NATURE IMAGES:
Effects On Patients Undergoing Surgery

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O U T L I N E

- Introduction & background
  - Literature/research design problems
- Simulated clinical lab study (2009)
  - Phase I: nature image selection
  - Phase II: experiment
- Hospital study (2010)
  - Phase I: nature image selection (completed)
  - Phase IIA: outpatient experiment (in process)
  - Phase IIB: inpatient experiment (in process)

INTERDISCIP LI NARY LITERATURE

AREAS	FIELDS
Stress and Pain	Medicine, Psychology, Nursing
Therapeutic Environments Therapeutic Landscapes Healthcare Settings	Environmental Psychology, Landscape Architecture, Architecture, Environmental Design, Horticulture
Evolutional Theory Landscape Preference	Geography, Cultural Geography, Biology, Landscape Architecture, History
Virtual Environments Therapeutic Art	Environmental Psychology, Computer Science, Art, Photography, Graphics Communications

RELATED LITERATURE

Stress, anxiety, & pain hinder well-being (healing) in the healthcare setting (Selye 1976; Johnston & Wallace 1990; Kiecolt-Glaser & Marucha 1995; Kiecolt-Glaser et al. 1998; Frederickson & Levenson 1998)

Nature views can reduce stress, anxiety, & pain (Moore 1981; West; Ulrich 1984; West 1985; Verderber 1986; Frumkin, 2001, 2008)

Architecture affects medical outcomes (Horsburgh 1995; Verderber 1987, 2000; Frampton et al. 2003)

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RELATED LITERATURE

Virtual views may serve hospitals whose design prohibits a view

Nature art on the wall reduced anxiety or stress among patients
(Heerwagen 1990; Ulrich et al. 1993)

Nature videos reduced stress
(Ulrich & Simons 1986; Frederickson & Levenson 1998; Parsons et al. 1998; Laumann et al. 2003; Ulrich et al. 1991, 2003; Sponselee et al. 2004; de Kort et al. 2006

Nature videos reduced pain levels
(Miller et al. 1992; Tse et al. 2002)

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RELATED LITERATURE

Problems with therapeutic environments (nature and health) research:

Multiple variables **(**Ruso, Renninger, & Atzwanger, 2003; Dijkstra et al., 2006)

Poor replication of images (Stamps, 2004)

Unclear category titles and descriptions (Stamps, 2004)

Investigator preference substituted for sample population (Stamps, 2004)

Interdisciplinary research is weak in theory **(**RMNO 2004; IJsselsteijn 2004; Dilani 2005 **)**

Getty images

RELATED LITERATURE

PROBLEM	OUR RESPONSE
Multiple variables confuse findings	Use a still image and assess visual preference
Boredom may result from viewing a still image	Assess for presence (experiential realism)
Presence may be difficult to understand	Assess for “influence on thoughts”
Investigator preference in image selection	Conduct controlled sort and rank tasks of study population
Unclear image category definitions	Appleton’s prospect, refuge, and hazard categories
Lack of theory	Appleton’s evolutionary theory of prospect refuge

PHOTOGRAPHS

Photographs are suitable surrogates for the real experience in research (Zube, Pitt, & Anderson 1975; Kaplan & Kaplan 1989; Stamps 1990, 2007, 2008; Shang & Bishop 2000; Laumann, Garling, & Stormark 2001; de Kort & IJsselsteijn 2006)

Photographs need to be reproducible (Stamps 2004; Singleton and Straits 2005)

Realism may be preferred by vulnerable people

experiential realism (Sponselee et al. 2004; deKort & IJsselsteijn 2006) visual realism (Ulrich & Gilpin 2003)

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P R E S E N C E

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

Presence is experiential realism.

de Kort & Ijsselsteijn, 2006

“Is the perceptual illusion of non-mediation.” Feeling as though you are really there.

IJsselsteijn, 2004, p. 136, 170

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.

P R E S E N C E

Presence, or a sense of really being there, is key to successful use of VE in mediated environments.

de Kort et al., 2006; Sponselee et al., 2004

VE technology successfully used in psychotherapy for the treatment of phobias.

IJsselsteijn, 2004

Experiential realism (high degrees of presence) may be responsible for effectiveness of VE therapy.

de Kort & Ijsselsteijn, 2006

P R E S E N C E

Measuring presence is difficult.

People may not understand the term.

IJsselsteijn, 2004

Some aspects of emotional experience are not available to subjective awareness.

Lopez & Snyder, 2004; Gordon, 2004

The concept of presence and its measurement tools are all in the developmental stage.

IJsselsteijn, 2004; de kort et al., 2006

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I N F L U E N C E

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 several pilot participants were puzzled by concept of "presence".

Influence of image on thoughts may be easier to comprehend than presence.

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EVOLUTIONARY THEORY

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.

Evolutionary theory for landscape preference has a distinguished following (Appleton 1975, 1996, Kaplan and Kaplan 1989, Ulrich 1991, 2008; Heerwagen & Orians 1993; Kellert & Wilson 1993; Frumkin 2001, 2008).

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PROSPECT REFUGE THEORY

Appleton's prospect refuge theory has been used in literature, design (Wenner 1993; Tetlow, 1996; Hud (Yeates, 1997; Ramanujam 2006; Juras 1997; Herzog & Kutzli 2002; Makhzoumi & Zako 2007 son 1993; Segal 2003) **and research for over 30 years.**

- Offers reproducible category definitions
- Utilizes real and symbolic landscape views

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PROSPECT REFUGE THEORY

Prospect refuge theory of landscape preference

"To see without being seen."

Jay Appleton, 1996

Categories include:

- Prospect
- Refuge
- Hazard

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PROSPECT REFUGE THEORY

OPERATIONAL DEFINITION

PROSPECT

An environmental condition, situation, object, or arrangement that presents real or symbolic access to a view.

PROSPECT REFUGE THEORY

PROSPECT: SAMPLE IMAGES

Getty Image

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PROSPECT REFUGE THEORY

OPERATIONAL DEFINITION

REFUGE

An environmental condition, situation, object, or arrangement that presents real or symbolic situations for hiding or sheltering.

Refuges provide protection from hazards.

Hides provide concealment from animate hazards.

Shelters provide concealment from inanimate hazards.

PROSPECT REFUGE THEORY

REFUGE:SAMPLE IMAGES

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Getty Image

PROSPECT REFUGE THEORY

OPERATIONAL DEFINITION

HAZARD

Incidents or conditions that present real or symbolic threats to life and well-being.

PROSPECT REFUGE THEORY

HAZARD:SAMPLE IMAGES

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Getty Image

PROSPECT REFUGE THEORY

OPERATIONAL DEFINITION

MIXED PROSPECT + REFUGE

An equal balance of each (50%) is shown in image.

PROSPECT REFUGE THEORY

MIXED PROSPECT+REFUGE: SAMPLE IMAGES

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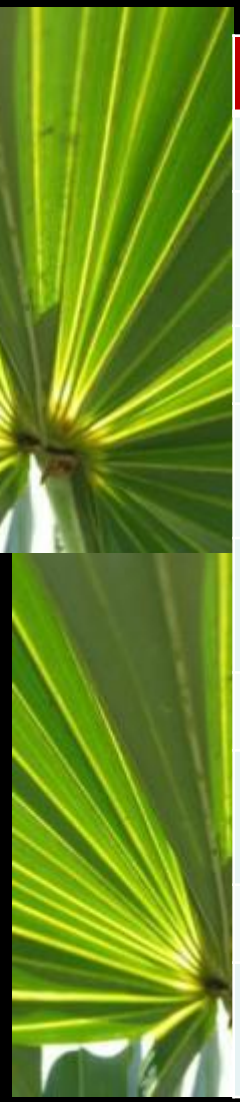
INTRODUCTION TO 1st STUDY: 2009

EFFECTS OF NATURE IMAGES ON PAIN IN A SIMULATED HOSPITAL PATIENT ROOM

INTRODUCTION Ph.D. Committee



PERSON	DISCIPLINE	ROLE
Ellen Vincent	Env Design & Planning	Ph.D. candidate
Dr. Dina Battisto	Architecture + Health	Ph.D. committee chair
Dr. Jim McCubbin	Psychology	Ph.D. committee
Dr. Stephen Verderber	Architecture + Health	Ph.D. committee
Dan Nadenicek	Planning & Landscape Architecture	Ph.D. committee
Dr. Larry Grimes	Experimental Statistics	Advisor
Dr. Sam Ingram	Graphics Communications	Advisor
Portia Botchway	Nursing	Advisor
Dr. Deborah Willoughby	Nursing	Advisor

INTRODUCTION TO LAB STUDY

OBJECTIVE

Measure the therapeutic benefits of nature images for healthcare settings using objective and subjective data

INTRODUCTION TO LAB STUDY

PURPOSE

(Phase I) Establish a methodology to select images

(Phase II) Study how images impact physiological and psychological indicators

Getty images

PHASE I: NATURE IMAGE SELECTION

	RESEARCH QUESTION
1)	Which photographic image best represents Appleton's categories of prospect, refuge, hazard, and mixed prospect + refuge?

Getty images

PHASE I: NATURE IMAGE SELECTION

METHODS: IMAGE SELECTION CRITERIA

- Horizontal orientation
- Color
- Limited reference to animals, structures, equipment
- Dominant nature over built features
- No distinguishable people
- No national, international landmark places
- Limited number of variables
- Clear category operational definitions (Appleton's words)
- Use royalty free Getty Images and own images (for replication)

Photos that cannot be used

Photos by Ellen Vincent

PHASE I: NATURE IMAGE SELECTION

METHODS: SEQUENTIAL MODEL

	A Investigator select	B Focus groups	C Sorting task	D Content validity
Who	Investigator	55 experts & students	100 students	Subject experts
	informal	informal	controlled	informal
What	Identify images based on theory	Identify preferred category images	Identify preferred category images	Compare findings with category definitions and characteristics
Where	Computer	Classroom	Classroom	Conference room
How	Subjective selection based on Appleton's definitions	Sorting task using "most" to "least" scale	Sorting task using "most" to "least" scale	Content validity rating "most" to "least" scale
Results	300 to 72 images	72 to 20 images (5 per category)	20 to 4 images (1 per category)	20 to 4 images (1 per category) for use in experiment

PHASE 1(C): NATURE IMAGE SELECTION

METHODS: CATEGORY SORTING TASK

Research question #1	Which images best represent Appleton's categories of prospect refuge theory?
Who	Students (100)
Materials	20 images Consent form Pre-sort surveys Taped audio instructions Instruction sheet Image category operational definition chart Score sheet
What	Complete consent form & surveys Listen to taped instructions; review category definitions Sort photos into four categories; Rank from "most to least"; Record selection on score sheet
Data analysis	Frequency table for each photo to establish "most fit"
Results	The highest rated photograph for each category retained for next stage; 4 images total (1 per category)

PHASE I(C): NATURE IMAGE SELECTION

PROSPECT





REFUGE





HAZARD





MIXED P+R





PHASE I: NATURE IMAGE SELECTION

RESULTS: CATEGORY IMAGES

Prospect

Refuge

Hazard

Mixed Prospect + Refuge

PHASE II: LAB EXPERIMENT

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

PHASE II: LAB EXPERIMENT

	HYPOTHESIS
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.

PHASE II: LAB EXPERIMENT

	RESEARCH QUESTIONS FOR PRESENCE AND INFLUENCE
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?

PHASE II: EXPERIMENT 2009

	HYPOTHESIS PRESENCE AND INFLUENCE
1)	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.

PHASE II: LAB EXPERIMENT

RESEARCH DESIGN VARIABLES:

Independent variables	Nature images
Dependent variables	Psychological + physiological responses

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PHASE II: LAB 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)
- Visual analogue scale for presence
- Visual analogue scale for influence
- Hope Scale
- Success with Life Scale

PHASE II: LAB EXPERIMENT

RESEARCH DESIGN OPERATIONAL DEFINITION:

THERAPEUTIC ASPECT*	INSTRUMENT
Relief from physical symptoms	Short-Form McGill Pain Questionnaire
Stress reduction	Blood pressures: systolic and diastolic Heart rate
Improvement in overall sense of well-being, hopefulness	Profile of Mood States Hope Scale Success with Life Scale

** Cooper Marcus and Barnes 1999*

PHASE II: LAB EXPERIMENT

RESEARCH DESIGN OPERATIONAL DEFINITION:

EXPERIENTIAL REALISM*	INSTRUMENT
Presence	Presence Visual Analogue Scale (VAS)
Influence	Influence Visual Analogue Scale (VAS)

** Ijsselsteijn, 2004*

PHASE II: LAB EXPERIMENT DESIGN

METHODS: SEQUENTIAL MODEL

	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

PHASE II: LAB PILOT EXPERIMENT

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PHASE II: LAB PILOT EXPERIMENT

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Clemson University

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PHASE II: LAB EXPERIMENT

INSTRUMENTS: PSYCHOLOGICAL

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PHASE II: LAB EXPERIMENT

PSYCH INSTRUMENT	ITEMS	DESCRIPTION
Short Form McGill Pain Questionnaire	15 items 3 scales: sensory (throbbing, shooting), affective (punishing-cruel) and total pain	Check a number from 0 “none” to 3 “severe”
Profile of Mood States (POMS)	65 items 6 subscales (1 positive emotion subscale = vigor)	Circle a number from 0 “not at all” to 4 “extremely”

PHASE II: LAB EXPERIMENT

PSYCH INSTRUMENT	ITEMS	DESCRIPTION
Visual analogue scale presence *How strong is your sense of presence, being there in the image right now?*	1	Vertical slash responses were made on a 10 cm. line. Responses were measured with a ruler and assigned a number.
Visual analogue scale for influence *How strong is the image at influencing your thoughts, either directly or indirectly, right now?*	1	

PHASE II: LAB EXPERIMENT

INSTRUMENTS: PSYCHOLOGICAL (PRESENCE)

How strong is your sense of presence, “being there”, in the image, right now?

Please make a vertical mark on the line below.

Extremely Weak Extremely Strong

|----------|

PHASE II: LAB EXPERIMENT

INSTRUMENTS : PHYSIOLOGICAL

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PHASE II: LAB EXPERIMENT

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.

PHASE II : LAB EXPERIMENT

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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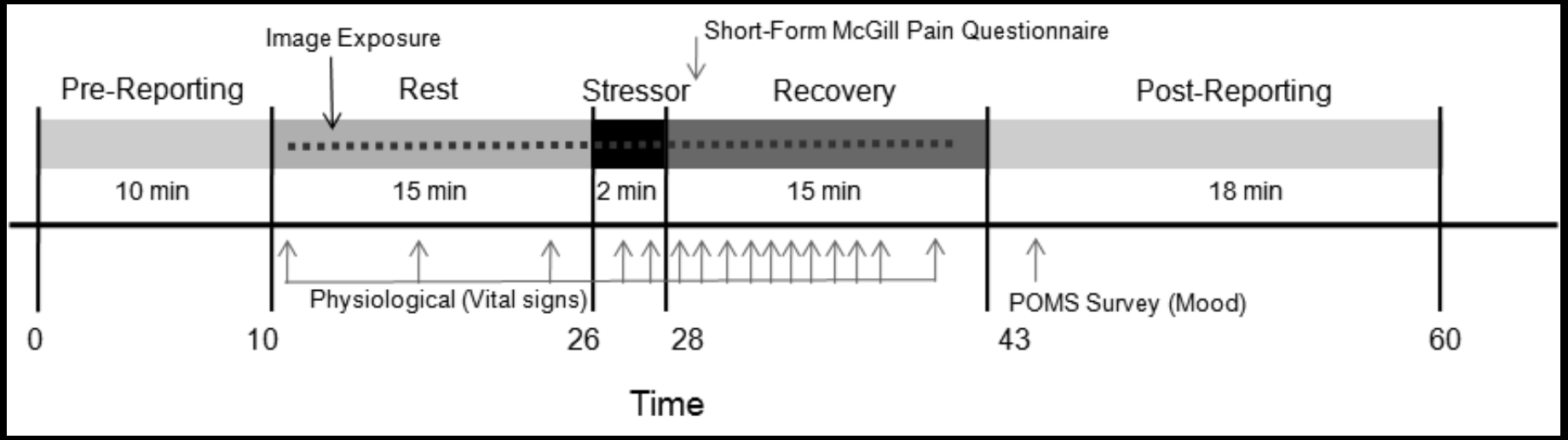
PHASE II: LAB EXPERIMENT

SCHEDULE OF EVENTS



Dina Battisto

PHASE II: LAB EXPERIMENT RESULTS

RESULTS: PSYCHOLOGICAL

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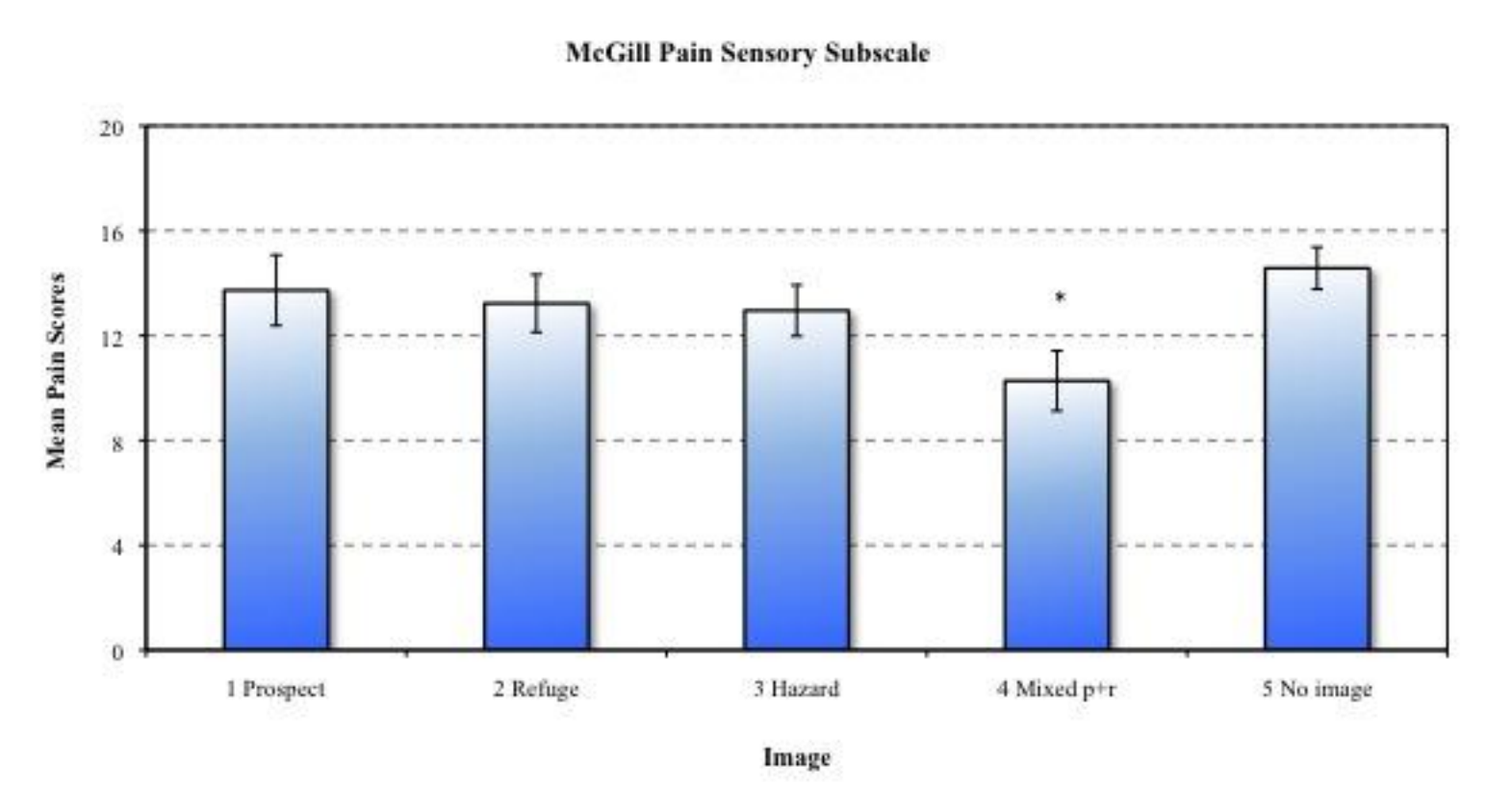
PHASE II: LAB EXPERIMENT

RESULTS: MCGILL SENSORY PAIN SUBSCALE (e.g. throbbing, shooting)

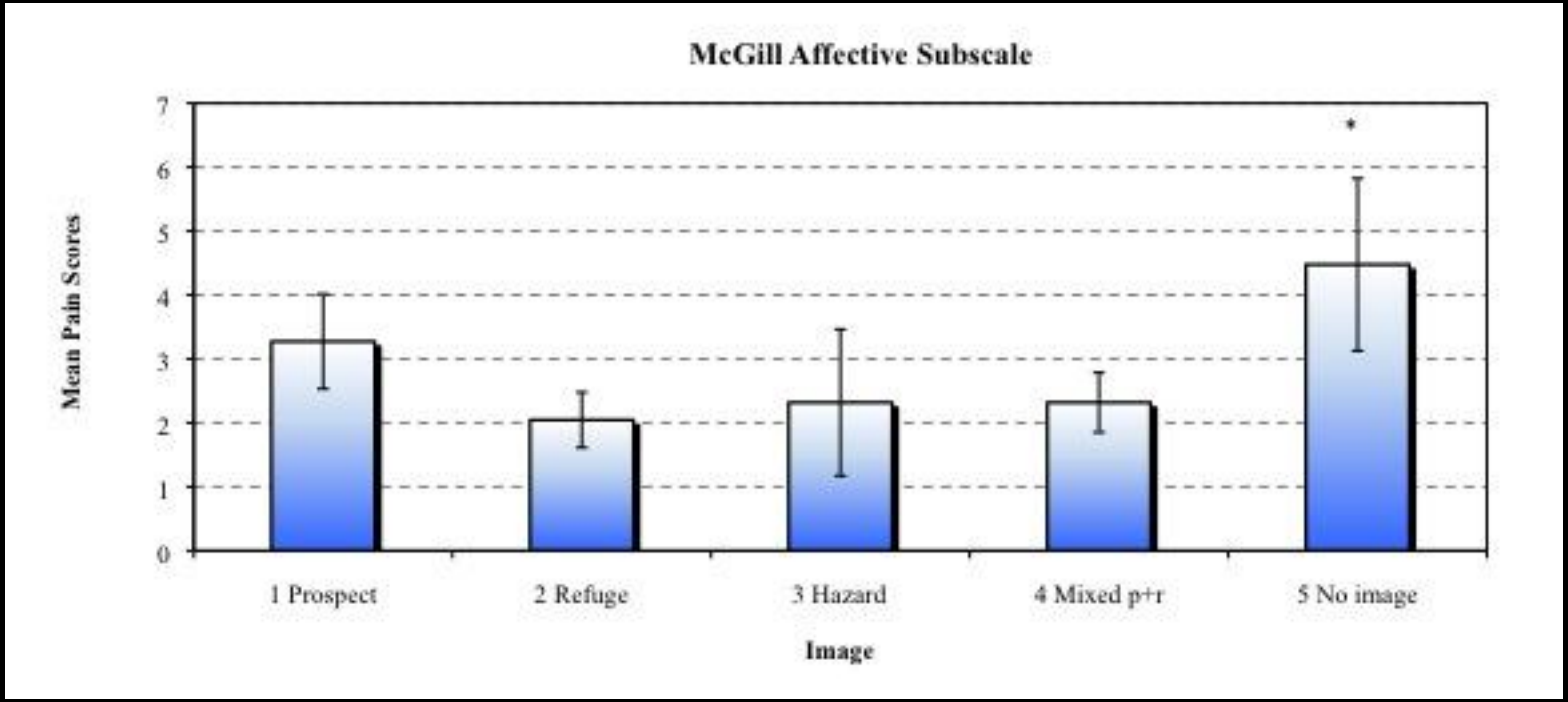


*Statistically significant $\alpha = 0.1$, F Value = 2.22, df = 4, 104 , $P = 0.0715$

Mixed prospect refuge image shows lowest pain levels

PHASE II: LAB EXPERIMENT

RESULTS: MCGILL AFFECTIVE PAIN SUBSCALE (e.g. sickening, punishing-cruel)

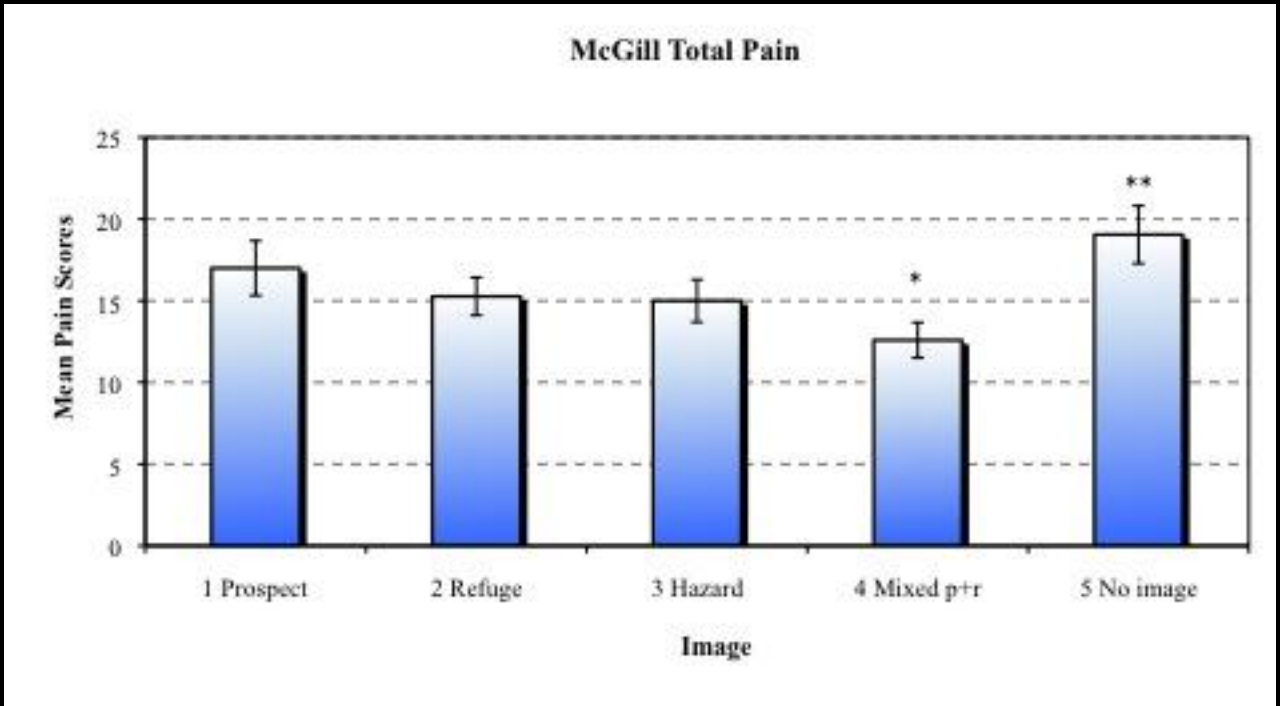


*Statistically significant $\alpha = 0.1$, F Value = 2.98, df = 4, 104. $P = 0.0226$

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

PHASE II: LAB EXPERIMENT

RESULTS: MCGILL TOTAL PAIN



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

No image treatment is higher than mixed prospect + refuge

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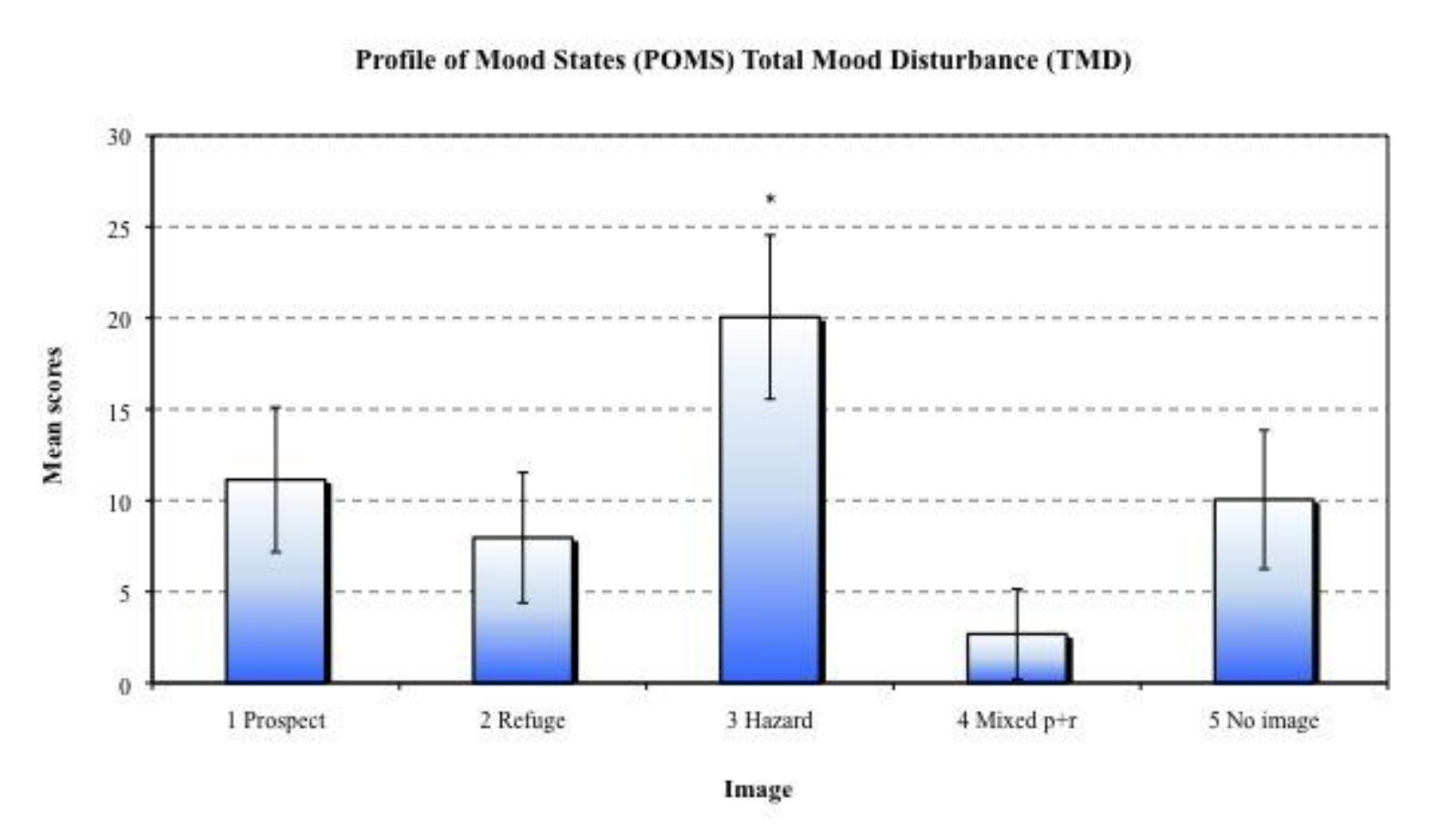
Mixed prospect + refuge

PHASE II: LAB EXPERIMENT

RESULTS: POMS TOTAL MOOD DISTURBANCE (TMD)



*Statistically significant $\alpha = 0.1$, F Value = 2.90, df = 4, 104, $P = 0.253$

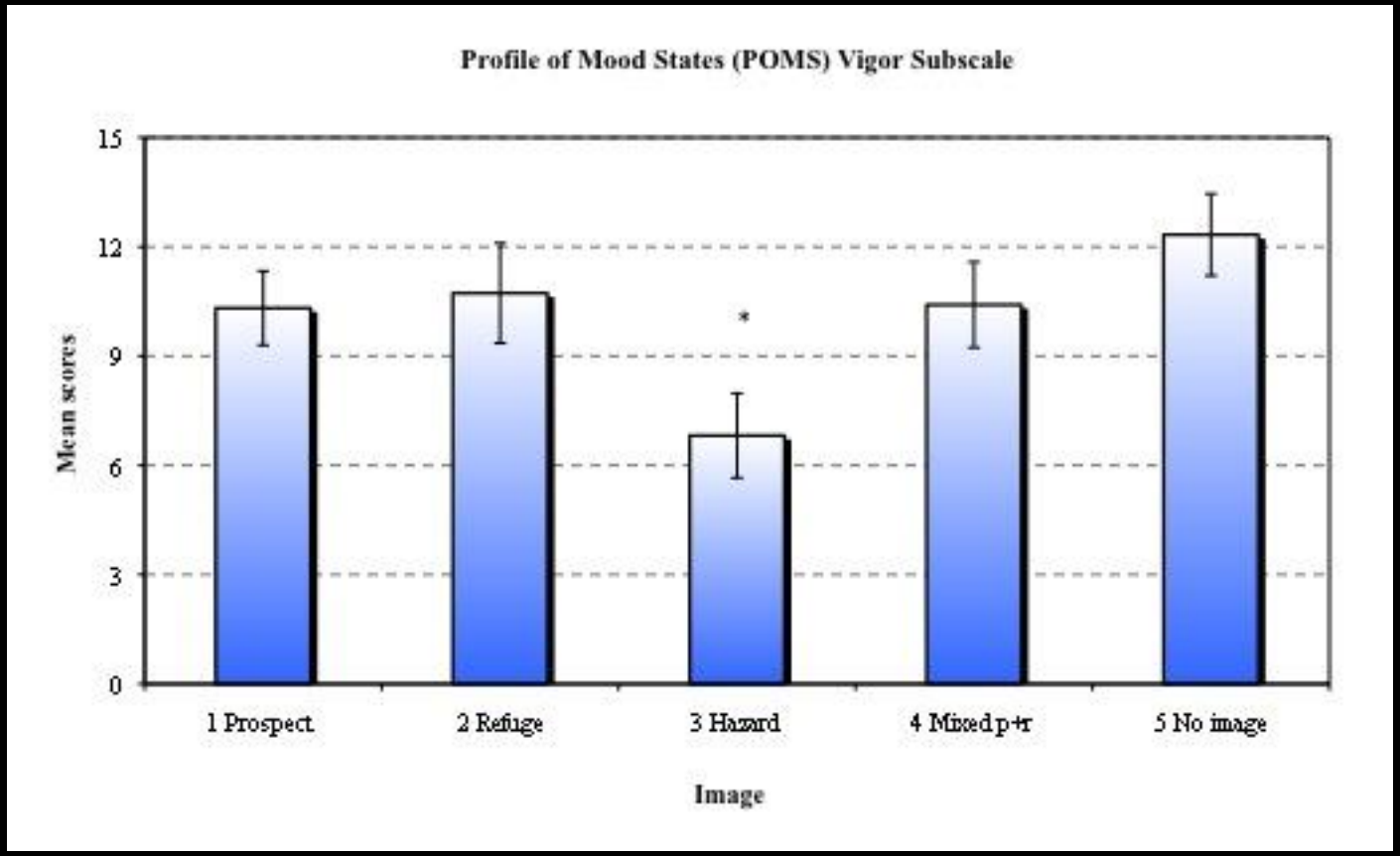
Hazard image has highest total mood disturbance responses

Getty Image

Hazard

PHASE II: LAB EXPERIMENT

RESULTS: PROFILE OF MOOD STATES (POMS) VIGOR SUBSCALE

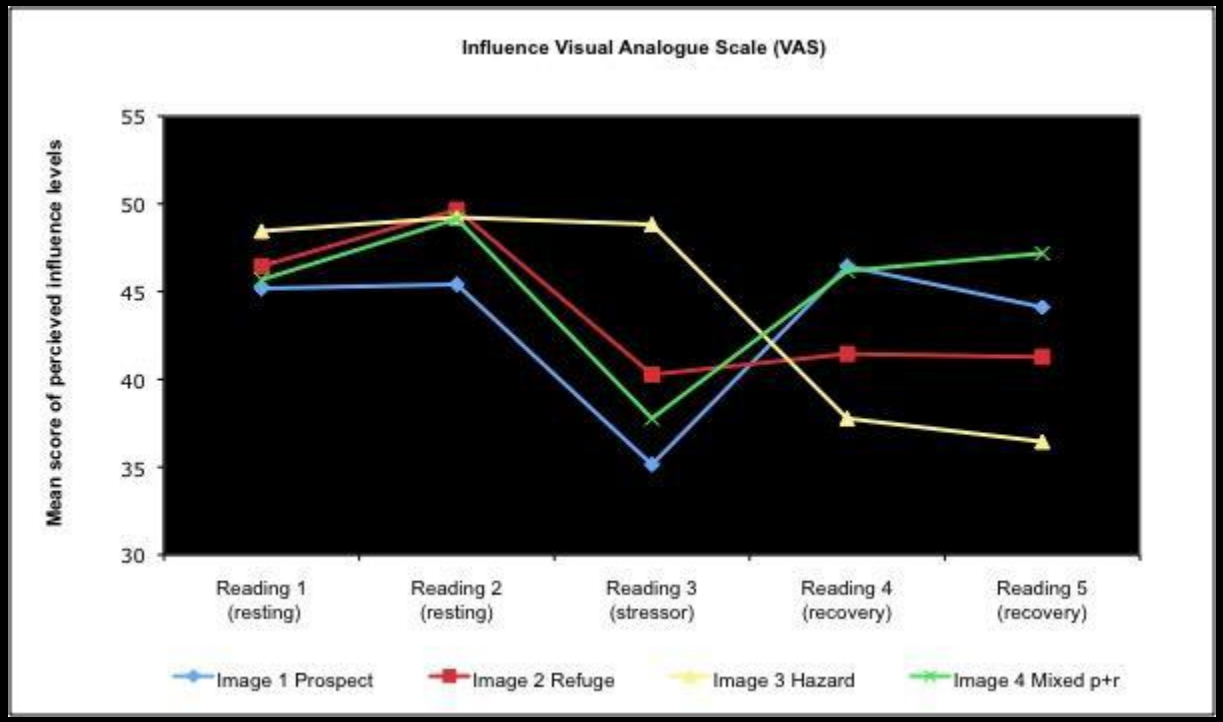


*Statistically significant $\alpha = 0.1$, F Value = 2.93, df = 4, 104, $P = 0.0244$

Hazard image shows lowest positive mood responses

PHASE II: LAB EXPERIMENT

RESULTS : PROFILE OF INFLUENCE VISUAL ANALOG SCALE



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

Hazard image shows highest influence responses during pain treatment and least during recovery.

PHASE II: LAB EXPERIMENT

RESULTS : STATISTICS OF INFLUENCE RESPONSE FOR IMAGE & READING

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 α = 0.1 to assess for trends over time.

Hazard image shows highest influence responses during pain treatment and least during recovery.

PHASE II: LAB EXPERIMENT RESULTS

RESULTS: PHYSIOLOGICAL

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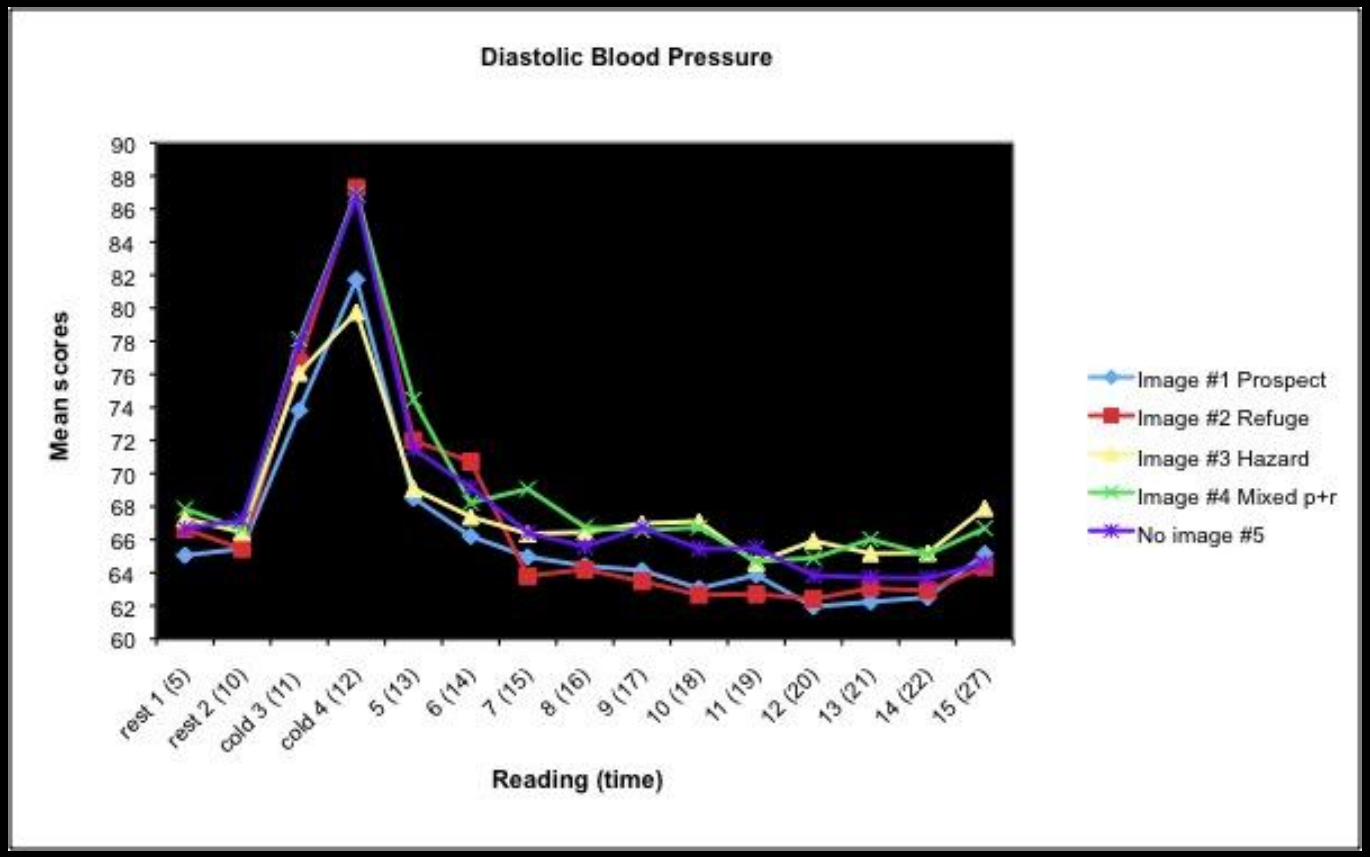
PHASE II: LAB EXPERIMENT

RESULTS : 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

PHASE II: LAB EXPERIMENT 2009

RESULTS: 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

PHASE II: LAB EXPERIMENT

RESULTS: 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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PHASE II: PRESENCE AND INFLUENCE

	RESEARCH QUESTIONS & RESULTS
1)	Is there a difference in the level of presence between the selected images?
Results	No statistically significant differences were seen.
Discussion	This may have been due to participants' unfamiliarity with the concept of 'presence' or perhaps due to equal levels of presence among images.

PHASE II: PRESENCE AND INFLUENCE

	RESEARCH QUESTIONS & RESULTS
2)	Is there a difference in the level of influence between the selected images?
Results	Yes. Effects of the Hazard image were significantly higher during the pain treatment and dropped significantly afterwards.
Discussion	Influence may have been caused by the dramatic qualities of the scene (arousal, fear?) or by it's ability to be used in this particular situation (fire/heat) to mediate cold/pain. Further studies are warranted.

PHASE II: PRESENCE AND INFLUENCE

	RESEARCH QUESTIONS & RESULTS
3)	Is there a correlation between levels of presence and levels of influence?
Results	Yes. Correlation analysis showed a moderate to strong correlation ($r = 0.62$. $P < 0.0001$). Presence and influence rose and fell together a significant portion of the time.
Discussion	This relationship could be coincidental. Replication is needed to firmly prove correlation.

PHASE II: PRESENCE AND INFLUENCE

	HYPOTHESIS
1)	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.
Result	No statistical significance occurred among images for presence. Influence for the Hazard image was significantly higher during the pain treatment then dropped during recovery.
Discussion	Influence levels were high at the same time that diastolic blood pressure was low. This may indicate the image was successful at distracting people from pain. Further study is warranted.

PHASE II: CONTROLLED EXPERIMENT

	RESEARCH QUESTION& 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 and highest influence responses.
Discussion	No one image clearly was “most” therapeutic. Hazard was not therapeutic due to low level mood responses.

PHASE II: CONTROLLED EXPERIMENT

	FUTURE RESEARCH QUESTION
Question	Why was hazard successful at distracting people from pain?
Discussion	Imagery effect of heat (fire) and cold (ice water) confounding variable (Turk 2002, Syrjala and Abrams (2002) . Will not be issue in hospital.

PHASE II: EXPERIMENT 2009

	RESEARCH HYPOTHESES & 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. Mixed category of prospect + refuge images will be taken into hospital research study.

PHASE II: EXPERIMENT 2009

	RESEARCH HYPOTHESES & 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. Mixed prospect + refuge images will move into the hospital research study.

INTRODUCTION TO 2ND STUDY: 2010

EFFECTS OF NATURE IMAGES ON PAIN IN HOSPITAL SURGERY PATIENTS

HOSPITAL RESEARCH DESIGN

PERSON	DISCIPLINE	INSTITUTION
Dr. Ellen Vincent	Env Horticulture	Clemson University
Dr. Dina Battisto	Arch + Health	Clemson University
Dr. Jim McCubbin	Psychology	Clemson University
Dr. Larry Grimes	Experimental Statistics	Clemson University
Dr. Sarah White	Env. Horticulture	Clemson University
	Nursing	Hospital
	Anesthesiologist	Hospital
	Orthopedic surgeon	Hospital

	STUDY PROCEDURES
1)	A sort and rank task will be used to select the most appropriate images for phase II experiment.
2)	Mixed methods (psychological and physiological data) will be used to investigate the health effects of the mixed prospect and refuge image category.

PHASE I : HOSPITAL EXPERIMENT

	RESEARCH QUESTION IMAGE SELECTION
1)	Which images best represent : (1) the therapeutic aspects (2) presence and influence (experiential realism) (3) the mixed prospect /refuge theory experience

PHASE IIA : HOSPITAL EXPERIMENT

	RESEARCH QUESTION OUTPATIENT
1)	Does viewing mixed prospect and refuge images reduce stress and or pain in surgical patients in outpatient and post-operative surgical environments?

PHASE IIB: HOSPITAL EXPERIMENT

	RESEARCH QUESTION INPATIENT
1)	Does viewing mixed prospect and refuge images reduce stress and or pain in surgical patients in the inpatient hospital room?

PHASE II: HOSPITAL EXPERIMENT

	HYPOTHESES
1)	Patients viewing mixed prospect refuge nature images have higher psychological and physiological measures of health status than do those patients viewing no image.
2)	There are no statistical differences between patients viewing the three different images that represent the mixed prospect refuge image category.

HOSPITAL RESEARCH DESIGN 2010

METHODS: SEQUENTIAL MODEL

	Sorting task 2008/2009	Phase I Sorting task 2010	Phase IIA Experiment 2010	Phase IIB Experiment 2010
Who	100 students	30 incoming surgery patients	40 surgery outpatients	20 surgery inpatients
	controlled	controlled	controlled	controlled
What	Identify preferred category images	Identify preferred images	Randomly assigned to I of 4 treatments	Randomly assigned to I of 4 treatments
Where	Classroom	Classroom	Perioperative room	Patient room
How	Sorting task using “most” to “least” scale	Sorting task using “most” to “least” scale	Physiological & psychological health status indicators	Physiological & psychological health status indicators
Results	12 most frequently selected for “mixed prospect refuge” category	12 to 3 images for use in experiment	Compare image groups data with control (no image)	Compare image groups data with control (no image)

PHASE I: IMAGE SELECTION

12 mixed prospect + refuge images are sorted and ranked (by people registering for surgery) according to 10 situations/questions that represent:

- Therapeutic aspects
- Presence and influence
- Theory confirmation

Ellen Vincent

PHASE I: IMAGE SELECTION PILOT

Ellen Vincent

Results:

"Oh! My back hurts." –Nurse participant

"You need a bigger space and a real table that a wheel chair can pull up to." -Nurse observer

PHASE I: IMAGE SELECTION PILOT

Results: Process now occurs in a nearby classroom/conference room.

PHASE I: IMAGE SELECTION

Process	Task
Step 1	Consent to participate form read and signed.
Step 2	Demographic questionnaire completed.
Step 3	“Spread the 12 images out in front of you on the table.”
Step 4: ***Sort***	“After I read a certain situation to you please select all the images that you think fit the situation and place them in a stack by themselves.”
Step 5: ***Rank***	“Now please sort the pile from most to least fits the situation with ‘most’ at the top of the pile and ‘least’ at the bottom.”
Step 6: ***Record***	“Now please record the image numbers on the back of the photos onto your score sheet.”
This process is repeated 10 times.	
Participant is thanked and given $10.00 remuneration.	

PHASE I: IMAGE SELECTION

RESEARCH DESIGN OPERATIONAL DEFINITION:

THERAPEUTIC ASPECT*	QUESTION/SITUATION
Stress reduction	• I feel safe and protected in this landscape. • I feel relaxed when I look at this landscape.
Improvement in overall sense of well-being, hopefulness	• I feel hopeful when I look at this landscape.

** Cooper Marcus and Barnes, 1999*

PHASE I: IMAGE SELECTION

RESEARCH DESIGN OPERATIONAL DEFINITION:

PRESENCE/VIRTUAL ENVIRONMENTS*	QUESTION/SITUATION
Degree of “being there” in the image	I can easily imaging myself in this landscape, as though I were really there.
Not feeling bored with a still image	I could look at this landscape image for hours and not feel bored.

** Ijsselsteijn, 2004; deKort et al., 2006*

PHASE I: IMAGE SELECTION

RESEARCH DESIGN OPERATIONAL DEFINITION:

THEORY* CONFIRMATION	QUESTION/SITUATION
Prospect: a view, exploration	• This landscape offers me a clear view of my surroundings. • This landscape would be easy to move about in, to explore.
Refuge: safety, shelter	• I can find shelter from harmful weather, or hide from harmful people or animals in this landscape. • I feel safe and protected in this landscape.
Prospect/refuge mixed: Image contains equal amounts of both prospect and refuge	• In this landscape I feel safe and sheltered yet I can see my surroundings clearly. • In this landscape I can see both a place I want to explore and a place where I can hide if I wanted to.

** Appleton, J. 1996*

P H A S E I MIXED PROSPECT REFUGE IMAGES












PHASE I: IMAGE SELECTION

Ellen Vincent

PHASE I: IMAGE SELECTION

1. This landscape offers me a clear view of my surroundings:

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PIC #1

N = 17 Sum = 58

PHASE I: IMAGE SELECTION

2. I can find shelter from harmful weather, or hide from harmful people or animals in this landscape:

PIC #8

N = 19 Sum = 52

PIC #10

N = 14 Sum = 54

Ellen Vincent

PHASE I: IMAGE SELECTION

3. This landscape would be easy to move about in, to explore:

Ellen Vincent

PIC #10

N = 18 Sum = 59

PHASE I: IMAGE SELECTION

4. I feel safe and protected in this landscape:

Ellen Vincent

PIC #10

N = 20 Sum = 61

PHASE I: IMAGE SELECTION

5. In this landscape I feel safe and sheltered yet I can also see my surroundings clearly:

Ellen Vincent

PIC #10

N = 19 Sum = 66

PHASE I: IMAGE SELECTION

6. I can easily imagine myself in this landscape, as though I were really there:

Getty images

PIC #2

N = 14 Sum = 42

PHASE I: IMAGE SELECTION

7. I feel hopeful when I look at this landscape:

Ellen Vincent

PIC #6

N = 16 Sum = 47

PHASE I: IMAGE SELECTION

8. In this landscape I can see both a place I want to explore and a place where I can hide if I wanted to:

PIC #3

Getty images

N = 12 Sum = 39

PIC #7

Ellen Vincent

N = 14 Sum = 37

PIC #8

Ellen Vincent

N = 13 Sum = 37

PHASE I: IMAGE SELECTION

9. I feel relaxed when I look at this landscape:

Ellen Vincent

PIC #6

N = 18 Sum = 57

PHASE I: IMAGE SELECTION

10. I could look at this landscape for hours and not feel bored:

PIC #4

N = 13 Sum = 42

PIC #2

N = 12 Sum = 40

RESULTS IMAGE SELECTION

PIC #10

Situations 2, 3,4, 5

PIC #6

Situations 7,9

PIC #2

Situations 6, 10 (close 2nd)

RESULTS IMAGE SELECTION

PIC #10

Ellen Vincent

2. I can find shelter from harmful weather, or hide from harmful people or animals in this landscape. Theory confirmation
3. This landscape would be easy to move about in, to explore. Theory confirmation
4. I feel safe and protected in this landscape. Theory confirmation; therapeutic aspect (stress reduction)
5. In this landscape I feel safe and sheltered yet I can also see my surroundings clearly. Theory confirmation

RESULTS IMAGE SELECTION

PIC #6

Ellen Vincent

7. I feel hopeful when I look at this landscape. Therapeutic aspect (well-being, hopeful)
9. I feel relaxed when I look at this landscape. Therapeutic aspect (stress reduction)

RESULTS IMAGE SELECTION

PIC #2

Getty images

6. I can easily imagine myself in this landscape, as though I were really there. Experiential realism (presence)
10. I could look at this landscape for hours and not feel bored. Experiential realism (virtual environments)

PHASE IIA&B: HOSPITAL EXPERIMENT

RESEARCH DESIGN VARIABLES:

Independent variables	Nature images
Dependent variables	Psychological + physiological responses





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PHASE IIA&B: HOSPITAL EXPERIMENT

INDEPENDENT VARIABLES

View (Appleton, 1975,1996)

Examples

(1) *Mixed Prospect + Refuge View*

(2)) *Mixed Prospect + Refuge View*

(3)) *Mixed Prospect + Refuge View*

(4) *No Image [control]*

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:

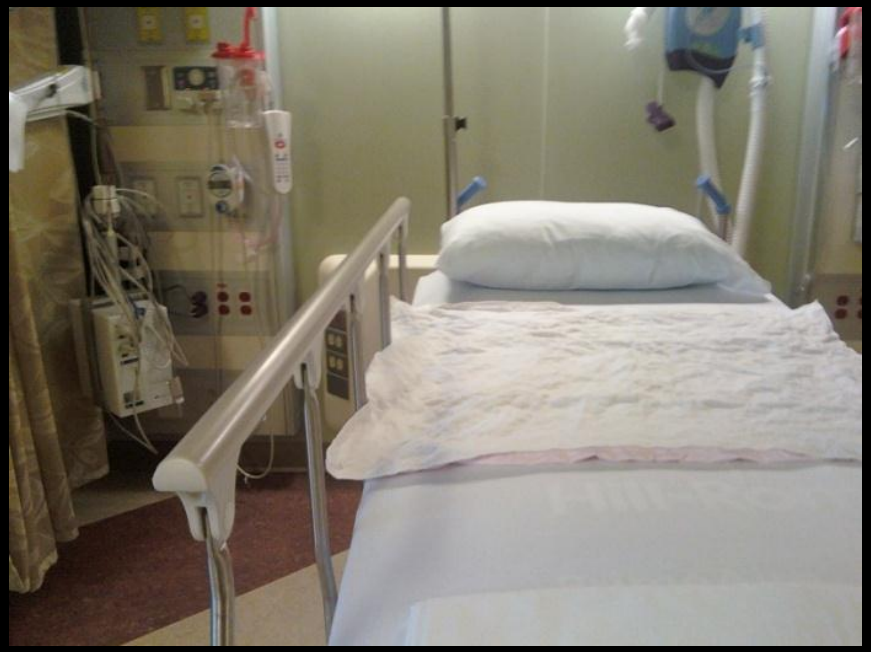
- Continuous vital signs-
- Blood pressures + heart rate

Health Status – Psychological measures:

- Short Form McGill Pain Questionnaire
- Profile of Mood States (POMS)
- Visual analogue scale for presence
- Visual analogue scale for influence

PHASE IIA&B: HOSPITAL EXPERIMENT

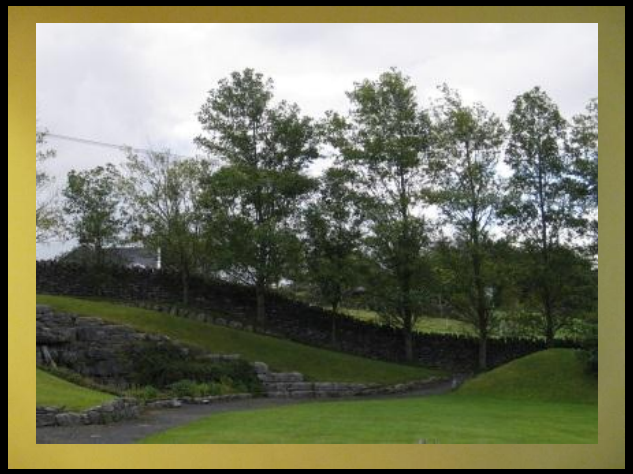
OUTPATIENT:
Image attached to bed side rail



Kathy Dalton

N = 40 participants
10 in each group
3 groups one image
1 group no image (control)

INPATIENT:
Image attached to wall



Ellen Vincent

N = 20 participants
5 in each group
3 groups one image
1 group no image (control)

PHASE IIA & B: EXPERIMENT

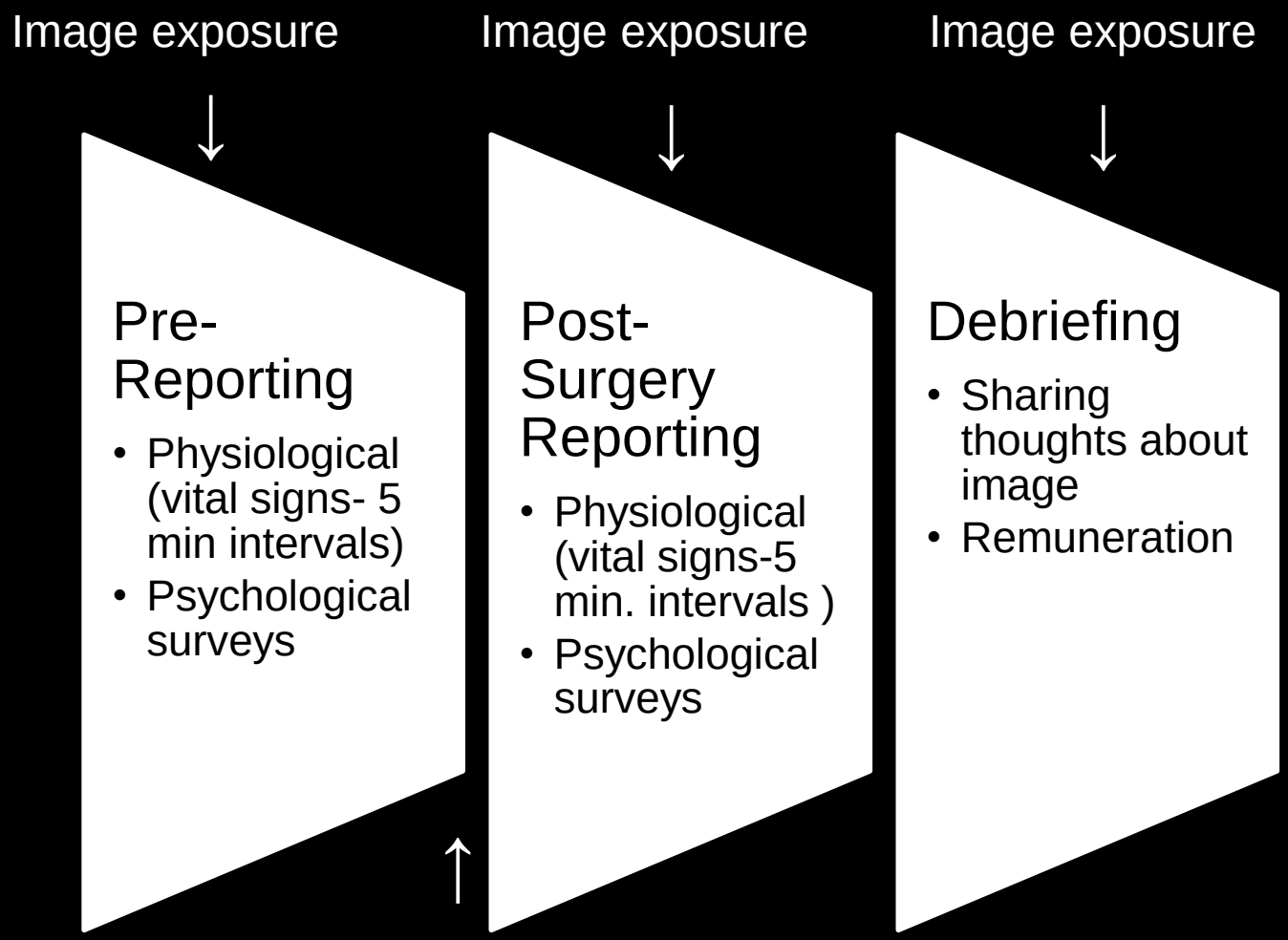
PSYCH TOOLS	PAIN	MOOD	PRESENCE/ INFLUENCE
Instrument	Short Form McGill Pain Questionnaire	Profile of Mood States (POMS) Brief Form	Visual analogue
Items	15 items 3 scales: sensory (throbbing, shooting), affective (punishing-cruel) and total	30 items 6 subscales	One for presence One for influence
Description	Check a number from 0 “none” to 3 “severe”	Circle a number from 0 “not at all” to 4 “extremely”	Slash mark on a line anchored by choices “extremely weak” and “extremely strong”

PHASE IIA & B: EXPERIMENT

PHYSIOLOGICAL	DESCRIPTION
Systolic blood pressure	Systolic pressure is the maximum arterial pressure of the heart. Measurements are in millimeters of mercury (mmHg).
Diastolic blood pressure	The relaxed state of the heart beat. Measured in millimeters of mercury (mmHg).
Heart rate	Heart rate is measured in beats per minute (BPM).

PHASE IIA: HOSPITAL EXPERIMENT

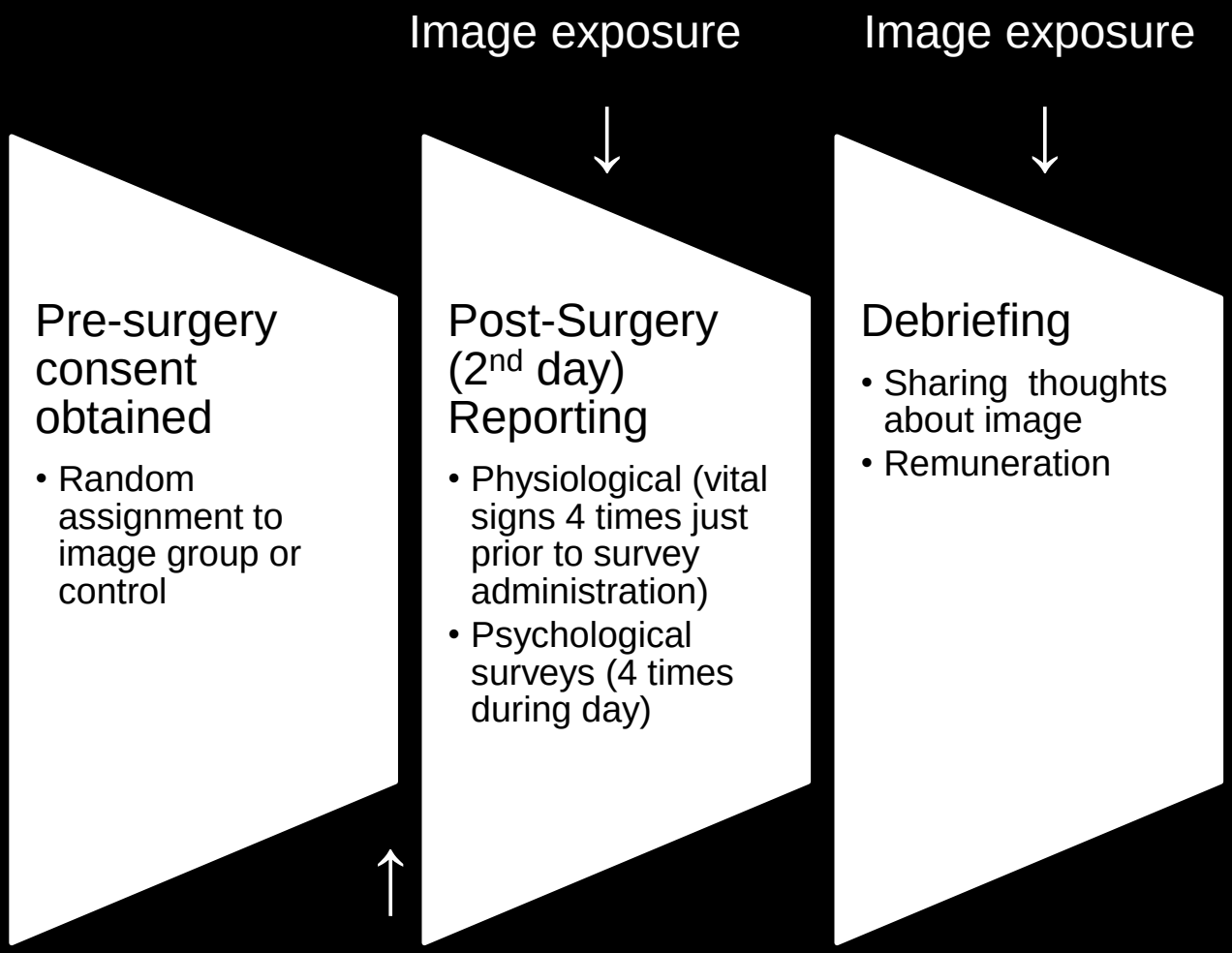
SCHEDULE OF EVENTS OUTPATIENT



No image or research involvement during surgery

PHASE IIB: HOSPITAL EXPERIMENT

SCHEDULE OF EVENTS INPATIENT



HOSPITAL RESEARCH 2010

CHALLENGES	OPPORTUNITIES
Lengthy review time for human subject approval by institutional review board(s): (1) Hospital (2) University (3) Dept. of Defense	Design is detailed, thorough, safe and respectful for all involved
New hospital has a more limited surgery volume	Slow pace allows for: (1) researcher/hospital staff relationship to develop (2) reflection of process and sensitivity towards patient to develop

Ellen Vincent

Ellen Vincent

RESEARCH DESIGN LIMITATIONS

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

Ellen Vincent

FUTURE STEPS

- Obtain additional grant dollars
- Replicate study in additional hospitals
- Replicate study using specific patient populations
- Publish results

Ellen Vincent

CONTRIBUTIONS

DATE	CONFERENCE PRESENTATIONS
2008. 6	INTERDISCIPLINARY SOCIAL SCIENCES CONFERENCE, PRATO, ITALY
2008. 9	URBAN & COMMUNITY FORESTY COUNCIL ANNUAL CONFERENCE, GREENVILLE, SC
2009. 5	INTERNATIONAL HEALTHCARE CONFERENCE, ROTTERDAM,THE NETHERLANDS
2009. 5	EDRA 40, KANSAS CITY, MO
2009. 11	HEALTHCARE DESIGN CONFERENCE, ORLANDO, FL

Ellen Vincent

P U B L I C A T I O N S

- Vincent, E., Battisto, D., Grimes, L., & McCubbin, J. (2010). The effects of nature images on pain in a simulated hospital patient room. *Health Environments Research & Design Journal 3*(3), 42-55.

- Vincent, E., Battisto, D., & Grimes, L., (2010). The effects of presence and influence in nature images in a simulated hospital patient room. *Health Environments Research & Design Journal 3*(3), 56-69.

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

(1) Methodology for selecting images & using in experimental research presented.

(2) Adding empirical research data to interdisciplinary field.

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

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

Ellen Vincent

THANK YOU

Getty image

C O N T A C T I N F O R MA T I O N

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