rescue Trees had the highest percentages of interactions between children and facilitators, and Sense-sational Plants had the lowest. Lastly, the highest percentage of interactions between adults and facilitators was observed at Sense-sational Plants, whereas the lowest percentage occurred at Seeds on the Go.

The differences in interactions that occurred at the various carts could be due, in part, to the behavior of the facilitators and to the degree of interaction that is appropriate to the topics and activities offered by the particular cart.

- To foster intergenerational interactions within visitor groups, train all facilitators to establish the type of group dynamics that encourage interaction.

Initiating Interactions

At both sites, social interactions were most often initiated by the cart facilitators. At BBG the facilitators initiated a median of six interactions; at BCM, they initiated a median of five. Adults at both locations initiated a median of four interactions. Children initiated interactions least frequently, initiating a median of two at BBG and one at BCM.

At 911 Rescue Trees, the highest percentage of facilitator-initiated interactions was observed. Adult-initiated interactions were most prevalent at Plant Expressions and least prevalent at Seeds on the Go. Children were more likely to initiate interactions at Seeds on the Go than at any other cart.

- Train facilitators in techniques that will make children feel comfortable initiating interactions, whether it be asking questions, touching objects, or expressing observations. Children need to feel that their active participation is desired and their input is welcome.

Types of Interactions

Four types of interactions were distinguished: mechanical, content, relevance, and appreciation. Most of the interactions were of the mechanical type, including such physical actions as looking, touching, smelling, drawing, reading, and playing games. A median of 5 mechanical interactions occurred within visitor groups at BBG, and 4.5 occurred at BCM. Content interactions included such activities as questioning and explaining about the cart's subject matter, objects, or activities. The number of content interactions taking place within groups was also similar at the

two sites. At BBG, the median number of content interactions occurring within visitor groups was 2; at BCM, the median was 2.5.

The other two types of interactions, relevance and appreciation, occurred infrequently at both sites. Relevance interactions refer to comments and actions relating the content of the cart to something in the visitor's past experience or daily life. The median number of relevance interactions at BCM's carts was one; the median number at BBG was zero (just slightly more than one-third of the groups engaged in a relevance interaction).

Appreciation interactions include comments or actions expressing appreciation for a cart's topics, objects, or activities. At BBG, 16 groups displayed one or more appreciation interactions; at BCM, only 3 groups displayed one.

Different types of interactions were more likely to occur at specific carts. For instance, of the four interaction types, mechanical interactions were the most prevalent at all of the carts, with Pollinators and 911 Rescue Trees eliciting the highest percentages. Among carts, the highest percentage of content interactions took place at Seeds on the Go; the lowest percentage occurred at Pollinators. Relevance interactions occurred most frequently at Plant Expressions and Sense-sational Plants. Appreciation interactions were most prevalent at Plant Expressions.

The differences in the types of interactions that occurred between sites and at the various carts are due, in part, to the topics conveyed by the carts, the activities in which visitors were involved, and the behaviors of the facilitators.

- Review the cart themes and associated activities and revise them, building on those aspects that are most successful at fostering various types of intergenerational interactions. For instance, Pollinators and Plant Expressions were the most successful at encouraging adults and children to interact; Seeds on the Go was the most successful at eliciting child-initiated interactions; and Plant Expressions and Sense-sational Plants were the most successful at evoking relevance interactions.

CITY PLANT ADVENTURE GUIDE AND OVERALL EVALUATION

The City Plant Adventure Guide is a colorful folder that is distributed to visitors at the Plant Discovery Carts at BBG and BCM. The Guide presents in-depth plant-related activities that are intended to promote intergenerational interaction and continued exploration of *Breaking Ground* topics at home. As each Cart offers a unique activity sheet, or Plant Adventure, it is hoped that the Guide will encourage repeat visitation to both BBG and BCM as well as cross-visitation between the two sites.

An evaluation was conducted of the overall *Breaking Ground* project to determine use of the various components, cross-visitation patterns between the two sites, use of the City Plant Adventure Guide, and visitor participation in intergenerational plant-related activities off site.

Experiences with BG *Components*

Mail-back and on-site survey respondents were more likely to have experienced a *BG* component only at BBG or at both sites, rather than only at BCM. One-fifth of respondents had never experienced a *BG* component.

Each exhibition (i.e., *Amazing Plants*, *Plants & People*, and the Discovery Garden) had been visited by over one-third of the respondents. The Discovery Carts at both sites had been visited by one-third of respondents. And the City Plant Adventure Guide had been seen or used at BBG by one-quarter of the respondents and at BCM by one-fifth.

Only one-third of survey respondents visited *BG* components at both sites. Furthermore, both BBG and BCM were visited by only 10 percent of respondents who came intentionally to see *BG* components.

- To increase awareness of the *BG* components, encourage visitation, and promote cross-visitation, establish a marketing and advertising plan to publicize the *Breaking Ground* project. This plan could include installing kiosks at each site that explain and promote the other site and offer take-home brochures describing programs, classes, exhibits, and membership benefits.

City Plant Adventure Guide

Over three-quarters of the mail-back survey respondents did not possess a City Plant Adventure Guide. In nearly half of the households that had one, the Guide was kept by an adult. In one-third of the households, it was kept by a child. One-quarter of the respondents did not know which household member had it. The number of respondents who reported that their Guide was displayed on a shelf, bulletin board, or refrigerator equaled the number who indicated that their Guide was in a pile of papers or a drawer (43 percent in each case).
Though the City Plant Adventure Guide is intended to promote repeat and cross-visitation at both institutions, it cannot have much impact unless a larger portion of visitors receive it. Moreover, it cannot stimulate intergenerational interaction and plant-related activities in visitors' own neighborhoods unless they take it home as a resource.

- Distribute Guides to all visitors on a consistent basis.

- To determine which Plant Adventures (i.e., activity sheets) are successful and what types of activities promote intergenerational interaction, hold focus groups with parents. Based on findings, redesign or develop more Adventures to keep families involved with plants in their own communities.

Intergenerational Plant-Related Activities

Statistical analyses were run to determine whether participation in any of the activities was correlated with visiting *BG* components. One analysis was conducted to compare participation

in each activity by the number of *BG* components experienced. Another analysis compared participation in each activity by the location at which *BG* components were experienced.

Participation in seven intergenerational plant-related activities was associated with the number of *BG* components experienced. Oddly, respondents who experienced five or more *BG* components were least likely to notice that a plant had changed. In general, however, the more components experienced by visitors, the more likely they were to go to the library to learn about plants, to rent or borrow computer software or videos about plants, to use a reference book to look up an unfamiliar plant, to watch a television program about plants, to grow plants from seeds or cuttings, or to note how plants adapt to their environment. Of course, there is no way to determine whether those who participate in these plant-related activities are simply more likely to visit *BG* components or if visiting the components prompt participation in these types of activities.

Participation in six activities was associated with the location(s) visited (i.e., BBG only, BCM only, both sites, or neither). For instance, respondents who experienced *BG* components at BCM only were less likely than the other three groups to have identified places in their neighborhood where plants grow, used a reference book to look up an unfamiliar plant, and visited other botanic gardens, museums, or science centers. In addition, those who experienced *BG* components at BCM only were less likely than those who experienced them at BBG only to compare plants that they had seen in other places with plants in their own neighborhood. These findings are to be expected. Individuals who visit a botanic garden are likely to be more interested in plants than are casual visitors to a children's museum. It is no surprise, then, that garden visitors are more likely than children's museum visitors to participate in plant-related activities.

The most important statistical finding to note here is that the *BG* components are highly correlated. In other words, the effects of no single component stand out. The effects of components cannot be distinguished because the components do not act independently; rather, they support each other. This result is significant because it demonstrates that the products of *Breaking Ground* represent a true collaboration rather than an assemblage of distinct parts.

- One focus of the marketing effort should be a cross-visitation promotion so that more visitors will experience *Breaking Ground* in its entirety.

BREAKING GROUND COLLABORATION

The Brooklyn Botanic Garden and the Brooklyn Children's Museum entered into a collaborative relationship to reach new markets, exchange and share staff resources and skills, and produce educational programs and exhibits that otherwise would have been too labor intensive and costly for either institution to produce on its own. The fruits of *BG*, however, are more than the education and exhibit components that staff members created. Mutual respect and trust between staff at each institution grew, institutional strengths and weaknesses were realized, and the trials and tribulations, as well as the joys, of working collaboratively were experienced by all.

Whether individuals feel good or bad about the collaboration, they all had experiences from which they learned a great deal about themselves, about teamwork, and about project management. Nearly all those interviewed knew what they would do differently if entering into another collaboration, suggesting that the collaboration was a rich learning experience for team members. The recommendations below are based on themes that emerged continually during the group and individual interviews when discussing what would improve the collaborative process.

- During the proposal-writing stage, carefully list and describe each exhibit and program that the collaborative project will generate and determine staff, resources, and skills necessary to actualize each piece of the collaboration. Review plans with staff who have some experience in developing and managing similar types of programs, whether it be an exhibition or an educational program, and have them determine if the plans are realistic given the funds, staffing, and time frame. Outline staff participation in the collaboration, and if a staff member is expected to give 20 percent of his or her time per week to the collaboration, then make provisions to relieve that person of 20 percent of his or her normal responsibilities.

- Also during the proposal-writing stage, determine how additional funds will be raised, who will be responsible for the fund raising, and who will be in charge of the fiscal management of the collaboration.

- Apprise high-level administrators and board members on how this collaborative effort might affect their institution. Introduce ideas that the project may encompass and, if necessary, inform them of the requirements of current museum practice.

- Hold training seminars in team- and consensus-building for existing and new staff who will work on the collaborative project.

- Hire a high-level project manager who is an experienced and skilled communicator and facilitator of people. This individual should be hired from the outside and not attached to either institution. She or he should also be accustomed to managing large, complicated, high-budget projects.

- Keep the review process simple by delegating responsibility of approving the project's development to one group. Have three reviews during the preliminary development stage and three during detailed-development at the following benchmarks of completion: 25 percent, 50 percent, and 90 percent. If the boards at each institution want to be involved, elect one or two board members from each institution to be members of the joint planning team.