
Oceans and
Human Health

2021
2030

United Nations Decade
of Ocean Science
for Sustainable Development

Seas, Oceans & Public Health in Europe

Linking oceans and health research

TARGET 1.
Sustainable seafood and healthy people

TARGET 2.
Blue spaces, tourism and well-being

TARGET 3.
Marine biodiversity, biotechnology and medicine

Needs

Transdisciplinary research
Awareness in all sectors of society
Engagement of citizens and stakeholders

European Marine Board. Policy Needs for Oceans and Human Health. EMB Policy Brief N°. 8, May 2020.

Today

Health

Well-being

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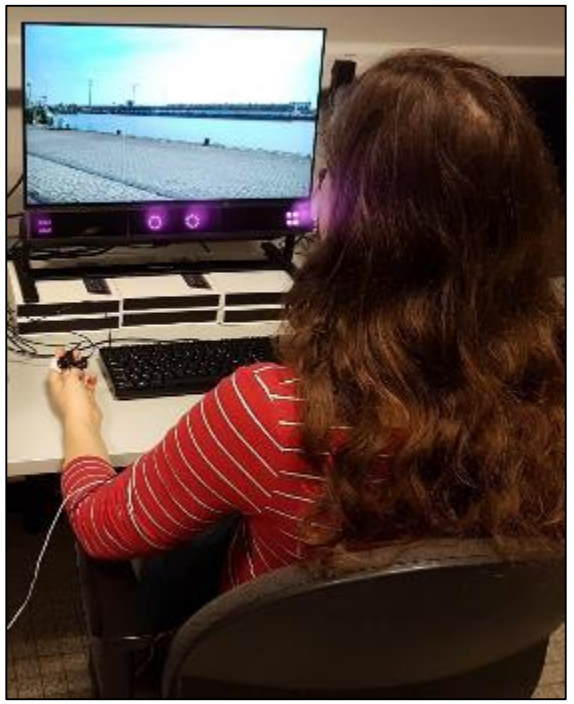
Today

Introduction



Landscape types and content

Psycho-physiology

The impact of coastal environments on human health

Alexander Hooyberg

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General health and residential proximity to the coast in Belgium: Results from a cross-sectional health survey

Alexander Hooyberg[a,*], Henk Roose[b], James Grellier[c], Lewis R. Elliott[c], Britt Lonneville[a], Mathew P. White[c], Nathalie Michels[d], Stefaan De Henauw[d], Michiel Vandegehuchte[a], Gert Everaert[a]

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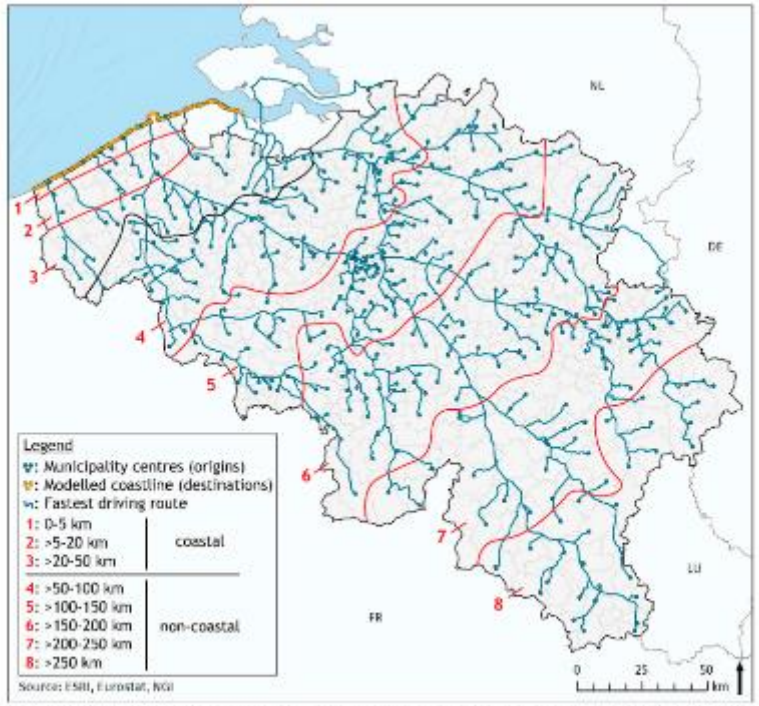
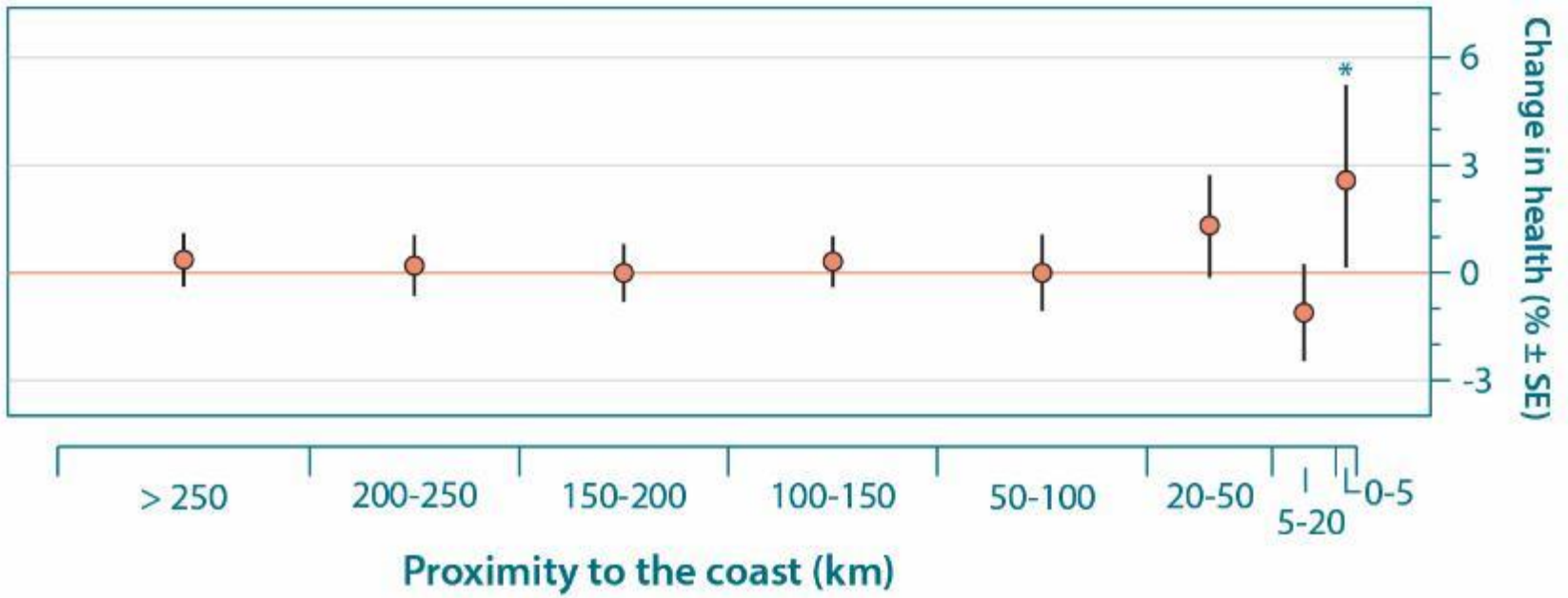
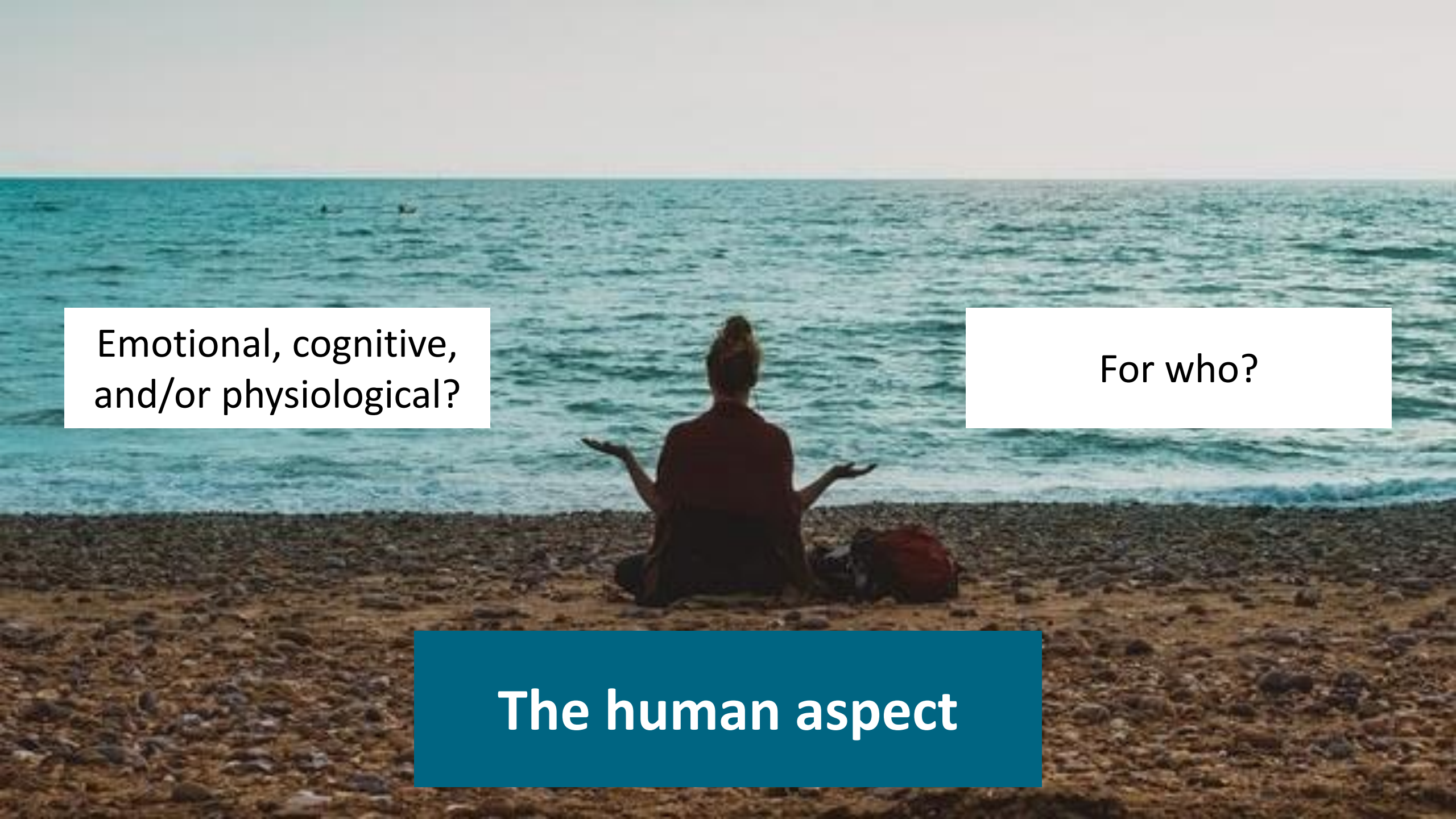


Fig. 1. Map of Belgium showing the geographical centres of all sampled municipalities (blue dots, legend) in any wave (1997, 2001, 2004, 2008 and 2013) throughout the study period, and the corresponding fastest driving route (blue lines, legend) to the nearest point at the coast (orange dots, legend). The corresponding distances are categorized as coastal or inland (black line, legend) by the EU NUTS3 definition, or in eight nuanced populations with different residential proximity to the coast (red lines and numbers, legend). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)



The spatial aspect

Spatial variation?
Influential factors (e.g. litter)?
What draws people’s attention?


Emotional, cognitive, and/or physiological?
For who?
The human aspect

Sociological drivers?
Avoided costs for healthcare?

The societal aspect

Psychological restoration along the Belgian coast: the influence of landscape type and content

Alexander Hooyberg[a], Nathalie Michels[b,c], Jens Allaert[d,e], Michiel Vandegehuchte[a], Henk Roose[f], Stefaan De Henauw[b], Gert Everaert[a]

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Introduction

- Attention Restoration Theory and Stress-Reduction Theory
  - Amount of restoration depends on the type of environment (natural vs. urban) and their components

- Coasts are ‘mosaics’

Inter- and intra-environment variation?
Influence of physical components?

Picture-rating experiment

Students (N=102, 18-30y, 83% female)

52 pictures

- Randomly shown, 8s each
- 10 coastal environments
  - **Beaches**, piers, dunes, salt marshes, green parks, dikes, towns, recreational harbors, docks, and historical sites
- 5 **beach**-specific
  - Open beach, in the seawater, on a breakwater, between beach cabins, in a beach bar
- Picture content
  - Manually drawn polygons
  - Hierarchical classification under ‘natural’, ‘urban’, or ‘people’

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Picture-rating experiment

Outcomes

Adapted perceived restorativeness scale (PRS)

- Likert-scale: 0-10
- Cronbach alpha = 0.90

Instructions of the PRS (English translation from Dutch presentation)
"Imagine that you are going through a mentally exhausting period. To relax, you have come to the Belgian coast. During your coastal visit, you are at the place where this picture has been taken. Indicate how strong you agree with the following sentences."

Item	Question
Likelihood of restoration	Here I can relax and regain mental strength and energy.
Being away	Here I am away from obligations.
Fascination	This place seems fascinating.
Coherence	This place seems chaotic.
Compatibility	This place suits with who I am.

Table 3: Description of the instructions and questions of the adapted perceived restoration scale (PRS) that was used in this study as main outcome variable.

Results

Inter-environment comparison

- Gradual change in PRS, more natural environments are perceived to be up to 30% more restorative compared to more urban ones.
- No adverse effects (no scores below the neutral score of 5)

Intra-environment comparison

- Environments with urban influences are less restorative

Influence of physical components

- Positive associations with natural components (e.g. vegetation, sky, and natural underground)
- Positive associations with the relative proportion of urban components (e.g. buildings, vehicles and hardened underground).

Discussion

Theoretical understanding

- Refinement compared to previous studies (e.g. White et al., 2010, Vert et al 2020)

Urban planners

- Blue tourism and accessibility
- ‘Green cities’
- e.g. coastal protection systems (e.g. dykes vs. dunes)

Health interventions

- Coasts as cost-effective therapy for mental health?

Limitations and strengths

- Exploratory design (students, for Belgium, perceived restoration)

Psycho-physiological responses to virtual blue, green, and urban spaces

Alexander Hooyberg et al.

(Data-analysis ongoing)

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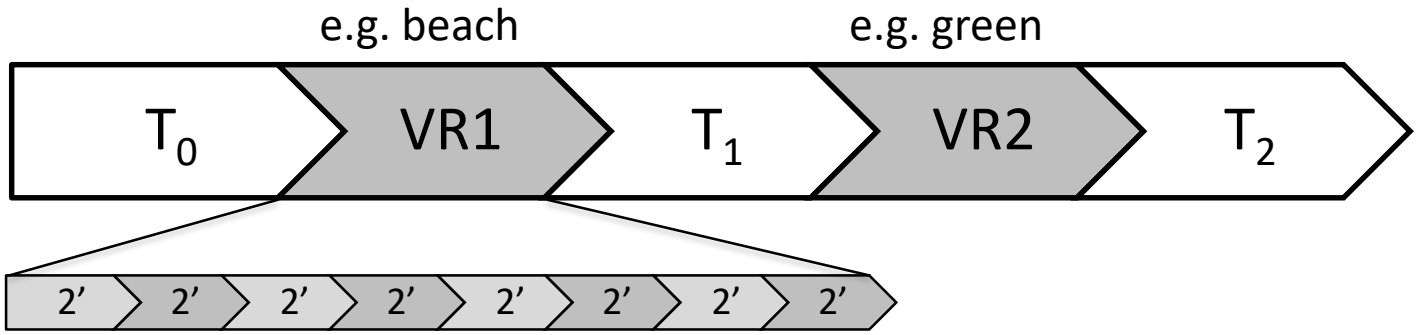
Virtual reality exposure

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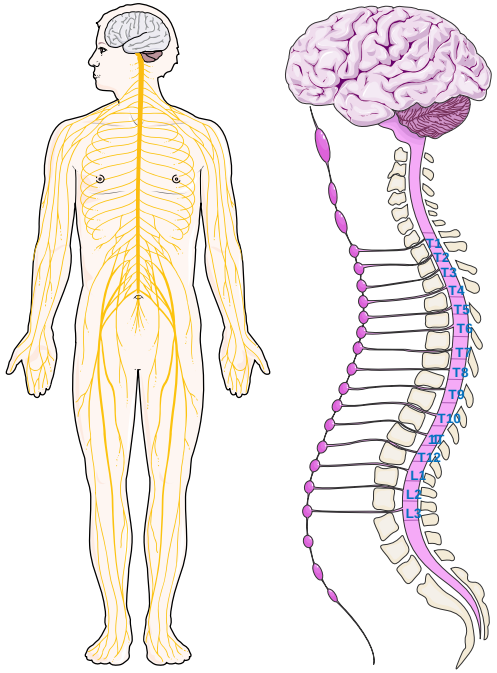
Virtual reality

Measurements

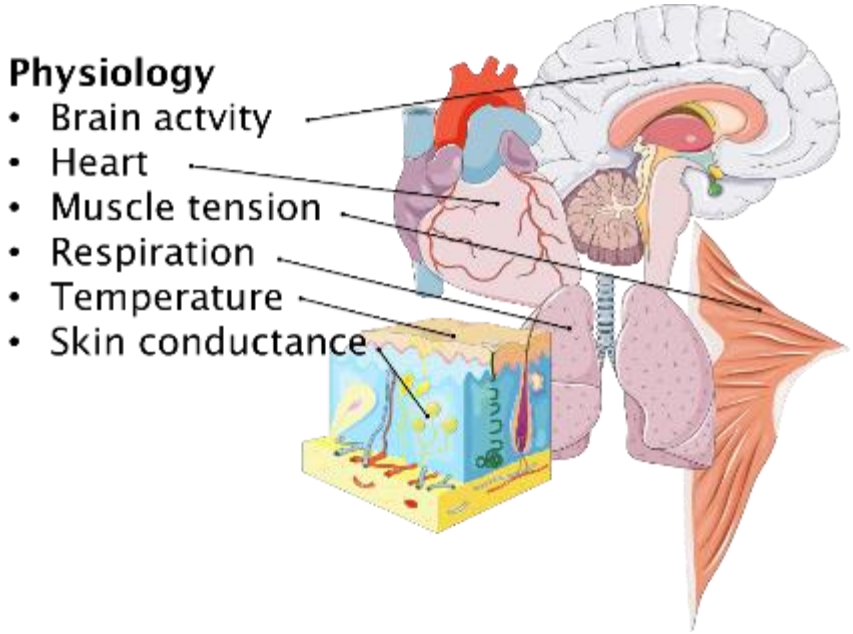
Granted by Brilliant Marine Research Idea:
NeXus-10 MKII (MindMedia)



Cognitive functioning (Stroop, DSB)

Mood (PANAS)

Physiology (~ Nervous systems)



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2021 - Experimenter Screen

HRV (BPM) 0.28

HR (BPM) 81.38

LF Power (%) 94.17

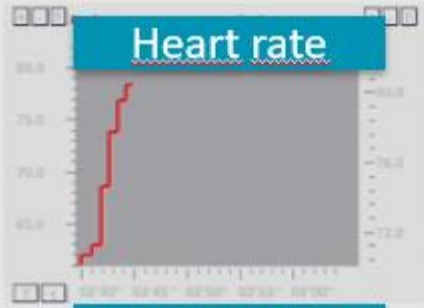
HF Power (%) 12.44

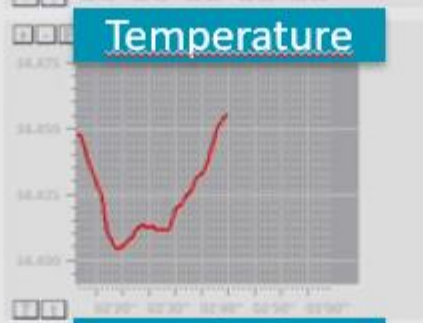
LF/HF Ratio 7.57

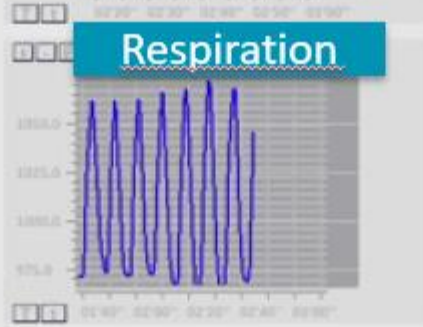
[H] Respiration Rate 6.24

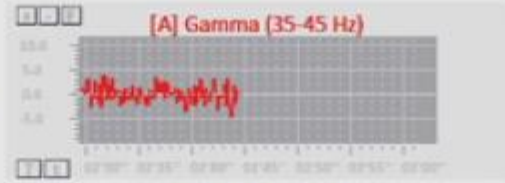
[G][H] HR,Reso. Coherence 0.38

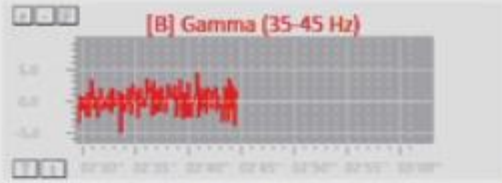
[H] Respiration Amp. 99.13

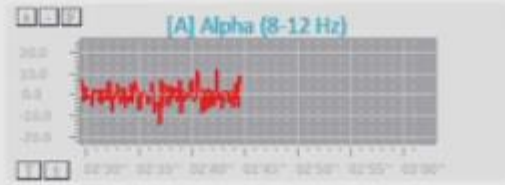


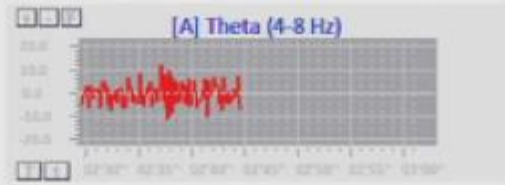


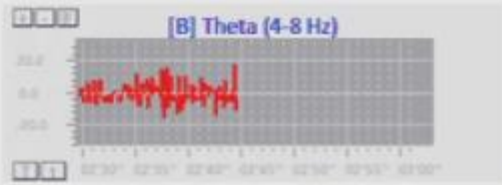


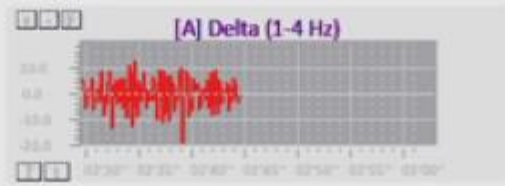












File -> Load channel SET

Record

Start experiment

Stop recording

Volg de stappen

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Restoration potential of the Belgian coast

Depends on

- Coastal landscape
- Components
- Psycho-physiology?

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Thank you!

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