



Using Neuroscience to Optimize Visitor Experience in a Museum

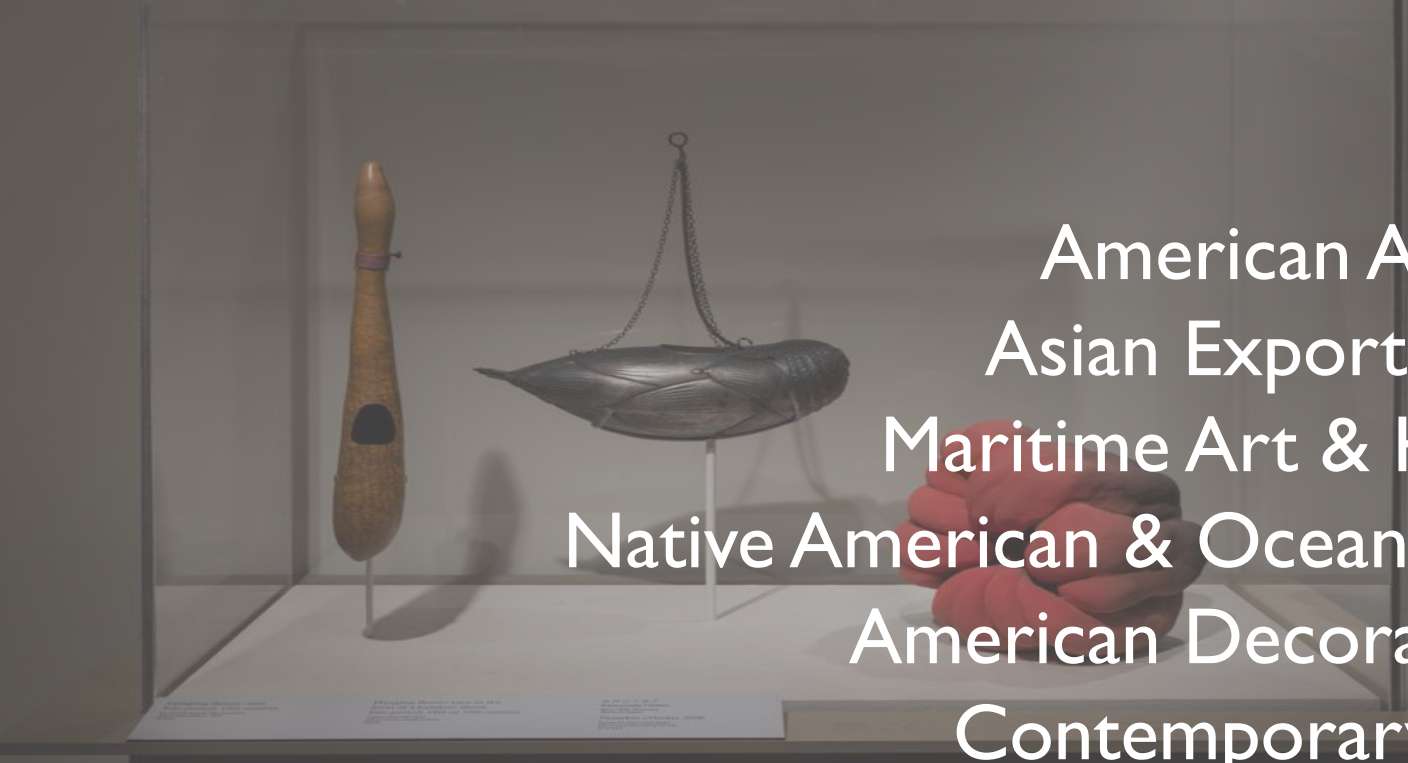
P | E | M Peabody
Essex
Museum


shimmer[™]
DISCOVERY IN MOTION

Overview

- **Background** on PEM's Neuroscience Initiative
- **Results** of PEM's first neuroscience study
- PEM's Work **Moving Forward**
- **Lessons Learned**
- **Application** to Shopper Work

American Art
Asian Export Art
Maritime Art & History
Native American & Oceanic Art & Culture
American Decorative Art
Contemporary Art
Chinese & East Asian Art
Photography
Fashion
Arts & Nature Center



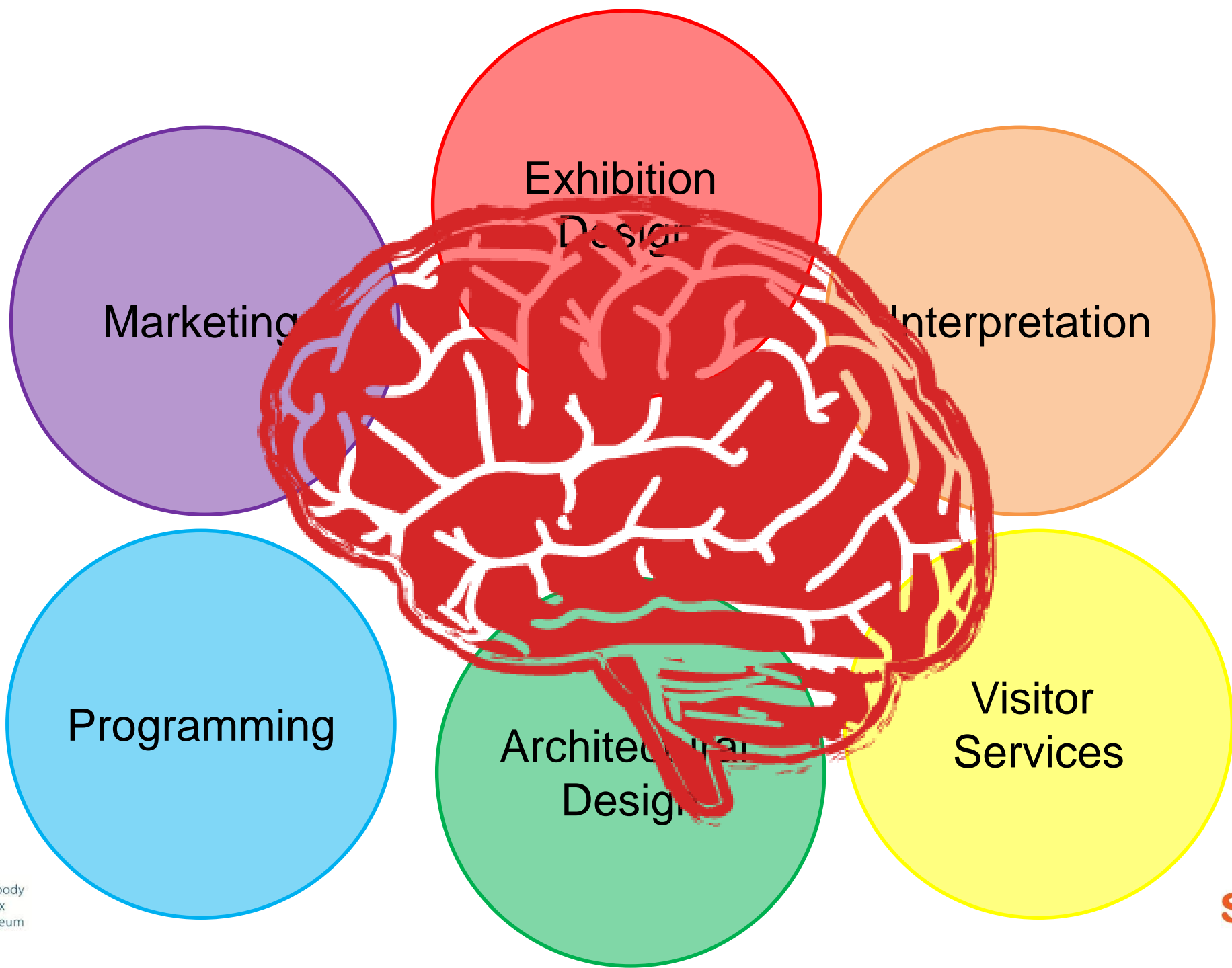


“PEM strives to create experiences that transform people's lives by broadening their perspectives, attitudes, and knowledge of themselves and the wider world.”

ASIA IN
AMSTERDAM THE
CULTURE
OF **LUXURY**
IN THE GOLDEN AGE

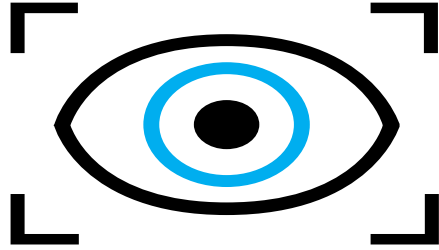






Mixed methods approach to measuring engagement

Attention



GAZE TRACKING



Emotion



BIOMETRICS



Memory



SURVEYS



Example Output



T.C. Cannon: At The Edge Of America

Experimental Question:



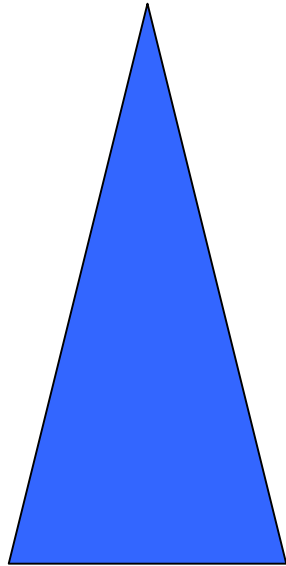
Does giving visitors a “viewing goal” – i.e. a specific task to perform while viewing a work of art – help them to engage better with that work of art?

Hypothesis:

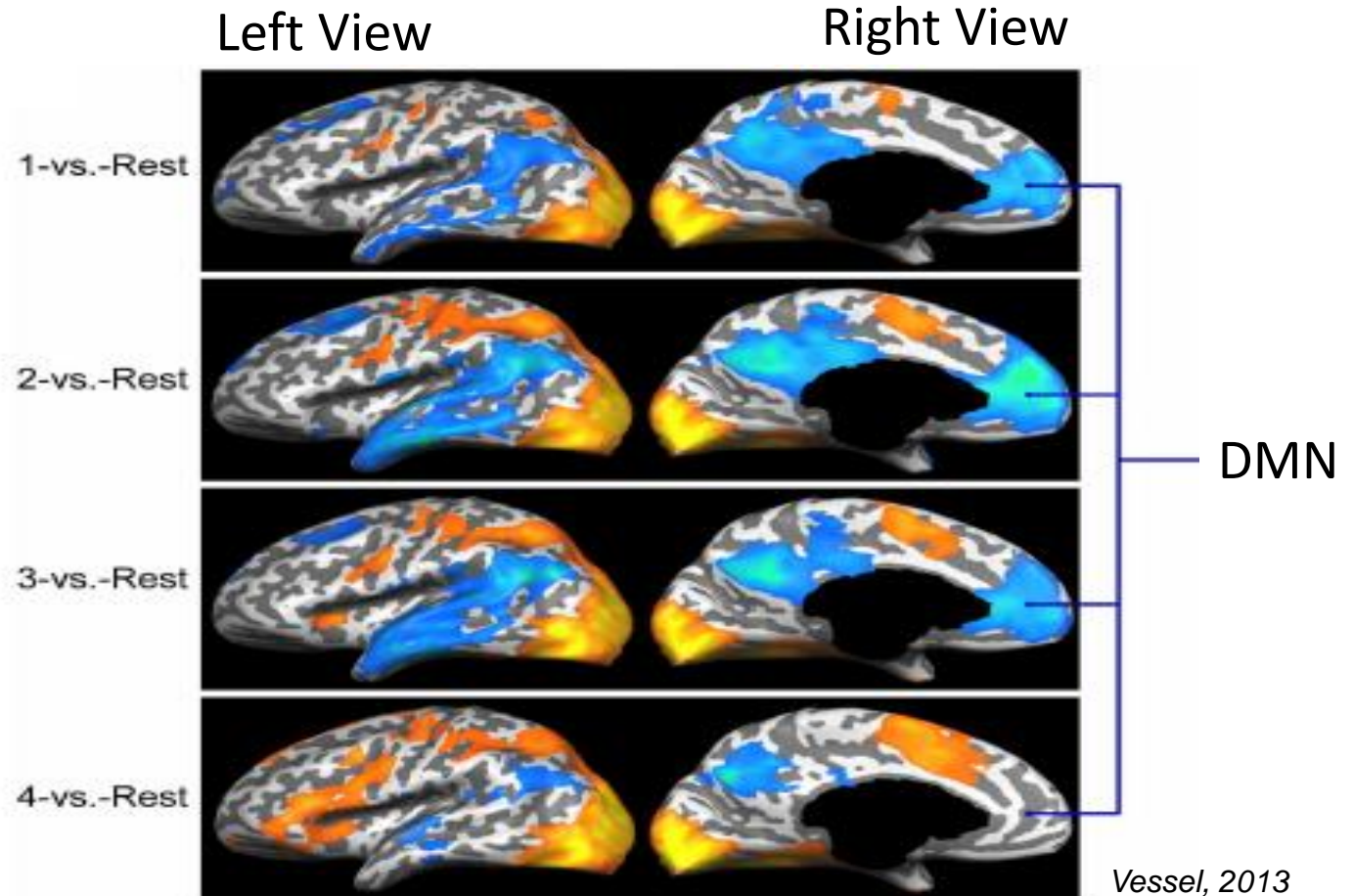
1. Any viewing goal will increase engagement
2. The “judging” viewing goal will be the best at increasing engagement

The default mode network (DMN) is activated by moving aesthetic experiences

Not emotionally moving

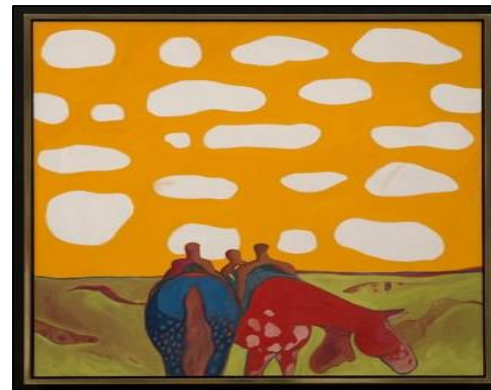


Very emotionally moving



DMN activation → Self-referential thinking → Moving experience

How does viewing goal impact engagement with...



No Prompt
Free-Viewing
Searching
Judging



Dwell Time
GSR
Self-Report

Viewing prompts

Free-Viewing:

Cannon's painting reflects his exploration of Abstract Expressionist art as a student at the Institute for American Indian Arts.



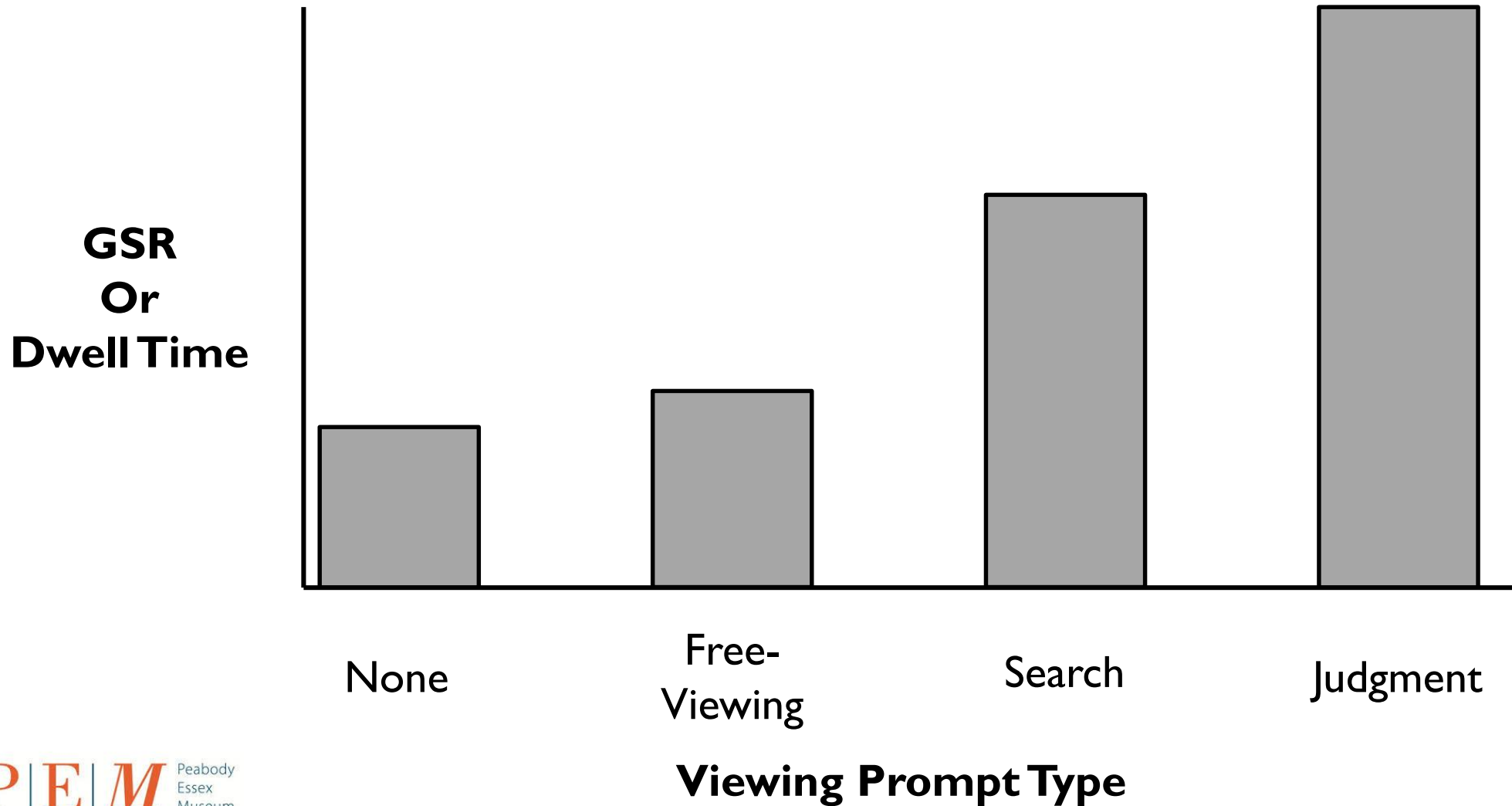
Searching:

The title of this painting, "Revelation of Standing Sun," is likely a reference to Cannon's own name, which is translated from Kiowa into English as "One Who Stands in the Sun," suggesting that perhaps this painting constitutes a self-portrait. Do you see elements of the human form in this composition?

Judging:

Cannon's painting reflects his exploration of Abstract Expressionist art as a student at the Institute for American Indian Arts. Are you moved by this painting?

Predicted results: Per Painting



Demographic Data

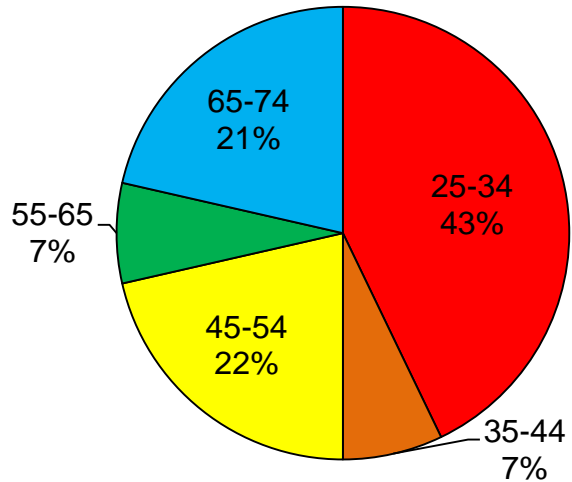
No prompt group: (N=4)

ABC group: Free-viewing → Searching → Judging (N=3)

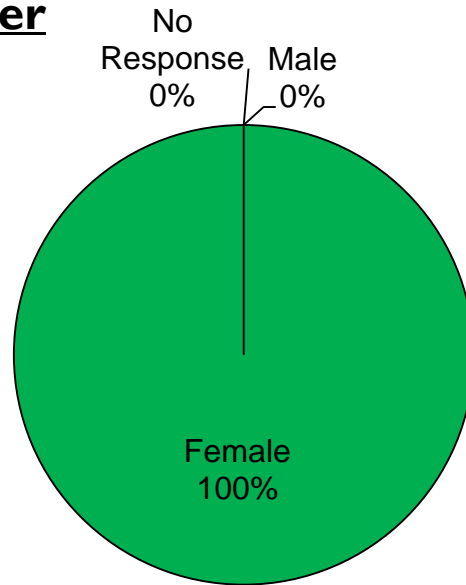
BCA group: Searching → Judging → Free-viewing (N=4)

CAB group: Judging → Free-viewing → Searching (N=3)

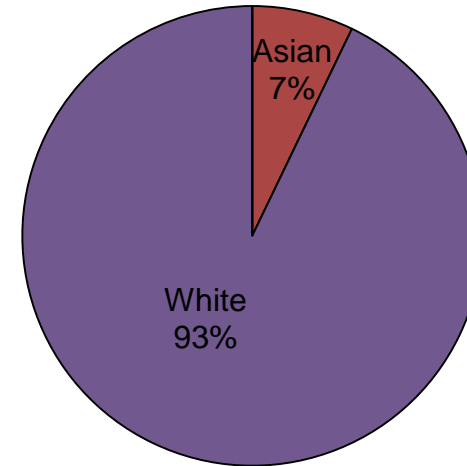
Age



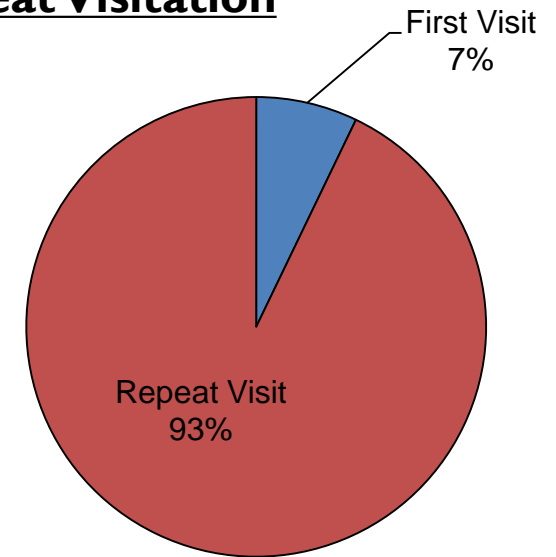
Gender



Ethnicity



Repeat Visitation



The visits lasted anywhere from 23 minutes to 118 minutes with an average of 53 minutes

Selected Results

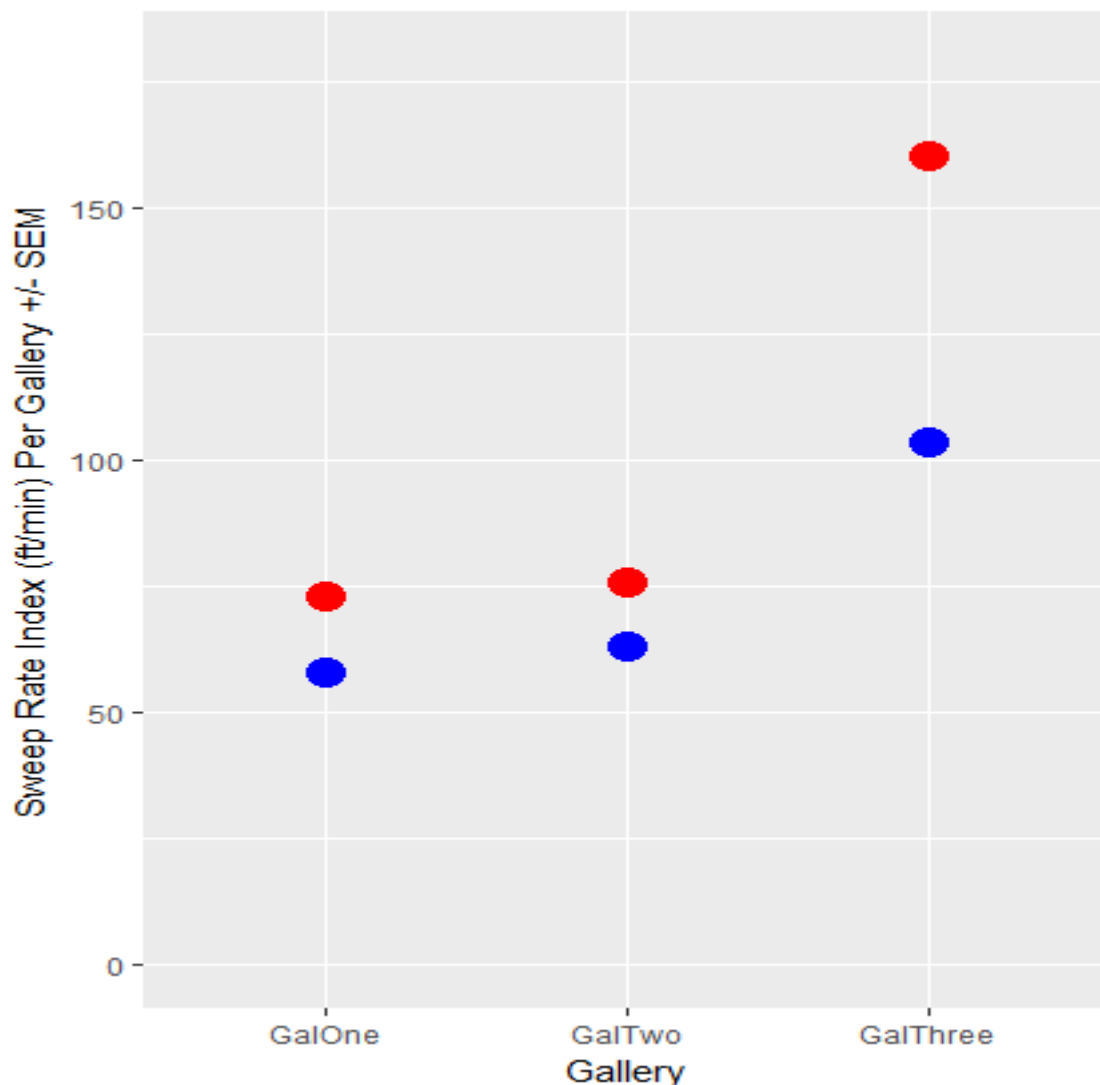
- Transit speed
- Effect of Prompts on engagement with select works of art
- Self Report Results
- Effect of prompts on label reading

Transit Speed

Faster



Slower



Prompt

● Prompted

● UnPrompted

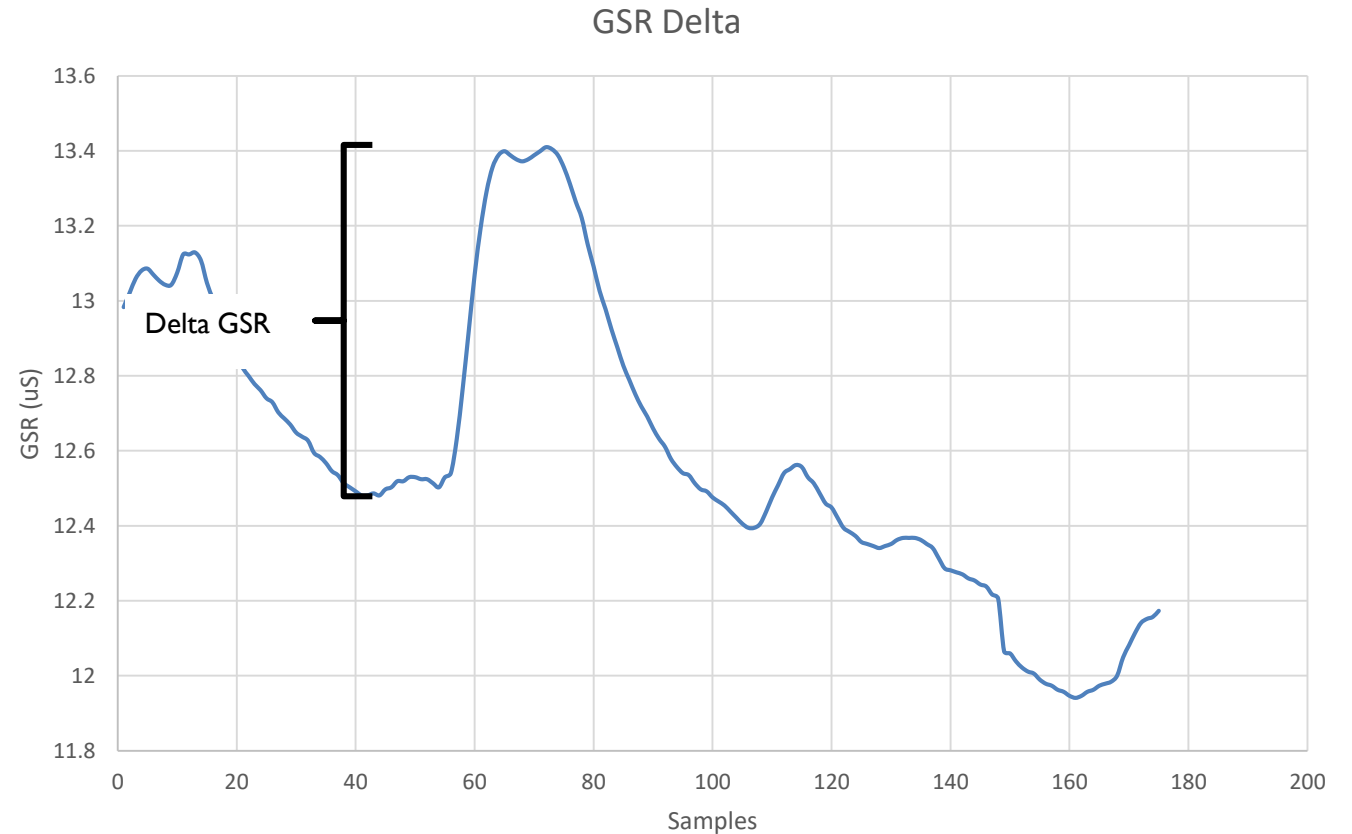
Affected by:

- The order of the galleries
- The presence of prompts

Note: the time to read the prompts represented ~25% of the difference

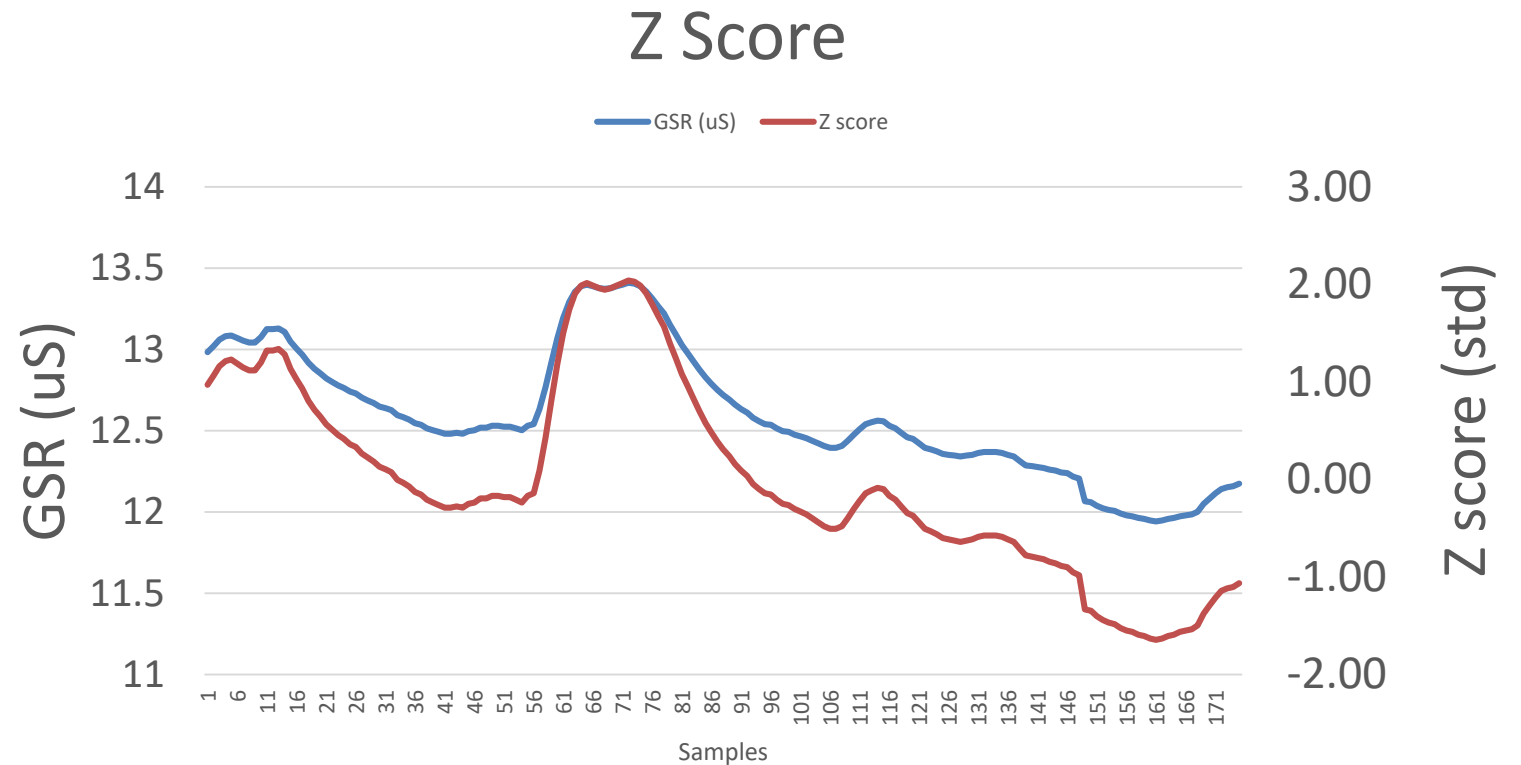
We studied the effects of prompts in a number of ways

- Number of peaks
- Delta GSR



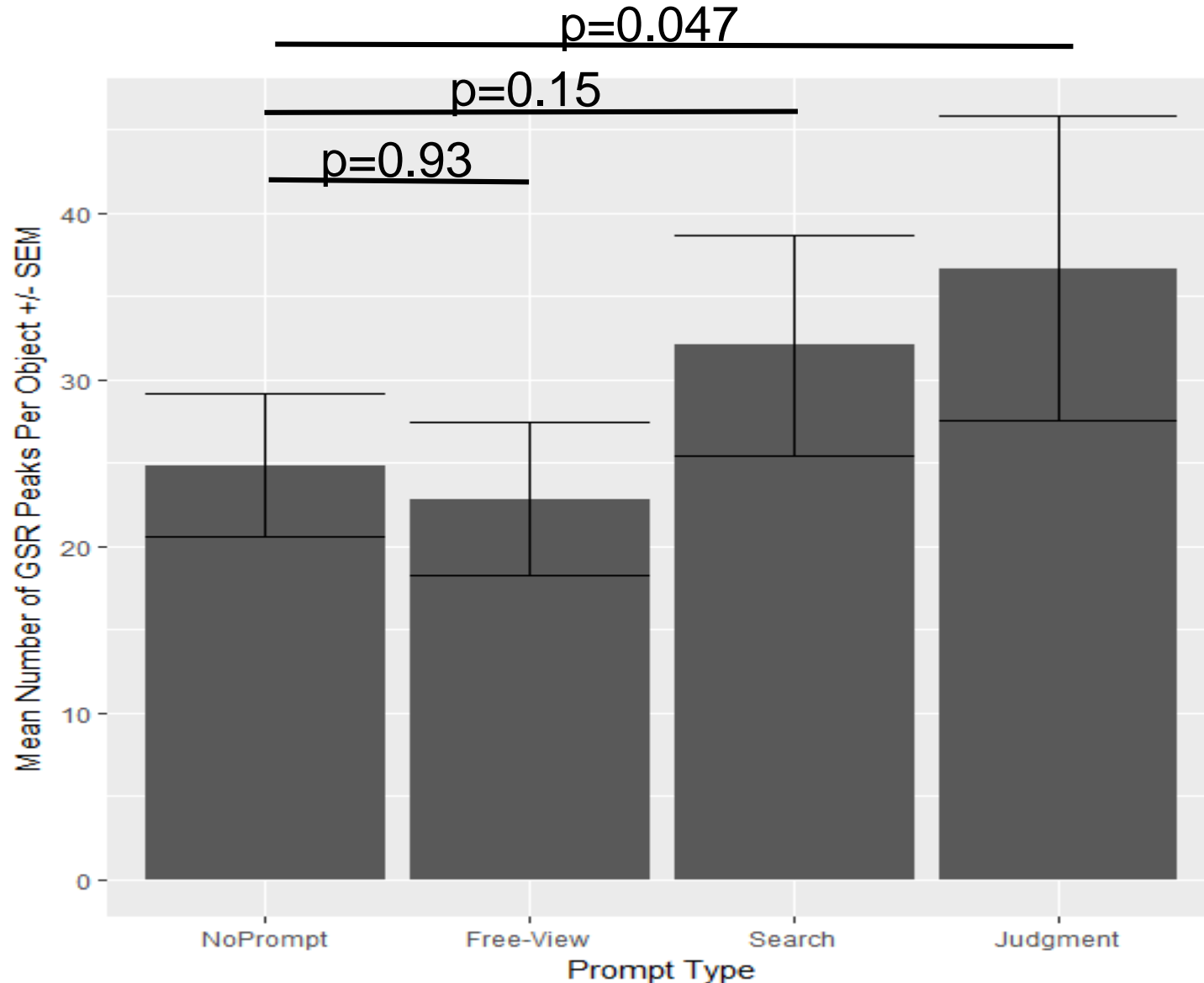
We studied the effects of prompts in a number of ways

- Number of peaks
- Delta GSR
- Z-scored GSR

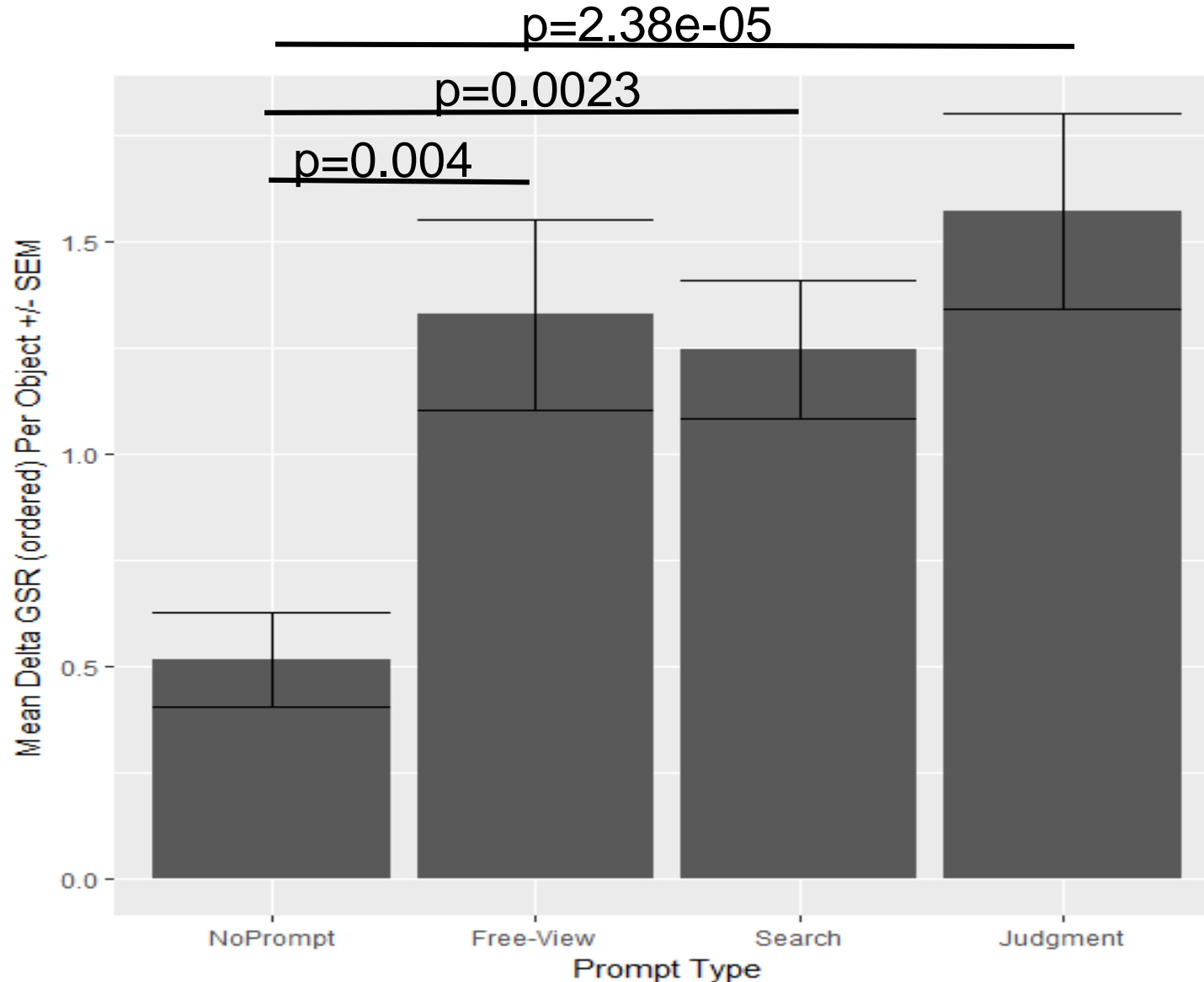


Do viewing prompts impact engagement at
specified works of art?

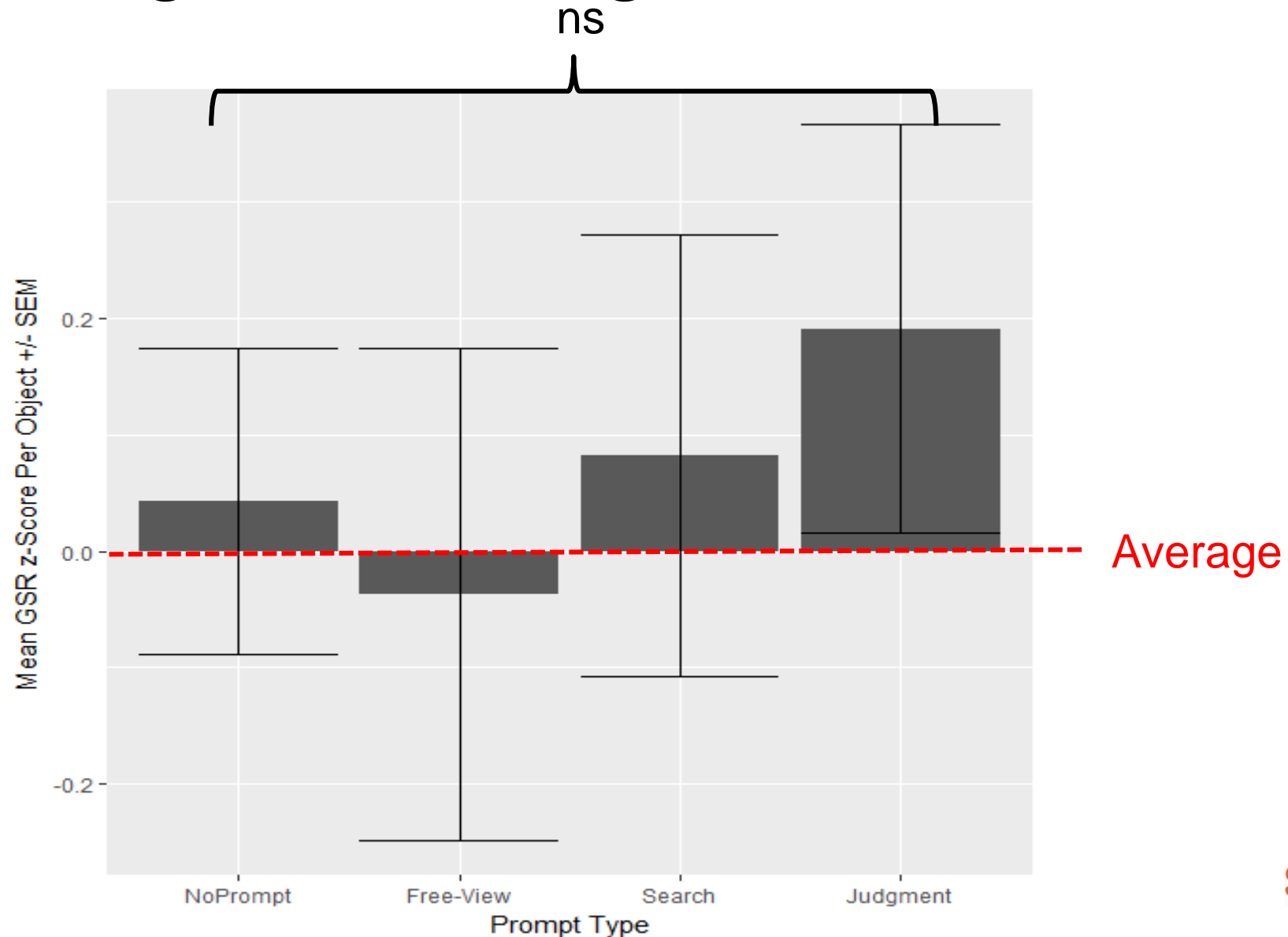
Judgment-prompted participants had significantly more GSR peaks than those who were not prompted



Prompted participants had significantly higher mean delta GSR relative to unprompted participants



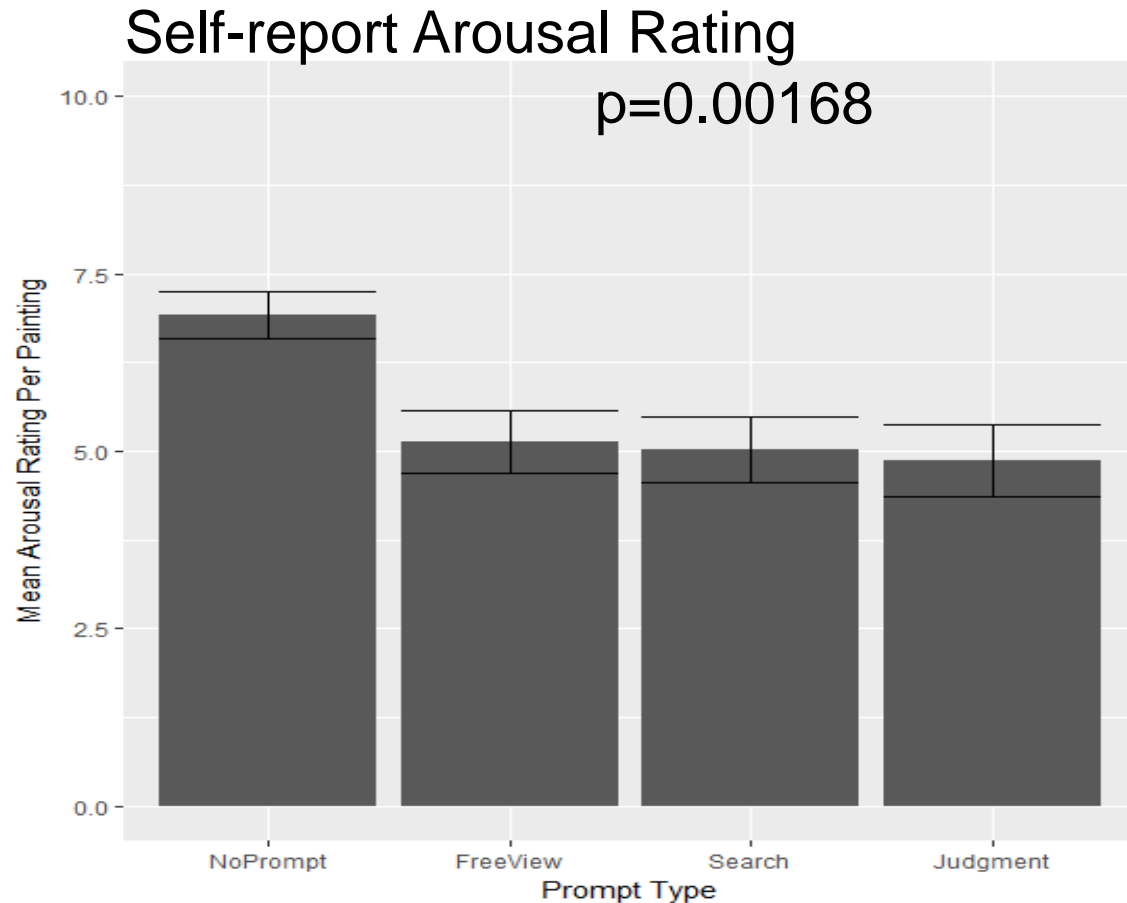
Trend toward visitors prompted with a judgment viewing task having above average GSR z-Score values



Summary – GSR Response to Prompts

- Prompted participants are more engaged at key works of art than unprompted participants.
- Judgment prompts elicited the highest level of engagement.

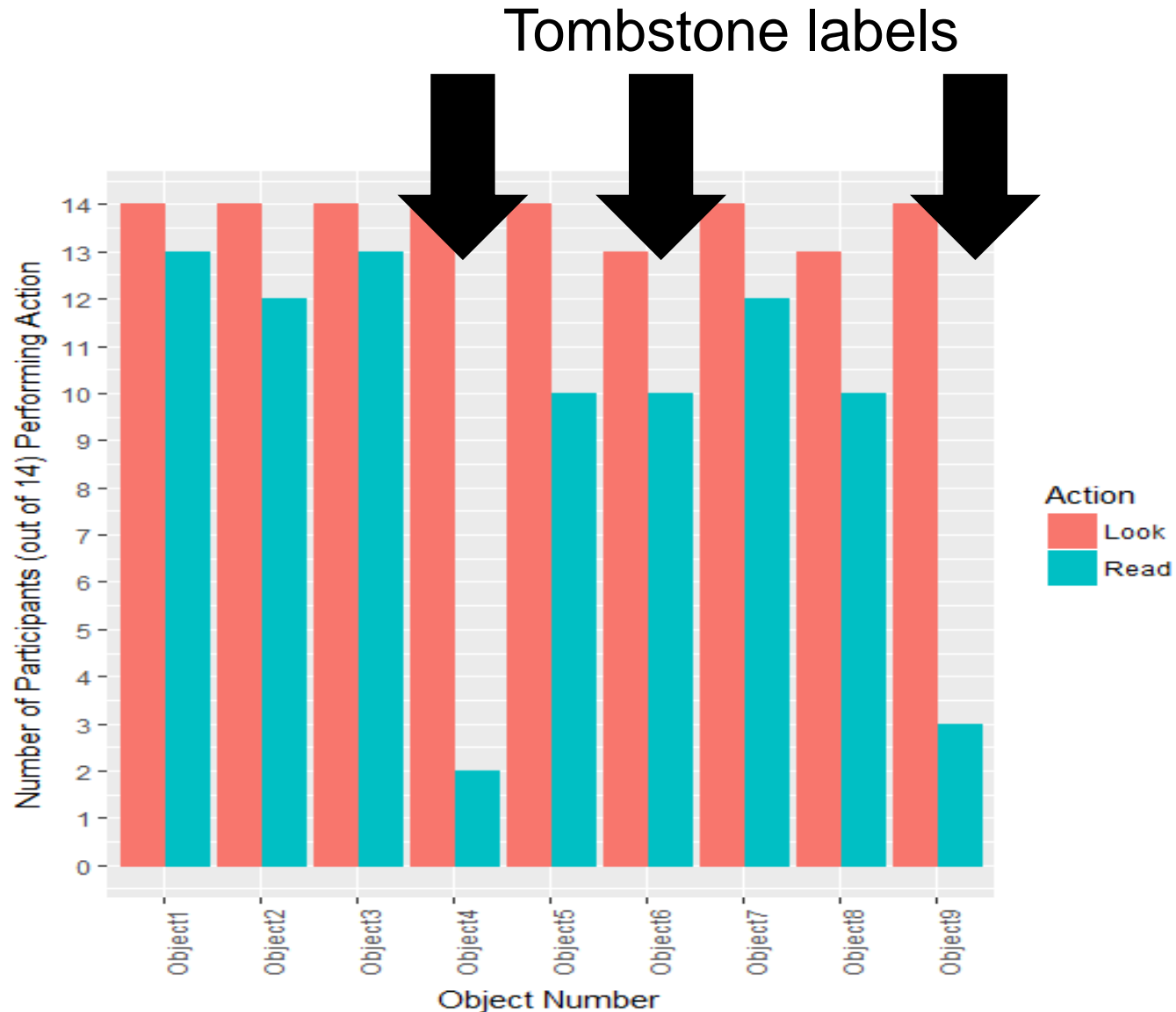
Self-report did not reflect GSR results



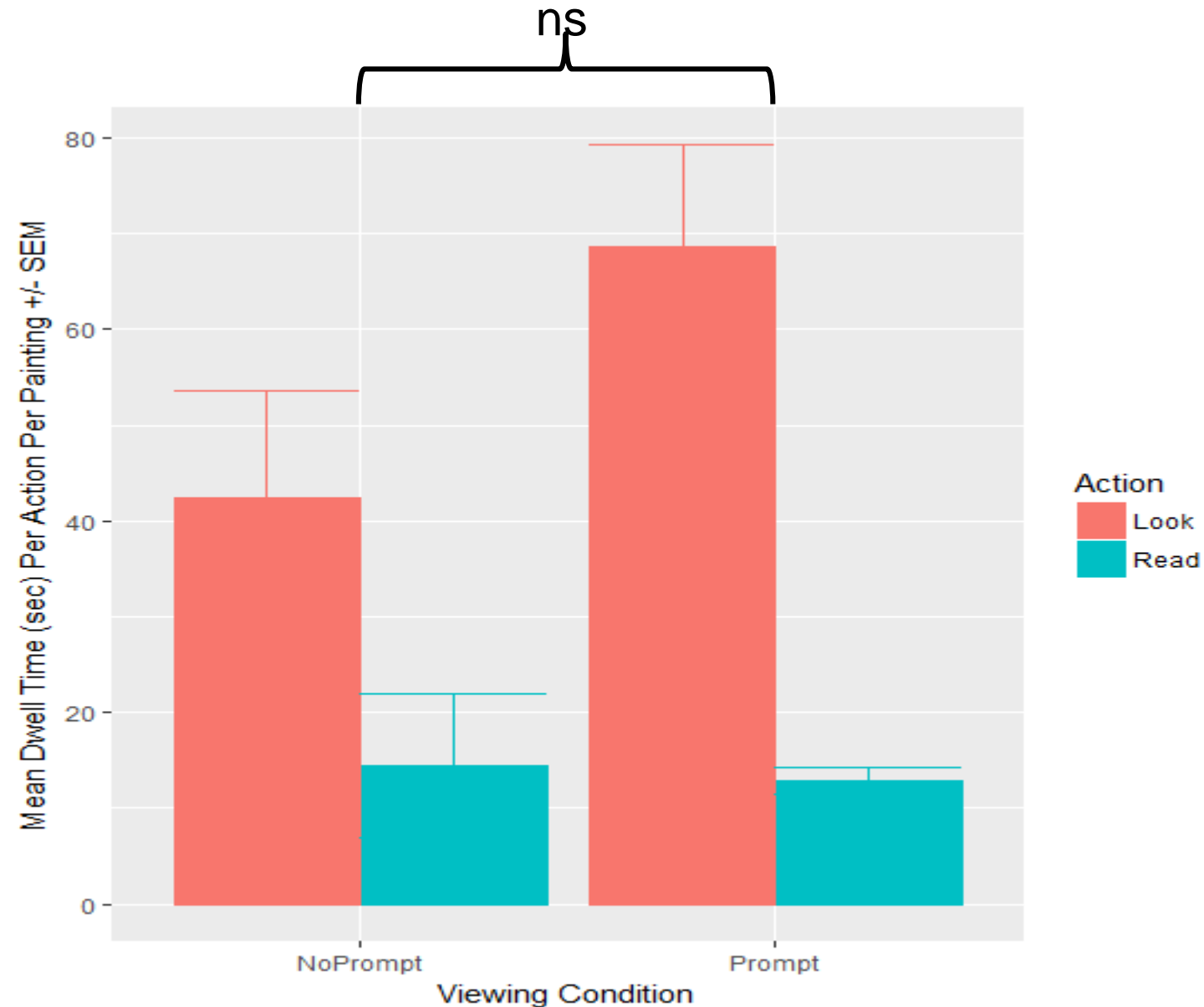
- People can't assess arousal
- Delivery of prompts interfered with enjoyment

Do viewing prompts impact label reading behavior
and associated responses?

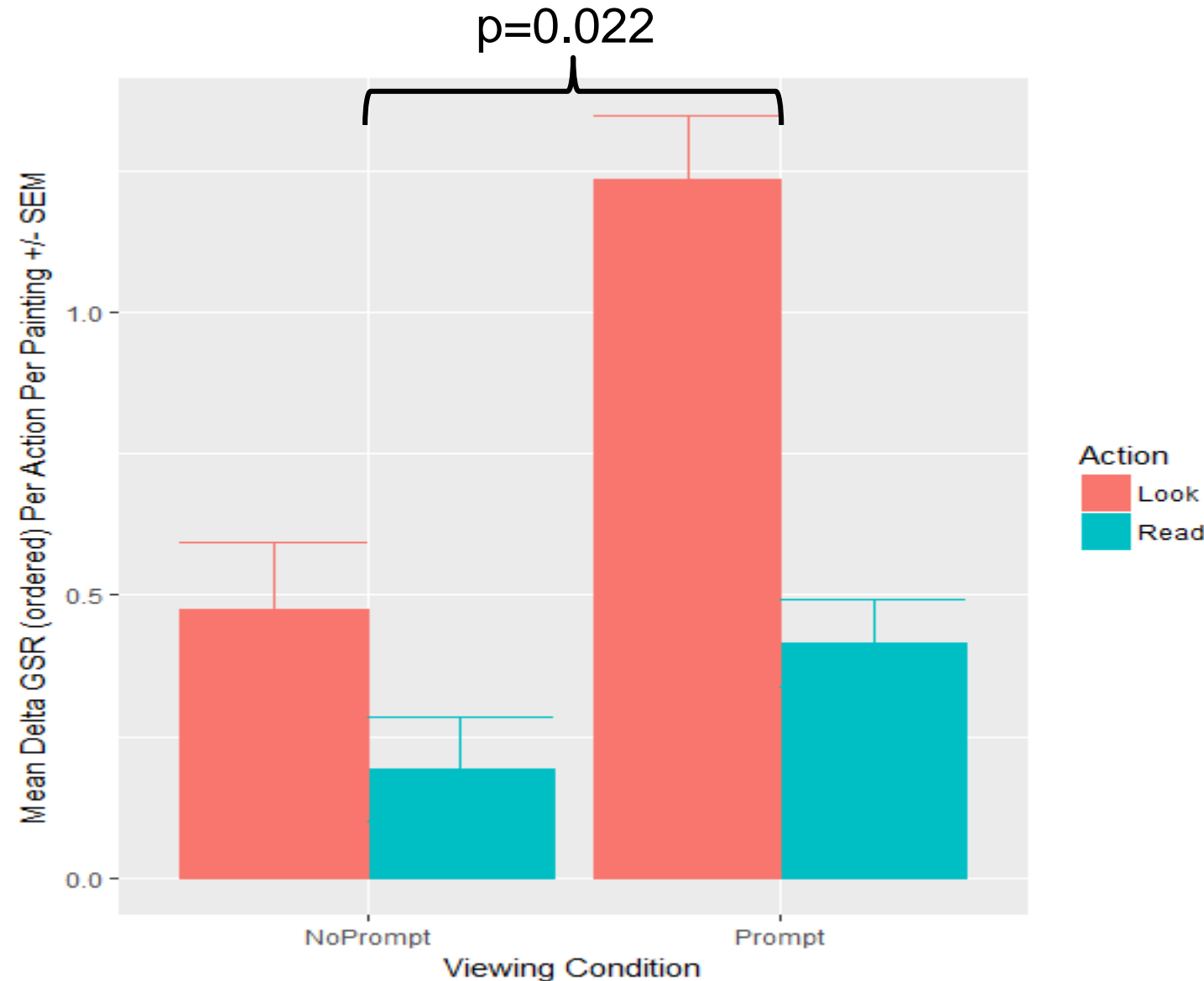
When there was something to read, participants spent some amount of time reading labels



Prompted participants look longer than unprompted participants



Prompted participants were more emotionally aroused while looking and reading than unprompted participants



Summary – Label Analysis

- Participants read labels to completion
- Prompts helped participants to engage with labels as well as art objects

Applications to Label Design

- Giving visitors a viewing prompt (e.g. in a label) may be used as a tactic to encourage slow looking and to facilitate emotional engagement with works of art.
- Self-referential questions (judgment prompts) may help visitors to engage with works of art better than free-viewing or search prompts.

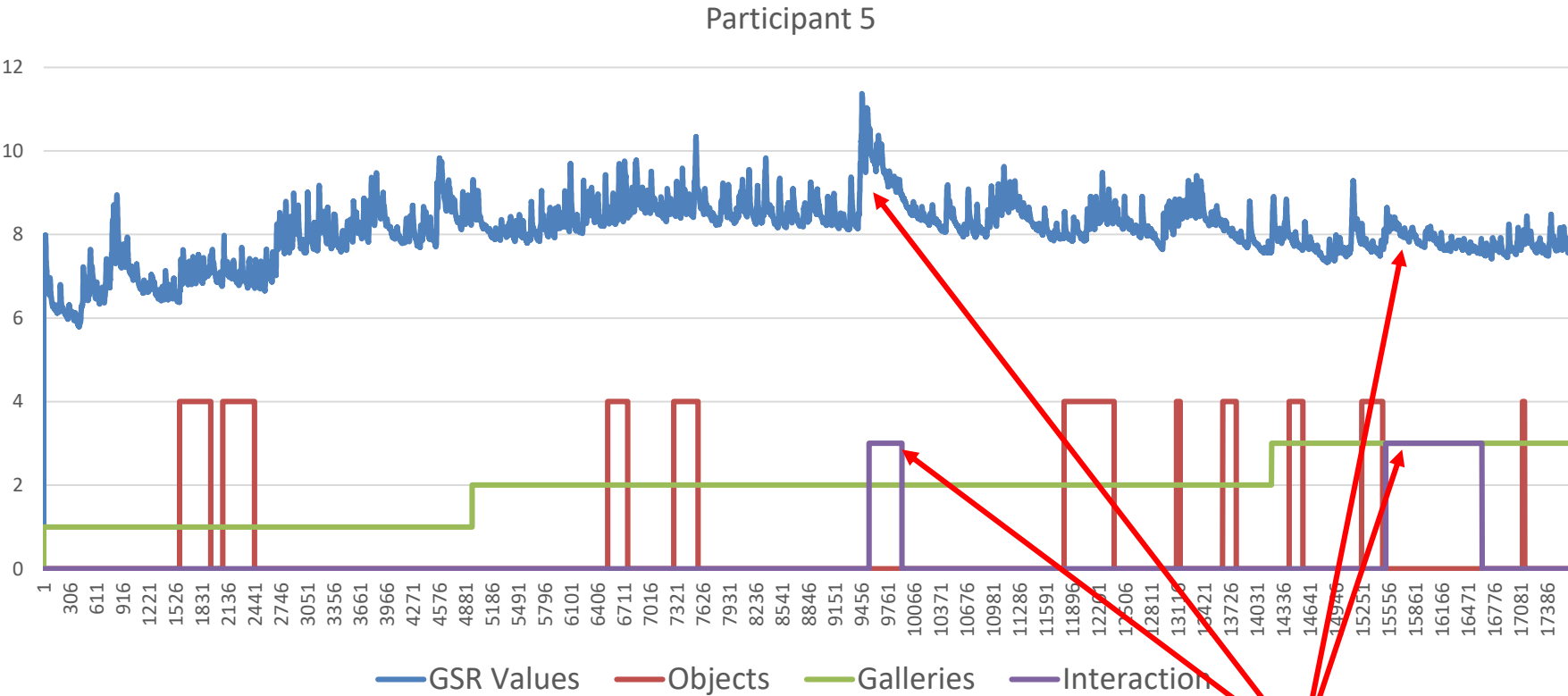
How is PEM moving forward

- Experiment with when to use judgment prompts in gallery labels
- Subsequent studies
 - Impact of figurative art on engagement with adjacent non-figurative art
 - Impact of label formatting on visitor engagement

Lessons Learned – In-Situ Research

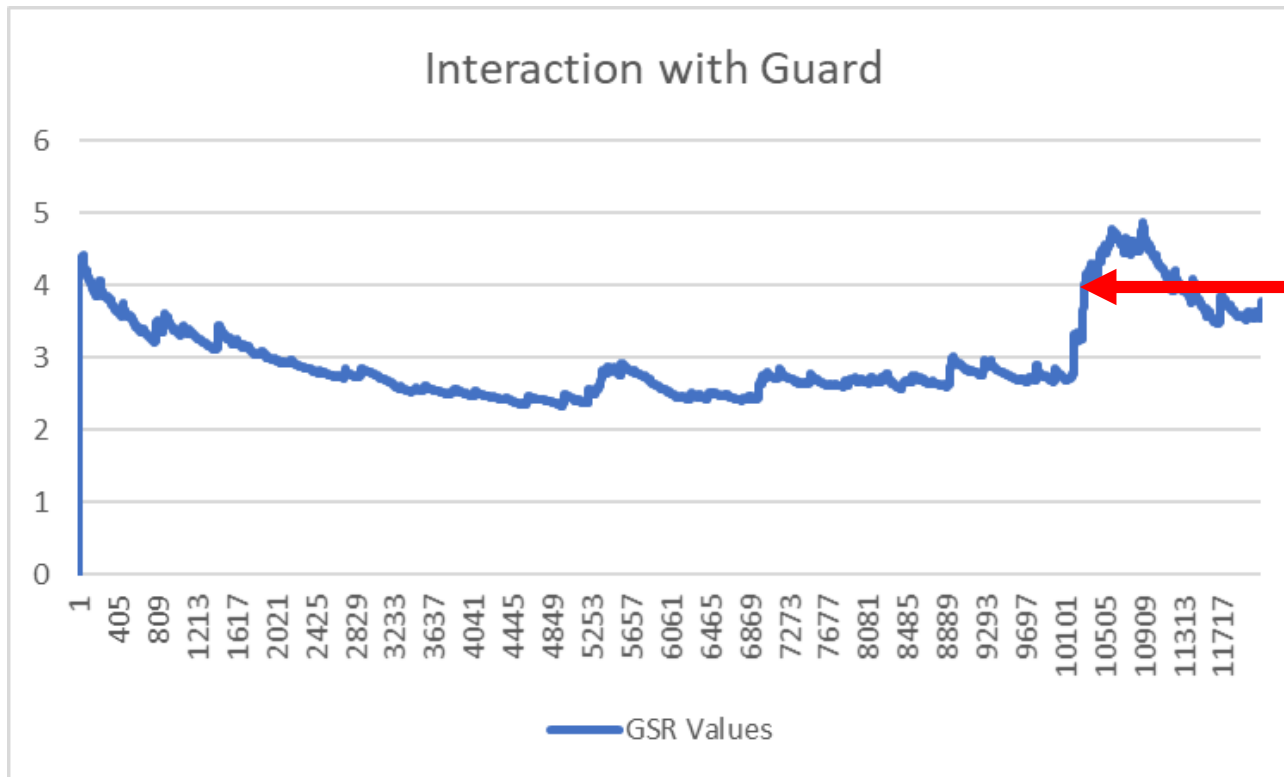
- The equipment worked well
- We were able to get statistical significance on a relatively small sample size
- Having a long experience (1+ hours) makes it challenging to do qualitative analysis
- The POV video is critical to understanding what the participant is reacting to

Interaction with people often generate higher responses than other stimuli...



People Interactions

...But not compared to interactions with a security guard



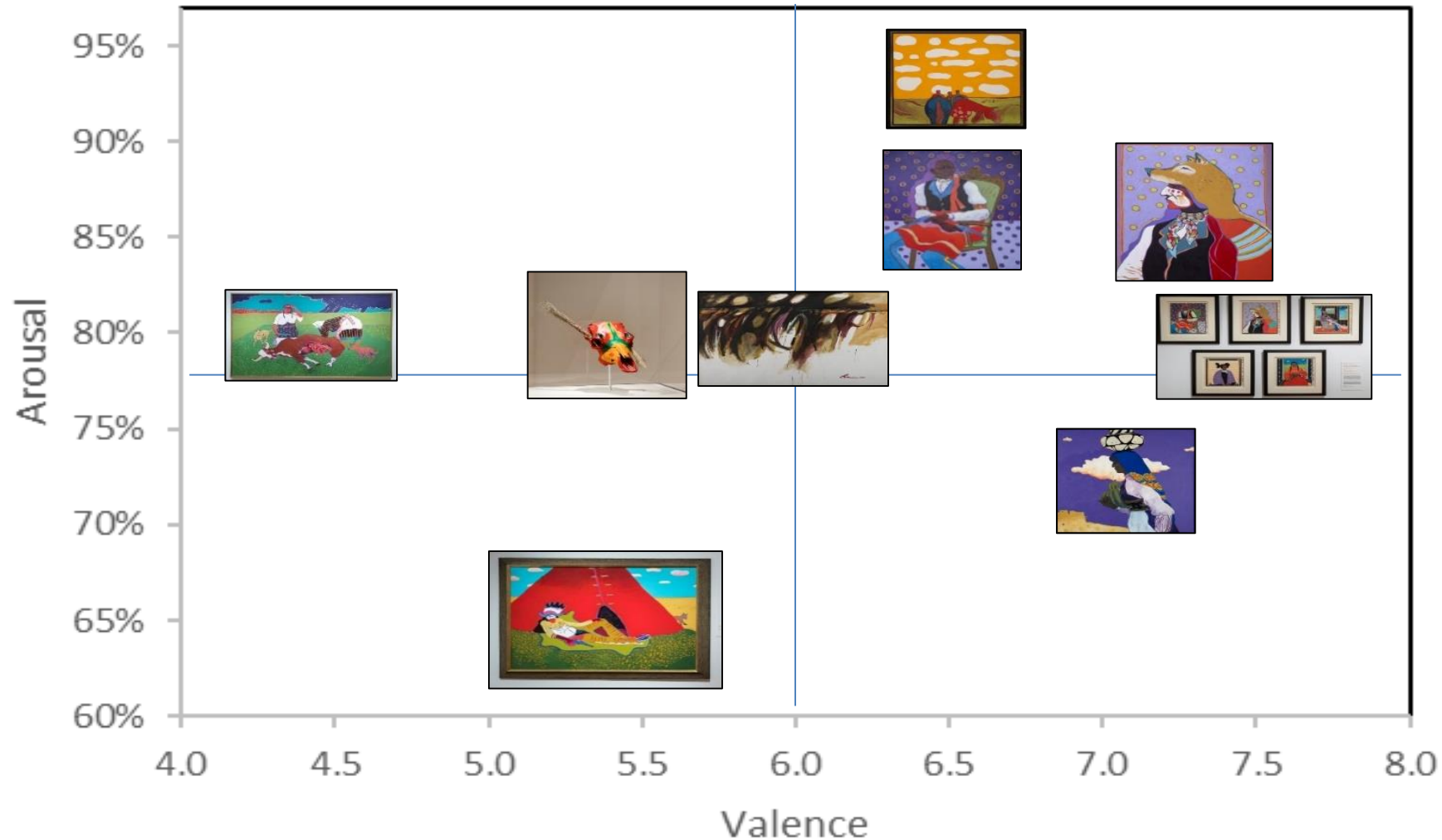
Interaction with Guard

Applicability of Research to Shopper Work

	Same	Different
Experience	<ul style="list-style-type: none">• Ambulatory• Wide area to cover – difficult for wireless• Want to spark engagement• Many competing stimuli	<ul style="list-style-type: none">• Shoppers have a goal; the journey is the goal for visitors• People want to think in a museum and get satisfaction from insights• Shopping can be a chore
Goal of Research	<ul style="list-style-type: none">• Maximize enjoyment of experience	<ul style="list-style-type: none">• Optimize results for a particular “object” for shopper

Choosing Winners: Valence/Arousal Analysis

All Participants



Final Takeaways

- ✓ Priming does impact behavior
- ✓ Hypothesis testing in-situ is feasible
- ✓ Data is incredibly rich, but studies need to be focused
- ✓ Need to address distractions that are everywhere in the real world