Provocation study on subjects with self reported EHS:

The NEMESIS Project

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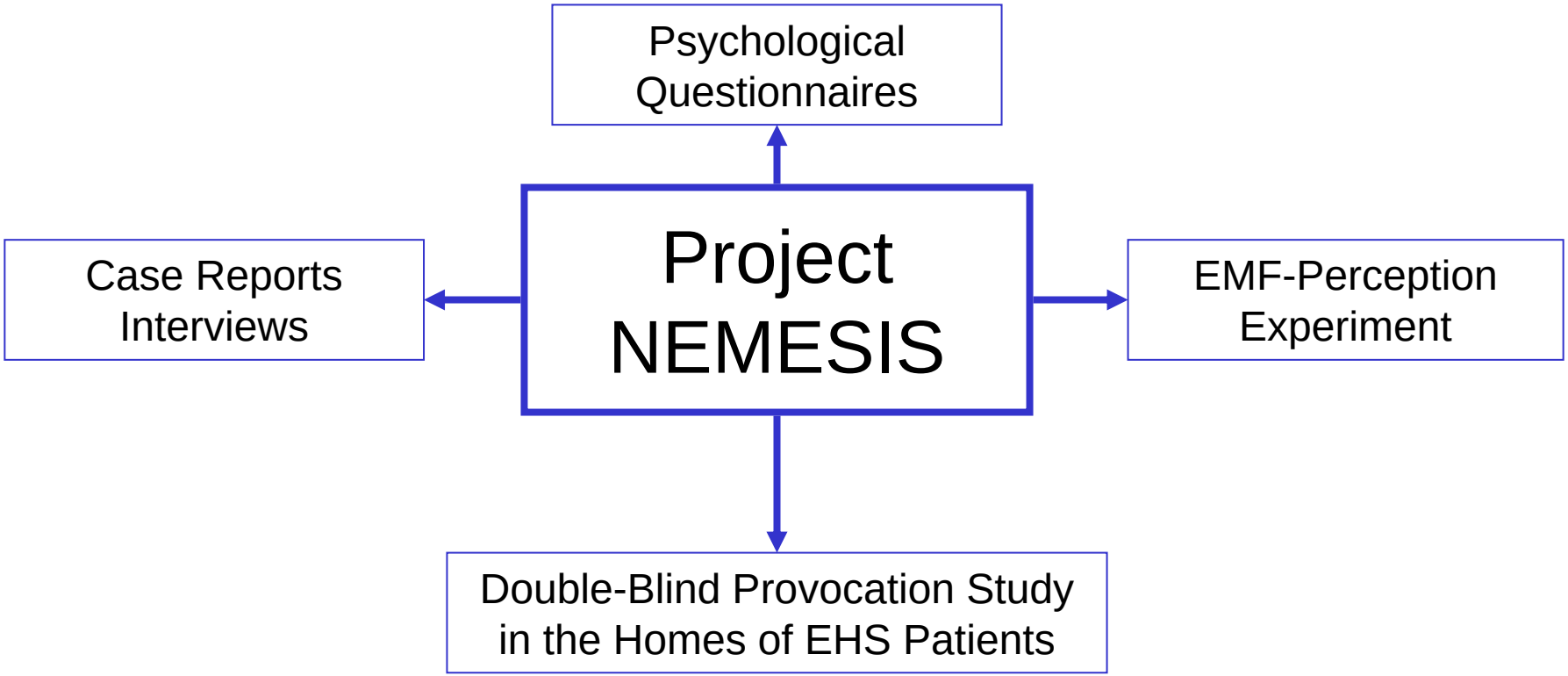
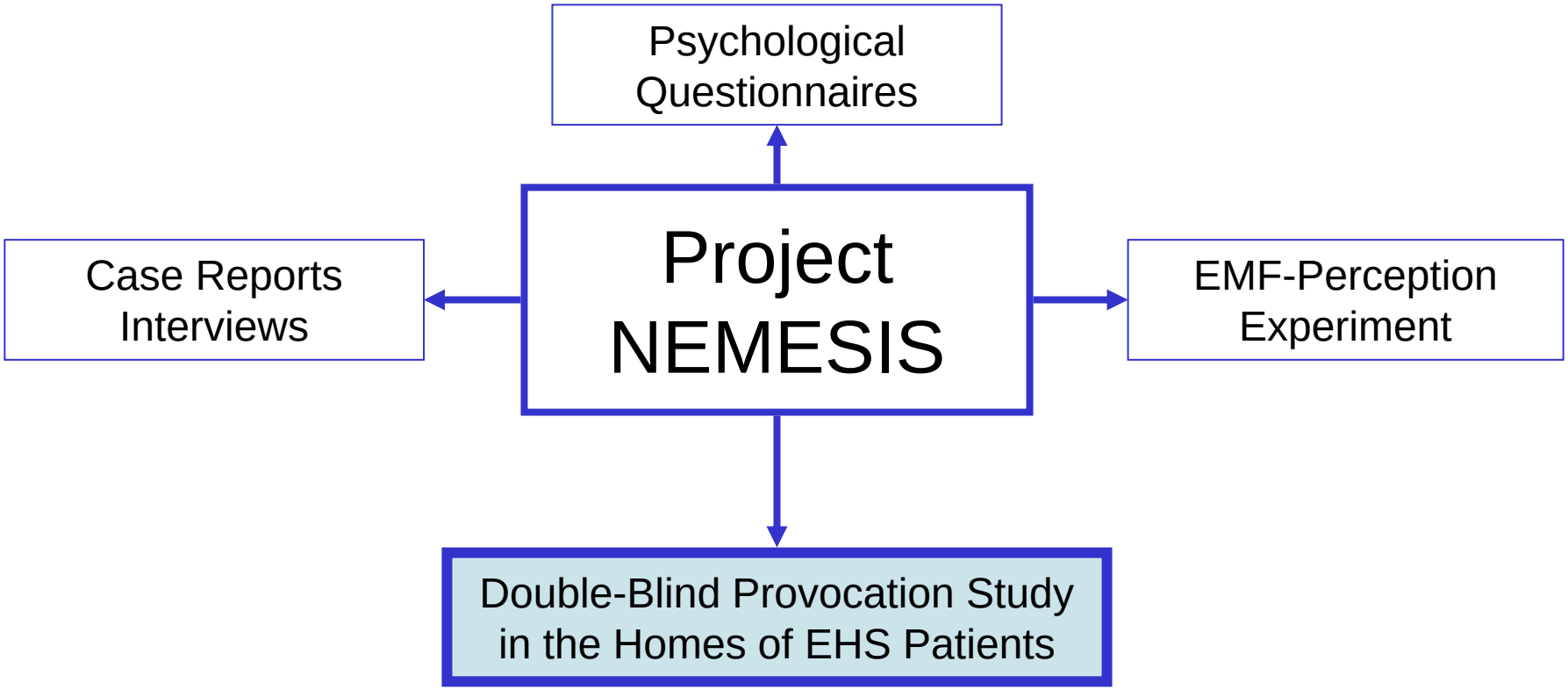
Structure of NEMESIS Project



Part I: Field Study



Hypothesis (Field Study)

Exposure to 50 Hz EMF of 80-160 V/m and 2-6 μT
respectively during 4 hours in the night affects
sleep quality, *physiological parameters* and *behavior*
in people suffering from EHS.

Subjects (Field Study)

Selection criteria:

- EHS attributed to 50Hz EMF sources
- Successful EMF-mitigation
- Healthy (asymptomatic)

n=54 (m=21; f=33)

Age: 17-76y (mean=47.3y)

Parameters (Field Study)

INPUT

EMF
50Hz; 80-160 $^{V}/_{m}$; 2-6 µT

Schedule
Double-Blind
Sham / Exposed

Confounders
indoor temp. and humidity, weather, number of test night

Effect?

OUTPUT

morning questionnaire
SeismosomnographySSG

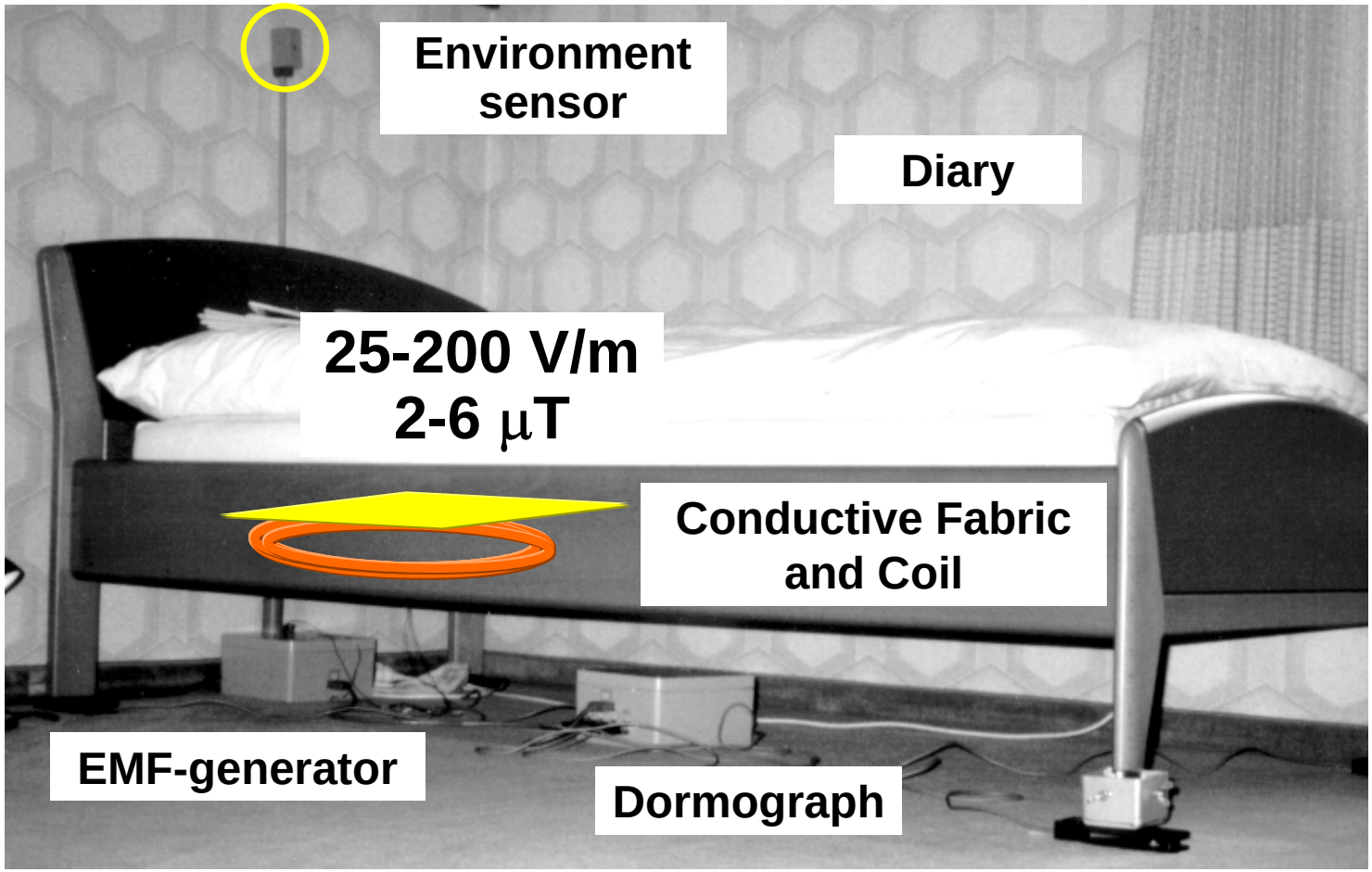
Subjective sleep parameters
Soundness of sleep

Emotional Status
Pleasure, Arousal

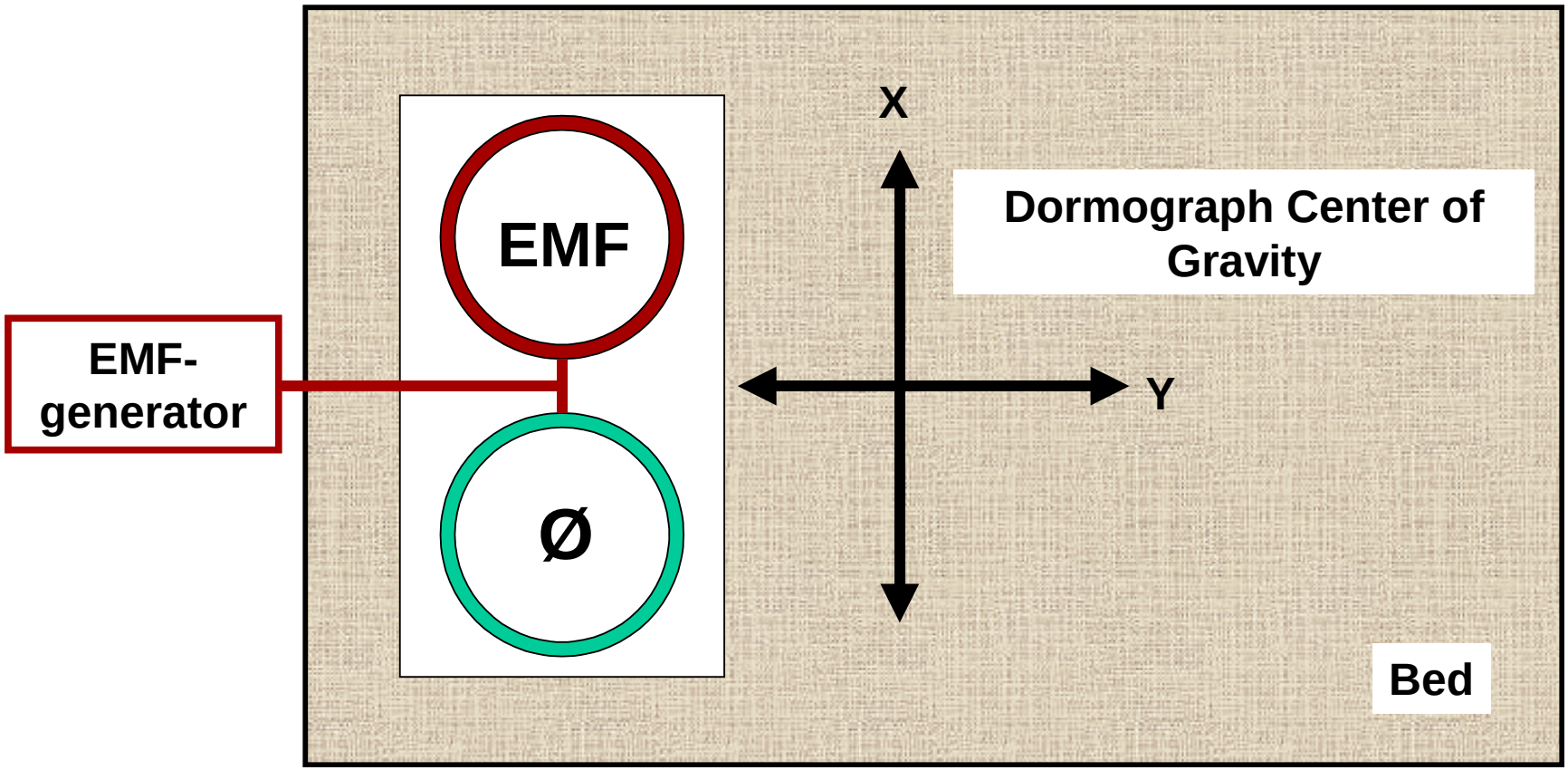
Physiological sleep parameters
Inter-beat-interval (IBI), heartrate variability (HRV)

Behaviour
Center of gravity

Setup in the subjects‘ homes



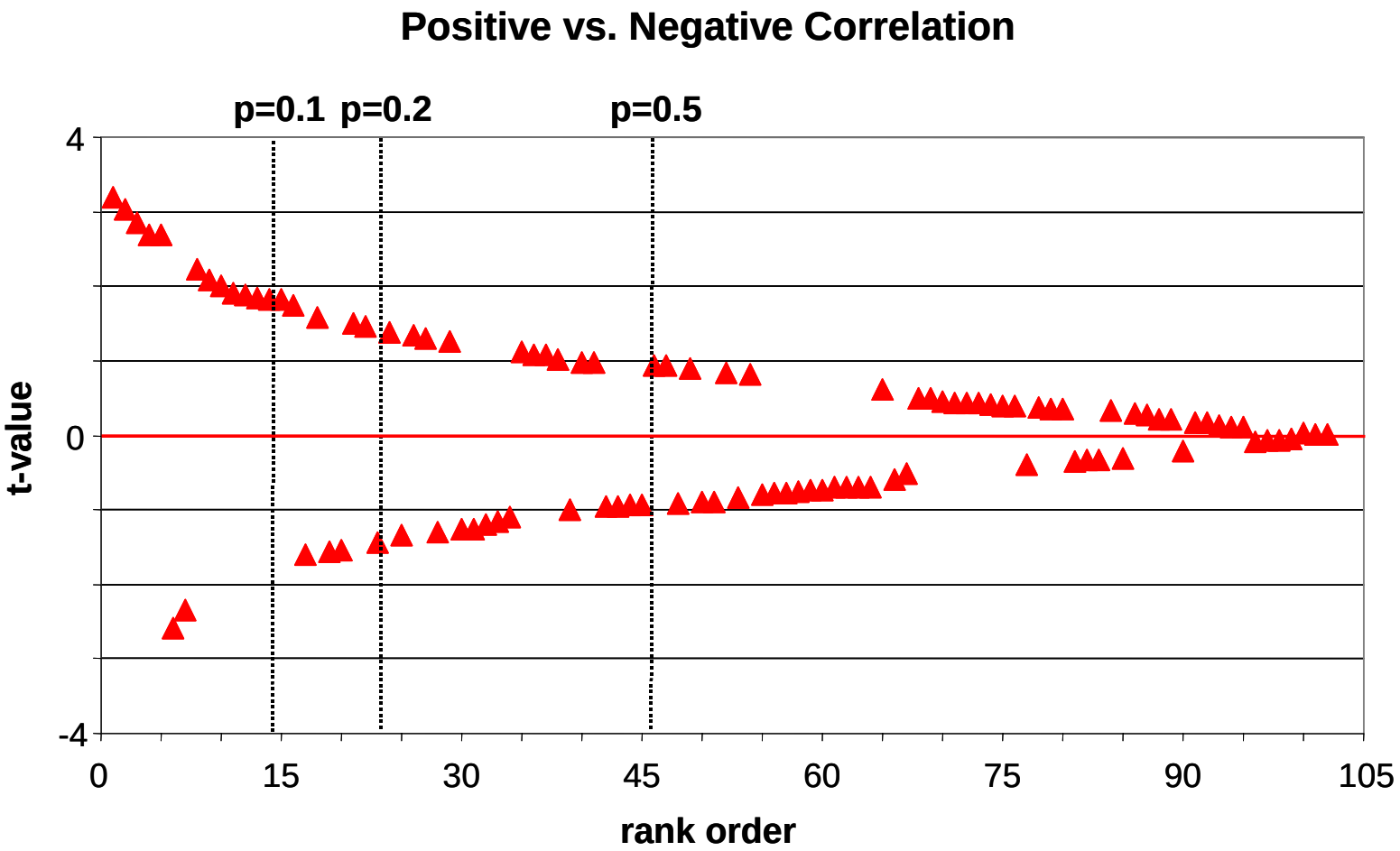
Position of Magnetic Field Coil



Results (sleep quality)

- Exposure to a 50 Hz EMF of 80-160 V/m and 2-6 μT respectively during 4 hours in the night affected subjective parameters (soundness of sleep, well being in the morning) in subjects with EHS.
  p=0.042
- Sleep quality not affected (p=0.535)
- Positive correlation between EMF-exposure at night and subjective parameters in the morning.

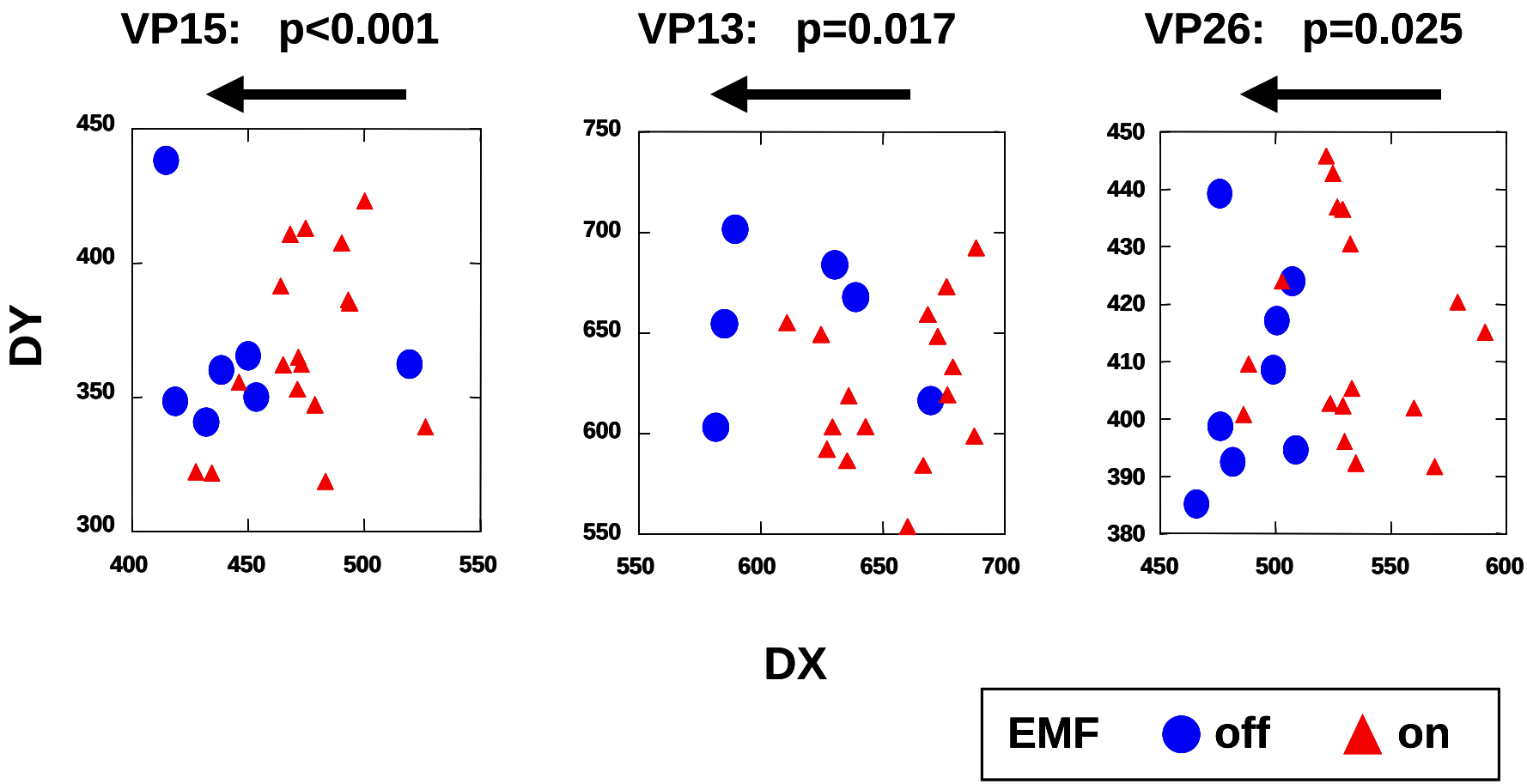
Analysis of the Results („positive effect“)



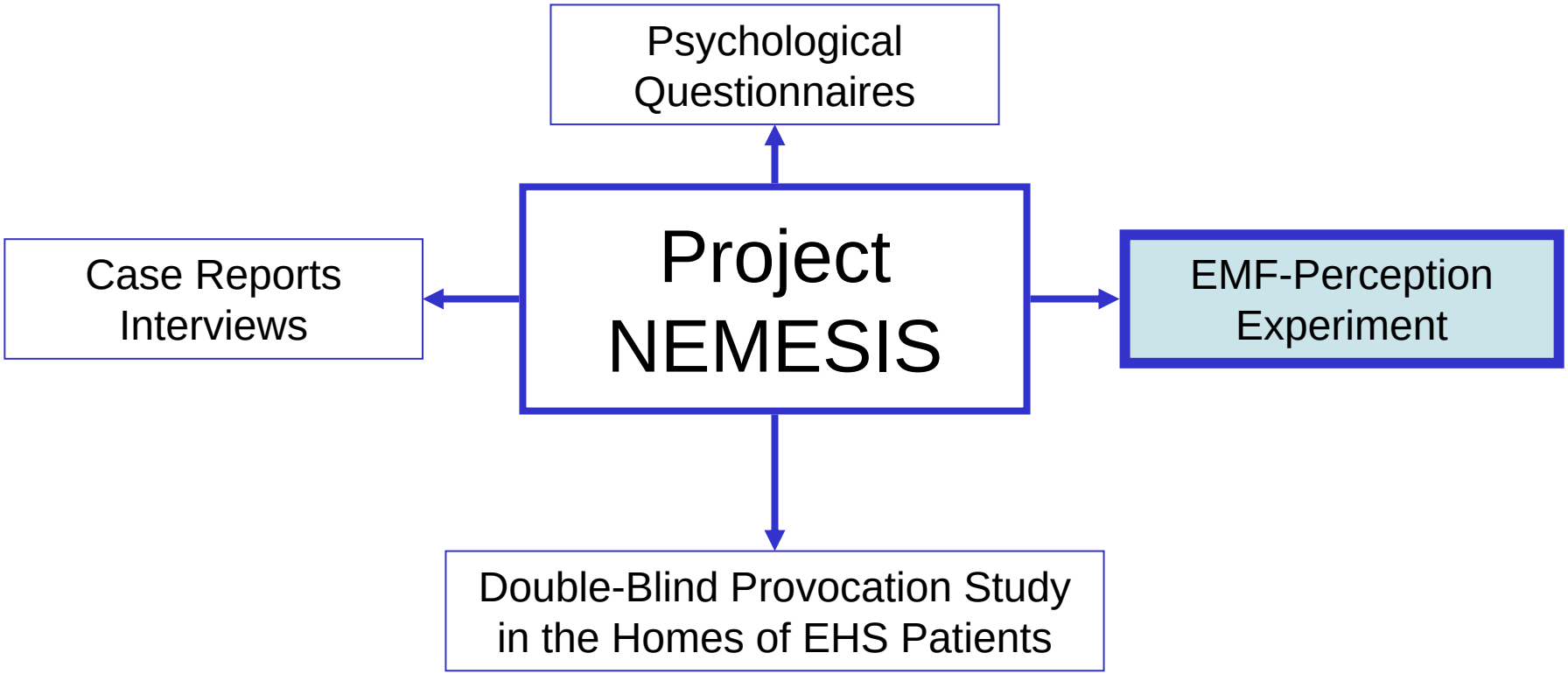
Results (physiology / behavior)

- No overall effect of exposure to 50 Hz EMF of 80-160 V/m and 2-6 μT on all heartbeat-parameters combined
  p=0.433
- Significant behavioral effects
  p=0.007
- EMF-Sensitivity-Effect measured
  p=0.018
- Strong indication of an EMF-effect on sleep stages

Position of Center of Gravity



Part II: EMF Perception



Hypothesis (Laboratory Experiment)

There are subjects who are able to perceive a 50 Hz EMF of 100 V/m and 4 μT (discern between „field on“ and „field off“)

Subjects (EMF Perception)

Selection criteria:

- Group 1: Subjects with EHS attributed to 50Hz EMF sources (n=49, 30 female and 19 male subjects)
- Group 2: Controls (n=14, 2 female and 12 male subjects)
- Healthy (asymptomatic)

Parameters (EMF Perception)

INPUT

EMF

50Hz, 100V/m, 4μT

Schedule

Double blind schedule
sham / exposed

Confounders

Duration of test

Effect?

OUTPUT

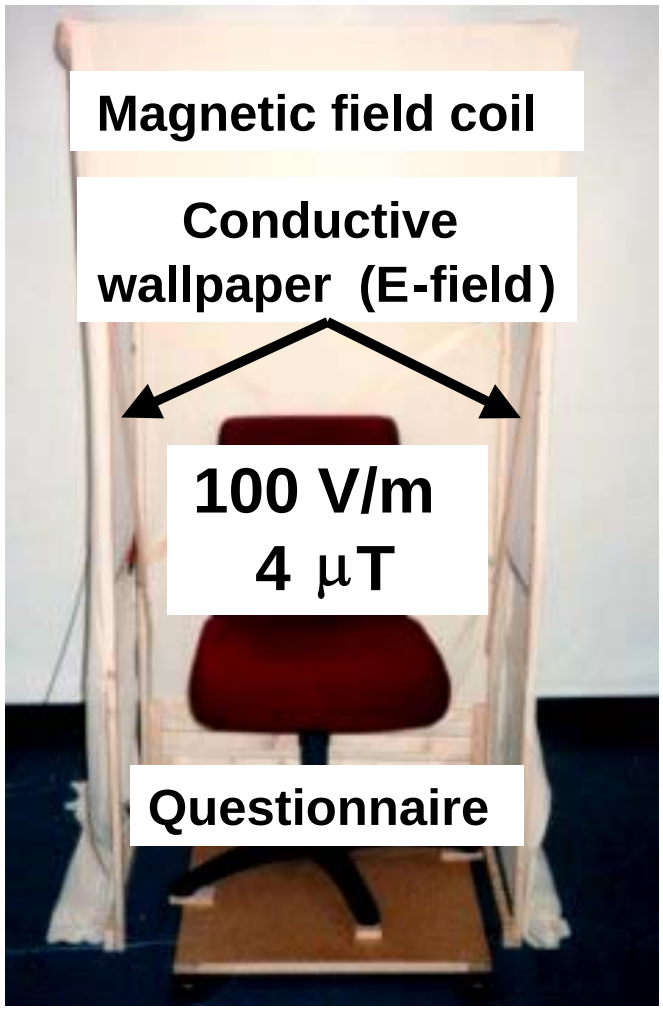
questionnaire

Direct EMF-Perception (score)

Difference between perception of magnetic field and electric field components

Difference between subjects with EHS and Controls

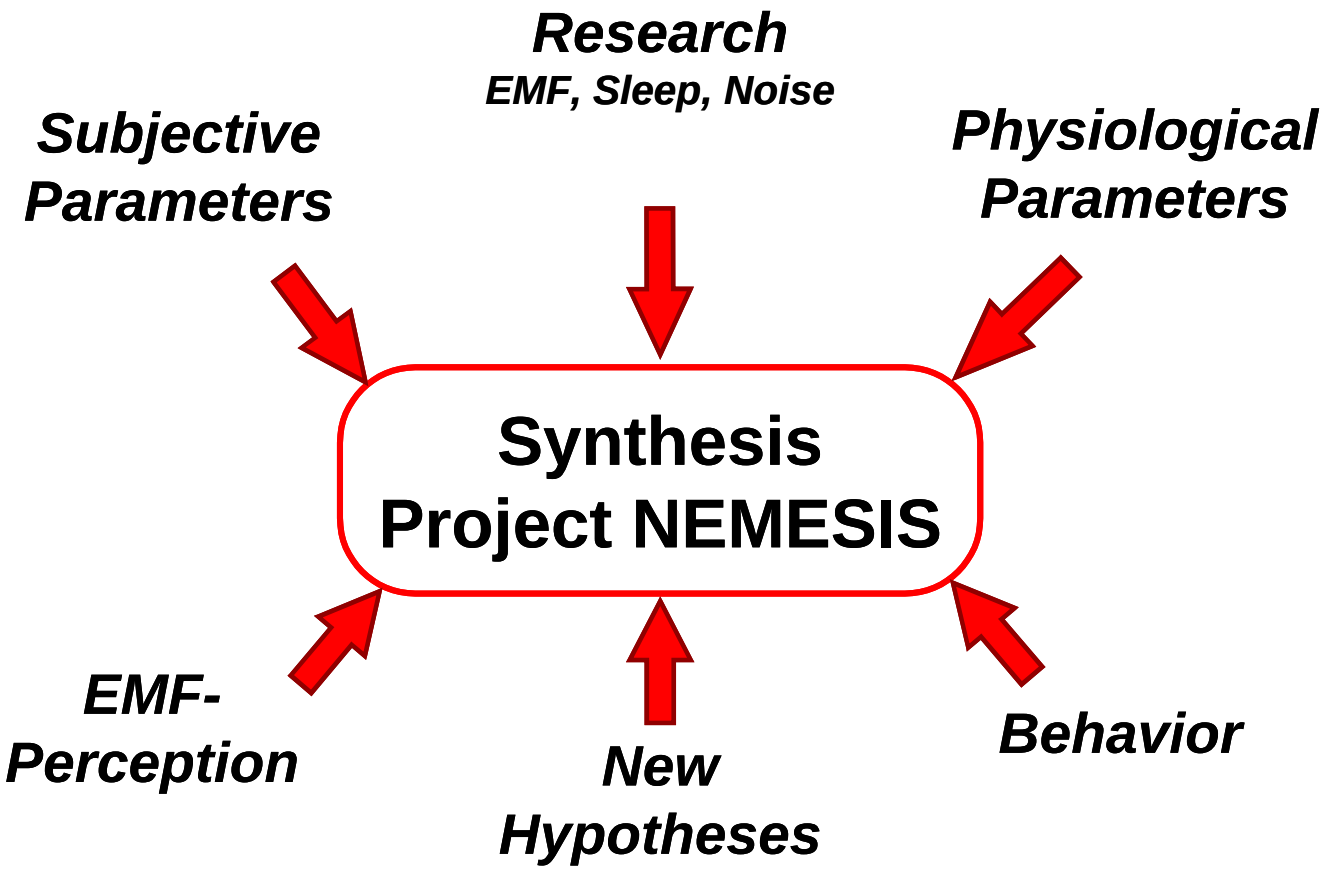
Setup in the Lab



Results: EMF Perception

- Number of subjects with statistically significant results exceeding the expected number for a chance result: **p=0.037**
- No difference in the accuracy of the EMF-judgements between electric and magnetic field provocation: **p=0.9**
- No difference in the accuracy of the EMF-judgements between the subjects with EHS controls: **p=0.7**

Synthesis: Can EHS be measured?

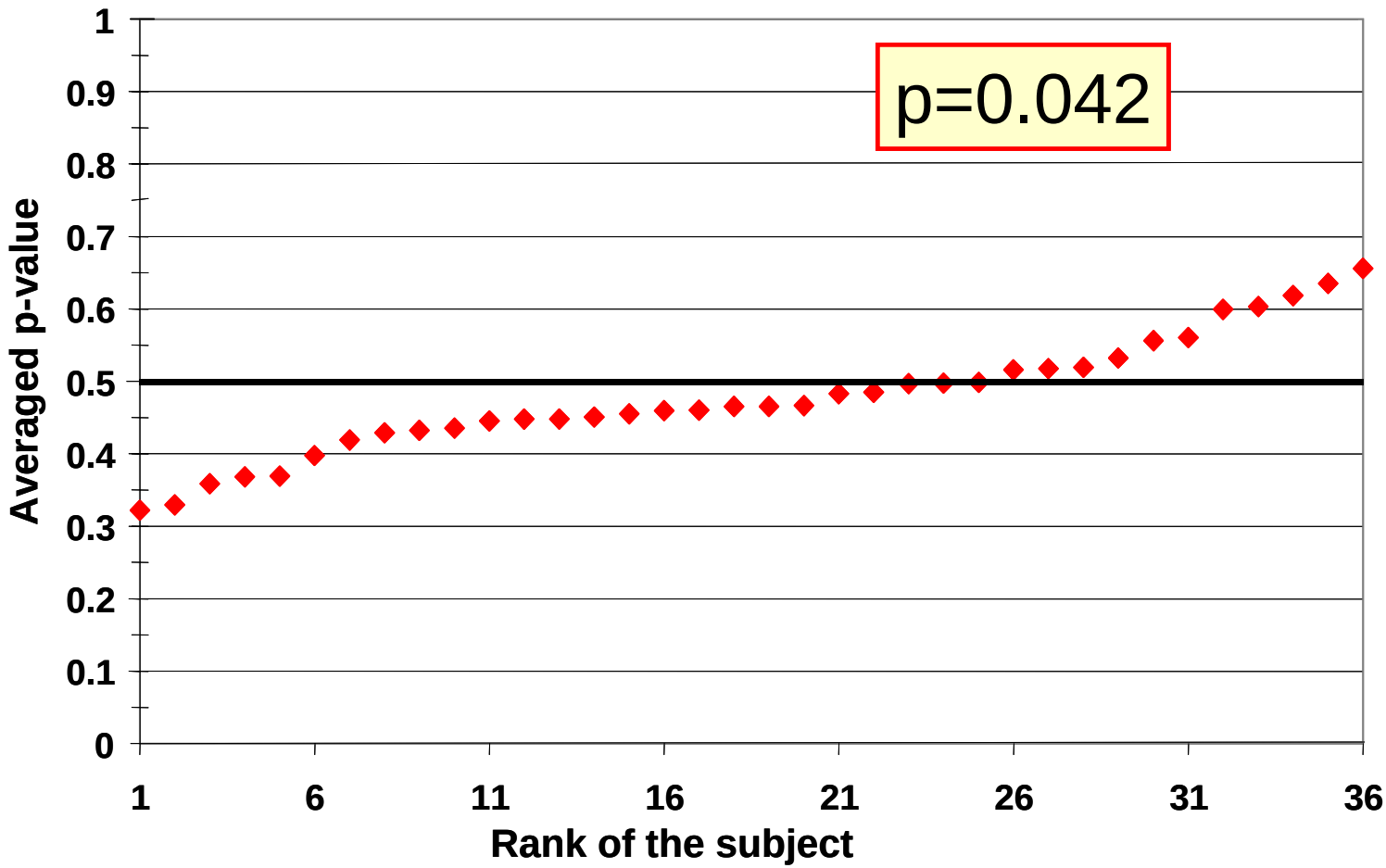


Approach

- Average of the p-values of all a-priori hypotheses
- Test the hypothesis with Wilcoxon rank test

„There is an objective measure of Electrical Hypersensitivity, if the distribution of the averaged p-values deviates from the expected symmetrical distribution around 0.5.“

Averaged p-Values per Subject (all results)



Conclusions Project NEMESIS

- Hypersensitivity to Electricity can be measured.
- Hypersensitivity to Electricity is not individually stable over time (level of sensitivity varies).
- EHS does not seem to be a prerequisite for the ability to consciously perceive EMF and vice versa.