Bronx Cheer Bulb
Post-Redesign Evaluation

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THIS IS A POST-REDESIGN EVALUATION REPORT

After an exhibit has been renovated, redesigned, or refurbished in preparation for the Exploratorium's move from the Palace of Fine Arts to Pier 15, an interview and observation study is conducted. The purpose of the study is to identify any major issues that would require immediate attention prior to the move. This collection of redesign evaluations will serve as a baseline of information for the Exploratorium's new exhibit set at Pier 15.

Post-redesign studies like this one **are conducted quickly,** which may mean:

- small sample sizes
- expedited analyses
- brief reports

Bronx Cheer Bulb
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Study Goals

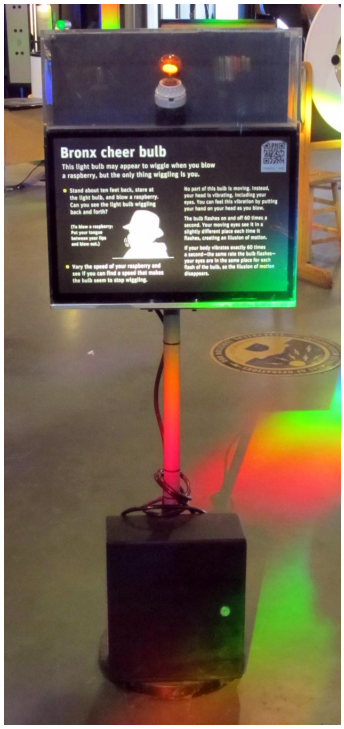
After an exhibit has been renovated, redesigned, or refurbished in preparation for the Exploratorium's move from the Palace of Fine Arts to Pier 15, an interview and observation study is conducted. The purpose of the study is to identify any major issues that would require immediate attention prior to the move. This collection of redesign evaluations will serve as a baseline of information for the Exploratorium's new exhibit set at Pier 15.

General goals:

- To confirm that visitors are able to access and use the exhibit
- To confirm that visitors can build a basic understanding of the exhibit's content
- To uncover visitors' frustrations and confusions
- To understand whether visitors move on from an exhibit for intrinsic or extrinsic reasons

Exhibit Description

The visitor stands about three meters away from an orange glow lamp and gives a "Bronx Cheer*." The visitor sees the light from the lamp dance around while the cheer is being given. Alternatively, the visitor can chew or pretend to chew some food; the lamp will appear to vibrate. Visitors find it intriguing that only the one who is giving the cheer can see the glow of the lamp vibrate. Other visitors see no motion of the glow.



The lamp glow is flashing back and forth from one electrode to another 60 times a second (In Europe this would be 50 times a second). Giving the Bronx cheer or chewing, vibrates the visitors skull. When the skull vibrates so do the eyes. This causes the images of the filaments on the retinas to vibrate. The brain interprets the vibration as being due to the motion of the lamp, not to the vibration of the skull. The rapid flashing of the bulb makes the vibration more obvious.

*To give a Bronx cheer: Stick out your tongue, close your lips around it, and blow producing a vibration and noise.

Methods

Uncued observations and interviews were conducted. A researcher randomly selected visitors who crossed an imaginary line on the floor that stopped facing the exhibit with two feet planted and either looked at or touched the exhibit for approximately 15 or more seconds.

Uncued visitors do not know they are part of the study until after they finish using the exhibit so their behavior can be considered representative of normal use patterns. This means that some of the visitors in this study may have used the exhibit only briefly. Visitors were approached after they left the exhibit and asked if they would be willing to participate in a 7-question interview about their experience at the exhibit.

Demographics

Gender	Count (N=12)
M	5
F	7

English as a Second Language?	Count (N=12)
N	11
Y	1

Estimated Age	Count (N=12)
8-12	2
13-17	2
18-29	2
30s	3
40s	2
50s	0
60+	1

Visitor Group Composition	Count (N=12)
Adults-only	2
Adults with children	8
Adults w/ teens	2
Adults w/ teens and children	0

Findings

Holding Time

This is the time the visitor spent using or otherwise engaged with this exhibit. The amount of time a visitor spends at an exhibit is influenced by many factors and can indicate level of engagement or interest, but not as a measure on its own.

Time at exhibit	In seconds (N=12)
Mean	0:27
Median	0:26
Minimum	0:18
Maximum	0:42

Visitor Behaviors

Visitors were observed as they used various parts of the exhibit.

Do they blow a "proper" raspberry?	Count (N=12)
Y	11
N	1

Do they stand >6ft back and try?	Count (N=12)
Y	2
N	10

Do they vary the speed (pitch) of their raspberries?	Count (N=12)
Y	0
N	12

Visitor Interest

Visitors were asked: *How interesting was that exhibit for you? With 1 being 'not interesting' and 7 being 'very interesting.'*

Interest Level	Count (N=12)
High Interest (6-7)	1
Moderate Interest (4-5)	4
Low Interest (1-3)	7

Visitor responses:

H	I have twin babies that blow raspberries all day! And the name "Bronx Cheers"…But for my daughter it was hard due to how high it was (her daughter was about 3 years old).
M	When you blow it vibrates, but when you don't blow it's still.
M	By reading the cause of why. First or all, I did not know what a raspberry was, but I learned, and then I got to experience what was going on.
M	Pretty simple and I already knew it's your face, not the bulb (vibrating).
M	Cool, the illusion.
L	More interesting in concept, blowing a raspberry. Um, not that hands-on. Not much to do.
L	Cool how it moves. Because I thought it was vibrating, but then I read it and saw it wasn't really moving. About the other exhibits are cooler…more surprising.
L	It wasn't very interactive. Didn't do much.
L	Might be more interesting if it did more. What I experiences was not as exciting as what I was expecting.
L	It was really simple and didn't seem to move much. (Her mom chimed in, "so the impact wasn't there?") Yeah.
L	I didn't understand it. Maybe not standing far enough back. And what's a raspberry? (I showed him) Oh! I see.
L	It didn't work.

Visitor Frustration or Confusion

Visitors were asked to tell us if there was anything confusing or frustrating, what the source of the frustration was, and whether or not it made them want to leave the exhibit and move on to another one.

Source of visitor frustration or confusion*	Count (N=13)	# that wanted to move on
Didn't work	1	0
Not sure what a raspberry is	2	1
More instant gratification	1	1
Nothing Frustrating or Confusing	9	--

*Totals may add up to more than N = 12 because visitors gave more than one response.

Visitor Understanding

Visitors were asked what they think the exhibit was about with the goal to determine whether or not they have a basic understanding of the concepts presented and to identify possible areas of misunderstanding. We acknowledge that this study has a small sample size and that these findings illustrate trends and may not be representative.

It appears that visitors DO have a basic understanding of concepts presented.	X
It appears that visitors DO NOT have a basic understanding of concepts presented.	

Visitor responses:

- Seems to be about vibrations you make when you blow a raspberry and how it affects your eyesight. But I didn't read past the first bullet! [Anything else?] No.
- I guess about sound affecting electricity. [Anything else?] No.
- About how vibrations…how your eyes can deceive you because when you blow a raspberry you vibrate, so things seem to vibrate. It changes your perspective.
- Um, about reaction of what you do with one part of your face can lead to misinterpretation with eyes.
- (She hesitated and looked at her mom) [Don't worry, there is no right or wrong answer] I have no idea! (laughed)
- Initially I said illusion. So as the eye vibrates you get the illusion it is the bulb, but it's your lips vibrating which moves your eyes, so it looks like the bulb is moving.
- How some things, the object that is moving, is you and not the other thing you are looking at. Actual item is not moving, just your view of it.
- Oh, I would imagine it's about…I don't know! The photons, light, electricity. I didn't read it all! (He seemed very unsure).
- Visual obviously. How the body adapts to motion and visual stimulation and how the body counteracts or reacts. That things are in constant motion and your body tries to create an equilibrium to maintain balance.
- Well, I guess initially I thought sound vibrations having an effect on the light
- Lets see…movement I guess? [Could you elaborate?] What does elaborate mean? [What was moving?] Seemed like the bulb was moving [Anything else?] No.
- I have no idea! Usually, after trying, I can figure it out, but not this one.

Visitor Reasoning for Leaving the Exhibit

The goal of this question is to explore how open or closed-ended the exhibit seems to be for the visitor. Visitors tend to leave exhibits for intrinsic reasons, such as feeling bored, or finished with the experience, or for extrinsic reasons, like having to go to lunch or being distracted by another exhibit. Leaving for intrinsic reasons could suggest a more close-ended exhibit experience.

Reasons for moving on to the next exhibit	Count (N=12)
Extrinsic	6
Intrinsic	4
Both	2

Visitor responses:

Extrinsic	Um, Mainly I am a chaperone and my girls are scattered about, but I notice with kids that they stay until they solve it and then move on.
Extrinsic	Following my charges here (his grandchildren).
Extrinsic	Um, I, lets see. I kind of just went to that one (glow discharge tube) because it seemed interesting.
Extrinsic	Besides kids dragging you? (Laughed) Well, kids dragging you away… their attention span is short, there is so much happening around them (pointed to Lumen Illusion). So a good color bulb would get interest so you say "oh, that's cool."
Extrinsic	Lines! I was waiting for this (Lumen Illusion), which is very interesting, and I saw there was a line. But the name sounded intriguing for this one (Bronx). [But you left to go to the next exhibit?] Yeah
Extrinsic	My family is moving! [Anything else?] Just to get to the next exhibit.
Intrinsic	I experienced it, I was able to understand, I couldn't achieve what I was trying to achieve, so time to move on. [What were you trying to achieve?] Where it wasn't flickering. [Did that frustrate you at all?] Not at all!
Intrinsic	Um, there wasn't enough to investigate. [Anything else?] No.
Intrinsic	I guess it wasn't that fun or exciting.
Intrinsic	I couldn't figure it out. [Sorry this seems to repetitive!] It's ok.
Both	Um, I finished what it told me to do. Also, there are other exhibits to do. Just having to move on to see it all.
Both	The other one looked more enticing (the sand and air exhibit).

Conclusions

Based on this small sample, we conclude that the redesigned exhibit does not require immediate remediation. This evaluation did not identify sufficient impediments to visitor use, engagement or basic understanding.

APPENDIX: Graphic Panel

5931_L1_BronxCheerBulb_MainLbl (17 15/16" x 12 3/8") NO rounded corners- BACKLIT FILM Trim on Magenta dieline

Bronx cheer bulb

This light bulb may appear to wiggle when you blow a raspberry, but the only thing wiggling is you.

- **Stand about ten feet back, stare at the light bulb, and blow a raspberry. Can you see the light bulb wiggling back and forth?**

(To blow a raspberry: Put your tongue between your lips and blow out.)

- **Vary the speed of your raspberry and see if you can find a speed that makes the bulb seem to stop wiggling.**

No part of this bulb is moving. Instead, your head is vibrating, including your eyes. You can feel this vibration by putting your hand on your head as you blow.

The bulb flashes on and off 60 times a second. Your moving eyes see it in a slightly different place each time it flashes, creating an illusion of motion.

If your body vibrates exactly 60 times a second—the same rate the bulb flashes—your eyes are in the same place for each flash of the bulb, so the illusion of motion disappears.

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