THERAPEUTIC BENEFITS OF NATURE IMAGES ON HEALTH:

Research Experiment to Study how Nature Images Impact Physiological and Psychological Responses when a Person is Subject to Pain

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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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RESEARCH HYPOTHESES

1)	Nature views are variable in their impact on specific psychological and physiological health status indicators.
2)	Prospect and refuge nature scenes are more therapeutic than hazard nature scenes.

RESEARCH QUESTION

1)	Which nature image categories are most therapeutic as evidenced by reduced pain and positive mood?

RESEARCH DESIGN VARIABLES

Independent variables	Nature images
Dependent variables	Psychological + physiological responses

RESEARCH DESIGN EXPERIMENT

Independent Variables

Type of view (Appleton, 1975,1996)

→

Dependent Variables

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

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.

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:

- Short Form McGill Pain Questionnaire
- Profile of Mood States (POMS)

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 pain and mood	Test effect of nature image on perceived pain 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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PILOT

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Clemson University

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INSTRUMENTS : PSYCHOLOGICAL

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INSTRUMENTS : PSYCHOLOGICAL

Instrument	Short Form McGill Pain Questionnaire	Profile of Mood States (POMS)
Items	15 items 3 scales: sensory (throbbing, shooting), affective (punishing-cruel) and total	65 items 6 subscales
Description	Check a number from 0 “none” to 3 “severe”	Circle a number from 0 “not at all” to 4 “extremely”

INSTRUMENTS : PHYSIOLOGICAL

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INSTRUMENTS : PHYSIOLOGICAL

Name	Description
1. Systolic blood pressure	Systolic pressure is the maximum arterial pressure of the heart. 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 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”.

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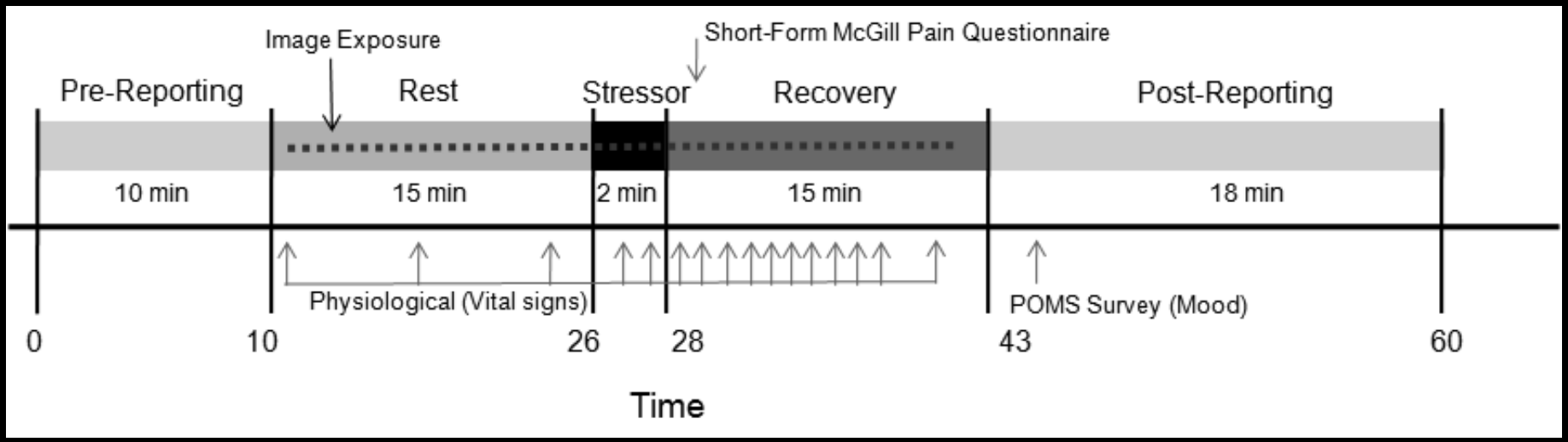
EXPERIMENT SCHEDULE



Dina Battisto

RESULTS : PSYCHOLOGICAL

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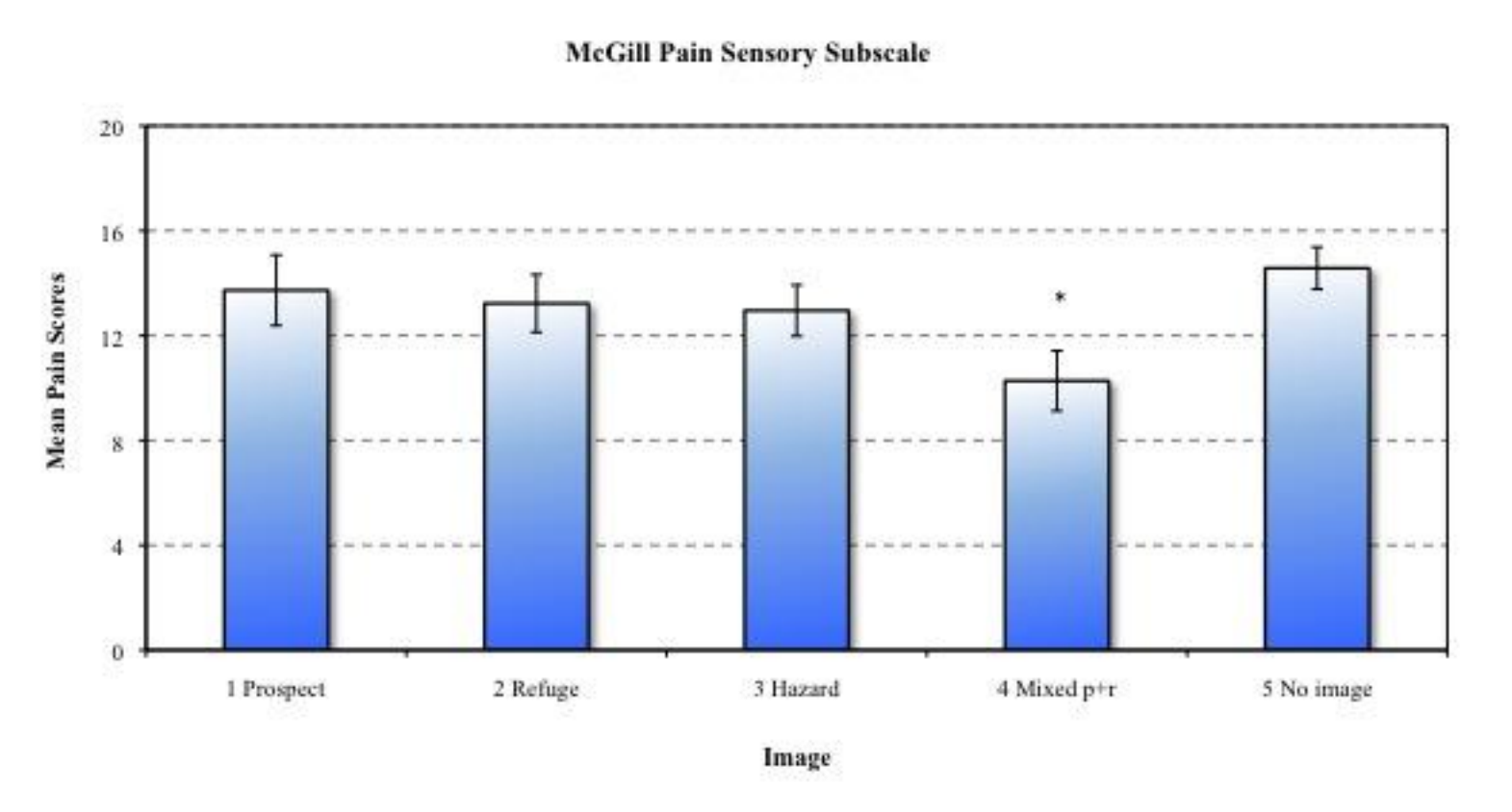
R E S U L T S : Short Form McGill Pain Questionnaire

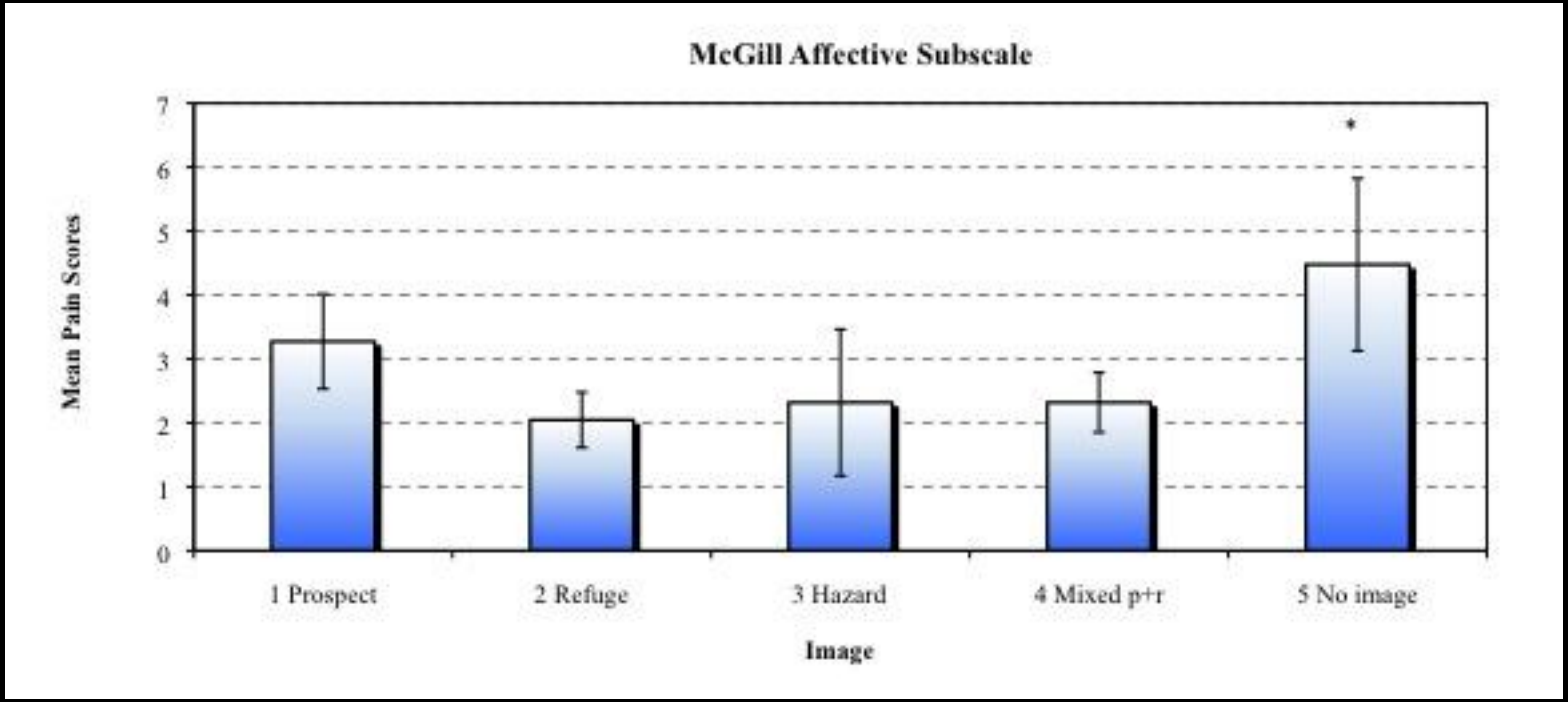
Sensory subscale (e.g. throbbing, shooting)



*Statistically significant $\alpha = 0.1$, F Value = 2.22, df = 4, 104 , $P = 0.0715$
Mixed prospect refuge image shows lowest pain levels

R E S U L T S : Short Form McGill Pain Questionnaire

Affective subscale (e.g. sickening, punishing-cruel)

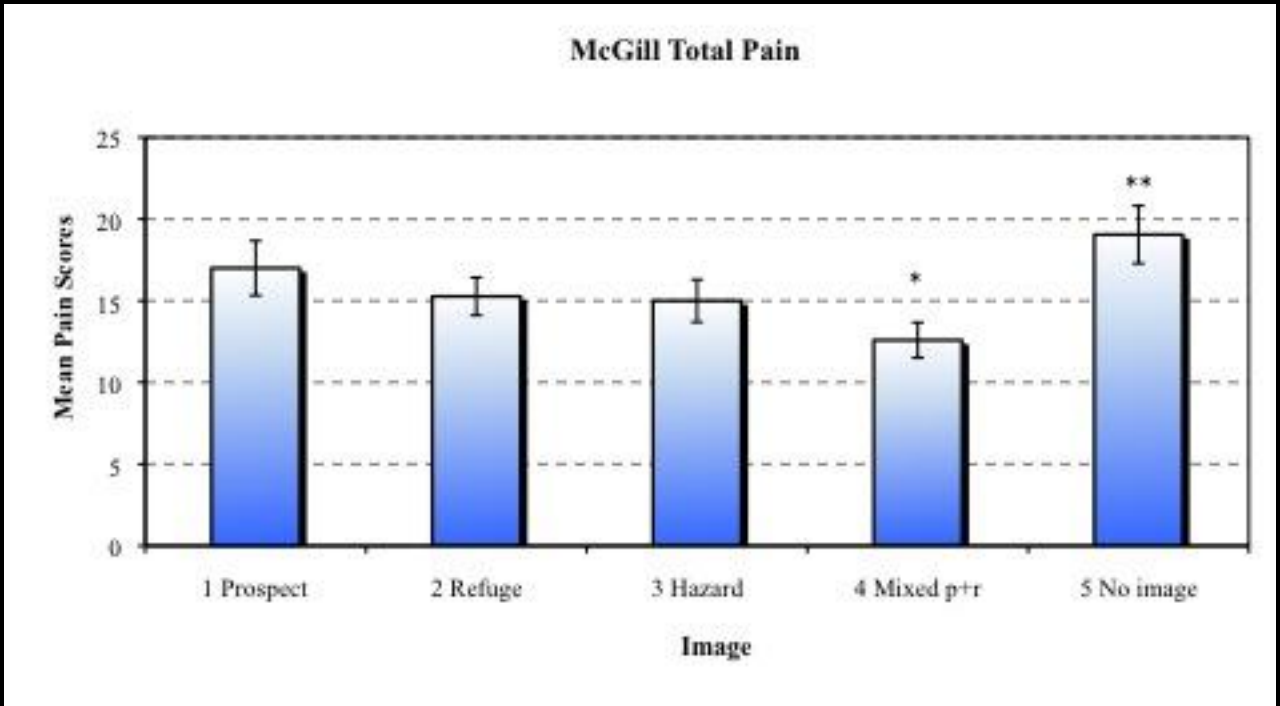


*Statistically significant α = *0.1*, F Value = 2.98, df = 4, 104. *P* = 0.0226

No Image treatment shows highest pain but prospect is not statistically different from any other treatment .

R E S U L T S : Short Form McGill Pain Questionnaire

Total Pain



*Statistically significant $\alpha = 0.1$, F Value = 2.87, df = 4, 104, $P = 0.0265$

No image treatment is higher than mixed p + r

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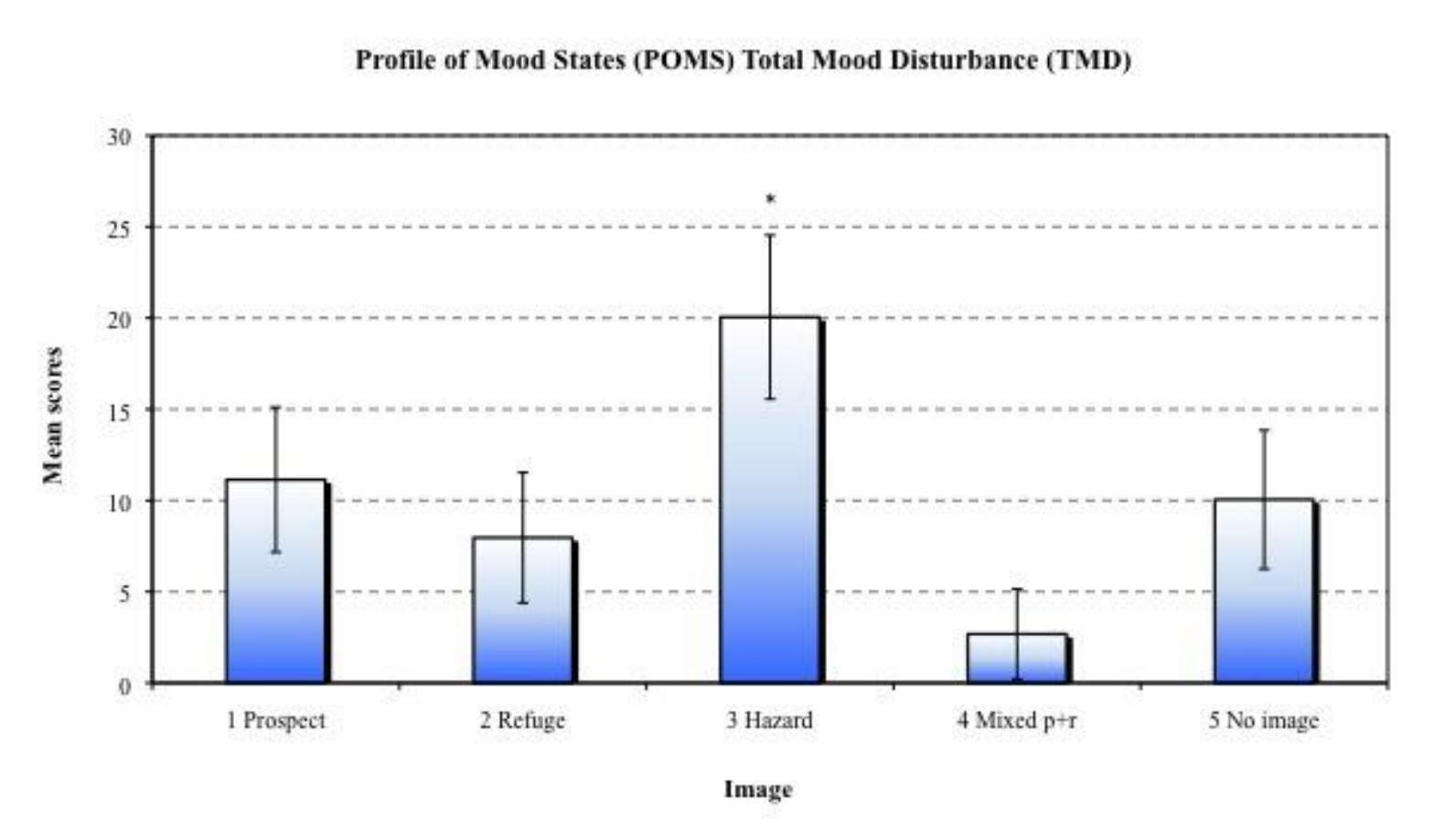
Mixed prospect + refuge

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

Total Mood Disturbance (TMD)

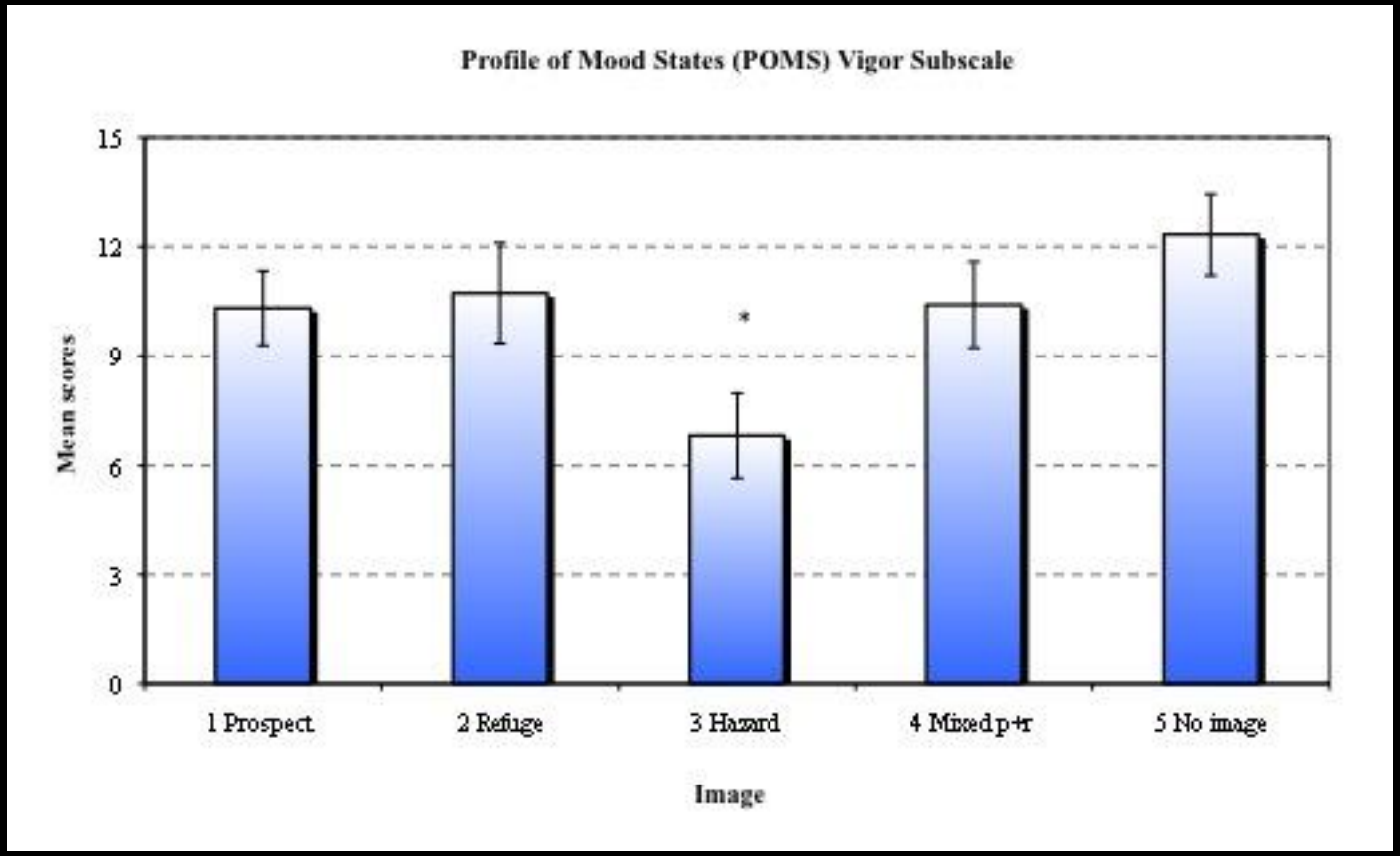


*Statistically significant $\alpha = 0.1$, F Value = 2.90, df = 4, 104, $P = 0.253$
Hazard image has highest total mood disturbance responses

Getty Image

Image #3 Hazard

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



*Statistically significant $\alpha = 0.1$, F Value = 2.93, df = 4, 104, $P = 0.0244$

Hazard image shows lowest positive mood responses

RESULTS : PHYSIOLOGICAL

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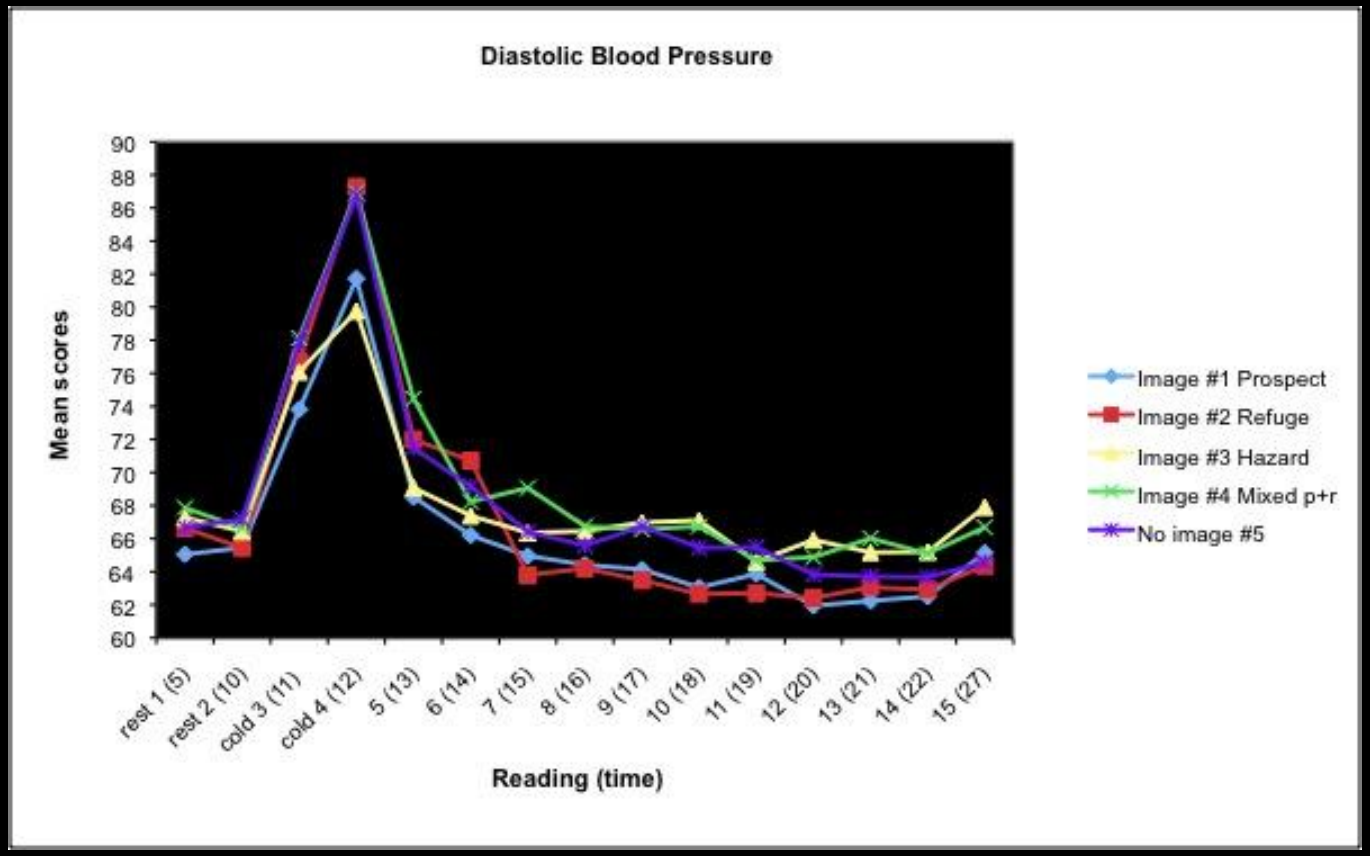
R E S U L T S : Diastolic Blood Pressure



*Statistically significant $\alpha = 0.1$ for changes in readings 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 $\alpha = 0.1$, to assess trends for changes over time

Hazard image is lowest during pain stressor then rises during recovery

T A B L E 3 : Effective Stressor

Measurement	Difference	Pr > [t]
Systolic	13.7628*	< .0001
Diastolic	14.0398*	<.0001
Heart rate BPM	7.6703*	<.0001
Mean arterial pressure (MAP)	15.6177*	<.0001

*Statistically significant $\alpha = 0.1$
Stressor was very effective

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RESEARCH QUESTIONS + RESULTS

1)	Which nature image categories are most therapeutic as evidenced by reduced pain and positive mood?
Result	Mixed prospect + refuge showed significantly lower sensory pain responses. Hazard received lowest diastolic blood pressure responses.
Discussion	No one image clearly was “most” therapeutic. Hazard was not therapeutic due to low level mood responses.

RESEARCH HYPOTHESIS+RESULTS

1)	Nature views are variable in their impact on specific psychological and physiological health status indicators.
Results	Perceived pain levels did vary. “No image” treatment had higher affective pain levels than all but prospect viewers. Sensory pain was lowest for mixed prospect and refuge.

RESEARCH HYPOTHESIS+RESULTS

2)	Prospect and refuge nature scenes are more therapeutic than hazard nature scenes.
Results	Yes-regarding mood. Mixed prospect + refuge shows potential for reducing sensory pain level perceptions.

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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