THERAPEUTIC BENEFITS OF NATURE IMAGES ON HEALTH: The Effects of Presence and Influence in Nature Images in a Simulated Hospital Patient Room

Ellen Vincent + Dina Battisto

A C K N O W L E D G E M E N T S

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INTRODUCTION

Research grounded in theory and experimental design that is replicable and randomized is needed to guide the selection of nature images for therapeutic environments
(Malenbaum et al., 2008; van den Berg, 2005; RMNO, 2004; Stamps, 2004; Dilani, 2001**) .**

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THEORY

Prospect refuge theory of landscape preference

"To see without being seen."

Jay Appleton, 1996

Present day landscape preferences stem from our hereditary hunter-gatherer roles in the African savannah.

Human's selection of habitats had serious life and death consequences.

Appleton developed a descriptive functional classification for landscapes.

Categories include "prospect"; "refuge"; and "hazard".

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INTRODUCTION: PURPOSE

How can we study the impact of nature images?

Establish a methodology to select images and then study how they impact physiological and psychological indicators.

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INTRODUCTION: PRESENCE DEFINED

Virtual environments (VE) research specializes in developing mediated environments.

"Is the perceptual illusion of non-mediation" (Ijsselsteijn, 2004, p. 136).

User (viewer) believes and acts as if the virtual environment is real.

Non-interactive media environments may create convincing sense of presence in the physical realm.

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INTRODUCTION: PRESENCE

Difficulty measuring presence

People may not understand the term (Ijsselsteijn, 2004).

Some aspects of emotional experience are not available to subjective awareness (Lopez & Snyder, 2004; Gordon, 2004).

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INTRODUCTION :INFLUENCE

***v.* "To affect or alter" (Merriam Webster, 1989, p. 382)).**

v. "Sway, affect, alter, change, induce, persuade" (Agnes & Laird, 2002, p. 328).

Influence question added because of pilot participant response. Influence of image on thoughts may be easier to comprehend than presence.

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RESEARCH QUESTIONS

1)	Is there a difference in the level of presence between the selected images?
2)	Is there a difference in the level of influence between the selected images?
3)	Is there a correlation between levels of presence and levels of influence?

RESEARCH HYPOTHESIS

Higher degrees of presence and/or influence in the still photograph make it more effective at holding the viewer's attention, which may then distract the viewer from pain.

RESEARCH DESIGN VARIABLES

Independent Variables

Type of view (Appleton, 1975,1996)

Examples

(1) *Prospect View [clear view]:* distant or close views; multiple vantage or viewing points.

(2) *Refuge View [safety]*: shelters or hides.

(3) *Hazard View [alarming]:* danger; exposure; no place to hide; impediments to movement.

(4) *Prospect/Refuge Mixed [view & safety]*: equal amounts of both prospect and refuge.

(5) *No Image [control]:* The LCD digital screen will be blank.

Dependent Variables

Health status & perceived well-being: Psychological and physiological responses

Perceived well-being – therapeutic aspects developed by Cooper Marcus (1995, 1999).

Health Status – Physiological measures: continuous vital signs- blood pressure + heart rate.

Health Status – Psychological measures:

- Profile of Mood States (POMS)
- Visual analogue scale for presence
- Visual analogue scale for influence

CATEGORY IMAGES

Prospect

Refuge

Hazard

Mixed Prospect + Refuge

R E S E A R C H D E S I G N
Sequential Model for Experiment

	A **Pilot group**	**B** **Experiment group**
Who	32 students	109 students
	controlled-yet seeking debriefing feedback and advice	controlled
What	Test effect of nature image on perceived presence, influence, and mood	Test effect of nature image on perceived presence, influence, and mood
Where	Simulated in-patient hospital room	Simulated in-patient hospital room
How	Psychological & physiological health data correlations with nature images	Psychological & physiological health data correlations with nature images
Results	Process refined due to feedback	Preliminary data towards most therapeutic image(s) category

PILOT

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Clemson University

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PILOT

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INSTRUMENTS : PSYCHOLOGICAL

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INSTRUMENTS : PSYCHOLOGICAL

Presence	Influence
Presence Visual Analogue Scale (VAS)	Influence Visual Analogue Scale (VAS)
How strong is your sense of presence, ‘bring there’, in the image right now?	How strong is the image at influencing your thoughts, either directly or indirectly right now?

Vertical slash responses were made on a 10-cm. line anchored by terms “extremely weak” and “extremely strong.”
Responses were measured with a ruler and assigned a number.

INSTRUMENTS : PSYCHOLOGICAL

Name	Description
Profile of Mood States (POMS)	6 subscales and 72 items for how you feel Right Now. Required responses range from 0-4, “Not at all” to “Extremely.” Vigor is the only positive emotion subscale.

Self report forms in QuikScore™ format. Respondent’s answers transfer through to concealed scoring page.

INSTRUMENTS : PHYSIOLOGICAL

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INSTRUMENTS : PHYSIOLOGICAL

Name	Description
1. Systolic blood pressure	Systolic pressure is the maximum arterial pressure of the heart beat. Measurements were taken using an arm cuff and a continuous vital sign tracker and are in millimeters of mercury (mmHg). 15 readings were used for comparison.
2. Diastolic blood pressure	The minimum arterial pressure (relaxed) state of the heart beat. Measured in millimeters of mercury (mmHg).
3. Heart rate	Heart rate is measured in beats per minute (BPM).
4. Mean Arterial Pressure (MAP)	Describes a notational average blood pressure in an individual. Defined as an average arterial pressure taken during a single cardiac cycle.

RESEARCH DESIGN PAIN STRESSOR

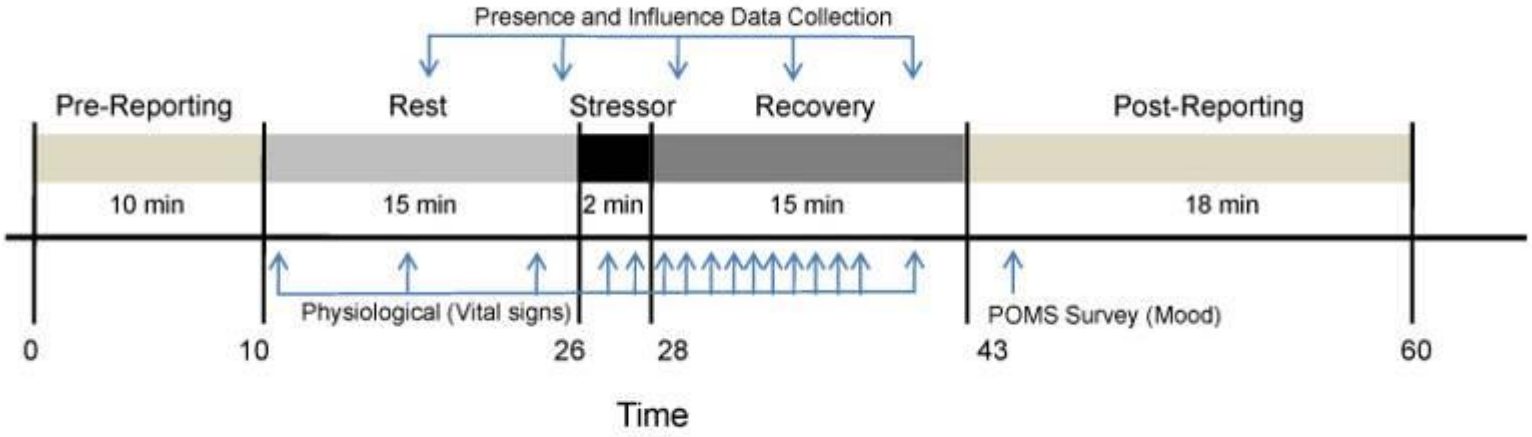
Cold Pressor
(Independent variable)

Used in experimental psychology research.
Used in cardiovascular research (McClelland & McCubbin, 2008).

Immerse hand in cooler of ice water (0 C = 32 F) for up to 120 seconds.

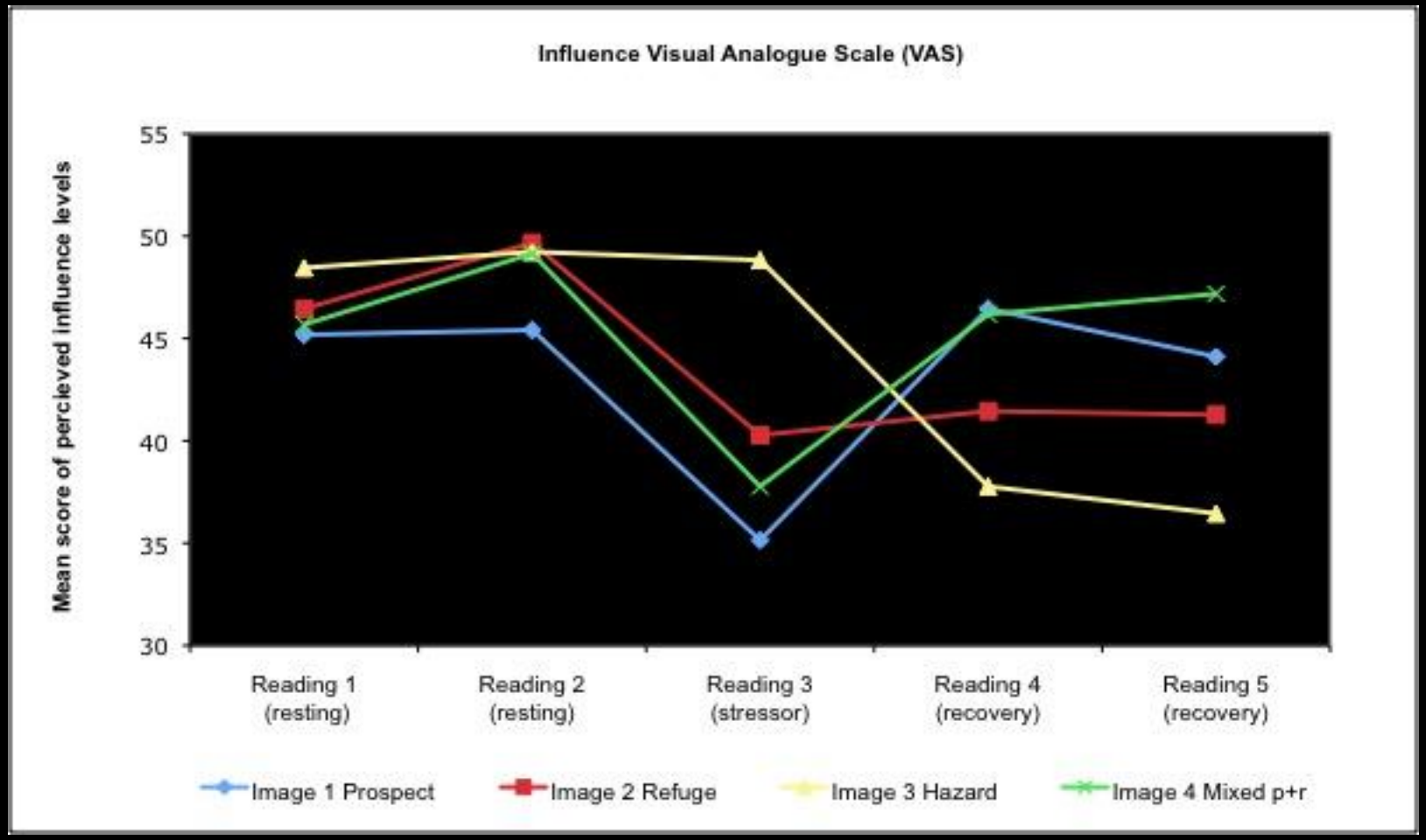
If pain is intolerable remove hand early and say “done”.

EXPERIMENT SCHEDULE



RESULTS : PSYCHOLOGICAL

R E S U L T S : Influence Visual Analogue Scale (VIS)



Statistically significant $\alpha = 0.1$ for changes among images by reading effect over time
Image #3 hazard shows most influence during pain and drops during recovery

Statistics of influence response for image and reading

Mixed model analysis of variance with a repeated measure design

Effect	Numerator DF	Denominator DF	F Value	Probability F
Image	3	83.9	0.07	0.9745
Reading	4	332.0	4.29	0.0021**
Image *Reading	12	332.0	1.95	0.0277**

**Statistically significant $\alpha = 0.1$ to assess trends for changes among images by reading effect over time.

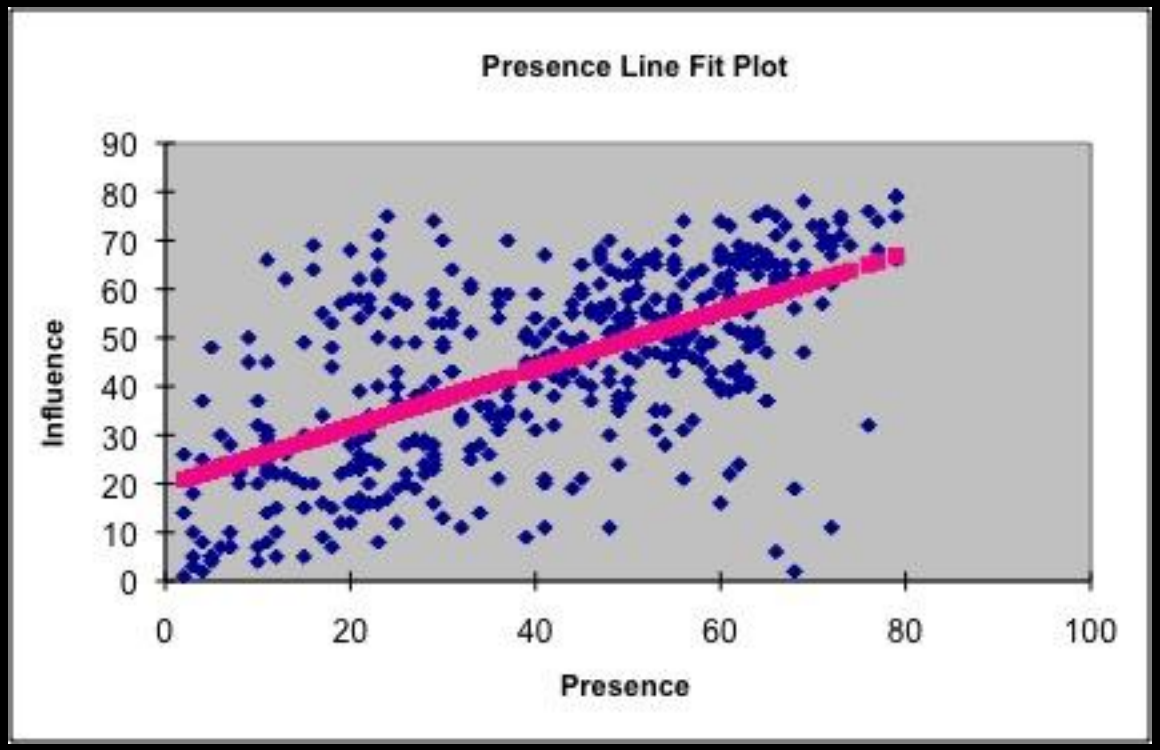
Hazard image showed highest influence responses during pain and least during recovery

Getty Image

Image #3 Hazard

RESULTS: CORRELATION

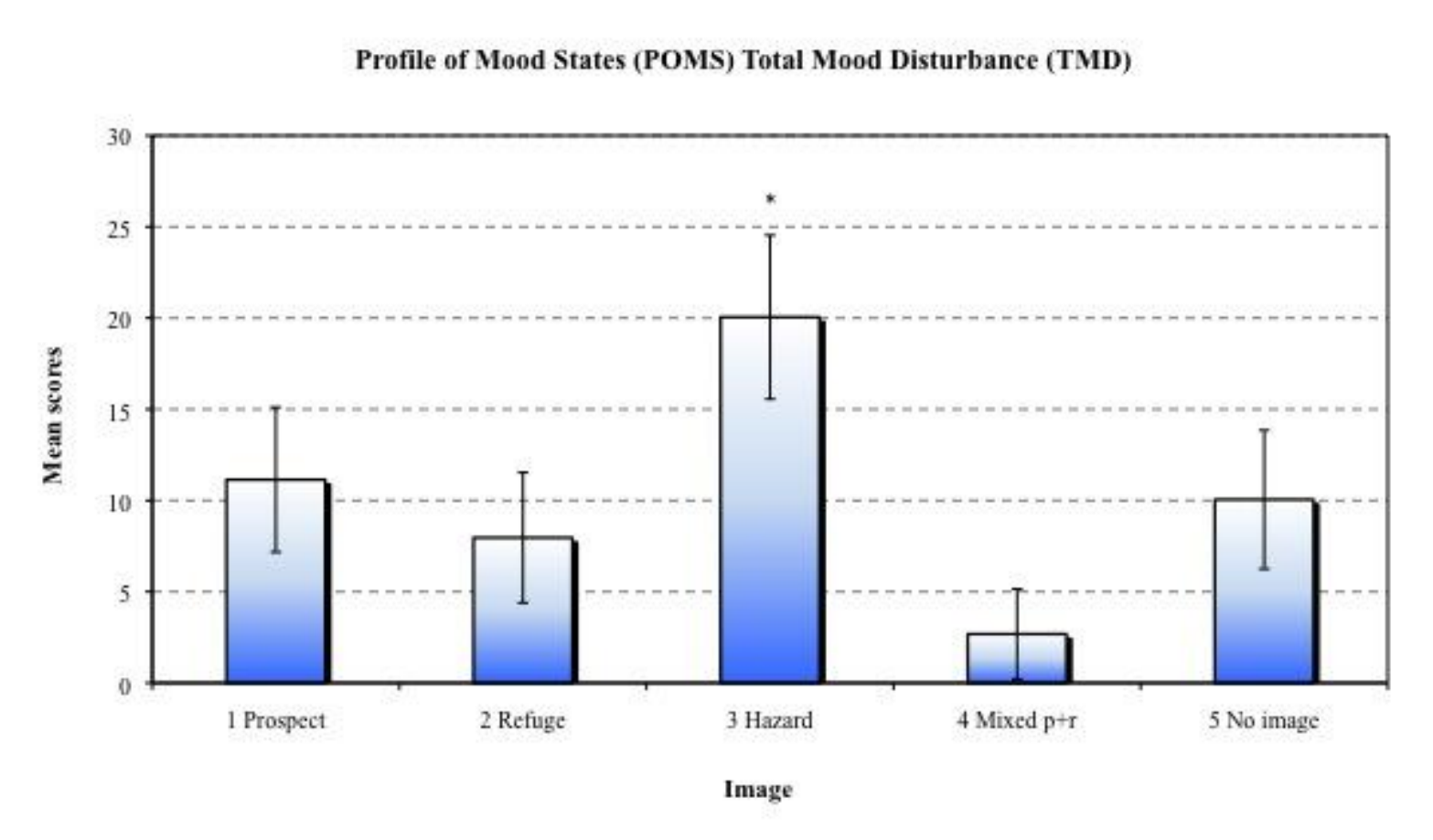
PRESENCE + INFLUENCE



Statistically significant (α = 0.1) to assess trends
Moderate to strong correlation (r = .62, $P < 0.0001$)
Presence and influence rose and fell together a significant portion of the time.

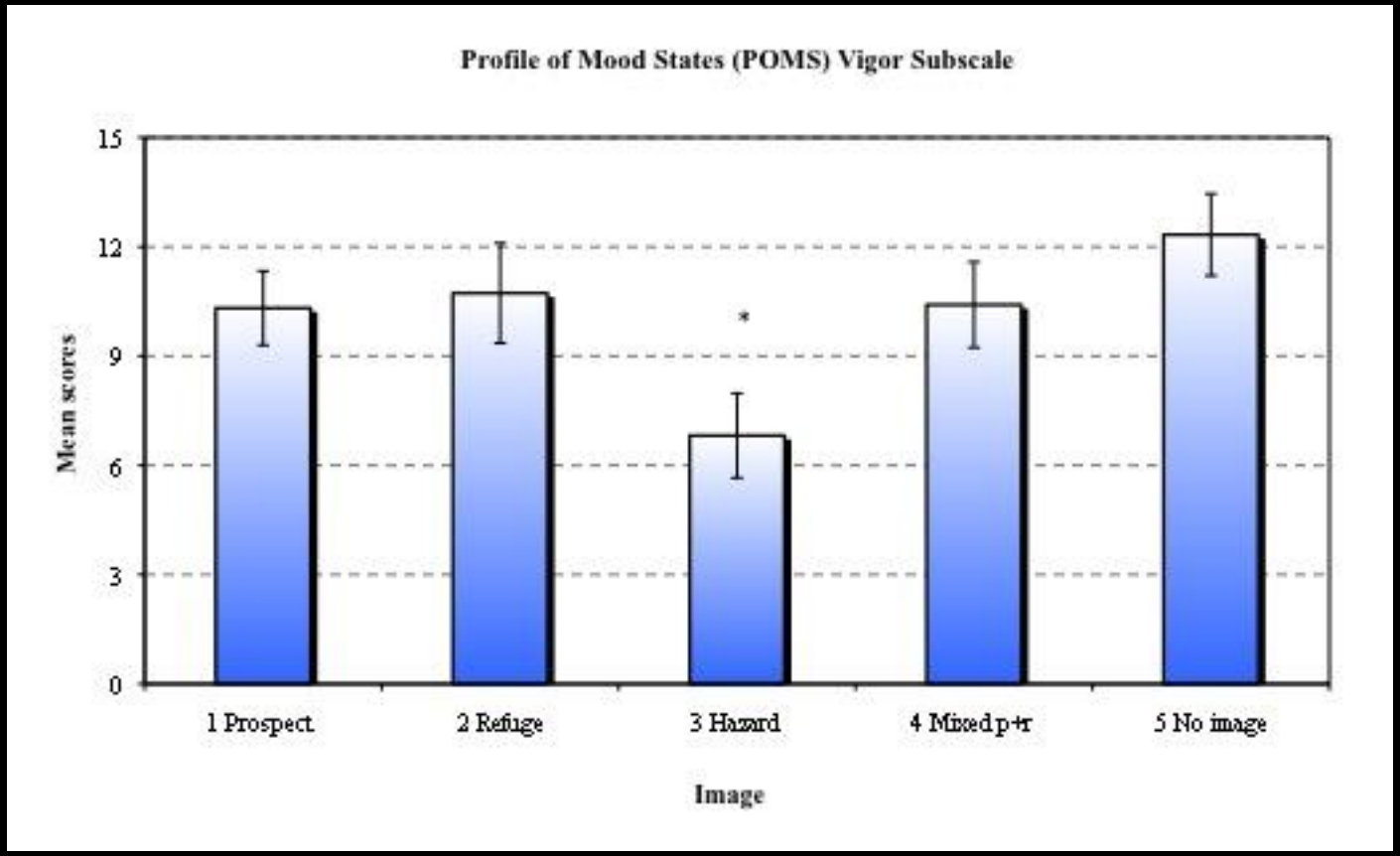
R E S U L T S : Profile of Mood States (POMS)

Total Mood Disturbance (TMD)



*Statistically significant $\alpha = 0.1$, F value = 2.90, df = 4, 104, P = 0.0253
Hazard has the highest total mood disturbance responses

R E S U L T S : Profile OF Mood States (POMS) Vigor



Hazard image shows lowest positive mood
(*Statistically significant $\alpha = 0.1$, F value = 2.93, df = 4, 104, $P = 0.0244$)

RESULTS : PHYSIOLOGICAL

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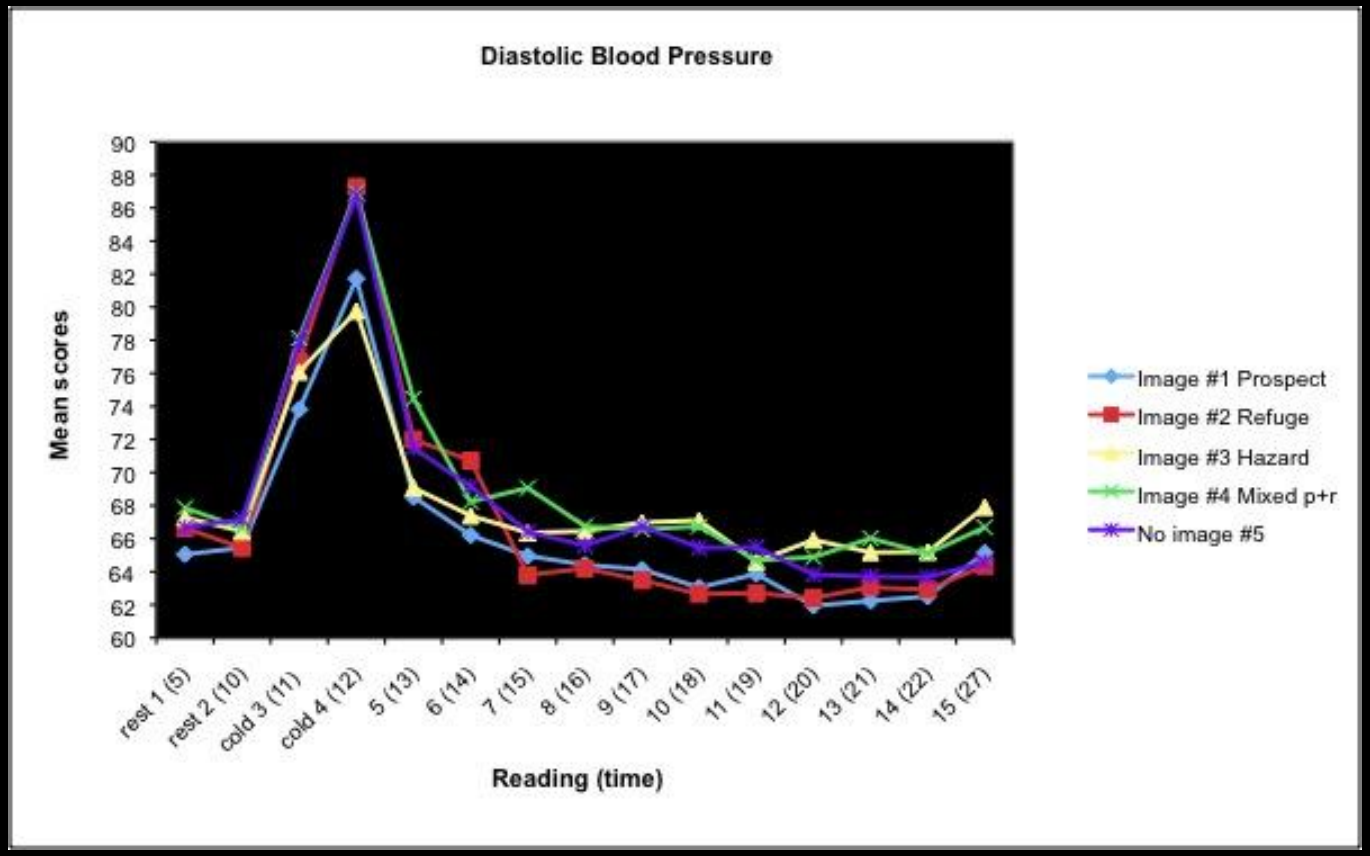
R E S U L T S : Diastolic Blood Pressure



*Statistically significant $\alpha = 0.1$ for changes in readings among groups over time

Hazard image is lowest during pain stressor then rises during recovery

Diastolic Blood Pressure

Statistics of interaction between reading and image group

Effect	Numerator DF	Denominator DF	F Value	Probability F
Image	4	104	0.57	0.6884
Reading	14	1245	118.88	<.0001**
Image *Reading	56	1245	1.33	0.0561**

**Statistically significant $\alpha = 0.1$, for changes among images by reading effect

Hazard image is lowest during pain stressor then rises during recovery

RESEARCH QUESTIONS + RESULTS

1)	Is there a difference in the level of presence between the selected images?
Result	No statistical difference found
Discussion	Levels may be equal due to rigorous image selection process Concept of presence may have been difficult to comprehend

RESEARCH QUESTIONS + RESULTS

2)	Is there a difference in the level of influence between the selected images?
Result	Yes. Influence was significantly higher for image group (3) ‘hazard’ over time. It was highest during the cold pressor and lowest during recovery.
Discussion	Forest fire may have high arousal and distraction potential. Use of imagery (heat and cold) to reduce pain may have been used by some participants (Turk 2002).

Getty Image

Image #3 Hazard

RESEARCH QUESTIONS

3)	Is there a correlation between levels of presence and levels of influence?
Result	Yes. A moderate to strong correlation (*r* = *.62*) was found between perceived presence and influence in this study.
Discussion	It is not known at this time whether this correlation is coincidence or not. Additional studies are needed.

RESEARCH HYPOTHESIS

1	Higher degrees of presence and influence in the still photograph make it more effective at holding the viewer's attention, which may then distract the viewer from pain.
Result + Discussion	Yes, as evidenced by the hazard image's influence and diastolic responses. But hazard image was not "therapeutic" due to a quick plummet in influence and high mood disturbance reports.

RESEARCH DESIGN LIMITATIONS

External generalization to other populations not possible with one study and small sample size.

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C O N T R I B U T I O N S

(1) Contributions to restorative/therapeutic environments research methodology & literature.

Developing experimental methods to test images effect on health indicators.

Adding empirical research data to interdisciplinary field.

(2) Informs future study with patient population in the hospital setting.

(3) Introduce nature into healthcare settings to reduce stress and pain.

(4) Evidence based outcomes for designers and hospital personnel responsible for selecting art work for the healthcare setting.

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RESEARCH CONTINUUM

NEXT STEPS	PHASES	POPULATION	TIME
Replicate study in hospital	Phase I- Sorting task Phase II- Experiment	In-patient	2009
Replicate study in multiple hospitals	Phase I- Sorting task Phase II- Experiment	In-patient	2010-2011

THANK YOU

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CONTACT INFORMATION

Ellen A. Vincent
Environmental Landscape Specialist
Horticulture Dept. Box 340319
Clemson, SC 29634-0319
USA
864.656.1342
803.243.8888 (cell)
ellenav@clemson.edu