

# Seeing: Dancing Dots Evaluation

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THIS IS NOT A DEFINITIVE FINAL REPORT

FORMATIVE evaluation studies like this one often:

- **are conducted quickly**, which may mean
  - small sample sizes
  - expedited analyses
  - brief reports
  
- **look at an earlier version** of the exhibit/program, which may mean
  - a focus on problems and solutions, rather than successes
  - a change in form or title of the final exhibit/program

## Seeing Evaluation: Dancing Dots interviews

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### Exhibit Prototype Description

This exhibit prototype consisted of a large laminated card with several dots of varying luminance that visitors would move in a certain direction. By moving the card the dots would appear to be moving or dancing.

### Methods

**N** = 15 cued interviews, conducted on 11/21/01      **Gender:** F (40%) M (60%)

**Age:** 8-12 (26.7%) 18-20s (26.7%) 30s (26.7%) 40s (20%)

**Group:** Adults (53.3%) Adults+Kids (46.7%)

**ESL:** No (86.7%) Yes, but fluent (13.3%)

**Exhibit/interview site:** Prototype Area

### Findings

**How visitors used the exhibit:** Although not all visitors used the exhibit correctly at first, all visitors eventually figured out how to hold and move the exhibit in the appropriate manner. A couple of visitors mentioned that the “move the card this way” arrows were helpful.

**How interesting visitors found the exhibit:** Visitors gave Dancing Dots pretty high marks (80% rated the exhibit “somewhat interesting” or “very interesting”), but I suspect that this is only a measurement of their interest once we’ve given them a reason to use the exhibit. Several visitors commented on the unobtrusiveness or unattractiveness of the exhibit.

**What effect visitors experienced:** All but one visitor noticed that the yellow and white dots moved differently when they jiggled the card. Despite leading text in the “what happened” section, only five visitors {33.3%} said that the yellow and white dots moved more slowly or lagged behind the other dots – others described their motion in a other ways (“white seemed to oscillate between the top and bottom dots, and yellow seemed to go back and forth like a pendulum;” “out of sync;” “like they were on rubber bands”).

**Why visitors thought they saw what they saw:** Some visitors {40%} seemed to understand that it had to do with the similarity between the background and the white and yellow dots, but they didn’t agree on how the dots and their backgrounds were similar. Some thought the similarity was a matter of brightness, while others talked about hue or color contrast – only one mentioned luminance specifically.

An almost equally large group {33.3%} thought that there was something about the dots themselves that caused them to appear to move differently (“the lighter colors, they have less...luminance, so you have to work harder;” “because they’re more subtle, they attract attention less”). Two {13.3%} visitors thought that the yellow dot somehow interacted with the yellow background and the white dot with the white background to create the effect.

**What elements of the exhibit visitors found confusing:** About half of visitors {53.3%} didn't point to anything specific as confusing. Those who did either thought that the directions on how to move the card could be clearer {33.3%}, or that the explanation of luminance was problematic {20%}.

**What visitors thought the exhibit was trying to show:** Two thirds of visitors {66.7%} thought that their brain was involved somehow. Four of these {26.7% of total} agreed that the dots danced because of how their brains processed motion, while the others suggested various other roles for the brain (how it processed color, how it communicated with the eyes, how it could become confused under certain conditions). Visitors who didn't mention the brain or the mind generally stuck to platitudes about "what you see isn't always what you get," "how your sight can trick you, or just described the dancing of the dots.

**How visitors thought the exhibit might be improved:** In general, those visitors who offered suggestions thought that the exhibit should be made more attractive (and larger, if possible), and that there should be some more intuitive mechanism for moving the card.

### Interpretations and Recommendations

**About the exhibit structure:** The bottom line is that visitors DO eventually figure out how to hold the card and how to move it. That said, "how to move the card" was the most common source of confusion, and suggestions about how to change this mechanism were the most common suggestions. Thoughts on this subject: the card with the dots could either be fixed to a table-top that slid back and forth, or hanging from a pair of lines, like Push Over. In general, the more control you have over the motion, the more free you are to change the type of motion to get the best possible effect for you. Changing the exhibit structure might also address the concern expressed by several visitors that the exhibit's was simply unattractive.

**About the label:** The word "jiggle" in the "Try This" section is quite vague – if the use mechanism of the exhibit changes, this may be a moot point, but if it doesn't, clarification might help. Perhaps "move the card back and forth," or "move the card side-to-side." You may even want to say "try moving the card slower or faster, with smaller or larger movements," since some people seemed to have more success with different speeds or magnitudes of movement.

Next, I think that the phrase "move more slowly" in "What Happened?" should be replaced by "move differently," given that many visitors do not perceive the motion specifically as slower. This is probably not critical, since visitors seem to form their own opinions about the motion of the dots regardless of what the label says, but some small percentage might think they were doing something wrong if their perception of the motion was different.

Last but most importantly, I think that the concept of "luminance" is not getting through to most visitors. Based on visitor responses to questions about why the dots behaved how they did and what visitors thought the exhibit was trying to show, it seems like only the first sentence or two of the "What's going on" is making an impression. As a result, we should think about the hierarchy of WGO information (motion, luminance, brain). The word "brightness" pops up a lot more than the word "luminance," and visitors volunteered the idea of color contrast several times. Because it seems to be so tempting for visitors to attribute the effect they see to similarity in color, it might be helpful to reference this in the explanation, if only to say that color contrast is NOT what's going on. Rough example: "even though the white dot is a different color than it's yellow background, it has almost exactly the same brightness as the background. the brightness of a color is also called *luminance*. Because the part of your brain that..." etc.

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## Dancing Dots Interview Questions

### SEEING EVALUATION: Dancing Dots (card on stand).iv.02

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Interview # \_\_\_\_\_

Gender: M F Age: 8-12 30s 60+

13-17 40s

18-20s 50s

Group Size: 1 2 3 4 5 + class

Group: A A+K A+T T (13-17) K (<12)

ESL: N Y Yes, fluent

Holding \_\_\_\_\_ Moving \_\_\_\_\_

How interesting is this exhibit to you on a scale of 1 to 5?

**1**  
Very

**2**  
Somewhat

**3**  
Neutral

**4**  
Somewhat

**5**  
Very

4

Uninteresting    Uninteresting

Interesting    Interesting

Can you tell me why you picked \_\_\_\_\_?

Can you tell me what you saw when you moved the card side-to-side?

(Did you notice that the yellow dot and the white dot seemed to be moving differently than the other dots? MEDIATE until yes)

Why do you think the yellow dot and the white dot seemed to be moving differently than the other dots?

I'd also like to find out if there was anything confusing about the exhibit like how to use it, the experience or the instructions or text. So, how about...

### **Try this/What Happened**

#### **The experience**

#### **What's Going On**

Can you tell me what this exhibit is trying to show? Or is about?

Any suggestions on how we can improve it or make it better?