Case Study 3: Healthcare Facilities

Research response 2: Non-Visual

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Publication date:
2014

Document Version
Publisher's PDF, also known as Version of record

Illuminating ENGINEERING SOCIETY

LIGHT'S INFLUENCE ON LIGHT+BEHAVIOR HUMAN BEHAVIOR

IES Research Symposium II

APRIL 6 - 8, 2014 | CLEVELAND, OHIO

Case Study 3: Healthcare Facilities
Research response 2: Non-Visual

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Phd

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Denmark, 2014

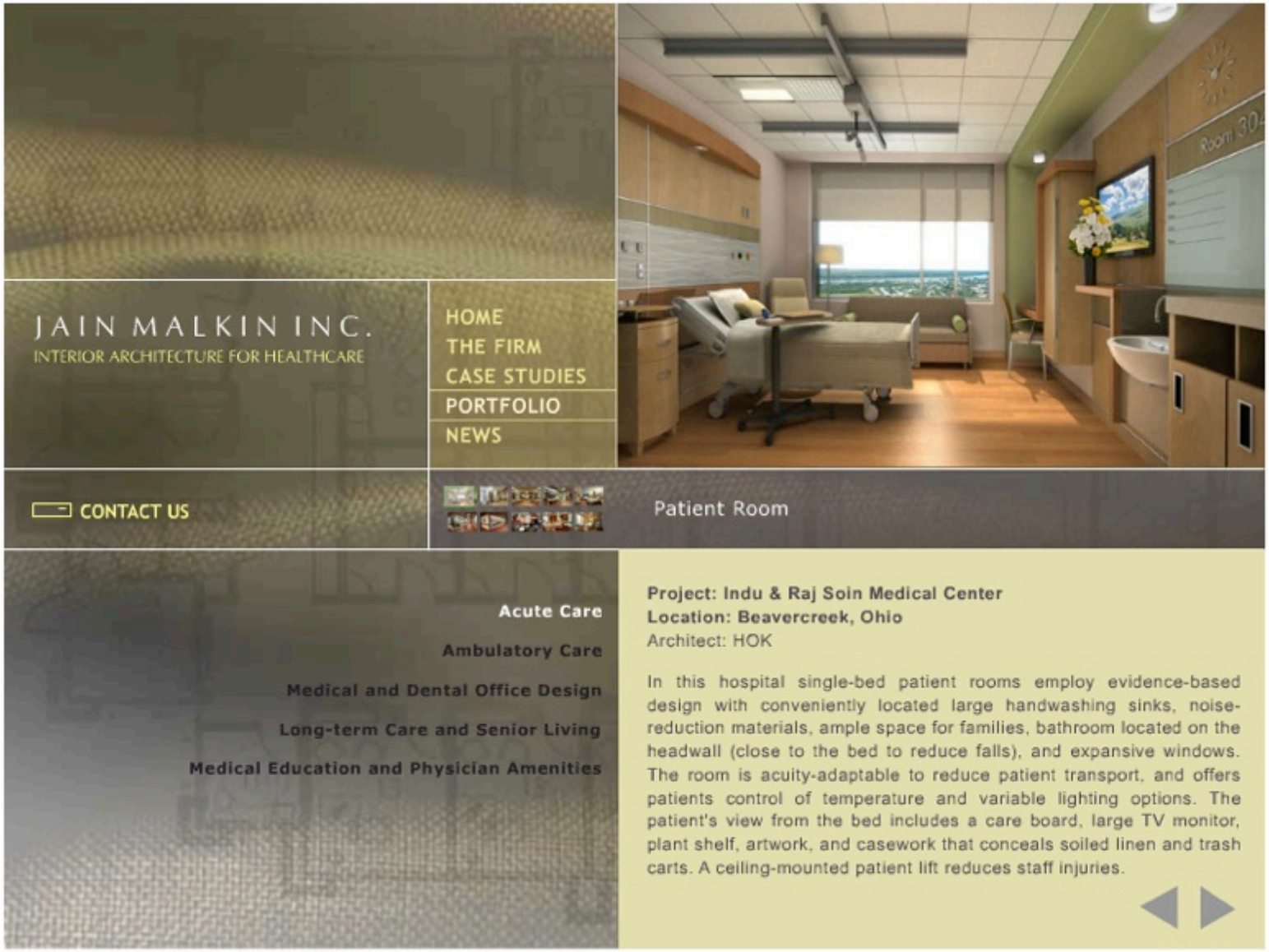
Background

Lone Mandrup Stidsen

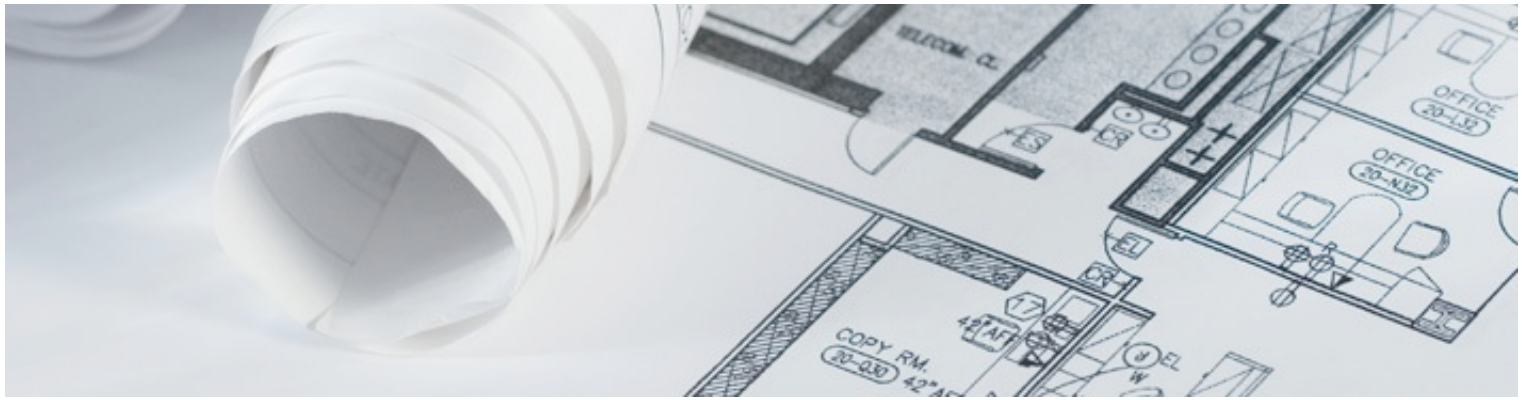
2013_ Ph.D. Aalborg university, Department of Civil Engineering
2006_ Textile Designer, Kolding School of Design (DK)
1999_ Primary School teacher, Silkeborg (DK)

Lighting healthcare facilities

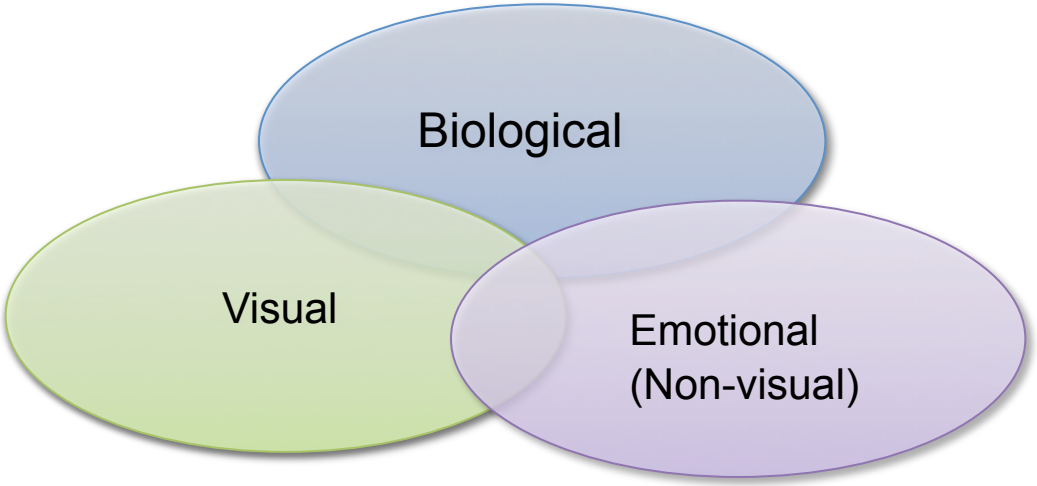
2004_ Hillary Dalke_ Lighting and Color for Hospital Design
2004_ Ulrich, Roger: Evidence Based Design
2006 Jain Malkin – Visual reference to evidence based design (US)
2009_ Anne Katrine Frandsen – Helende arkitektur (DK)


JAIN MALKIN INC.
INTERIOR ARCHITECTURE FOR HEALTHCARE
HOME
THE FIRM
CASE STUDIES
PORTFOLIO
NEWS
CONTACT US
Patient Room
Acute Care
Ambulatory Care
Medical and Dental Office Design
Long-term Care and Senior Living
Medical Education and Physician Amenities
Project: Indu & Raj Soin Medical Center
Location: Beavercreek, Ohio
Architect: HOK
In this hospital single-bed patient rooms employ evidence-based design with conveniently located large handwashing sinks, noise-reduction materials, ample space for families, bathroom located on the headwall (close to the bed to reduce falls), and expansive windows. The room is acuity-adaptable to reduce patient transport, and offers patients control of temperature and variable lighting options. The patient's view from the bed includes a care board, large TV monitor, plant shelf, artwork, and casework that conceals soiled linen and trash carts. A ceiling-mounted patient lift reduces staff injuries.

The Danish situation



HOSPITAL LIGHTING



Quality of Light

3. Light received by the eye

2. Light supporting human needs

1. Light level on horizontal plane

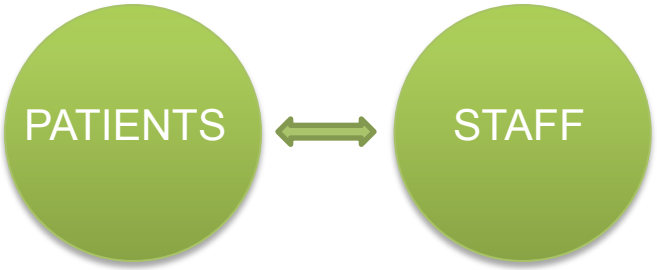
Cuttle C, 2010 ‘Towards the third step of lighting profession

Regulation for Light in Danish Hospitals (DS703)

Pleasant Light atmosphere

'Homelike' illumination

Pleasurable surroundings



Sufficient lighting

Visual demanding task lighting

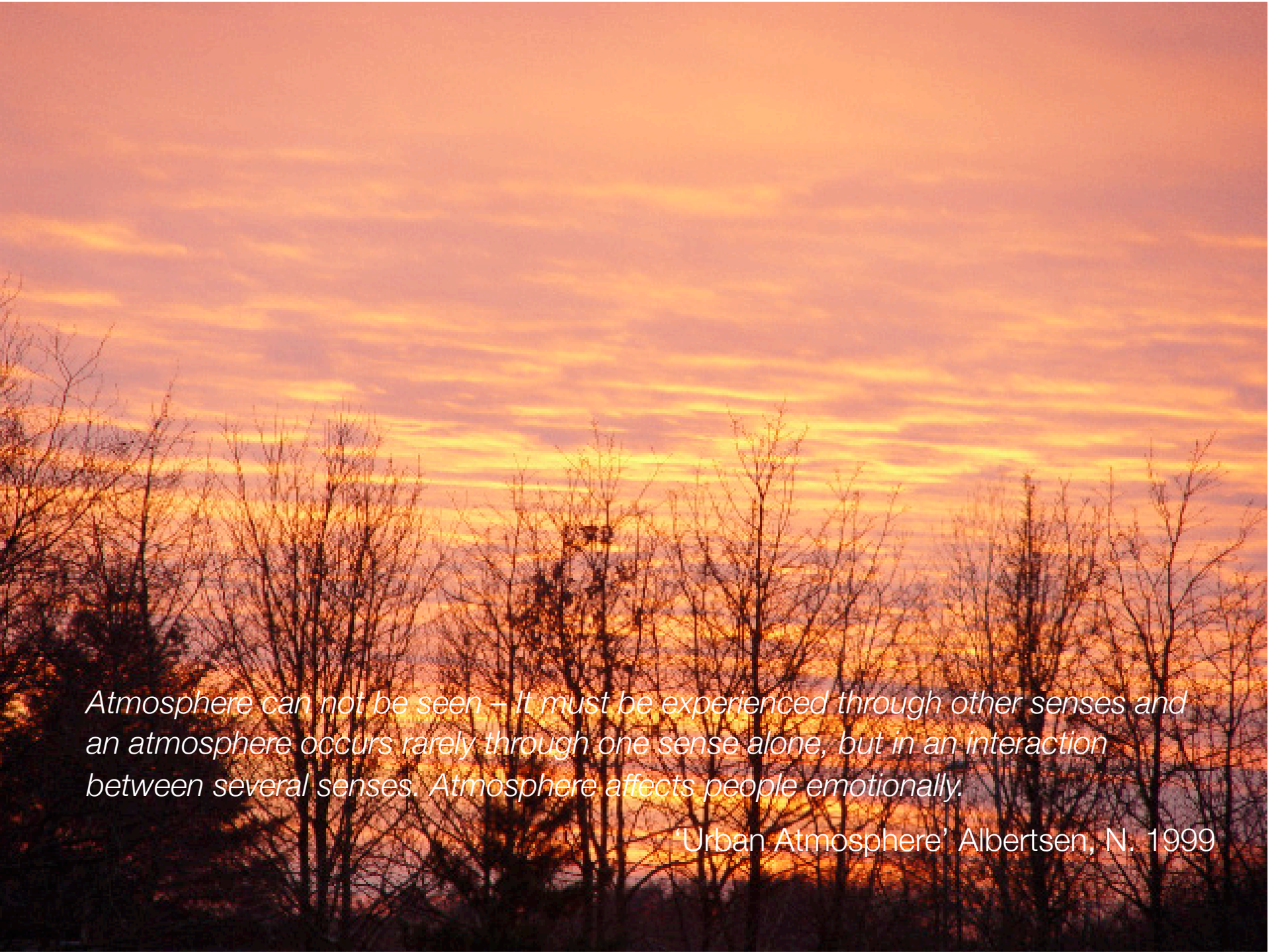
Patients only have few visual tasks. They require pleasurable surroundings supported by the illumination. Staff however need sufficient lighting to perform work that is often highly visually demanding. The light color must be selected according to the patients' needs for a pleasant 'homelike' illumination, which in most cases is color temperatures no higher than 3000K and a fairly good color rendering of Ra>80

?

‘Homelike and Pleasant’

=

‘Pleasant atmosphere’



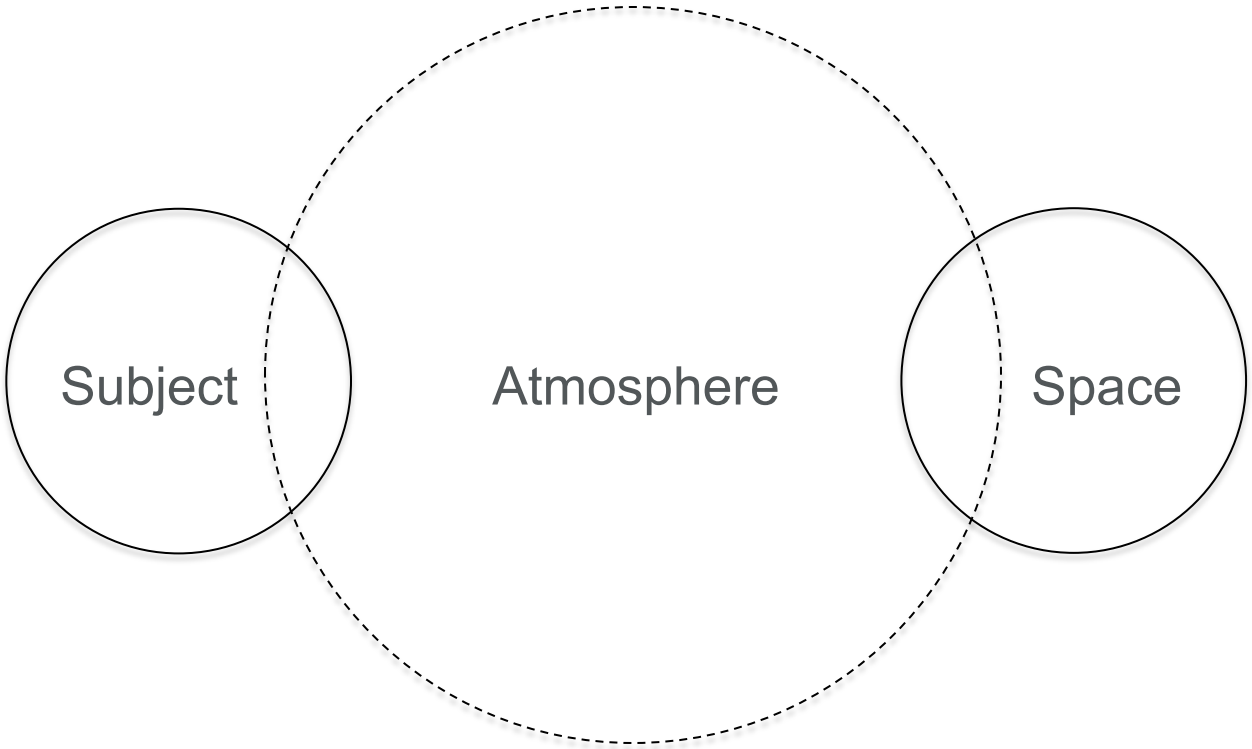
Atmosphere can not be seen – It must be experienced through other senses and an atmosphere occurs rarely through one sense alone, but in an interaction between several senses. Atmosphere affects people emotionally.

'Urban Atmosphere' Albertsen, N. 1999

Atmosphere is not ‘A stamp of approval’ for a good taste or a correct architectural understanding. Atmosphere is momentary phenomenon available everywhere at all times.

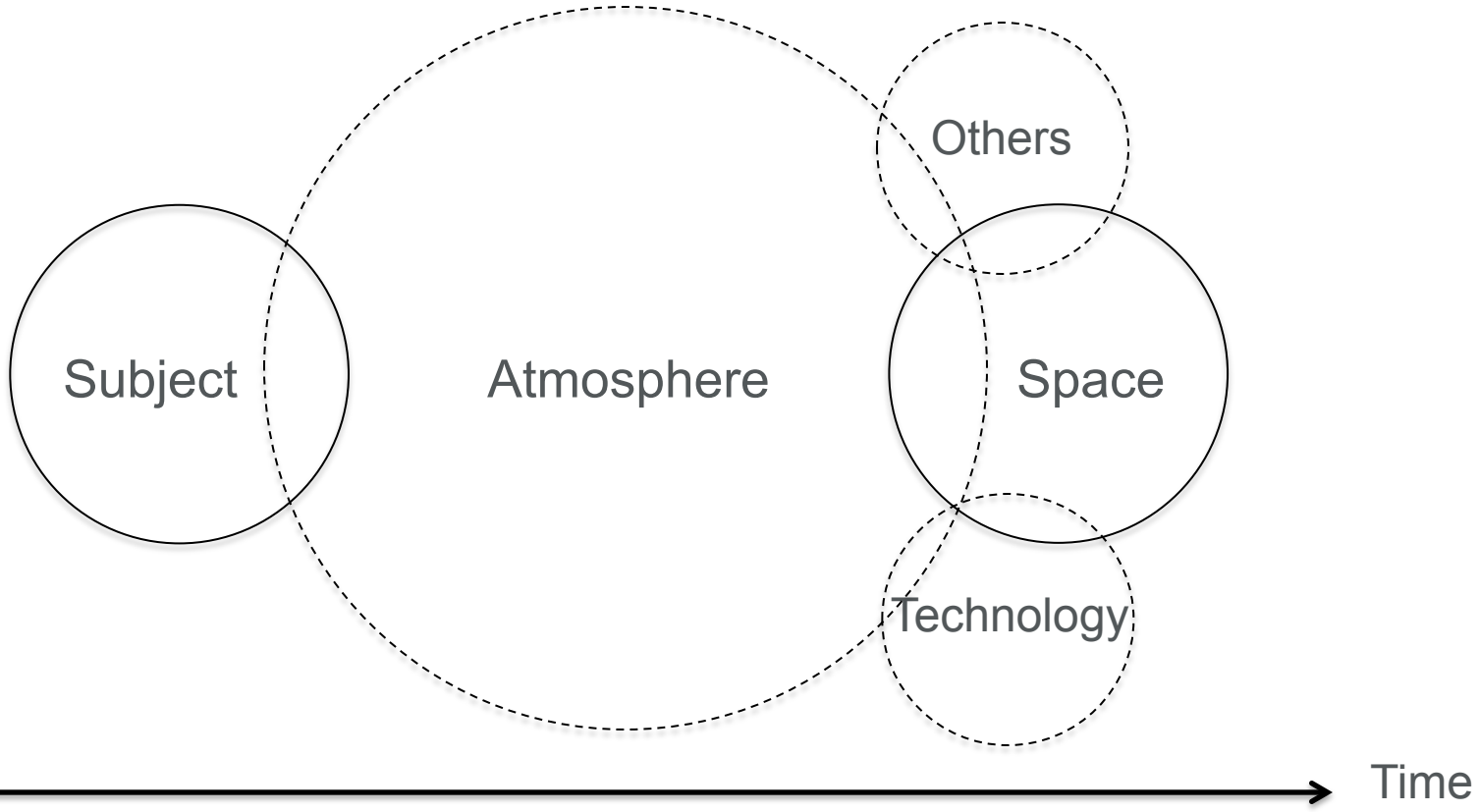

Feel Good
MALTA
Every Day!
SO THICK,
SO DELICIOUS
WITH EXTRA
VITAMINS

EXPERIENCING ATMOSPHERE



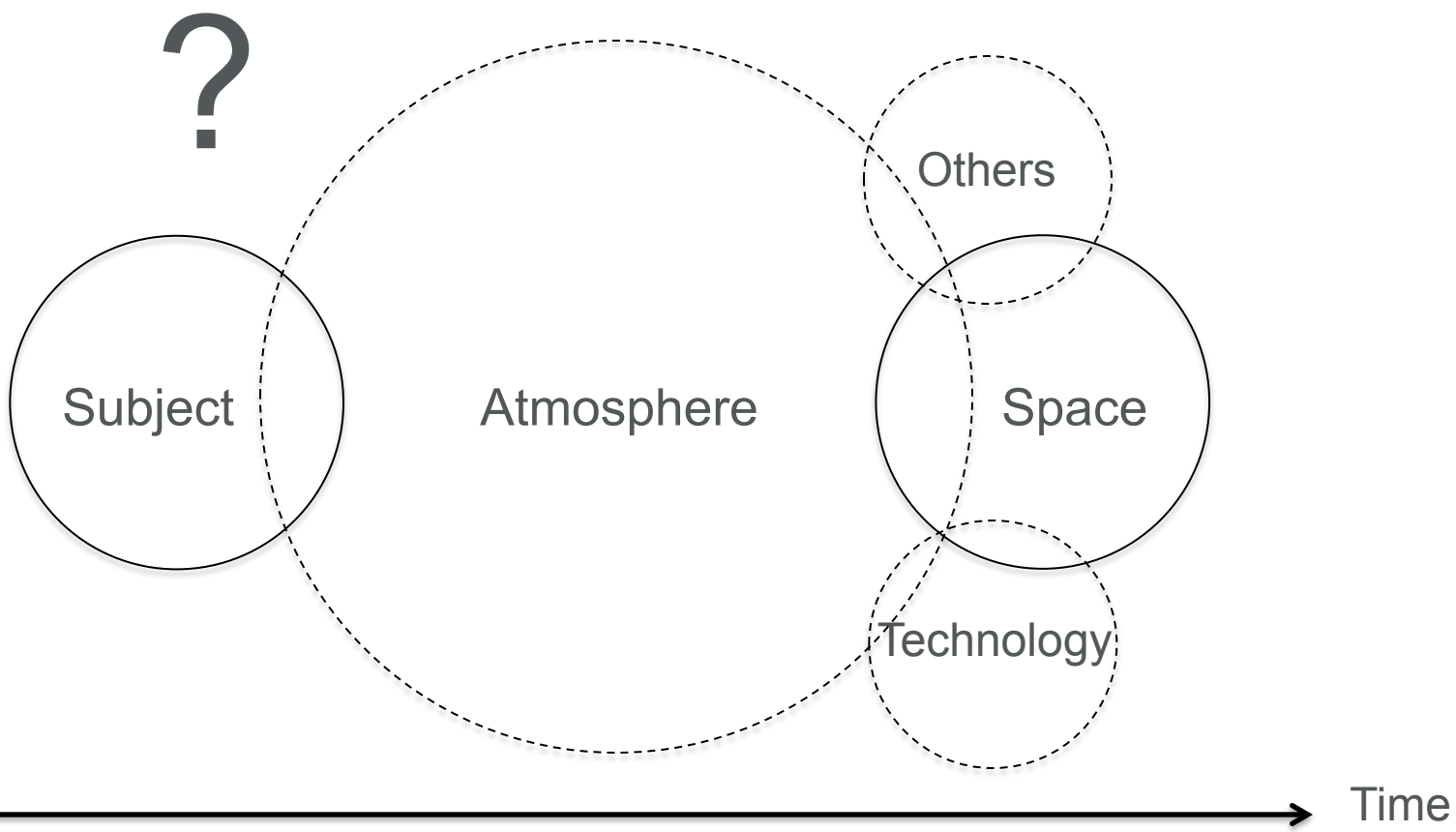
‘The Concept of Atmosphere’, Böhme, Gernot 1993

EXPERIENCING ATMOSPHERE



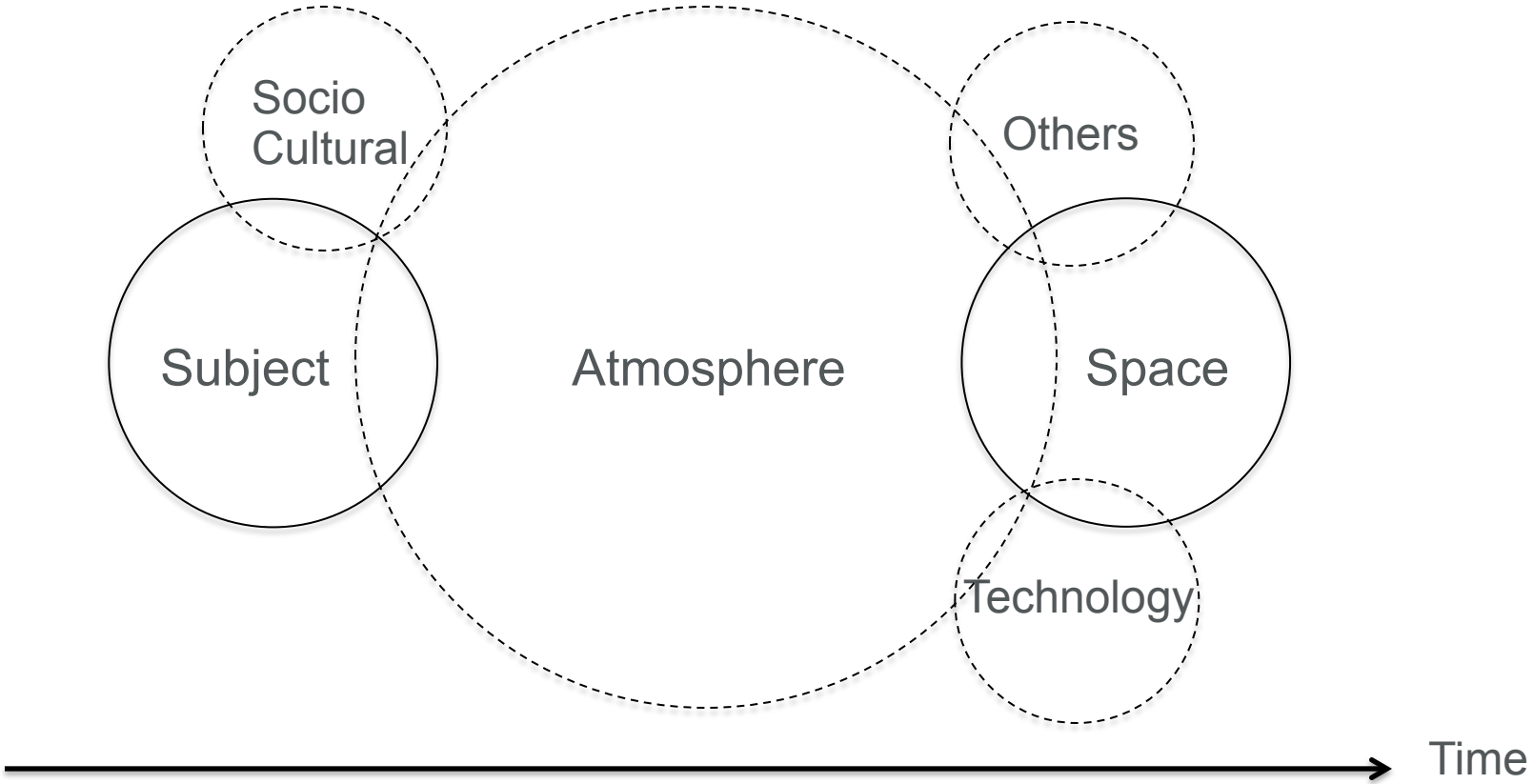
Dalsgaard, Kortbak – Staged atmosphere into a design scene

EXPERIENCING ATMOSPHERE

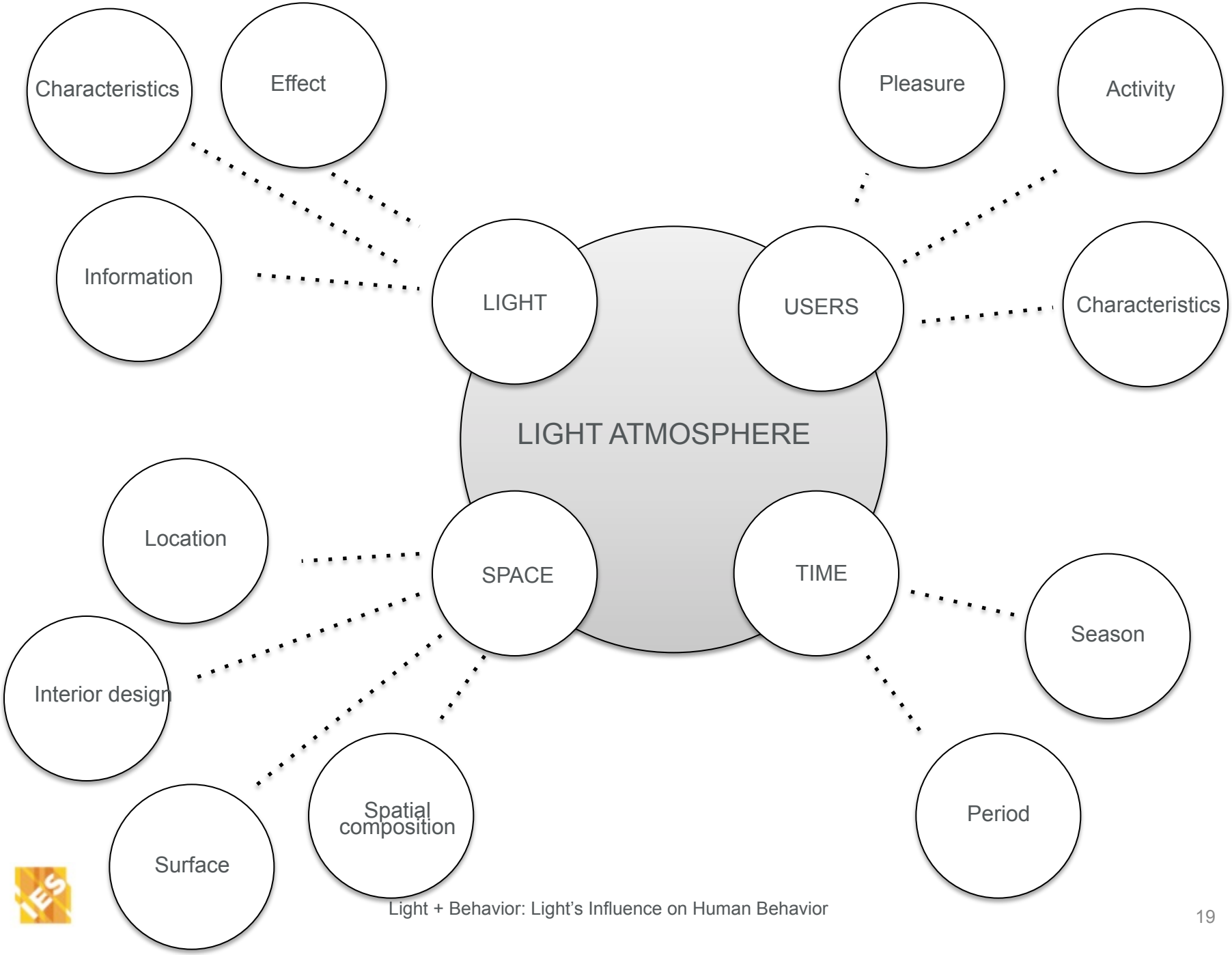


Symbolic interactionism – Herbert Blumer

EXPERIENCING ATMOSPHERE

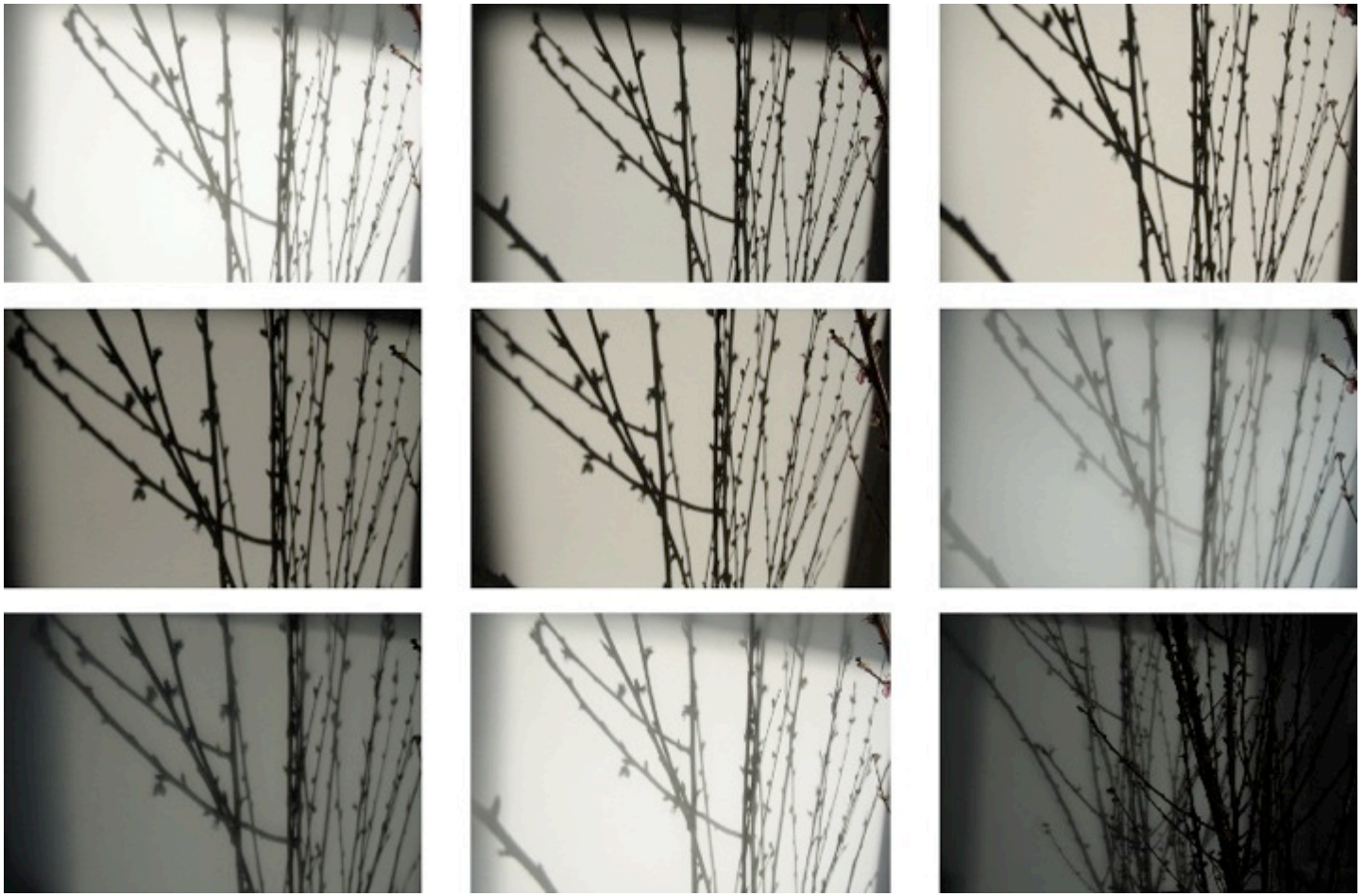


Stidsen, Kirkegaard 2013


Characteristics
Effect
Information
LIGHT
Pleasure
Activity
USERS
Characteristics
LIGHT ATMOSPHERE
Location
SPACE
Interior design
Surface
Spatial composition
TIME
Season
Period

LIGHT CHARACTERISTICS

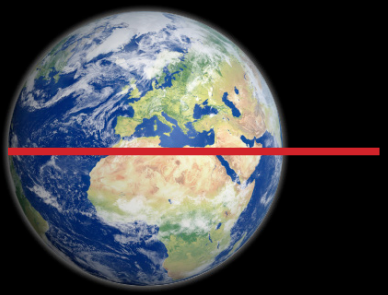
LIGHT INFORMATION



LIGHT FUNCTION

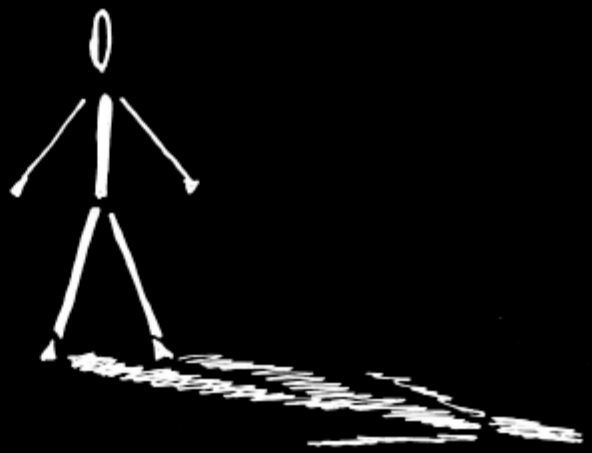
‘Human factors in lighting’, Boyce PR. 2003

SPACE LOCATION

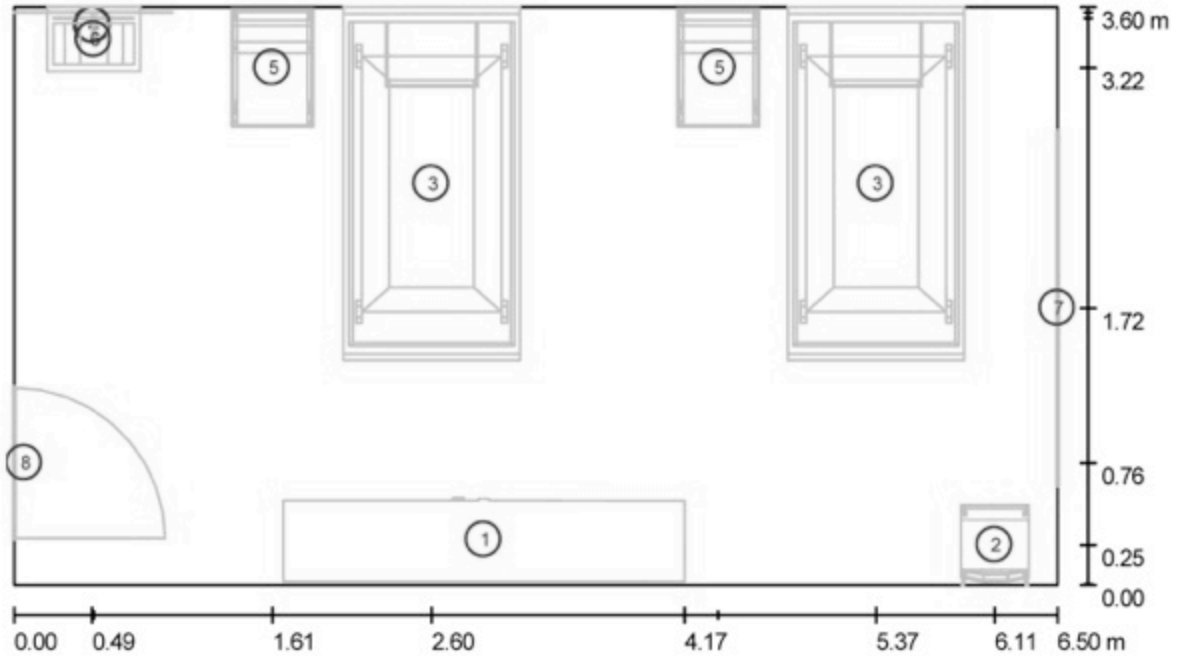


Equator

SPACE LOCATION

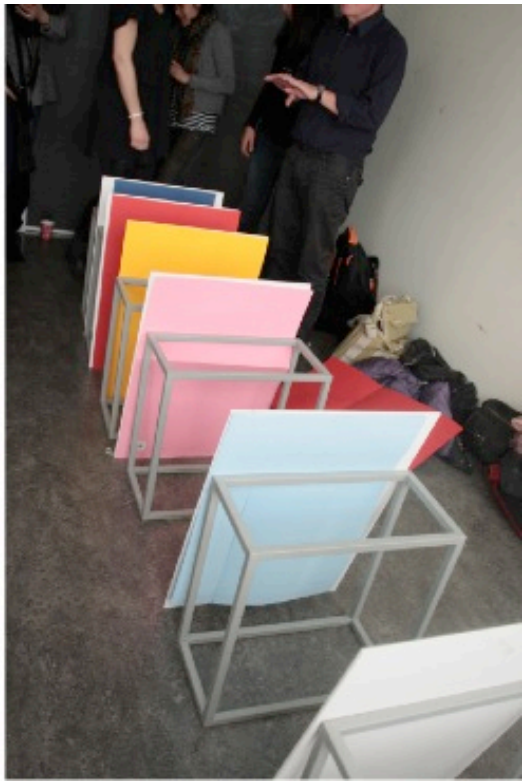


SPATIAL COMPOSITION



SPACE INTERIOR DESIGN

SPACE SURFACE



SPACE SURFACE

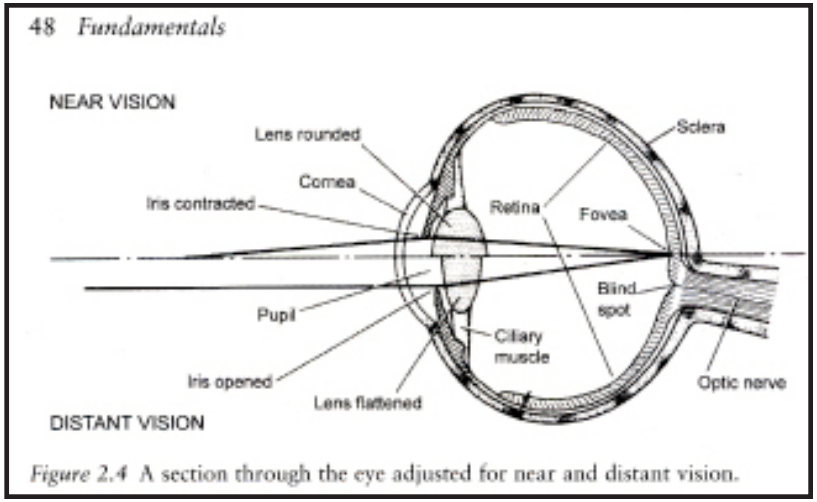
SPACE SURFACE

TIME SEASON

TIME PERIOD

USER CHARACTERISTICS

USER PLEASURE



Physical Pleasure

Patrick Jordan ‘ The four pleasures’ 2000

USER PLEASURE

Psychological Pleasure

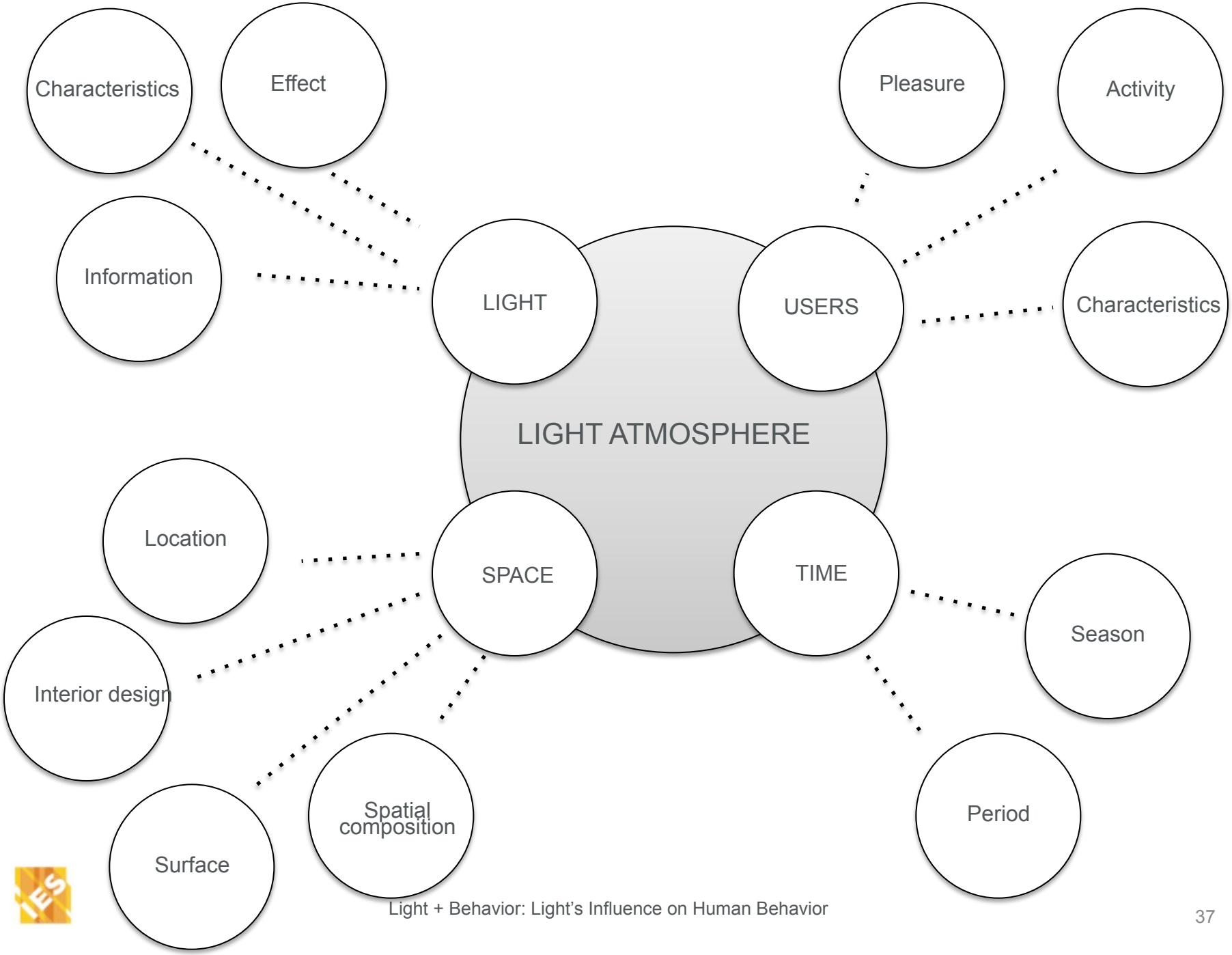
USER - PLEASURE

Socio Pleasure

USER - PLEASURE

‘To stand in the shadow of a man’……

Ideo Pleasure


Characteristics
Effect
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LIGHT
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Activity
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LIGHT ATMOSPHERE
Location
SPACE
Interior design
Surface
Spatial composition
TIME
Season
Period

‘The roots of an architectural understanding lie in our architectural experience. In that way we are all affected by an early experience of these spaces, and therefore we unconsciously compare them with later experiences of towns, houses and countryside. ‘

(Zumthor 2006, Zumthor 2006).

Cultural preferences for light

KÜLLER, R., BALLAL, S., LAIKE, T., MIKELLIDES, B. and TONELLO, G., 2006. The impact of light and colour on psychological mood: a cross-cultural study of indoor work environemt.

BILLE, M. and SØRENSEN, T.F., 2007. Anthropology of Luminosity: The Agency of Light.

PARK, N., PAE, J.Y. and MENEELY, J., 2010. Cultural Preferences in Hotel Guestroom

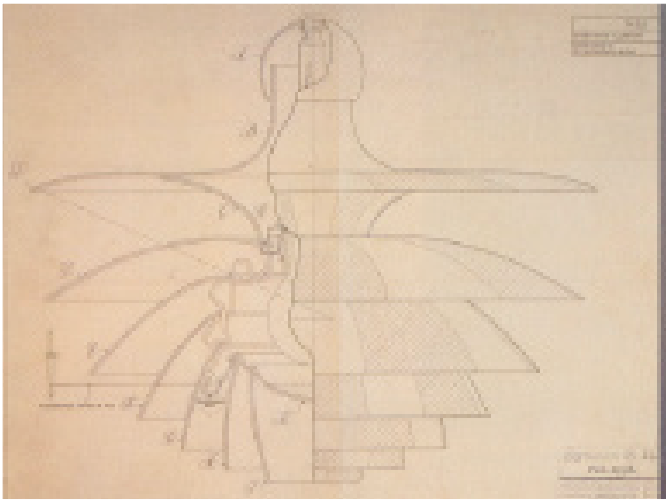
STIDSEN, L.M. and KIRKEGAARD, P.H., 2013. A Danish Socio-cultural approach to lighting design - inspiration for the lighting of hospital wards.

BILLE, M., 2014. Lighting up cosy atmosphere in Denmark.

Jordan ‘Reception room’ Foto: Mikkel Bille, 2008
Luminosity of Protections’

Danish ‘Reception room’ Photo: Raakjær 2009,

‘Socio cultural aspects of light atmosphere’ Stidsen, L. 2009



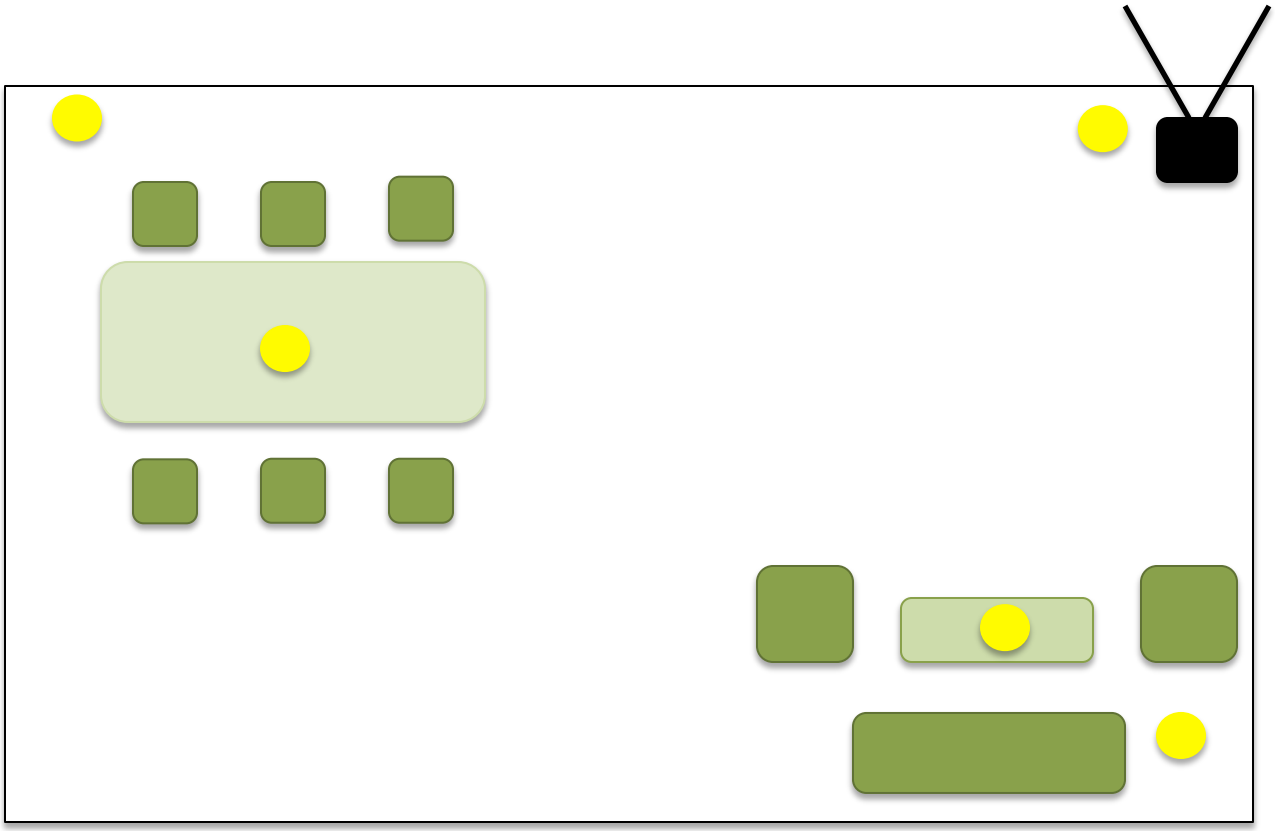
Explorative studies

Patients light preferences in hospital wards - related to light atmosphere in Danish homes
Stidsen, Bjerrum 2010

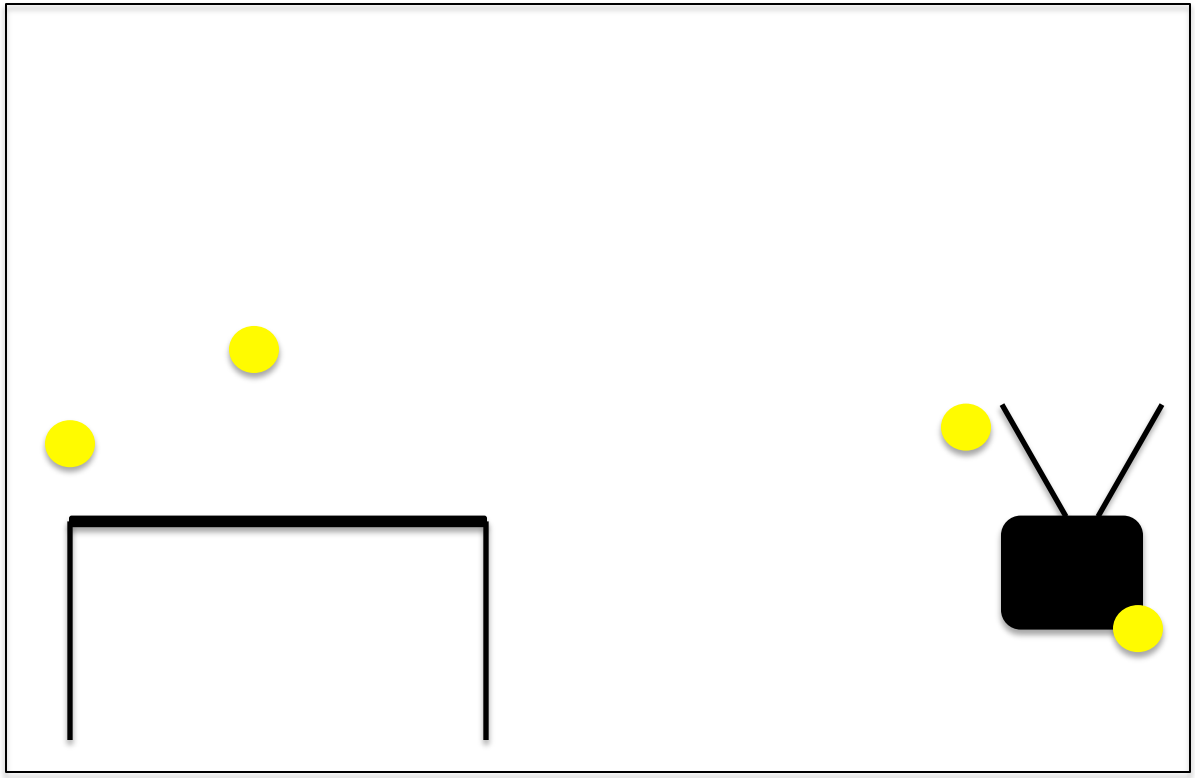
Anthropological study
Photo album based on daily activities and use of light

Results:
Vertically and horizontal zoning

Livingroom



Livingroom



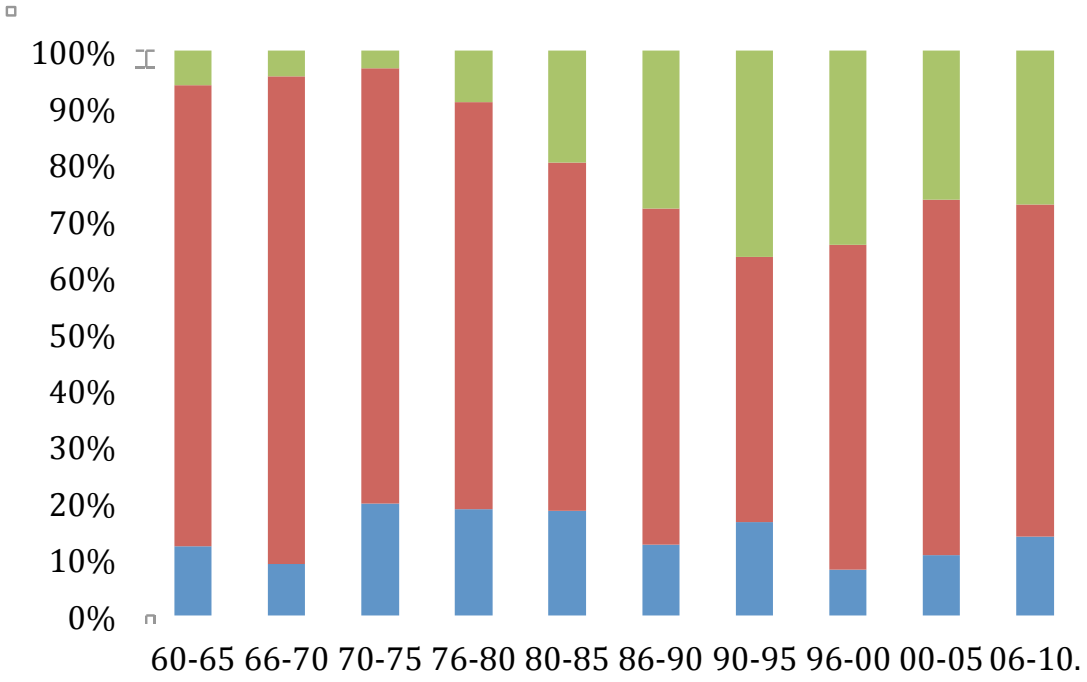
Explorative studies

Design trend magazine
1961-2010
3500 images
Room categories
Horisontal and vertical zoning
Space appearance

Explorative studies

Activity	**Horizontal**	**Vertical**
Upstanding activity Walking/Working	High Lighting Scenario	Centre of space
Sitting activity Conversation /TV	Centre Lighting Scenario	Near the walls
Going to sleep relaxation	Low Lighting Scenario	Near the walls

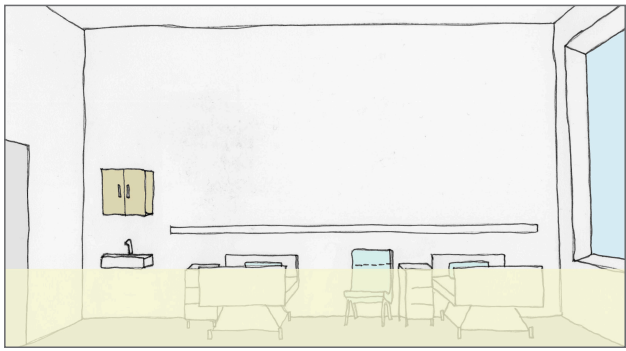
LIVINGROOM

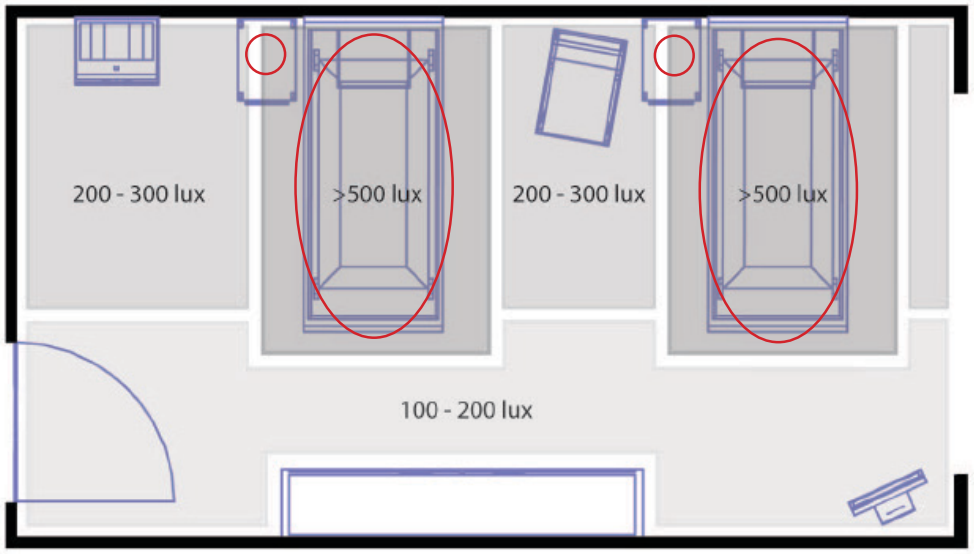

100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
60-65
66-70
70-75
76-80
80-85
86-90
90-95
96-00
00-05
06-10.

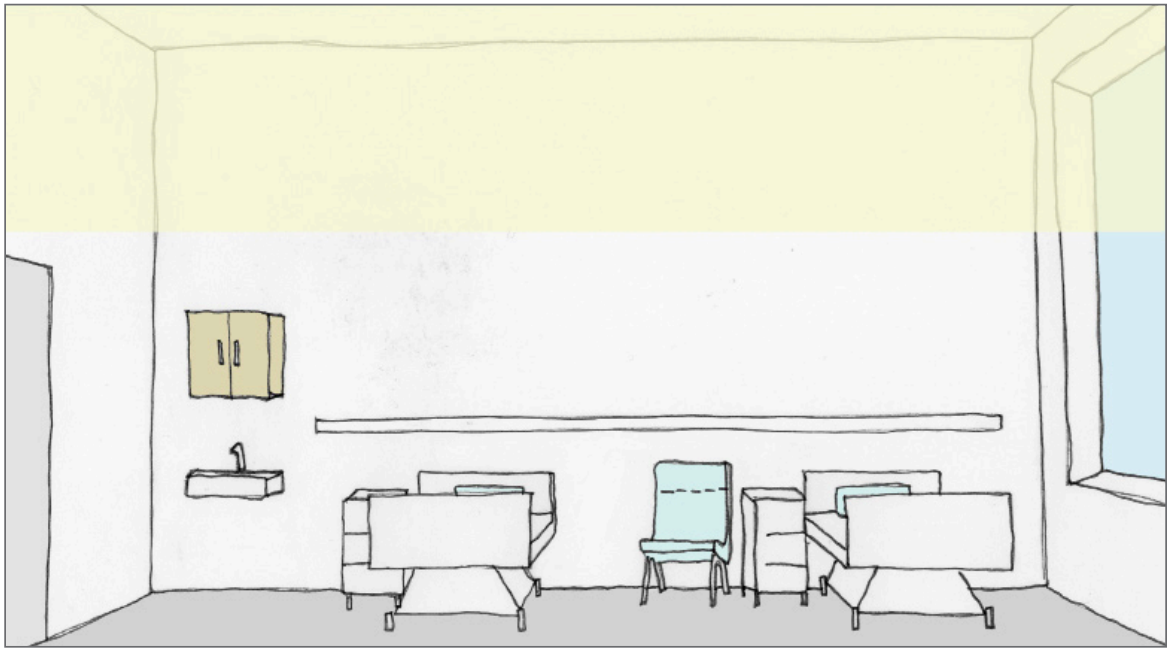
PILOT STUDY

TRADITIONAL WARD LIGHTING

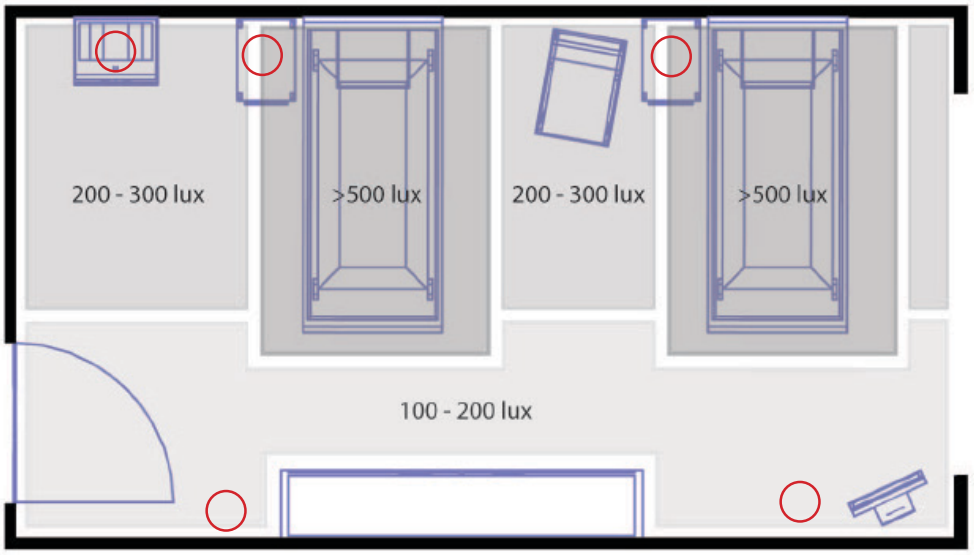
DESIGNED WARD LIGHTING



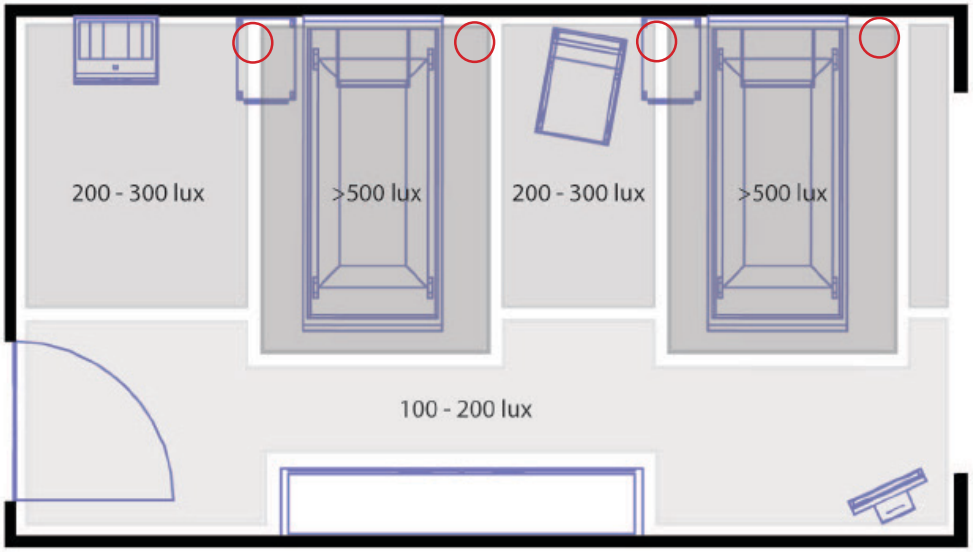

200 - 300 lux
>500 lux
200 - 300 lux
>500 lux
100 - 200 lux

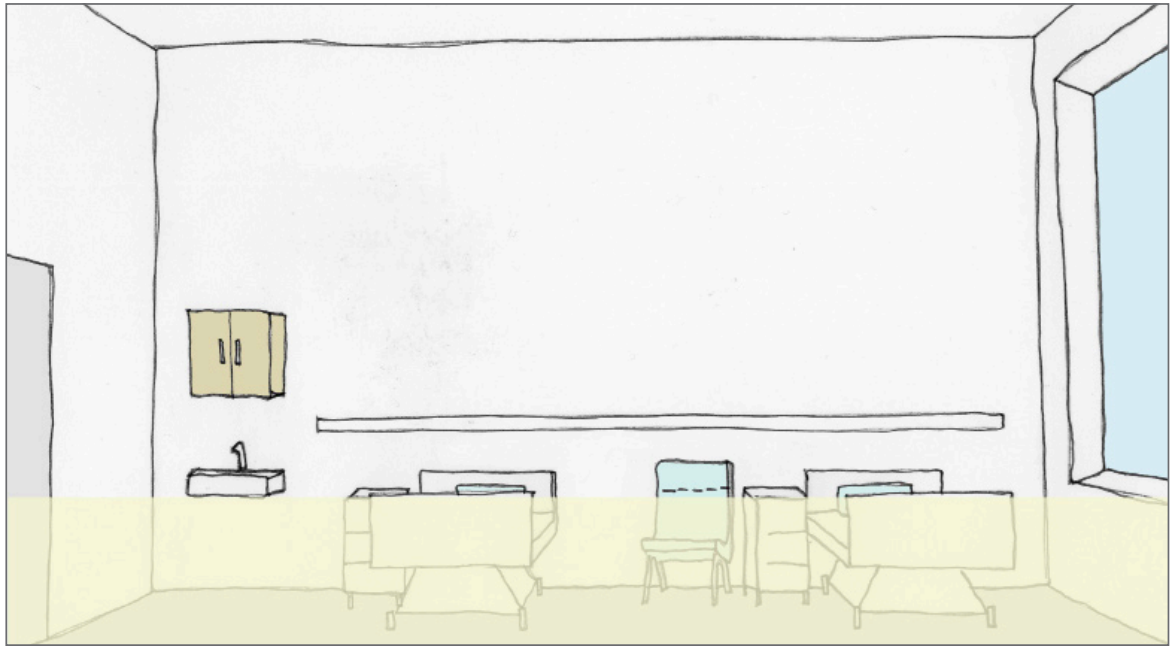


HIGHT LIGHT ZONE


200 - 300 lux
>500 lux
200 - 300 lux
>500 lux
100 - 200 lux

CENTRE LIGHT ZONE


200 - 300 lux
>500 lux
200 - 300 lux
>500 lux
100 - 200 lux



LOW LIGHT ZONE

Traditional ward lighting vs. Designed ward lighting

SED

Semantic Environmental Description
Rikard Küller

Physical Environmental Eight factors	
Pleasantness	Comfort, beauty and security
Complexity	Liveliness and variety
Unity	How well it fits together
Enclosedness	Size and degree of demarcation
Potency	Intrinsic force
Social Status	Economic and social
Affections	Sense of identity, well known
Originality	Unusual surprising

Designed

Traditional