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Glossary

accent lighting -	method of lighting that focuses light on an object with very little spill-light and creates a high contrast from the object to its background. This effect creates sharp shadows and visual interest.
ambient lighting-	method of lighting that appears as a non-directional, un-concentrated, soft, and uniform light. It is used for general lighting purposes
angle of incidence-	angle at which a light ray strikes surface, measured between ray and line perpendicular to surface
diffuse point source-	light source that emits light in all directions
direct glare-	glare caused by bright light source directly in field of vision
footcandle-	unit of illuminance, the quantity of light on one square foot surface area one foot away from light source of one candela
grazing-	lighting effect that uses well-shielded luminaires, either recessed into the ceiling or surface mounted, which cast light down upon a surface.
illumination-	(illuminance), the density of luminous flux on a surface measured in footcandles
linear source-	light source that emits light along a particular length
luminaire-	a complete lighting unit consisting of a lamp(s) and parts designed to distribute light and protect the lamp(s) and connections to power supplies.
proxemics-	invisible space that surrounds a person which serves to maintain proper spacing between individuals
reflected glare-	glare resulting from specular reflections of high illuminance in polished or glossy surfaces within the field of view
sociofugal-	type of seating or spatial arrangement that discourages the formation of groups and discussion due to the separation of spaces
sociopetal-	type of seating or spatial arrangement that encourages people to form groups and to interact

spill-light-	light from adjacent areas falling into a particular space
task lighting-	method of lighting that provides light at a specific location for the performance of specific activities such as cooking, reading, sewing, drafting, writing, etc.
visual perception-	the process of taking information in through the sense of sight and giving it meaning based on previous experiences
washing-	lighting effect produced through the use of well-shielded directional luminaires, either recessed into the ceiling or surface mounted, which cast even illumination along an entire plane

APPENDIX A

Email Request for Volunteers

Email request for volunteers to participate in experiment

Hi! My name is Amy Laughead. I am working on my masters degree and in the process of collecting data for my thesis. I am in need of volunteers who would be willing to participate in a study regarding environmental perception.

If you liked playing with dolls or toy soldiers growing up, you might like to participate. This will only require about 30 minutes of your time.

To partake in this study, you would be required to view and interact with scale-models of interior environments and answer a short questionnaire.

Please respond to this email, and I will work with you to set up a time that is convenient for you to participate. All participants will work with the researcher in a one-on-one session at a lab in Wallace Hall on the VA Tech campus. Please respond at your earliest convenience.

Thanks for your time and consideration.
Sunshine,
Amy

APPENDIX B

Informed Consent Form

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Informed Consent for Participants of Investigative Projects

Title of Project: Illumination and Proxemic Behavior

Investigators: Amy L. Laughead and Dr. Lennie Scott-Webber (faculty advisor)

I. The Purpose of this Research Project

The purpose of this research is to collect data regarding environmental perceptions of waiting/reception areas. Approximately sixty subjects will participate in this study.

II. Procedures

Each subject will be asked to look at six models of waiting/reception area spaces. Each subject will be given several scale-figures to place within each model. After this task is completed, each subject will be asked to complete a short questionnaire. After these two tasks are completed, the subject will be finished with his or her participation in the study. Video and audio taping of the subjects hands will be performed throughout the participation in the experiment.

III. Risks

There are no physical or mental risks to the subjects.

IV. Benefits to this Project

Interior designers and designers in related fields understand that environmental factors influence behavior, but it is unclear how particular environmental factors influence human spatial behavior. The findings of this study may indicate what factors have an affect on spatial behavior. Designers can take this information to better integrate design and furniture space planning so that waiting areas can be designed more efficiently and effectively for users and clients.

V. Extent of Anonymity and Confidentiality

Confidentiality is promised to all subjects that participate in this study. The only persons with access to the data collected are the researchers named at the top of this form. Once participation in the study is agreed upon, each subject will be assigned a number, one through sixty. This number will not be associated with the subject's name.

Audio and video taping will be performed for the purposes of qualitative data collection. The only persons with access to these recordings are the a-fore mentioned researchers. No other person will have access or viewing privileges to these recordings. The recordings will be stored in a faculty office in Wallace Hall. Once all the recordings are completed and reviewed by the researchers, they will be stored in a secure place, and destroyed within five years after the completion of data collection.

Publicly reported information will only contain aggregate data. No subject will be identified by name in any publicly reported information. Subjects will be informed that if they wish to receive additional information about the study, they may give the researchers their mailing address so that information can be forwarded.

VI. Compensation

Subjects will not receive any compensation of any type for participation in this research.

VII. Freedom to Withdraw

Subjects are free to withdraw from this study at any time without penalty. If he or she chooses to withdraw, the subject may simply tell the researcher and can exit the study without question. Subjects are free to not answer any questions or respond to experimental situations that they so choose without penalty.

VIII. Approval of Research

This research project has been approved, as required, by the Institutional Review Board for Research Involving Human Subjects at Virginia Polytechnic Institute and State University and by the Department of Near Environments.

IX. Subject's Responsibilities

I voluntarily agree to participate in this study. I have the following responsibilities:

I will complete the task of placing scale-figures within six scale models and complete the short questionnaire.

X. Subject's Permission

I have read and understood the Informed Consent and conditions of this project. I have had all my questions answered. I hereby acknowledge the above and give my voluntary consent for participation in this project.

If I participate, I may withdraw at any time without penalty. I agree to abide by the rules of this project.

Signature

Date

APPENDIX C

Script for Introducing Experiment to Subjects

Script for introducing study to subjects

The experiment that you have volunteered to participate in is being performed to collect data regarding environmental perception. Video taping of your participation in the study will be done. However, only the movement of your hands will be recorded. No other identifying information about you will be noted. Please read and sign the informed consent form before proceeding with this experiment.

If at anytime you feel uncomfortable and do not wish to continue with this study, please notify the researcher, and you will be free to leave. If you wish to be sent the results of this study, leave your name and address with the researcher before you leave.

Now that you have read and understood the protocol for this experiment, let's begin. There are six models in this experiment that you need to look at and interact with. After you have worked with each model, fill out the short questionnaire on the clipboard at each station. Feel free to ask questions and make comments throughout your interaction with these models.

Go to the model labeled with a 1.

Take the first of the four people located on top of the model. Pretend this person is you walking into the space for the first time. Assuming you are going to wait approximately fifteen minutes, choose a place to sit.

This person is now a stranger to you. Take the second person and pretend this is you. Assuming this "new" you is walking into the space for the first time, choose a place to sit. You will wait about 15 minutes.

This person is now a stranger to you. Take the third person and pretend this is you. Assuming this "new" you is walking into the space for the first time, choose a place to sit. You will wait about 15 minutes.

Now that have placed all the people in the model, answer the short questionnaire on the clipboard beside the model.

Now that you have completed the first model, move to the model labeled 2.
(Follow the same procedure as for model 1, etc..)

Now the you have completed all six models, step over to this desk and fill out the last short questionnaire.

Thank-you for your time and participation in this study.

APPENDIX D

Semantic Differential Questionnaire

The following questions are to obtain information regarding your impression of the model that you have just interacted with.

In regards to the model you just viewed answer the following:

Place one check on the continuum.

1. This environment felt....

FRIENDLY	:_:_:_:_:_:	HOSTILE
PLEASANT	:_:_:_:_:_:	UNPLEASANT
HARMONIOUS	:_:_:_:_:_:	FRUSTRATING
SOCIABLE	:_:_:_:_:_:	UNSOCIABLE

2. This environment was....

RELAXING	:_:_:_:_:_:	AGITATING
INTERESTING	:_:_:_:_:_:	MONOTONOUS
COMFORTABLE	:_:_:_:_:_:	UNCOMFORTABLE
BRIGHT	:_:_:_:_:_:	DIM
CLEAR	:_:_:_:_:_:	HAZY
FOCUSED	:_:_:_:_:_:	UNFOCUSED
RADIANT	:_:_:_:_:_:	DULL

3. This environment seemed...

SIMPLE	:_:_:_:_:_:	COMPLEX
UNCLUTTERED	:_:_:_:_:_:	CLUTTERED
LARGE	:_:_:_:_:_:	SMALL
LONG	:_:_:_:_:_:	SHORT
SPACIOUS	:_:_:_:_:_:	CRAMPED

4. This environment appeared....

ROUNDED	:_:_:_:_:_:	ANGULAR
INFORMAL	:_:_:_:_:_:	FORMAL
CONTEMPORARY	:_:_:_:_:_:	TRADITIONAL

5. I would not mind waiting in this space for: (Please place one check beside your answer)

___ 0-1/2 HOUR ___ 1/2-1 HOUR ___ 1-2 HOUR

For Office Use Only

MODEL: _____
 DATE/TIME: _____
 SUBJECT NO. _____

APPENDIX E

Open-ended Questionnaire

Your responses to this experiment:

Please answer the questions below in as much detail as you can.

1) Describe how you felt interacting with the models:

2) What did you feel motivated your seating selections within the models?

3) Did you think about the lighting within the models? _____ If so, how did the lighting influence your seating selection?

For Office Use Only

DATE/TIME: _____

SUBJECT NO. _____

APPENDIX F

Demographic Questionnaire

Now that you have finished placing the scale-figures in the models, please answer the following questions:

1. I am _____ years old. *(Please place one check beside your answer.)*

____ 20-29 ____ 30-39 ____ 40-49 ____ 50-59 ____ 60+

2. I have _____ siblings. *(Please place a check beside your answer.)*

____ 0 ____ 1 ____ 2 ____ 3 ____ 4+

3. I am _____.

____ AFRICAN-AMERICAN
____ CAUCASIAN
____ HISPANIC
____ PACIFIC ISLANDER
____ ASIAN-AMERICAN
____ OTHER

4. I am _____.

____ FEMALE
____ MALE

5. I have lived in the United States _____ years. *(Please place one check beside your answer.)*

____ 0-2 ____ 3-4 ____ 5-6 ____ 6-7 ____ 7+

Thank-you for your time.

For Office Use Only

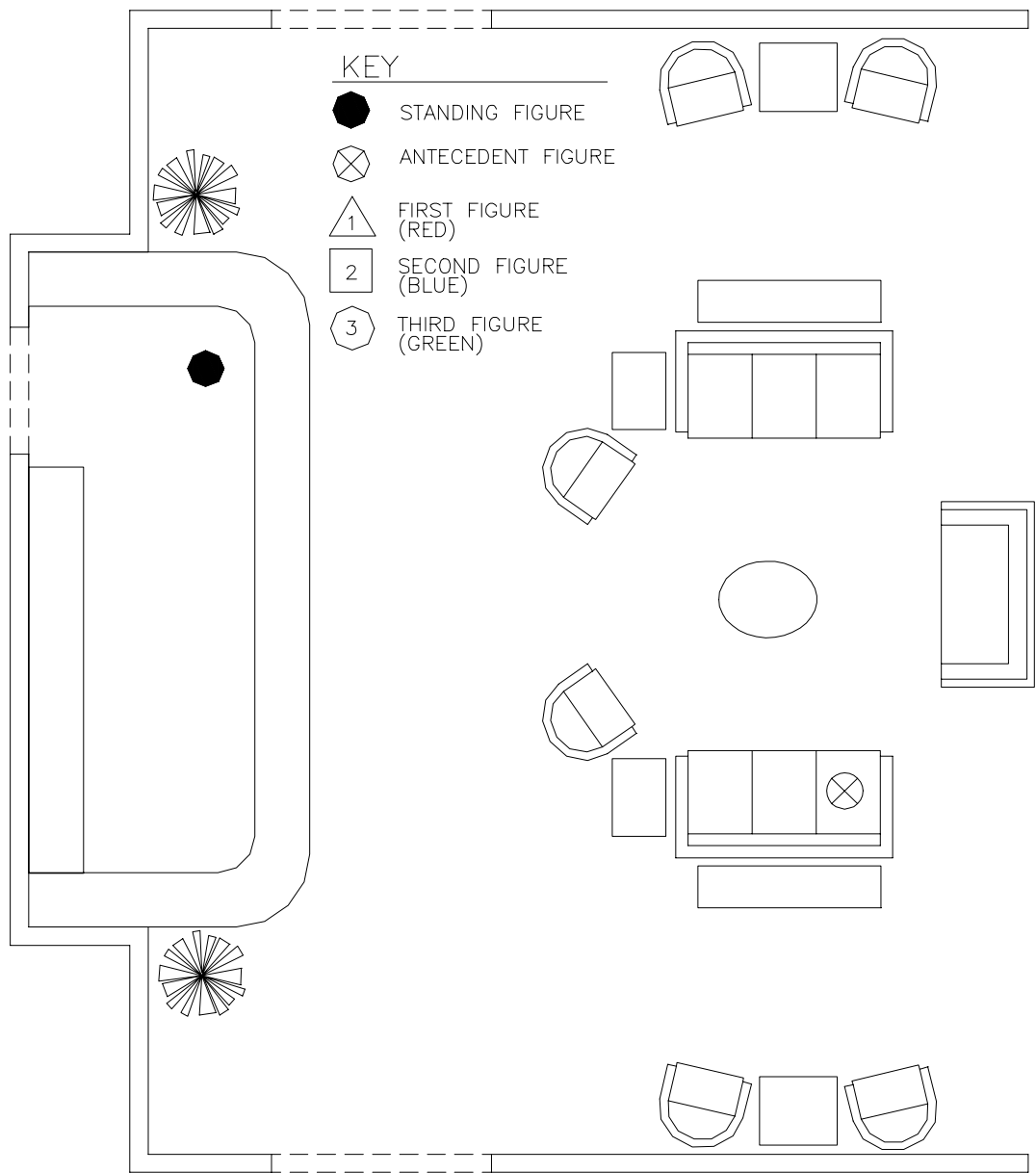
MODEL: _____

DATE/TIME: _____

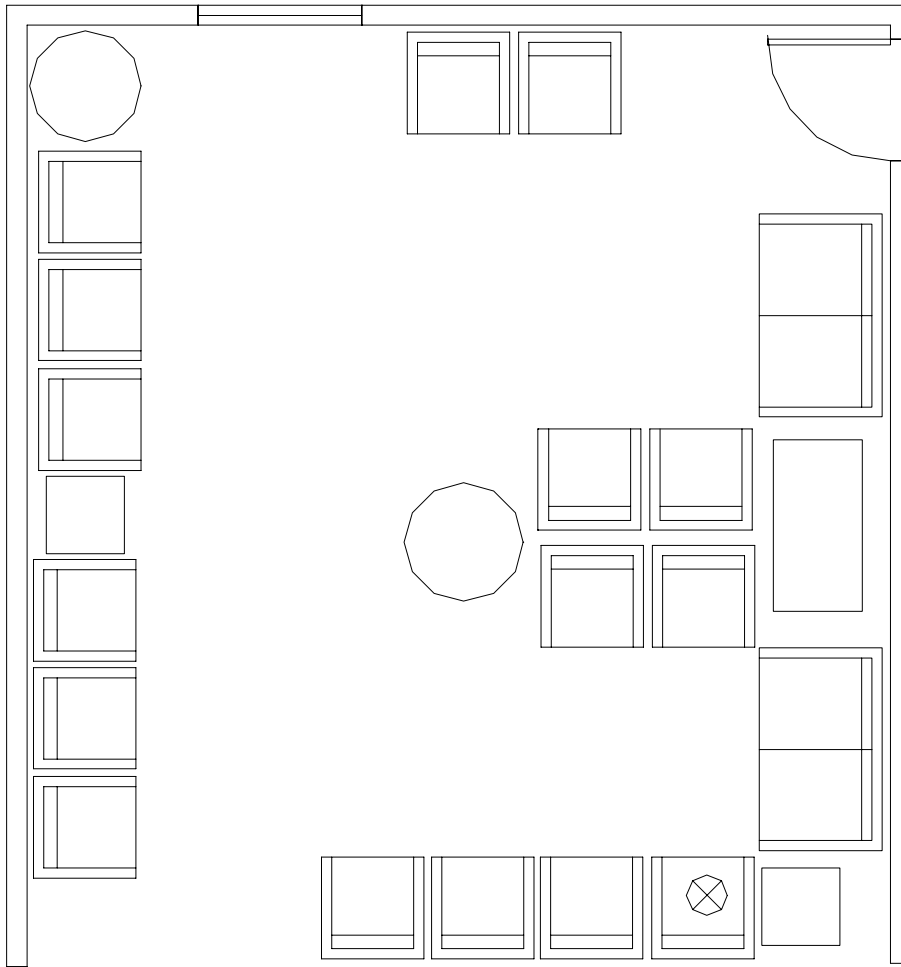
SUBJECT NO. _____

APPENDIX G

Forms to Record Proxemic Distances



Researcher: AMY L. LAUGHEAD Virginia Polytechnic Institute and State University	SCENARIO: HOTEL LOBBY WAITING AREA BRIGHT or DIM SUBJECT NO. _____ DATE: _____
Data Collection for Masters Thesis Illumination Level Affect on Proxemic Behavior	



KEY

-  ANTECEDENT FIGURE
-  FIRST FIGURE (RED)
-  SECOND FIGURE (BLUE)
-  THIRD FIGURE (GREEN)

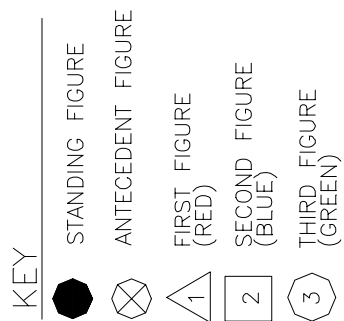
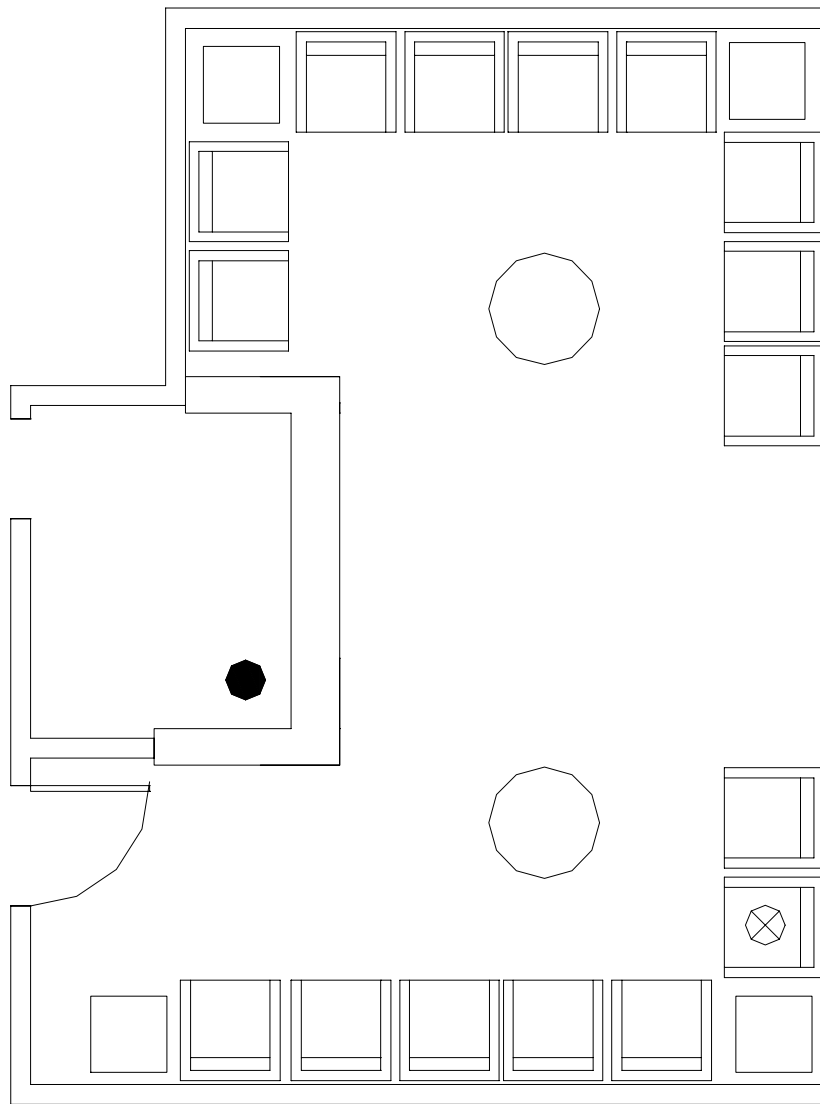
Researcher: AMY L. LAUGHEAD
 Virginia Polytechnic Institute and State University

Data Collection for Masters Thesis
 Illumination Level Affect on Proxemic Behavior

SCENARIO: PHYSICIAN'S OFFICE WAITING AREA

BRIGHT or DIM

SUBJECT NO. _____ DATE: _____



Researcher: AMY L. LAUGHEAD Virginia Polytechnic Institute and State University		SCENARIO: SERVICE WAITING AREA BRIGHT or DIM	
Data Collection for Masters Thesis Illumination Level Affect on Proxemic Behavior		SUBJECT NO. _____ DATE: _____	

APPENDIX H

Statistical Results

The SAS System					
-----Question 1: Friendly/Hostile-----					
The GLM Procedure					
Class Level Information					
Class	Levels	Values			
COMBO	6	HB HD PB PD SB SD			
QUESTION	1	1			
Number of observations		360			

The SAS System					
-----Question 1: Friendly/Hostile-----					
The GLM Procedure					
Dependent Variable: RESPONSE					
Source	DF	Sum of Squares	Mean Square	F value	Pr > F
Model	5	40.16666667	8.0333333	10.09	<.0001
Error	354	281.7333333	0.7958569		
Corrected Total	359	321.9000000			
R-Square 0.124780 Coeff-Var 25.61076 Root MSE 0.892108 REPSONSE Mean 3.483333					
Source	DF	Type I SS	Mean Square	F value	Pr > F
COMBO	5	40.16666667	8.0333333	10.09	<.0001
Source	DF	Type III SS	Mean Square	F value	Pr > F
COMBO	5	40.16666667	8.0333333	10.09	<.0001
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Hotel B/D	1	2.13333333	2.13333333	2.68	0.1025
Physician B/D	1	1.00833333	1.00833333	1.27	0.2611
Service B/D	1	0.40833333	0.40833333	0.51	0.4743

The SAS System					
-----Question 2: Pleasant/Unpleasant-----					
The GLM Procedure					
Class Level Information					
Class	Levels	Values			
COMBO	6	HB HD PB PD SB SD			
QUESTION	1	2			
Number of observations		360			

The SAS System					
-----Question 2: Pleasant/Unpleasant-----					
The GLM Procedure					
Dependent Variable: RESPONSE					
Source	DF	Sum of Squares	Mean Square	F value	Pr > F
Model	5	45.1583333	9.0316667	9.78	<.0001
Error	354	326.8166667	0.9232109		
Corrected Total	359	371.9750000			
R-Square 0.121402 Coeff-Var 27.51805 Root MSE 0.960839 RESPONSE Mean 3.491667					
Source	DF	Type I SS	Mean Square	F value	Pr > F
COMBO	5	45.15833333	9.03166667	9.78	<.0001
Source	DF	Type III SS	Mean Square	F value	Pr > F
COMBO	5	45.15833333	9.03166667	9.78	<.0001
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Hotel B/D	1	0.67500000	0.67500000	0.73	0.3931
Physician B/D	1	1.87500000	1.87500000	2.03	0.1550
Service B/D	1	2.40833333	8.40833333	2.61	0.1072

The SAS System						
-----Question 3: Harmonious/Frustrating-----						
The GLM Procedure						
Class Level Information						
Class	Levels	Values				
COMBO	6	HB	HD	PB	PD	SB SD
QUESTION	1	3				
Number of observations		360				

The SAS System					
-----Question 3: Harmonious/Frustrating-----					
The GLM Procedure					
Dependent Variable: RESPONSE					
Source	DF	Sum of Squares	Mean Square	F value	Pr > F
Model	5	34.3888889	6.8777778	9.38	<.0001
Error	354	259.4333333	0.7328625		
Corrected Total	359	293.8222222			
	R-Square	Coeff-Var	Root MSE	RESPONSE Mean	
	0.117040	24.30494	0.856074	3.522222	
Source	DF	Type I SS	Mean Square	F value	Pr > F
COMBO	5	34.3888889	6.8777778	9.38	<.0001
Source	DF	Type III SS	Mean Square	F value	Pr > F
COMBO	5	34.3888889	6.8777778	9.38	<.0001
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Hotel B/D	1	0.13333333	0.13333333	0.18	0.6700
Physician B/D	1	2.13333333	2.13333333	2.91	0.0889
Service B/D	1	0.03333333	0.03333333	0.05	0.8312

The SAS System						
-----Question 4: Sociable/Unsociable-----						
The GLM Procedure						
Class Level Information						
Class	Levels	Values				
COMBO	6	HB	HD	PB	PD	SB SD
QUESTION	1	4				
Number of observations		360				

The SAS System					
-----Question 4: Sociable/Unsociable-----					
The GLM Procedure					
Dependent Variable: RESPONSE					
Source	DF	Sum of Squares	Mean Square	F value	Pr > F
Model	5	54.7583333	10.9516667	13.45	<.0001
Error	354	288.2166667	0.8141714		
Corrected Total	359	342.9750000			
	R-Square	Coeff-Var	Root MSE	RESPONSE Mean	
	0.117040	24.30494	0.856074	3.522222	
Source	DF	Type I SS	Mean Square	F value	Pr > F
COMBO	5	54.7583333	10.9516667	13.45	<.0001
Source	DF	Type III SS	Mean Square	F value	Pr > F
COMBO	5	54.7583333	10.9516667	13.45	<.0001
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Hotel B/D	1	0.53333333	0.53333333	0.66	0.4189
Physician B/D	1	5.20833333	5.20833333	6.40	0.0119
Service B/D	1	0.30000000	0.30000000	0.37	0.5442

The SAS System

-----Question 5: Relaxing/Agitating-----

The GLM Procedure

Class Level Information

Class	Levels	Values
COMBO	6	HB HD PB PD SB SD
QUESTION	1	5

Number of observations 360

The SAS System

-----Question 5: Relaxing/Agitating-----

The GLM Procedure

Dependent Variable: RESPONSE

Source	DF	Sum of Squares	Mean Square	F value	Pr > F
Model	5	30.3000000	6.0600000	7.66	<.0001
Error	354	280.1000000	0.7912429		
Corrected Total	359	310.4000000			

R-Square	Coeff-Var	Root MSE	RESPONSE Mean
0.097616	26.16231	0.889518	3.400000

Source	DF	Type I SS	Mean Square	F value	Pr > F
COMBO	5	30.3000000	6.0600000	7.66	<.0001

Source	DF	Type III SS	Mean Square	F value	Pr > F
COMBO	5	30.3000000	6.0600000	7.66	<.0001

Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Hotel B/D	1	0.13333333	0.13333333	0.17	0.6817
Physician B/D	1	0.53333333	0.53333333	0.67	0.4122
Service B/D	1	0.03333333	0.03333333	0.04	0.8375

The SAS System						
-----Question 6: Interesting/Monotonous-----						
The GLM Procedure						
Class Level Information						
Class	Levels	Values				
COMBO	6	HB	HD	PB	PD	SB SD
QUESTION	1	6				
Number of observations		360				

The SAS System					
-----Question 6: Interesting/Monotonous-----					
The GLM Procedure					
Dependent Variable: RESPONSE					
Source	DF	Sum of Squares	Mean Square	F value	Pr > F
Model	5	100.3583333	20.0716667	22.09	<.0001
Error	354	321.6166667	0.09085217		
Corrected Total	359	421.9750000			
R-Square 0.237830 Coeff-Var 33.54243 Root MSE 0.953164 RESPONSE Mean 2.841667					
Source	DF	Type I SS	Mean Square	F value	Pr > F
COMBO	5	100.3583333	20.0716667	22.09	<.0001
Source	DF	Type III SS	Mean Square	F value	Pr > F
COMBO	5	100.3583333	20.0716667	22.09	<.0001
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Hotel B/D	1	0.53333333	0.53333333	0.59	0.4441
Physician B/D	1	0.40833333	0.40833333	0.45	0.5030
Service B/D	1	0.30000000	0.30000000	0.33	0.5659

The SAS System

-----Question 7: Comfortable/Uncomfortable-----

The GLM Procedure

Class Level Information

Class	Levels	Values
COMBO	6	HB HD PB PD SB SD
QUESTION	1	7

Number of observations 360

The SAS System

-----Question 7: Comfortable/Uncomfortable-----

The GLM Procedure

Dependent Variable: RESPONSE

Source	DF	Sum of Squares	Mean Square	F value	Pr > F
Model	5	42.9583333	8.5916667	10.01	<.0001
Error	354	303.8166667	0.8582392		
Corrected Total	359	345.7750000			

R-Square	Coeff-Var	Root MSE	RESPONSE Mean
0.123880	27.5847	0.926412	3.358333

Source	DF	Type I SS	Mean Square	F value	Pr > F
COMBO	5	42.9583333	8.5916667	10.01	<.0001

Source	DF	Type III SS	Mean Square	F value	Pr > F
COMBO	5	42.9583333	8.5916667	10.01	<.0001

Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Hotel B/D	1	1.40833333	1.40833333	1.64	0.2010
Physician B/D	1	1.87500000	1.87500000	2.18	0.1403
Service B/D	1	1.87500000	1.87500000	2.18	0.1403

The SAS System						
-----Question 8: Bright/Dim-----						
The GLM Procedure						
Class Level Information						
Class	Levels	Values				
COMBO	6	HB	HD	PB	PD	SB SD
QUESTION	1	8				
Number of observations		360				

The SAS System					
-----Question 8: Bright/Dim-----					
The GLM Procedure					
Dependent Variable: RESPONSE					
Source	DF	Sum of Squares	Mean Square	F value	Pr > F
Model	5	226.7583333	45.3516667	45.62	<.0001
Error	354	368.0166667	1.0395951		
Corrected Total	359	594.7750000			
	R-Square	Coeff-Var	Root MSE	RESPONSE Mean	
	0.381251	30.36046	1.019605	3.3583333	
Source	DF	Type I SS	Mean Square	F value	Pr > F
COMBO	5	226.7583333	45.3516667	45.62	<.0001
Source	DF	Type III SS	Mean Square	F value	Pr > F
COMBO	5	226.7583333	45.3516667	45.62	<.0001
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Hotel B/D	1	70.5333333	70.5333333	67.85	<.0001
Physician B/D	1	86.7000000	86.7000000	83.40	<.0001
Service B/D	1	69.0083333	69.0083333	66.38	<.0001

The SAS System					
-----Question 9: Clear/Hazy-----					
The GLM Procedure					
Class Level Information					
Class	Levels	Values			
COMBO	6	HB HD PB PD SB SD			
QUESTION	1	9			
Number of observations		360			

The SAS System					
-----Question 9: Clear/Hazy-----					
The GLM Procedure					
Dependent Variable: RESPONSE					
Source	DF	Sum of Squares	Mean Square	F value	Pr > F
Model	5	123.9805556	24.7961111	23.62	<.0001
Error	354	371.5500000	1.04965763		
Corrected Total	359	495.5305556			
	R-Square	Coeff-Var	Root MSE	RESPONSE Mean	
	0.250198	29.57625	1.024488	3.463889	
Source	DF	Type I SS	Mean Square	F value	Pr > F
COMBO	5	123.9805556	24.7961111	23.62	<.0001
Source	DF	Type III SS	Mean Square	F value	Pr > F
COMBO	5	123.9805556	24.7961111	23.62	<.0001
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Hotel B/D	1	43.20000000	43.20000000	41.16	<.0001
Physician B/D	1	43.20000000	43.20000000	41.16	<.0001
Service B/D	1	37.40833333	37.40833333	35.64	<.0001

The SAS System						
-----Question 10:Focused/Unfocused-----						
The GLM Procedure						
Class Level Information						
Class	Levels	Values				
COMBO	6	HB	HD	PB	PD	SB SD
QUESTION	1	10				
Number of observations		360				

The SAS System					
-----Question 10:Focused/Unfocused-----					
The GLM Procedure					
Dependent Variable: RESPONSE					
Source	DF	Sum of Squares	Mean Square	F value	Pr > F
Model	5	53.7583333	10.7516667	9.93	<.0001
Error	354	383.2166667	1.0825330		
Corrected Total	359	436.9750000			
	R-Square	Coeff-Var	Root MSE	RESPONSE Mean	
	0.123024	30.52660	1.0448	3.408333	
Source	DF	Type I SS	Mean Square	F value	Pr > F
COMBO	5	53.7583333	10.7516667	9.93	<.0001
Source	DF	Type III SS	Mean Square	F value	Pr > F
COMBO	5	53.7583333	10.7516667	9.93	<.0001
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Hotel B/D	1	25.20833333	25.20833333	23.29	<.0001
Physician B/D	1	12.03333333	12.03333333	11.12	0.0009
Service B/D	1	10.80000000	10.80000000	9.98	0.0017

The SAS System					
-----Question 11: Radiant/Dull-----					
The GLM Procedure					
Class Level Information					
Class	Levels	Values			
COMBO	6	HB	HD	PB	PD SB SD
QUESTION	1	11			
Number of observations		360			

The SAS System					
-----Question 11: Radiant/Dull-----					
The GLM Procedure					
Dependent Variable: RESPONSE					
Source	DF	Sum of Squares	Mean Square	F value	Pr > F
Model	5	80.1250000	16.0250000	18.02	<.0001
Error	354	314.8500000	0.8894068		
Corrected Total	359	394.9750000			
R-Square 0.202861 Coeff-Var 31.52369 Root MSE 0.943084 RESPONSE Mean 2.991667					
Source	DF	Type I SS	Mean Square	F value	Pr > F
COMBO	5	80.1250000	16.0250000	18.02	<.0001
Source	DF	Type III SS	Mean Square	F value	Pr > F
COMBO	5	80.1250000	16.0250000	18.02	<.0001
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Hotel B/D	1	30.00000000	30.00000000	33.73	<.0001
Physician B/D	1	25.80333333	25.80333333	28.34	<.0001
Service B/D	1	19.20000000	19.20000000	21.59	<.0001

The SAS System						
-----Question 12: Simple/Complex-----						
The GLM Procedure						
Class Level Information						
Class	Levels	Values				
COMBO	6	HB	HD	PB	PD	SB SD
QUESTION	1	12				
Number of observations		360				

The SAS System					
-----Question 12: Simple/Complex-----					
The GLM Procedure					
Dependent Variable: RESPONSE					
Source	DF	Sum of Squares	Mean Square	F value	Pr > F
Model	5	48.666667	9.6933333	9.21	<.0001
Error	354	372.633333	1.0526365		
Corrected Total	359	421.100000			
	R-Square	Coeff-Var	Root MSE	RESPONSE Mean	
	0.115095	28.36813	1.025981	3.616667	
Source	DF	Type I SS	Mean Square	F value	Pr > F
COMBO	5	48.666667	9.6933333	9.21	<.0001
Source	DF	Type III SS	Mean Square	F value	Pr > F
COMBO	5	48.666667	9.6933333	9.21	<.0001
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Hotel B/D	1	0.03333333	0.03333333	0.03	0.8589
Physician B/D	1	1.40833333	1.40833333	1.34	0.2482
Service B/D	1	0.07500000	0.07500000	0.07	0.7897

The SAS System						
-----Question 13: Uncluttered/Cluttered-----						
The GLM Procedure						
Class Level Information						
Class	Levels	Values				
COMBO	6	HB	HD	PB	PD	SB SD
QUESTION	1	13				
Number of observations		360				

The SAS System					
-----Question 13: Uncluttered/Cluttered-----					
The GLM Procedure					
Dependent Variable: RESPONSE					
Source	DF	Sum of Squares	Mean Square	F value	Pr > F
Model	5	24.0888889	4.8177778	4.60	<.0001
Error	354	370.9666667	1.049284		
Corrected Total	359	395.0555556			
	R-Square	Coeff-Var	Root MSE	RESPONSE Mean	
	0.060976	28.13177	1.023684	3.638889	
Source	DF	Type I SS	Mean Square	F value	Pr > F
COMBO	5	24.0888889	4.8177778	4.60	0.0004
Source	DF	Type III SS	Mean Square	F value	Pr > F
COMBO	5	24.0888889	4.8177778	4.60	0.0004
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Hotel B/D	1	0.40833333	0.40833333	0.39	0.5329
Physician B/D	1	0.07500000	0.07500000	0.07	0.7892
Service B/D	1	0.13333333	0.13333333	0.13	0.7215

The SAS System						
-----Question 14:Large/Small-----						
The GLM Procedure						
Class Level Information						
Class	Levels	Values				
COMBO	6	HB	HD	PB	PD	SB SD
QUESTION	1	14				
Number of observations		360				

The SAS System					
-----Question 14:Large/Small-----					
The GLM Procedure					
Dependent Variable: RESPONSE					
Source	DF	Sum of Squares	Mean Square	F value	Pr > F
Model	5	11.2666667	2.253333	2.69	0.211
Error	354	296.633333	0.8379473		
Corrected Total	359	307.900000			
		R-Square	Coeff-Var	Root MSE	RESPONSE Mean
		0.36592	24.85234	0.915395	3.683333
Source	DF	Type I SS	Mean Square	F value	Pr > F
COMBO	5	11.2666667	2.253333	2.69	0.211
Source	DF	Type III SS	Mean Square	F value	Pr > F
COMBO	5	11.2666667	2.253333	2.69	0.211
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Hotel B/D	1	1.200000000	1.200000000	1.43	0.2322
Physician B/D	1	1.083333333	1.083333333	1.20	0.2734
Service B/D	1	2.408333333	2.408333333	2.87	0.0909

The SAS System					
-----Question 15: Long/Short-----					
The GLM Procedure					
Class Level Information					
Class	Levels	Values			
COMBO	6	HB HD PB PD SB SD			
QUESTION	1	15			
Number of observations		360			

The SAS System					
-----Question 15: Long/Short-----					
The GLM Procedure					
Dependent Variable: RESPONSE					
Source	DF	Sum of Squares	Mean Square	F value	Pr > F
Model	5	8.2472222	1.6494444	2.77	0.0180
Error	354	210.6833333	0.5951507		
Corrected Total	359	218.9605556			
R-Square 0.037670 Coeff-Var 23.83911 Root MSE 0.771460 RESPONSE Mean 3.26111					
Source	DF	Type I SS	Mean Square	F value	Pr > F
COMBO	5	8.2472222	1.6494444	2.77	0.0180
Source	DF	Type III SS	Mean Square	F value	Pr > F
COMBO	5	8.2472222	1.6494444	2.77	0.0180
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Hotel B/D	1	1.40833333	1.40833333	2.37	0.1249
Physician B/D	1	0.00833333	0.00833333	0.01	0.9059
Service B/D	1	0.67500000	0.67500000	1.13	0.2876

The SAS System					
-----Question 16: Spacious/Cramped-----					
The GLM Procedure					
Class Level Information					
Class	Levels	Values			
COMBO	6	HB HD PB PD SB SD			
QUESTION	1	16			
Number of observations		360			

The SAS System					
-----Question 16: Spacious/Cramped-----					
The GLM Procedure					
Dependent Variable: RESPONSE					
Source	DF	Sum of Squares	Mean Square	F value	Pr > F
Model	5	14.50000000	2.90000000	3.20	0.0077
Error	354	320.6000000	0.9056497		
Corrected Total	359	335.1000000			
	R-Square	Coeff-Var	Root MSE	RESPONSE Mean	
	0.043271	26.31308	0.951656	3.61667	
Source	DF	Type I SS	Mean Square	F value	Pr > F
COMBO	5	14.50000000	2.90000000	3.20	0.0077
Source	DF	Type III SS	Mean Square	F value	Pr > F
COMBO	5	14.50000000	2.90000000	3.20	0.0077
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Hotel B/D	1	1.200000000	1.200000000	1.33	0.2505
Physician B/D	1	1.875000000	1.875000000	2.07	0.1511
Service B/D	1	1.408333333	1.408333333	1.56	0.2132

The SAS System					
-----Question 17: Rounded/Informal-----					
The GLM Procedure					
Class Level Information					
Class	Levels	Values			
COMBO	6	HB HD PB PD SB SD			
QUESTION	1	17			
Number of observations		360			

The SAS System					
-----Question 17: Rounded/Informal-----					
The GLM Procedure					
Dependent Variable: RESPONSE					
Source	DF	Sum of Squares	Mean Square	F value	Pr > F
Model	5	228.3555556	45.67111111	53.25	<.0001
Error	354	303.6333333	0.8577213		
Corrected Total	359	531.9888889			
	R-Square	Coeff-Var	Root MSE	RESPONSE Mean	
	0.429249	35.54453	0.926132	2.605556	
Source	DF	Type I SS	Mean Square	F value	Pr > F
COMBO	5	228.3555556	45.67111111	53.25	<.0001
Source	DF	Type III SS	Mean Square	F value	Pr > F
COMBO	5	228.3555556	45.67111111	53.25	<.0001
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Hotel B/D	1	0.20833333	0.20833333	0.24	0.6224
Physician B/D	1	0.00833333	0.00833333	0.01	0.9215
Service B/D	1	0.03333333	0.03333333	0.04	0.8438

The SAS System						
-----Question 18:Informal/Formal-----						
The GLM Procedure						
Class Level Information						
Class	Levels	Values				
COMBO	6	HB	HD	PB	PD	SB SD
QUESTION	1	18				
Number of observations		360				

The SAS System					
-----Question 18:Informal/Formal-----					
The GLM Procedure					
Dependent Variable: RESPONSE					
Source	DF	Sum of Squares	Mean Square	F value	Pr > F
Model	5	30.3666667	6.0733333	4.70	0.0004
Error	354	457.533333	1.2924670		
Corrected Total	359	487.900000			
	R-Square	Coeff-Var	Root MSE	RESPONSE Mean	
	0.062240	39.89008	1.136867	2.850000	
Source	DF	Type I SS	Mean Square	F value	Pr > F
COMBO	5	30.3666667	6.0733333	4.70	0.0004
Source	DF	Type III SS	Mean Square	F value	Pr > F
COMBO	5	30.3666667	6.0733333	4.70	0.0004
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Hotel B/D	1	1.00833333	1.00833333	0.78	0.3777
Physician B/D	1	0.13333333	0.13333333	0.10	0.7483
Service B/D	1	0.40833333	0.40833333	0.32	0.5744

The SAS System					
-----Question 19: Contemporary/Traditional-----					
The GLM Procedure					
Class Level Information					
Class	Levels	Values			
COMBO	6	HB HD PB PD SB SD			
QUESTION	1	19			
Number of observations		360			

The SAS System					
-----Question 19: Contemporary/Traditional-----					
The GLM Procedure					
Dependent Variable: RESPONSE					
Source	DF	Sum of Squares	Mean Square	F value	Pr > F
Model	5	19.5805556	3.9161111	2.99	0.0117
Error	354	483.4166667	1.3090866		
Corrected Total	359	482.9972222			
	R-Square	Coeff-Var	Root MSE	RESPONSE Mean	
	0.040540	38.17379	1.144153	2.997222	
Source	DF	Type I SS	Mean Square	F value	Pr > F
COMBO	5	19.5805556	3.9161111	2.99	0.0117
Source	DF	Type III SS	Mean Square	F value	Pr > F
COMBO	5	19.5805556	3.9161111	2.99	0.0117
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Hotel B/D	1	0.07500000	0.075000000	0.06	0.8110
Physician B/D	1	1.63333333	1.633333333	1.25	0.2648
Service B/D	1	0.03333333	0.033333333	0.03	0.8733

The SAS System						
-----Question 20: Wait Time-----						
The GLM Procedure						
Class Level Information						
Class	Levels	Values				
COMBO	6	HB	HD	PB	PD	SB SD
QUESTION	1	20				
Number of observations		360				

The SAS System					
-----Question 20: Wait Time-----					
The GLM Procedure					
Dependent Variable: RESPONSE					
Source	DF	Sum of Squares		Mean Square	F value Pr > F
Model	5	9.1222222		1.8244444	4.52 0.0005
Error	354	142.833333		0.0434840	
Corrected Total	359	151.955556			
	R-Square	Coeff-Var	Root MSE	RESPONSE Mean	
	0.060032	42.66295	0.635204	1.488889	
Source	DF	Type I SS	Mean Square	F value	Pr > F
COMBO	5	9.1222222	1.8244444	4.52	0.0005
Source	DF	Type III SS	Mean Square	F value	Pr > F
COMBO	5	9.1222222	1.8244444	4.52	0.0005
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Hotel B/D	1	0.67500000	0.67500000	1.67	0.1967
Physician B/D	1	0.00833333	0.00833333	0.02	0.8858
Service B/D	1	0.83333333	0.83333333	2.07	0.1516

The SAS System

Summary Statistics for Lighting Condition
by Proxemic Distances Controlling for Scenario

Cochran-Mantel-Haensel Statistics (Based on Contingency Table Scores)

Statistic	Alternative Hypothesis	DF	Value	Prob
1	Nonzero Correlation	1	1.468	0.226
2	Row Mean Scores Differ	1	1.468	0.226
3	General Association	5	2.785	0.733

Total sample size = 2160

APPENDIX I

Qualitative Results

Comments used to formulate categories from Open-Ended Questionnaire

Question 1: Describe how you felt interacting with the models.

Realistic

"It was reasonably easy to 'place myself' in the models. They had a realistic feel."

"Models were representative enough to put you in the right mind set."

"Felt like I was there."

"The scenes felt surprisingly realistic, given that everything was white."

"It was like I was really walking into a waiting area looking for a comfortable place to sit. The models were easy to work with and I felt like I was involved in the actual situations."

"I felt the tendency to compare the models with actual waiting areas I have experienced and in large part to choose the seating I usually do choose in those environments."

Unrealistic

"It was a bit difficult to imagine the people without any distinguishing characteristics, though my answers probably would not have changed."

"I also wondered what the other person/people in the models looked like."

"Analytical, detached."

"[Felt] OK. They [models] were on the bland side. Not too realistic in terms of what the situations might really look like - color, fabric, sound."

User Friendly

"Comfortable. Interested in study."

"Comfortable. The models were easy to handle and 'human' enough to relate to."

Stimulating

"Good. It was fun to imagine where I would sit, depending on the environment."

"Interesting. Really tried to place myself in the varying situations."

Awkward/Frustrated

"Silly at first, then more confident."

"Funny, yet awkward. Moving doll-like objects didn't seem real at first. The sensation changed by the third model. I began to focus in on the subtle changes per lighting and layout."

"Frustration at times when I was trying to find a seat, but I couldn't because the lighting was dim, or hazy, or there was another person sitting too close."

"Sometimes I felt frustrated because someone was in the seat I would have selected (even though I put the person there!)"

Thought Provoking

"Very useful to visualize how I would react to room and proximity to others. (I'm very visual)."

"It seemed like I knew where I would sit immediately."

"These models made me think about where I would sit when entering a room. Interacting with these models also made me have an awareness of the people around me before I sat down."

"It was interesting to see how I would select a seat in each setting. Slight differences did change my perspective."

Question 2: "What did you feel motivated your seating selections within the models?"

Presence of table

"Reading materials on end tables would prompt me to sit near the tables."

"Presence of a table (reading material.)"

"To be near a table w/ magazines, to put a purse, coffee cup, etc."

Proximity to others

"Proximity to others."

"Seating selection was based mostly on the location of other people in the models."

"Opportunity to talk with others."

"Close enough to speak with others."

"Not too close, not too isolated. Give the opportunity to talk with other persons are interesting and be far enough to avoid if they are dull."

Privacy

"Wanted to have private space around me."

"Desire for privacy."

"Attempt for privacy."

"I generally tried to maximize the space from the next nearest person. Although in the central circular models [hotel models], I chose to be closer because the chairs at the edges had a 'left out' feeling."

"What mattered most was where the first person (the one already there) was sitting and how far I could sit from him/her. Then, it became a matter of placing each successive 'me' as far away from the other figures as possible."

"Keeping appropriate distances from others."

"In public places, don't want to sit close to others (might have made different choices if more seats were already occupied)."

"Desire to sit where I wouldn't have people crowding me (even those who might come in after me)."

"I never like to sit beside someone directly - I like to give people their space - so I would choose a place that was far away from others but not too far."

"Didn't want to impose on the 'space' of others."

Viewing plane

"View of total space."

"Space. Visibility."

"Good view of room."

"Good view to see what was going on."

"Sit where I can see the room (to spy on people.)"

"Wanted to leave myself personal space, but still see reception area."

Service

"Wanted to be close to service person or reception window, or counter."

"I like to be close to exits and service counters where I have to interact with staff."

"Direct line of sight to receptionist or where the nurse would come out."

"Visibility of service counter (if present) or other doors thru which service provider may enter room."

"Desire to watch the desk/door for my name to be called."

Lighting

"Where the light was brightest - I usually read while I wait."

"I always have reading material, so I look for a light spot."

"I also tend toward bright areas near tables."

Seat Orientation

"I like corner seats"

"I prefer to sit with my back against a wall."

"I like my back against a wall"

Proximity to entrances/exits

"I like to sit near an exit."

"I like to be close to the entrances and exits so I can get out fast."

Questions 3: "Did you think about the lighting within the models? If so, how did the lighting influence your seating selection?"

No impact

"I don't believe it did so much."

"Not really."

Proximity

"Particularly in the lobby, the lights (bright) focused on the central area, I avoided that as to not 'be in the spot light'."

"I may have sat closer to people in dimmer rooms."

"If it was dark I did not want to go too close."

"Brighter lighting seemed to be more 'friendly' a more willingness to sit nearer someone."

Spatial Comfort

"Did not influence where I would sit, but it definitely would affect how I would feel or how agitated I might feel."

"It didn't affect the seating selection, but it motivated my comfort within in the room. I was more comfortable in brighter rooms."

"Quality of light is important to a sense of comfort in a space."

"Feel better with good lighting."

"It influenced my comfort level more than my seating selection. I'd be willing to wait longer in a well lit place because of being able to see well and because it would allow me to more easily/better ... to read or do work..."

"Dim lighting in a non-social situation seems more uncomfortable than bright lighting."

Prefer Bright Lighting

"Bright lights are more inviting to me and presents a more positive atmosphere to me."

"I usually picked the well lit areas."

"Went toward the light."

"The more brightly lighted models were friendlier feeling." "When [the lights were] brighter, I wanted to socialize."

"I prefer good lighting for magazine reading."

"Under dim lighting conditions I chose places under overhead lights to permit reading."

"I will sit under good lights so I can read..."

"I would always choose a seat that was well lit. If there was not much light then I would not sit in that place."

"I preferred well lit areas where I could read. However, getting away from strangers was more important."

Aversion to dim lighting

"I hate dim lighting."

"Dull or low light you tend to see as a controlled location with less interaction with other patrons."

VITA

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EDUCATION

Master of Science in Interior Design, December 1999

Virginia Polytechnic Institute and State University, Blacksburg, VA

Courses

Advanced Interior Design

Advanced Design Research

Advanced Environmental Controls

Orientation to Research

Independent Lighting Study

Statistics for Behavioral Sciences

Interior Design Studio

Behavioral Science Methods in Education

Bachelor's of Science in Interior Design, May 1995

Miami University, Oxford, OH

Magna Cum Laude, President's List, Dean's List, recipient of two Miami Alumni Scholarships

EXPERIENCE

Staff Designer (September 1999-Present)

Cline Bettridge Bernstein Lighting Design, New York City, NY

- Responsible for developing lighting layouts, luminaire schedules, dimming and switching plans for a variety of applications including residential, commercial offices, and hotels

Instructor (Jan. 1997 - May 1999)

Virginia Polytechnic Institute and State University, Blacksburg, VA

- Responsible for lesson planning and teaching two sections of a design drawing course for first year interior design students. Course emphasis on hand-drafting, perspectives and introduction to AutoCad r14.

Interior Designer (May 1997 - December 1997 & August 1998 - July 1999)

Barrows, Roanoke, VA

- Responsible for space planning, specifications and CAD drawings for Steelcase office furniture, as well as interior space planning and specification of nursing homes.

Interior Designer (June 1998 - December 1998)

FRCH Design Worldwide, Cincinnati, OH

- Collaborated with the Department Stores Studio to produce detailed construction drawings for department stores such as Lazarus, Rich's, and Stern's.

Project Manager (May 1995 - August 1996)

Globe Business Interiors, Cincinnati, OH

- Responsible for coordination of installation of Haworth Race furniture systems, CAD drawings, space planning, specifying, purchasing, invoicing, receiving of shipments, organization and updating of resource library.

AWARDS

1998

22nd Annual Halo/Metalux Student Commercial Fluorescent Lighting Award Winner
Interior Design Educators Council Student Design Competition, Regional Winner

1997

21st Annual Halo/Metalux Student Residential Recessed Downlighting Award Winner
Jean M. Lane Scholarship, College of Human Resources and Education, Virginia Tech