

Seeing Section Pre Interview

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Seeing Section Pre Interview Preliminary Results Joshua Gutwill 3/29/01

Goal

The Seeing Team wished to determine visitors what visitors understood from interacting with the Seeing section of the museum, before the section was to be renovated. In particular, they wanted to know what visitors took away from the exhibits as a group.

Method

We interviewed pairs of visitors after they had been directed to spend as much time as they wanted in the Seeing section (as marked off by blue tape on the floor). Seeing included the exhibits in the back of the museum as well as those near the south bathrooms.

We collected approximately 55 interviews, of which 33 had been transcribed by the time this preliminary report was written.

Summary of results

This report is based on a quick analysis of one-third (11) of the 33 transcripts.

- Most visitors remembered several exhibits. Shadowbox was the most often remembered exhibit.
- Nearly all visitors knew that the section was about vision and/or light.
- Probably the biggest “point” visitors came away with was that our perceptions can be fooled, either by tricking our eyes or by relying on preconceptions and expectations.
- Visitors also came away with the belief that vision and perception are complex processes.
- The exhibits seemed to be related to each other, but were not seen as building on each other.
- Most visitors felt the exhibits were not very related to their everyday lives, though some felt they were quite related.
- By and large, pairs of visitors were not very skilled at carrying on a conversation with each other about seeing. In particular, they had little to say about the mechanism for how our eyes see, about the mechanics of seeing an entire scene, about two people seeing the same thing differently. They focused on exhibits when talking about technology that affects seeing and what is intrinsically interesting about seeing (i.e., they would mention particular exhibits as interesting or as tools to change how we see). However, they were able to articulate the idea that the brain affects our perceptions, limits how much of a scene we see, and can even lead to optical illusions.
- About half of the pairs interviewed contained at least one person who had studied some aspect of vision or light in college. The rest had studied it in high school or middle school.

Detailed results — responses to questions

Note: some visitors did not respond to some questions.

1. Was there anything about the exhibits that you really liked or thought was especially interesting? [Anything else?]

Most visitors simply mentioned particular exhibits, though many said that the “interactive” exhibits were the ones they liked the most. A few visitors mentioned that they liked getting explanations: “When there was something that tells you to do something and then something happens and then explains it. It's nice because you get everything right there.” One person mentioned that they like challenges, such as tracing a curve in the mirror.

The exhibits spontaneously mentioned (though not always by name) were:

Ames Room
 Between the Lines
 Bubble Hoops
 Cloud Chamber
 Everyone Is You and Me
 Green Tomatoes? (“Two pictures & you look through different glasses to get red and then green and then all the colors. I remember something from middle school, but it's been a long time.”)
 Impossible Triangle
 Laser
 Magic Wand
 Perspective Drawing
 Recollections
 Shadow Box (mentioned by nearly everyone)
 Soap Film painting
 Strobe Fountain
 Sun Painting
 The one that made noise, all the little clicks on it [I don't know the name]
 Touch the Spring
 Touch Theatre

Several visitors also mentioned exhibits outside the seeing section, particularly Hoop Nightmares.

2. Was there anything that you wondered about or were curious about while you were in the section? [Anything else?]

About half of the visitors reported that they did not really wonder about anything. One common response was wondering how an exhibit worked:

Curious about everything because I didn't understand how the things worked. I'm interested in astronomy, but didn't see any here.

[Touch the Spring] was really interesting and I was wondering how is that possible?

I was curious about the [Light Sticks]. We never saw an explanation of that, so I was wondering about that.

Others wondered about how they perceived certain things:

Everyone is you and me, when you looked in it and moved it and used your hand to go through the other person's head.

The brain's perception of some things, like the big mass of straw but it's heavier in real life. The dots on the computer. I liked trying an exhibit and see if it does anything for you. I liked the interactive things best.

Others wondered about how we create or maintain our exhibits:

How does this sort of evolve over time? Albert didn't work. I photograph a lot and some of this has to do with photography. I liked the flash room, Shadowbox. Didn't really wonder about anything.

Does Sun Painting work?

**3. OK. Here's a different one. Can you try to complete this sentence?
"I never knew" or "I didn't realize..."**

One common response was that visitors didn't realize something about themselves, often regarding their own susceptibility to illusions:

The idea of all the different illusions that can be played on your eyes. Didn't realize there were so many ways to trick your brain.

I didn't realize the range of optical illusions. I knew about the faces in the vase, but the chairs [Ames chairs]. There's an incredible range with which you can set things up that will really fool what we think we're looking at. Also the one where you match colors inside and outside the square - I thought it'd be easy since I use paint a lot in art but it was really hard. I couldn't do it even though I had an advantage.

I didn't realize how cool and interesting vision stuff is. I didn't realize that your eye, when your heart's beating, that your eye is doing the same thing [pulsing].

Face/mask doesn't follow you, but it can seem like it does because of your brain.

How instinctual I am

Another common response was that visitors didn't realize that some kind of phenomenon or exhibit existed:

Never really understood [Albert]. It was so well explained.

Never knew you could swing a stick and get a picture on it [Magic Wand]

I never knew you could make pictures with bars of light [Light Sticks].

Shadow box - was never taught about that sort of thing.

One visitor mentioned that the museum was more into science than art, which was something unexpected:

This place is so scientific, not too artsy

4. What do you think the whole section of exhibits is trying to show people? Did you get any sense of that?

Visitors often mentioned vision, optical illusions, and perception (general, depth and color) as the main points of the section. They also tended to focus on how complex vision and perception are:

There's more than meets the eye. There's stuff you usually don't perceive. Your perceptions can easily change, like when you change your angle (Ames chairs). It depends on what you're looking at and how you look at it. Also shows perceptions and color (spinning B&W disk makes you see color). How come your mind would all of a sudden put some color in there where there was no color? If it was going on to the B&W screen, how come you saw it (color) in there as well?

Vision, how eyes can be fooled or tricked, taking time to look at things in different ways, colored light can make different impressions, depth perception can change, one eye sees things the other can't

The light and all the problems in the way we perceive things, how we could be affected by different situations. That it's much more complicated. Light and vision was the main subject.

Vision. All about it. How it works. Color, form, illusion, how light works. Light and it's perception, ways to fool yourself with changes in lighting, changes in perception.

How people perceive things & how your senses can be fooled

Lights, how lights work. And visions, how our vision tricks us, like the [touch the spring]

A lot of illusions. And it's all about vision. And you the eye can trick you.

Perception of vision, visual perception and sound perception, light perception.

Some visitors were very general, and gave little indication of understanding the main point:

There's life beyond Nintendo and Playstation.

That people can be creative, there's a lot of creativity here.

There's a lot here.

5. Did the ideas in the exhibits seem to build on each other, or did they seem like separate experiences? [What are you thinking?]

Most visitors thought that the exhibits were connected to each other, but did not actually build on each other:

Similar, but not built on each other. Like maybe had [Ames Room] near the [Impossible] Triangle. But nothing telling you to go here and then there.

Some built. Vision stuff showed you different things about vision. Some things were meant to be together and something were meant to be different.

Connected. All about vision, showing different facets of it. Fits together, but not telling the same story at each exhibit. [Other person:] I felt they didn't build on each other, but they were just different facets of the same idea.

Separate & similar. [Magic Wand] separate from light you try to make yellow with red and green light [Light Island? Green Tomatoes?]. Similar because both have to do with red and green.

Connected. Some connect, some separate. They were all unique and some were the same. Most had lights, and most were dark.

I went through unsystematically, so didn't seem to be building. They all had same theme, but were separate. Except for the one pocket of hand-eye coordination where you write your name backwards in the mirror.

They are related. Here is physical presentation and here is more beats the eye. Eye and perspective.

Fit together

Yes & No

Build

Separate

I've never seen them before, but it's like being indoors and taking pictures. I like light.

We do such different things in our lives. We are teachers, but we teach other things like literature.

7. CARDS — show visitors a topic and have them engage in a conversation about it

How our eyes see things

Some visitors mentioned the mechanics of how our eyes see, but they seemed to be bringing much of that information from knowledge gained before coming to the museum. This would make sense since the mechanics of seeing is not strongly emphasized in the current exhibits. Examples are:

I saw on TV that they're just like a camera. Your lens [inaud] like your [inaud] structure and some mirroring and your brain.

Lens focuses light on retina, optic nerve sends info to brain.

The Vanna White one. Our eyes make presumptions. Our eyes have those receptors that get light back on them upside down. But this didn't show us much on the physical level of how our eyes see things but mostly how our brains see.

See the retina and the cornea. You could see a box, I could see a square.

I don't know. I studied how our eyes work, but I cannot explain.

Other visitors tended to speak in generalities, or even said that they did not know what to say:

Impossible triangle - have to be in the right spot at the right time. Depends on your perspective & point of view.

Your eyes get the light.

They're what the picture is telling us.

You perceive things and process them and it's fascinating.

Don't really have a jumping off point here.

How much of a scene do we really see?

Most visitors said that we do not see all of a scene, but they talked about different aspects of that issue. A few visitors focused on the physical aspects of seeing only a part of a scene:

We see part of the world, but when things move, we can see more out of the corners of our eyes. We see only visible light, not UV or IR.

Peripheral vision thing. [Ames room] might be related - how much you generate on your own to satisfy your own preconditions of what you expect.

Other visitors focused on the mental effects of preconceptions and attention:

Peripheral vision thing. [Ames Room] might be related - how much you generate on your own to satisfy your own preconditions of what you expect.

You can see something that's not really there, but when it's explained to you, then it is there. You only see what we know. We see a little bit and conclude the rest.

See what you want to see. You've been trained to see things. See what you're interested in. Can learn to adjust your perceptions to be aware of something.

See what you want to see, if you want to focus on a certain part, then that's what you see.

Depends on perspective & how much attention you pay to a given scene & to detail. By the time you get to the back of the museum, your sense start to become opened and you're more alert and looking a bit harder and more acutely. By the end, there's so many ways you've bent your mind and stimulated yourself.

Still others either mentioned that perspective affects seeing a scene or were fairly vague:

That's weird. If you're looking at yourself flying in the split mirror, and the one where you push the yellow bar back and forth depending how far it is, the yellow bar will blend in an out, so it depends where you are. Everybody's recollection of a scene is going to be a lot different. We all see the scene, but interpret it in order to make sense for ourselves.

I don't think we see it all, now that I've been here today. There's the present scene and the microscope scene and the laser light scene and the optical illusion scene - there's a whole world of scenes out there & I think we see what we want to see.

Sometimes we see a lot and sometimes we don't.

[We see] a lot of a scene.

What your brain has to do with seeing

Most visitors talked about how one's perceptions can be fooled because the brain has certain expectations of what it will see:

[Ames room] Would you consider that seeing? Seeing is the actual physical? Your experiences are used to seeing visual cues in a certain way. When it's flipped on you and the perspective changes, that makes you think of how you are born and evolve and perceive visual cues which become part of your everyday life.

Your brain is what makes you see. Your mind has certain tricks it gives you, to judge size and color. You get to bring reality into awareness. It's the coordinator and the media player.

Brain is trained to accept stuff but it can be tricked, like [Hoop Nightmares]. You can train your brain to what it thinks is normal. Your eyes are just a conduit, the brain interprets info.

Perception is a big part of seeing & it happens in the brain, but the exhibits didn't say that specifically. They mostly talked about the ways your perceptions could be fooled, how your brain can see something that isn't truly how it is.

It's the way we understand things. The section on perspective is related to what your brain is seeing because the perspective is interfering, is conditioning the way you see things. On the other hand, your brain is influencing the way you see.

Everything you see is sent from the brain, all perceptions.

Some visitors tried to explain the particular function of the brain in the seeing process:

Your medulla mungada [sic] sends the brainwaves down to your eye, so your brain's telling your eyes to open and look and that makes you see.

Light goes into head & brain interprets, people might interpret things slightly differently

You have to concentrate on what you're looking at, to focus on it. If the eyes hurt, the brain says don't look too long. I think communication, delivering messages back to the brain.

When you see, the brain offers you to touch it. When you see something, you must try to understand why some things happen.

Different people see things differently

Most visitors agreed with this statement, but they focused on different aspects of it. Some felt that physical perceptions of the same phenomenon can vary:

See shapes in a cloud or in a rock, depends on person.

That's true. From a sense of where you're standing, like the impossible triangle thing. It looks completely different depending on where you're standing, what sort of light there is, what sort of colors are associated with it, how awake you are, are there distractions.

Witnesses always say different things. They're not reliable. The ways we perceive things are so different. You can have [sic] the same and they'll describe them two different ways like two different things. In good faith.

Saw something on TV about people seeing different colors from a spinning B&W disk. Might think of different things each time you went into that room.

Some visitors said that we can see something the same way, but we will interpret it differently:

Yes. It's just different upbringing totally. If I say something to him and to you, you might take offense and he was just thinking it was instruction so it depends on the mind of the person.

Yeah, but everything today you and I saw the same thing. But people interpret things differently. We could see the same thing but think two different things. Yeah, but we're have to see them first.

Some visitors felt that we usually see the same thing in the same way:

In the exhibits we saw, like spinning disk, we always saw the same things, so I'm not sure what this means.

True, but the exhibits that made most sense to me were the effects that everyone can experience. The placard [label] tells what is happening so people come to a different understanding based on that, or the same understanding. But with [squirming palm] everybody who sees it gets the effect, so the exhibits were presenting aspects of vision that are universal.

Not really. Everybody has the same eye vision except some people see better than others.

Not really. We all eventually saw the same thing, even the [Light Sticks]. I don't think people see things differently.

What's interesting about the way we see

Visitors were interested in the process by which we physically see and in the ways that our perceptions can be fooled. In the former, visitors often mentioned the exhibits as interesting:

It's having to do with nerve signals. I'm not sure, I've never thought about what's interesting. Some of these experiments [exhibits] are interesting.

How our eyes put objects into focus, like the [Impossible] triangle. You look at the thing and see a triangle. A person who's color blind won't see color.

Power of it. Deer see on different sides of their head & we see straight ahead.

It's fascinating when you step back and think about how a visual stimulus is processed, how you visualize that through cues in your brain. They wrote about scanning techniques in different parts of the brain that were stimulated upon sight of different objects. Then they change the [orientation] of the object and the imagery in the brain is different. I read another article about how a 6 month old and 8 month old see differently. It's neat how the brain works and nobody understands it. Without a museum like this, you get comfortable, thinking that it's all reality. You come here and think about what you're seeing and how you're seeing. That it might be a chair from this view but something else to someone else. It's not a lesson you

learn everyday. [Slow Blue] is cool. The way your eye processes color and the way the brain perceives that is cool.

Sometimes you put a color in front of your eye and all around you color changes, and how your eye sees things like that. You can use different materials and look at something change by the nature of the material.

Several visitors mentioned optical illusions as interesting:

That things are not always as we see them.

That things are not always as we see them. The light sticks - how much we put together and fill in. A lot of it is neat, a sort of low level neat, not Gee wow!

We make up a lot of things. What we think we see isn't necessarily there. It's interesting that the exhibits can trick us, but it doesn't happen very much. It's not like we see a tree and it's not really there in everyday life.

If you change the way you see it, you see it, not just from the physical side but mentally also.

One visitor talked about the impact of perceptions on emotion:

When you see certain things, sometimes they have an impact on the way you feel. Seeing stuff creates emotions.

Tools & technology can change what we see

Most visitors agreed with this statement and mentioned particular exhibits or exhibit elements that relate to it. Some included objects or technology that are not directly from our exhibits:

Eyeglasses, laser beams, prisms, filters can change what we see.

Yes. Filters and light, binoculars.

Sure, like at [hoop nightmares] looking through basketball goggles. And looking through the cloud chamber. You start to see all the trails of electrons shooting through.

You apply a polarizing filter and you see different things about the light. The colors changing, the photographing changing the color of the woman's facial features. Bridge light where everything looked black and white.

For the glasses, it was plain yellow & when you put on the green glass, it changes, all the pictures become more colorful [green tomatoes?]. When you put the red one in it changes and you put the green and red together you get all the colors. The tool ca

I liked the exhibits with mirrors where you try to do something while watching in the mirror. Or the different colors and how they're applied can really change your

perception. They changed the pixels when we put Emily [16 month old] in front of the pixels.

[Hoop Nightmares] should've been in here [seeing section] because with that technology you can't shoot a basket. Reminds me of morphing into different faces - technology played a part in what we see.

Refers to the morphing things. But most of the [exhibits] helped us understand what we were seeing, and didn't necessarily change what we saw.

Other visitors made broad statements or did not discuss anything related to the seeing section:

Yes. It takes tools and creativity to create a lot of these exhibits so it can change what I see.

[Talks only about electricity exhibits]

8. If you ever learned about light or vision in school, do you remember what level of schooling it was, like elementary, middle, high school, college?

The pairs of visitors reported:

Biology PhD,
EdPsych PhD, College
College physics, Middle School
College, High School
Mining engineer, Elementary School
High School/College, Middle School
High School, High School
High School, High School
High School, Middle School
Middle School, physical lab
Middle School

9. How about learning about them informally — do you have any special interest or knowledge in light or vision, like through hobbies, your own readings, that kind of thing?

The pairs of visitors reported:

Art, none
Courses on color theory & perspective, none
I like lasers, none
Photography, none
Photography, none
Telescope, contact lenses
Work with fiber optics, none
Writes software for vision research, none