NATUREACH

– Nature Reachable for All

Optimizing environmental qualities and restorative components in nature-based VR interventions

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Co-funded by the European Union

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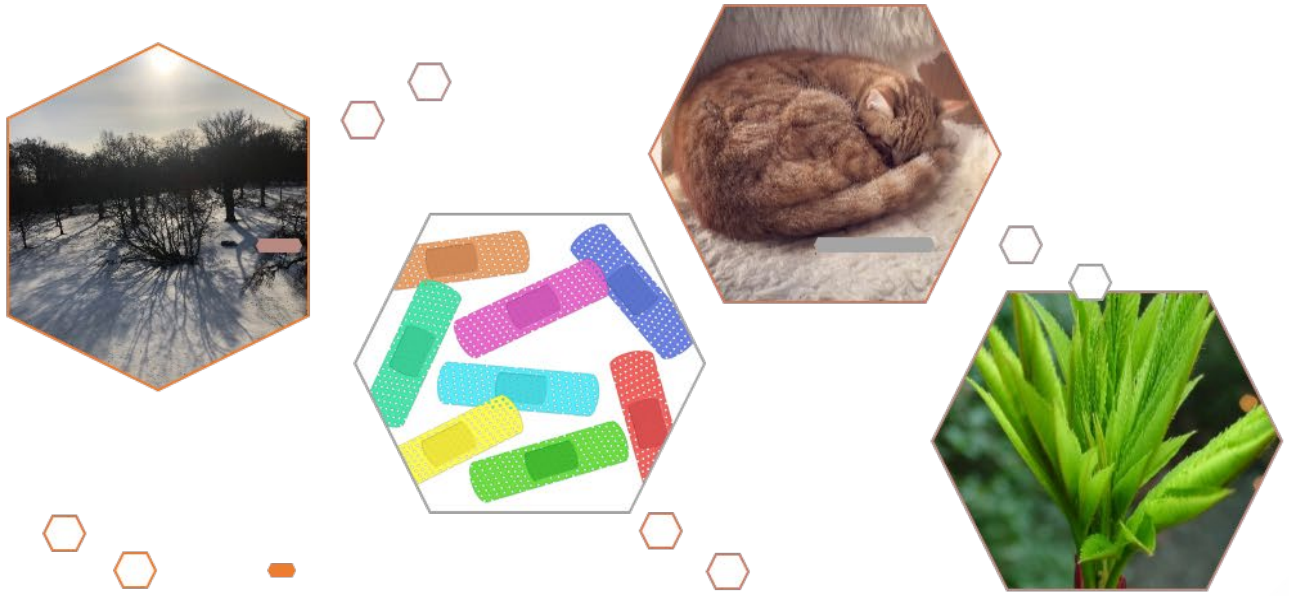
landscape architecture with specialization
in environmental psychology

environmental psychology



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The physical setting
- a dimensional world

The mental setting
- the infinite dimensions of the mind

Drawing by Hugo Settergren

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Understanding landscape

- Subjective
- Objective

Evidens-based Health Design

Nature and public health

The evolutionary approach

- Biophilia (Fromm; Wilsson) – Biophopia
- Savannah Theory (Orians)
- Prospect-Refuge Theory (Appleton)
- *Psychoevolutionary Theory (Ulrich)*
- *Attention Restoration Theory (Kaplan & Kaplan)*

The coping, communications, and relations approach

- *Relations **(Searls)***
- Scope of meaning/action (Grahn)
- *Sensory Perceived Dimensions **(Grahn)***

The active approach

- Meaningful activities (Kielhofner; Relf)
- Flow (Csikszentmihalyi)
- Experiential Balance model (Persson & Johnsson)

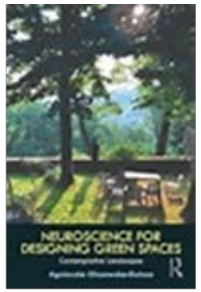
The physiological approach

- Oxytocine (Uvnäs Moberg)

The ecological approach

- Ecotherapy (Burns; Burls)
- Ecopsychology (Jordan)

Sensory Dimension	Qualities description Pálsdóttir, 2014
Nature	The experience of a wild free growing vegetations. Something created not by humans, but by the power of something mightier.
Refuge	An enclosed room offering experience of safety & shelter. Where your feel safe, can play or watch other people being active.
Serene	A silent & calm room that offers experience of retreat, safeness, being undisturbed and one with nature.
Rich in species	A room offering experience of life in form of a vast variety of flora & fauna.
Space	A room offering a restful experience of entering “another world” which is a spacious and free.
Cultural historic	A room offering experience of fascination through evidence of people´s values, beliefs, efforts, perhaps with the passage of time.
Prospect	A green, open place with room for vistas and a place that invites you to stay.
Social	A room offering vistas for meetings and festivities.



Contemplative Landscape Model

CLM is a tool developed by Dr. Agnieszka Olszewska-Guizzo, a researcher at Neuro Landscape and the National Parks Board of Singapore, intended to **identify or design landscapes that stimulate reflection, inner calm, and mental restoration.**

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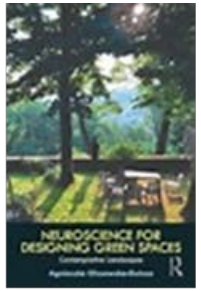
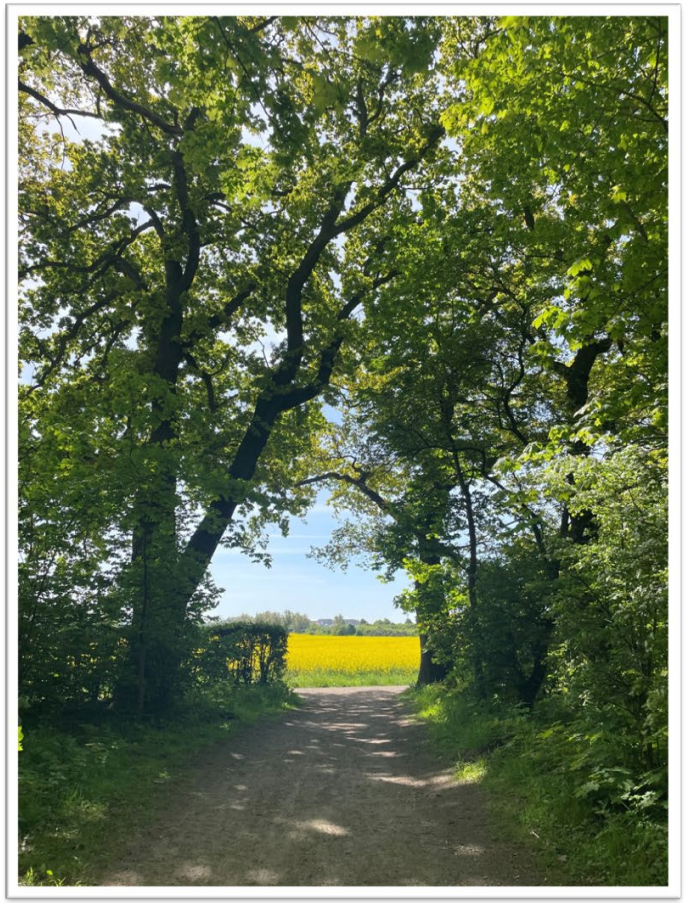
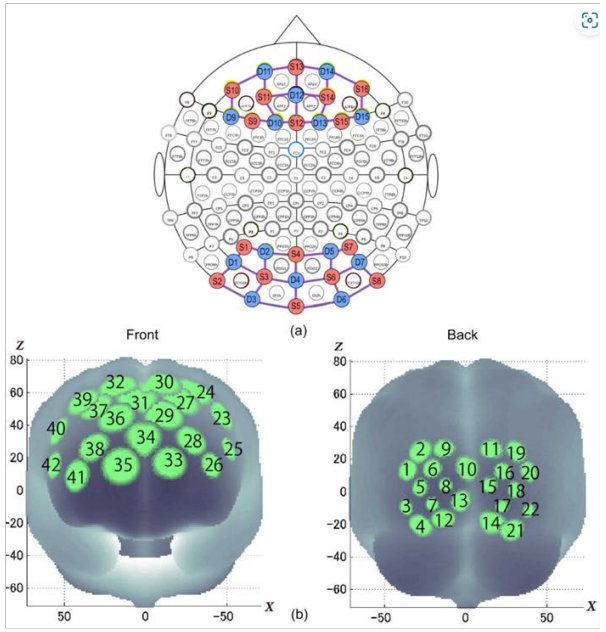


Contemplative Landscape Model





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Total CLM score	Classification	Interpretation
> 4.33	High	High probability of the landscape scene to induce a significant positive brain response in most people.
3.83 - 4.33	Average	Low to no probability of the landscape scene to induce a positive mental health response in most people. The case of most existing urban parks and gardens
< 3.83	Low	The scene most likely induces increased cognitive load and psychological strain - a brain response typical for busy urban space exposure in most people.

The aim when producing VR-materials for Nature Based VR-interventions

- Spontaneous attention - Not an action movie
- Imitate a quiet moment in nature
- VR-environment based on
  - Sensory dimensions
  - Evolutionary research theories
    - as Attention Restoration Theory

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How to produce VR- materials for Nature Based VR-interventions?

Chose Nature type and elements

- Check what nature types are the most restorative and what properties are the most important for the well-beeing?
- Include restorative elements e.g. a good view, shelter, water, >80yrs old forest, sounds from a large number of bird species etc. Important can also be what kind of nature environments you grew up with.

Chose view, camera spot and camera angle

- Chose carefully a natural spot where you would sit when you rest in nature with a long, good view and shelter in the back.
- Place the camera on the right hight, a little lower than "sitting"-hight.

Chose equipment

- Chose camera and sound equipment with good enough quality!
  If the quality isn´t good enough the effect can be negative.

Mix the sound propely *(not only direct record in nature)*

- Chose apropriate nature sounds that fit the environment, location and season. E.g. Bird sounds, leaves, water, wind etc.
- Remove disturbing sounds and level all sounds to a comfortable mix.

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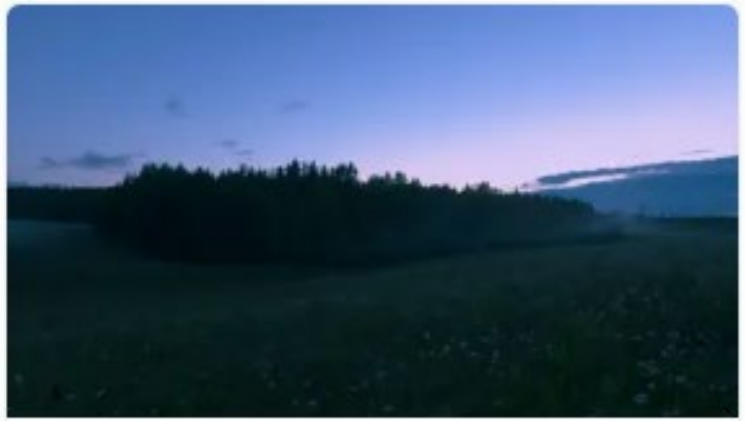
VR – Nature Environments produced in the NATUREACH project

Our VR environments have been recorded in northern Sweden and Finland, encompassing a diverse range of natural landscapes, seasonal variations, times of day, weather conditions, and degrees of animal presence. The recordings used for the interventions within the project are approx.15 minutes long.

Birch pasture with cows

A pasture by a lake with cows passing by. You sit under a big birch tree with a light wind blowing in the leaves. Cinematography: Martin Gärdemalm Sound design: Andreas Estensen

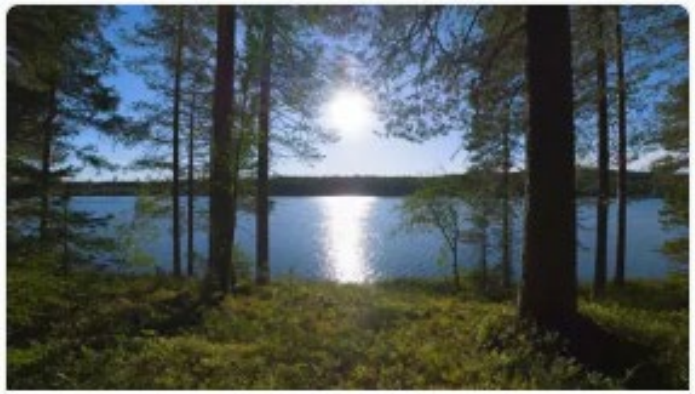


Meadow in a summer night

Here, you stand in a meadow with daisies and misty trails during a summer night. Cinematography: Martin Gärdemalm Sound design: Andreas Estensen Ljuddesign: Andreas Estensen

River bank

Here, you sit by small rapids where the water flows slowly past you. Cinematography: Martin Gärdemalm Sound design: Andreas Estensen



Sunny Forest Lake

You sit by a small forest lake and the sun glittering in the water. Cinematography: Martin Gärdemalm Sound design: Andreas Estensen

Pine forest in morning fog

Here you experience the morning mist in a forest with large pine trees. Cinematography: Martin Gärdemalm Sound design: Andreas Estensen

Forest creek

You are sitting in the forest beside a stream, listening to the gentle murmur of flowing water. Cinematography: Joel Riskumäki & Janiv Oskár Sound Design: Henri Oskár

Summer night campfire

You are sitting by a campfire in the forest on a late summer night, listening to the crackling of the fire. Cinematography: Martin Gärdemalm Sound Design: Henri Oskár

Mire

A view over a mire in late summer, with a light wind in the trees and clouds in the sky passing by. Cinematography: Martin Gärdemalm Sound design: Andreas Estensen

Winter campfire

Here you sit by a campfire during a ski trip in springtime winter. Cinematography: Martin Gärdemalm Ljuddesign: Andreas Estensen

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Seaside cliffs

You sit on a cliff looking out over the sea, with the waves hitting the shore. Cinematography: Martin Gärdemalm Sound design: Andreas Estensen

Bay

You are sitting on a beach by a calm bay with small ripples on the water where the sun is shining. Cinematography: Esa Siltaloppi Post-production: Niko Siltaloppi

Seagull with eggs

Along the calm shoreline of a sea bay, a seagull guards its eggs. Cinematography: Esa Siltaloppi Post-production: Niko Siltaloppi

Seaside in winter sun

Here you look out over a costal bay, the sun glistening in the snow. Cinematography: Esa Siltaloppi Post-production: Niko Siltaloppi

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Evaluation of the effect of the different environments in the NATUREACH project

- Choice of environment, number of times and length viewed
- Eye and head movement/ what elements are viewed (in VR-glasses)
- Qualitative surveys/ interviews
- Quantitative surveys/ e.g. mood estimations
- Physiological measures/ e.g. HRV, blood pleasure etc.

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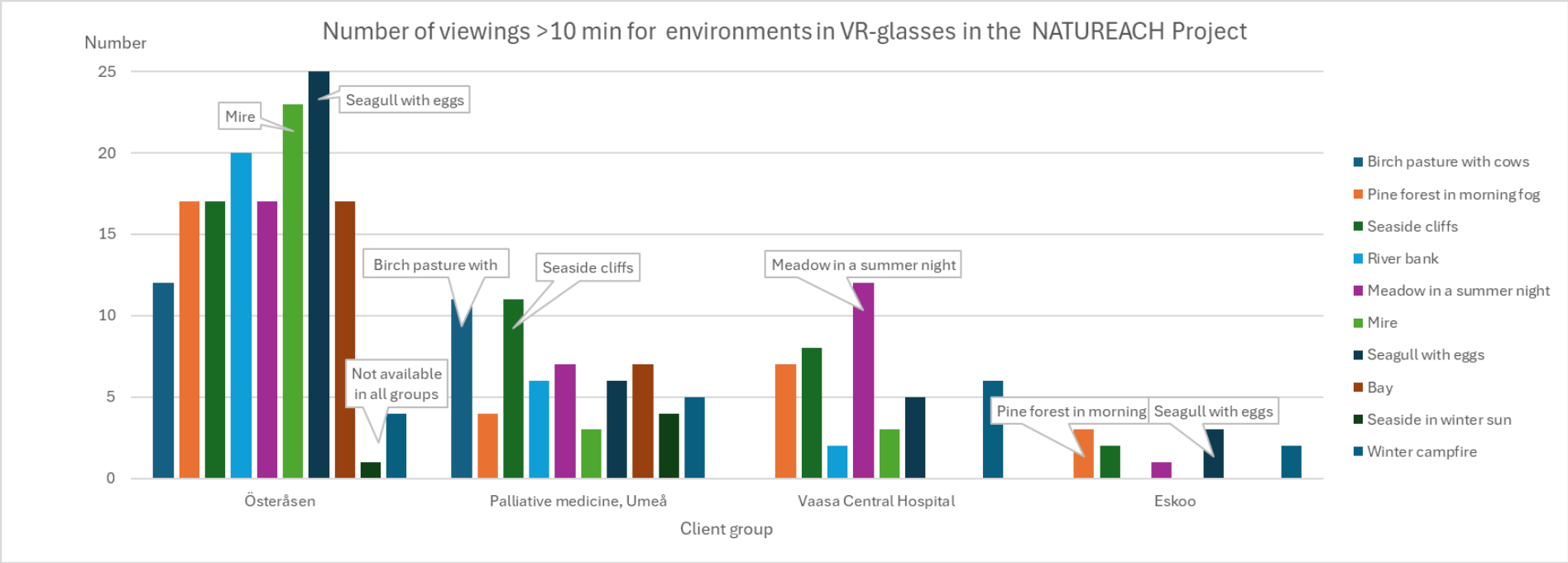
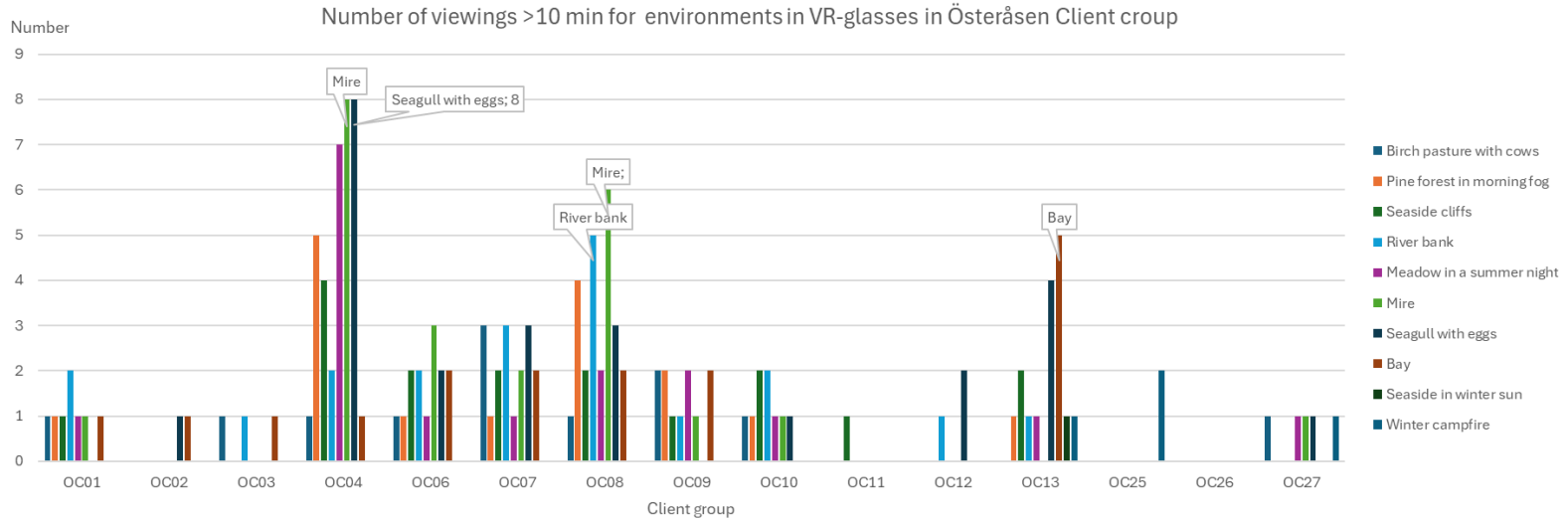
Chosen/Viewed environments in VR-glasses in different client groups

(Prelimenary results, environments available to most groups are included) ***Conclusiona: quite evenly distributed and personal preferenses***





Separate Clients at Österåsen

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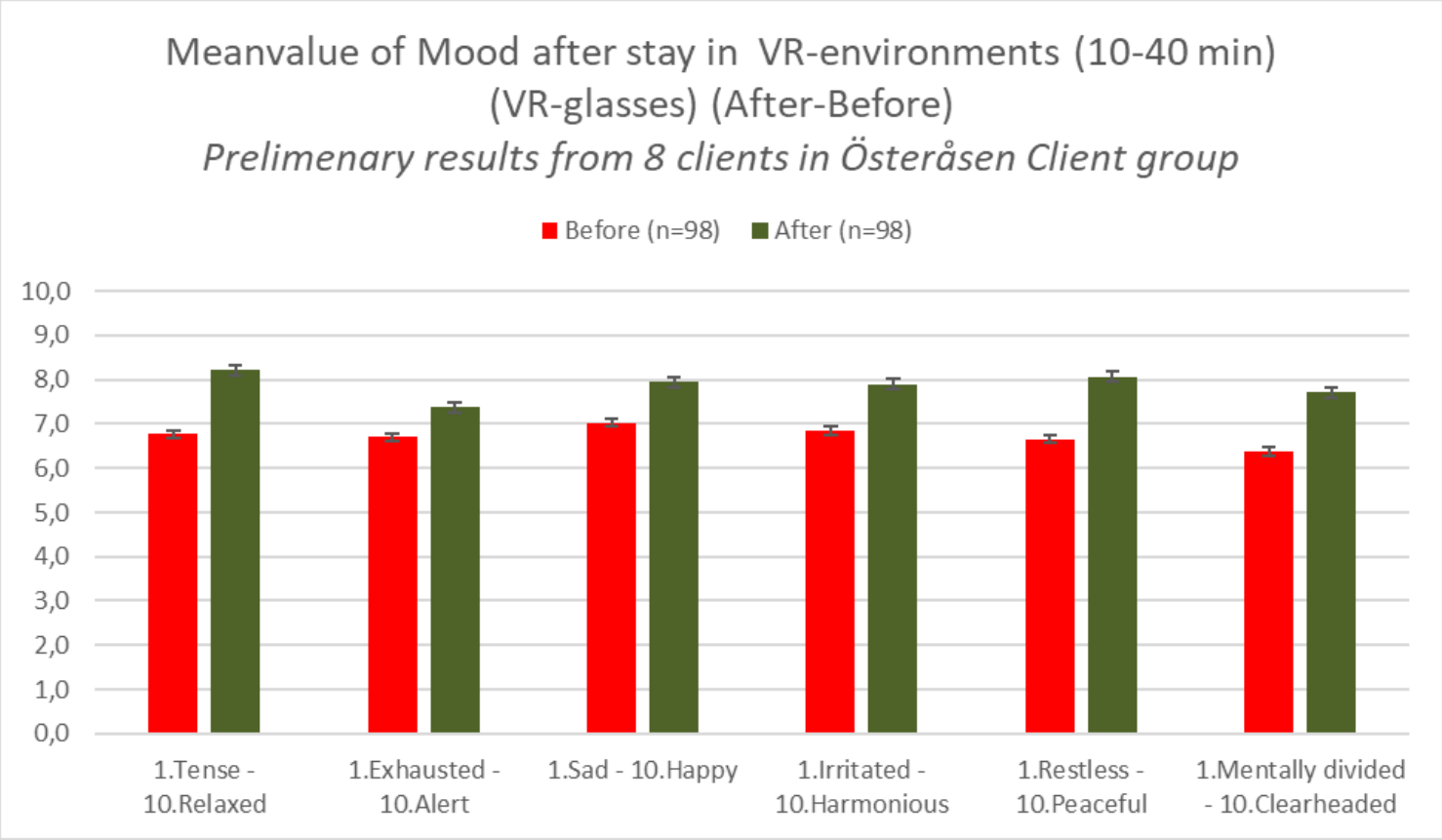
Mood survey

The purpose of this type of survey is to monitor changes in the Mood of persons that have experienced a stay in a specific environment. - An example



This survey method was developed by ***Sonntag-Öström E, Nordin, M, Slunga Järvholm L, Lundell Y, Brännström R, Dolling A.*** *2011. Can the boreal forest be used for rehabilitation and recovery from stress-related exhaustion? A pilot study. Scandinavian Journal of Forest Research 26: 245-256.*

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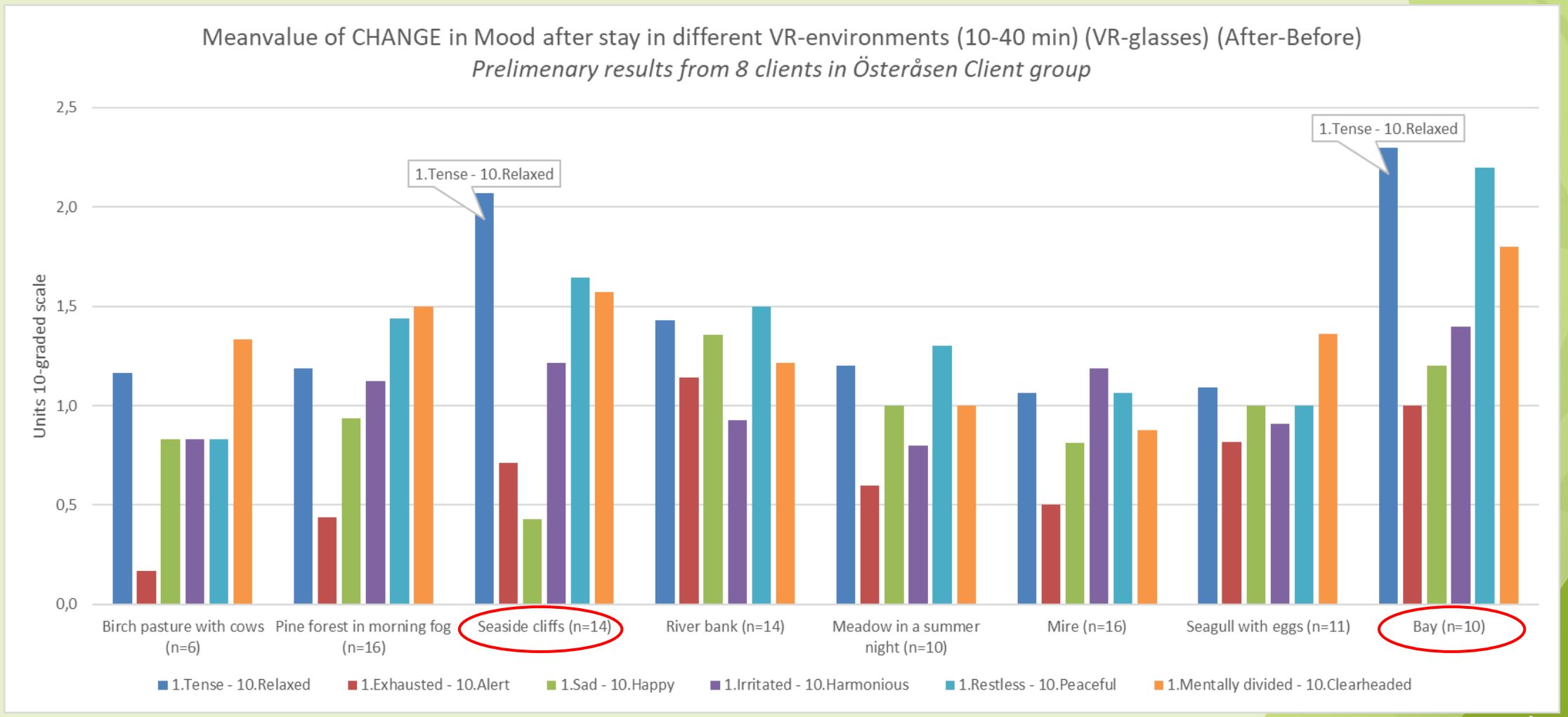
Mood survey



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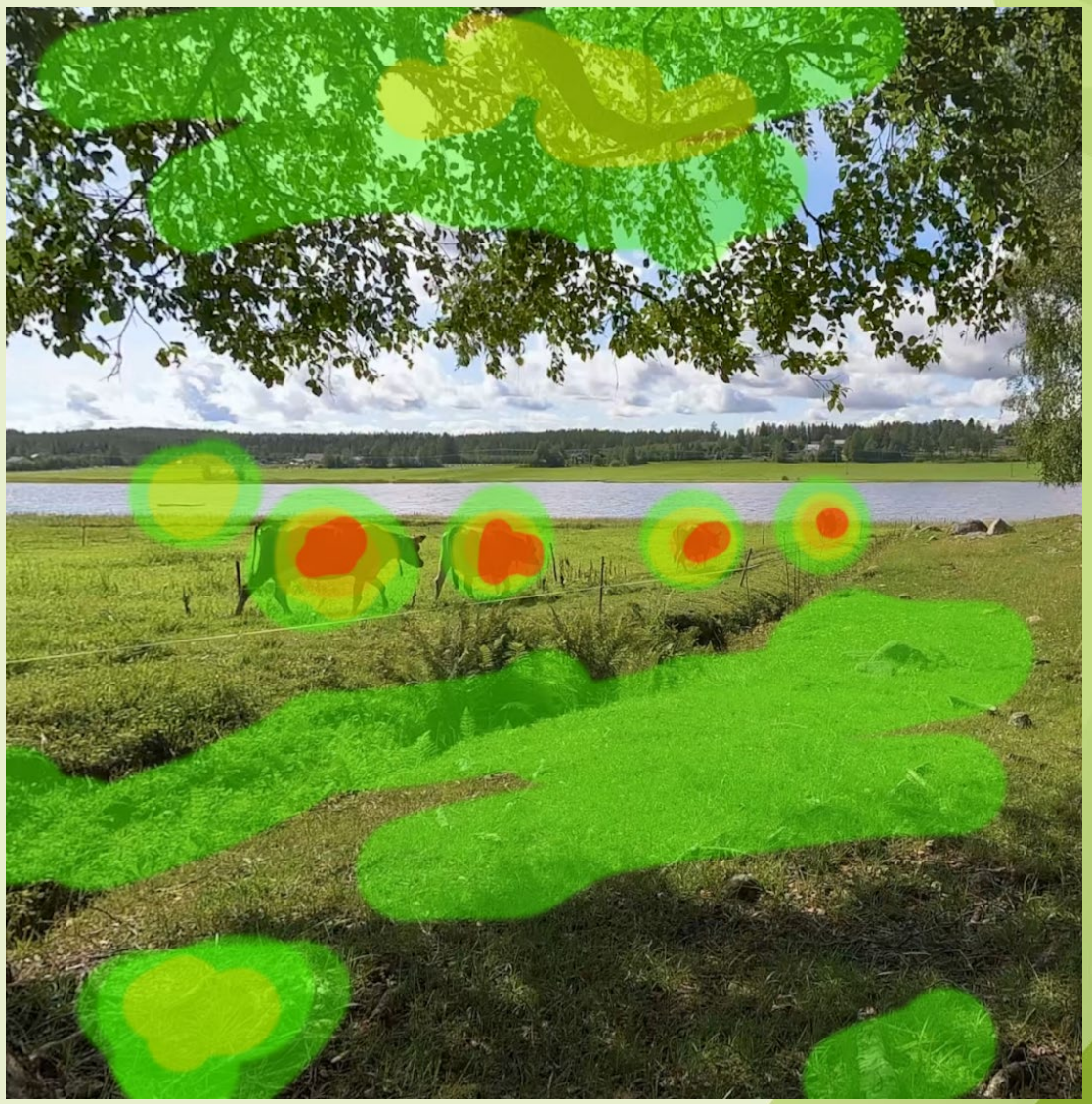
Identifying preferred nature elements

- **VR-data analysis - Heatmap:**
  Aggregates gaze data to show areas of high and low visual attention.
- **Color Gradient:**
  - Uses color intensity to represent fixation density and duration.
  - Red → High attention (more fixations or longer duration).
  - Yellow → Moderate attention.
  - Green → Low attention.
- **Use Cases:**
  - Identifying high-traffic areas of visual attention.
  - Understanding which elements attract the most focus.
  - Comparing attention patterns between different areas.



Birch pasture with cows

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Thank you!

Questions?

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