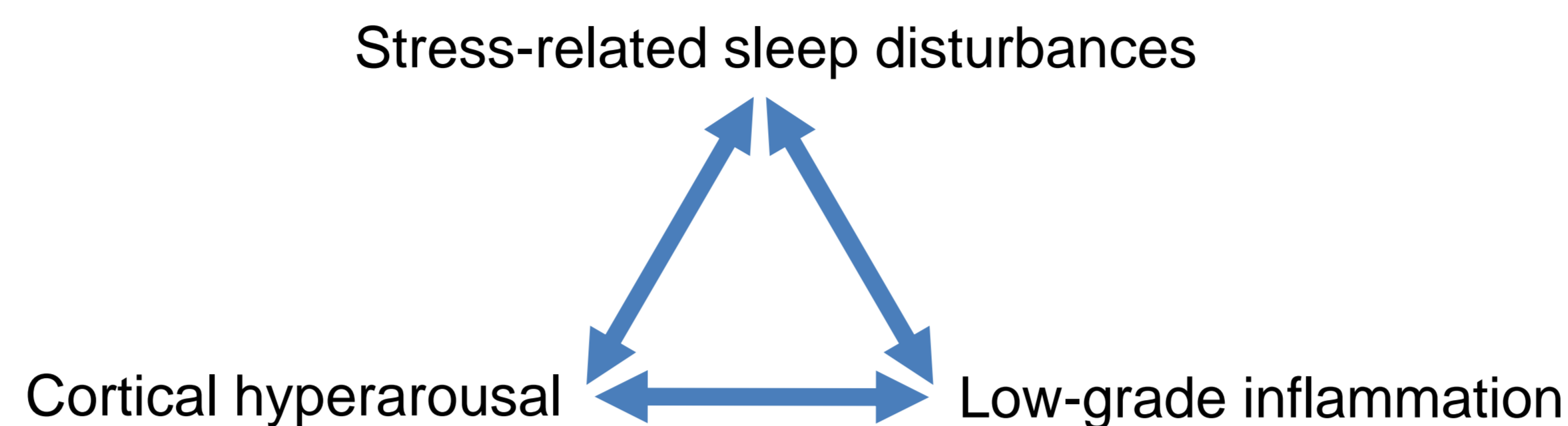


## INTRODUCTION

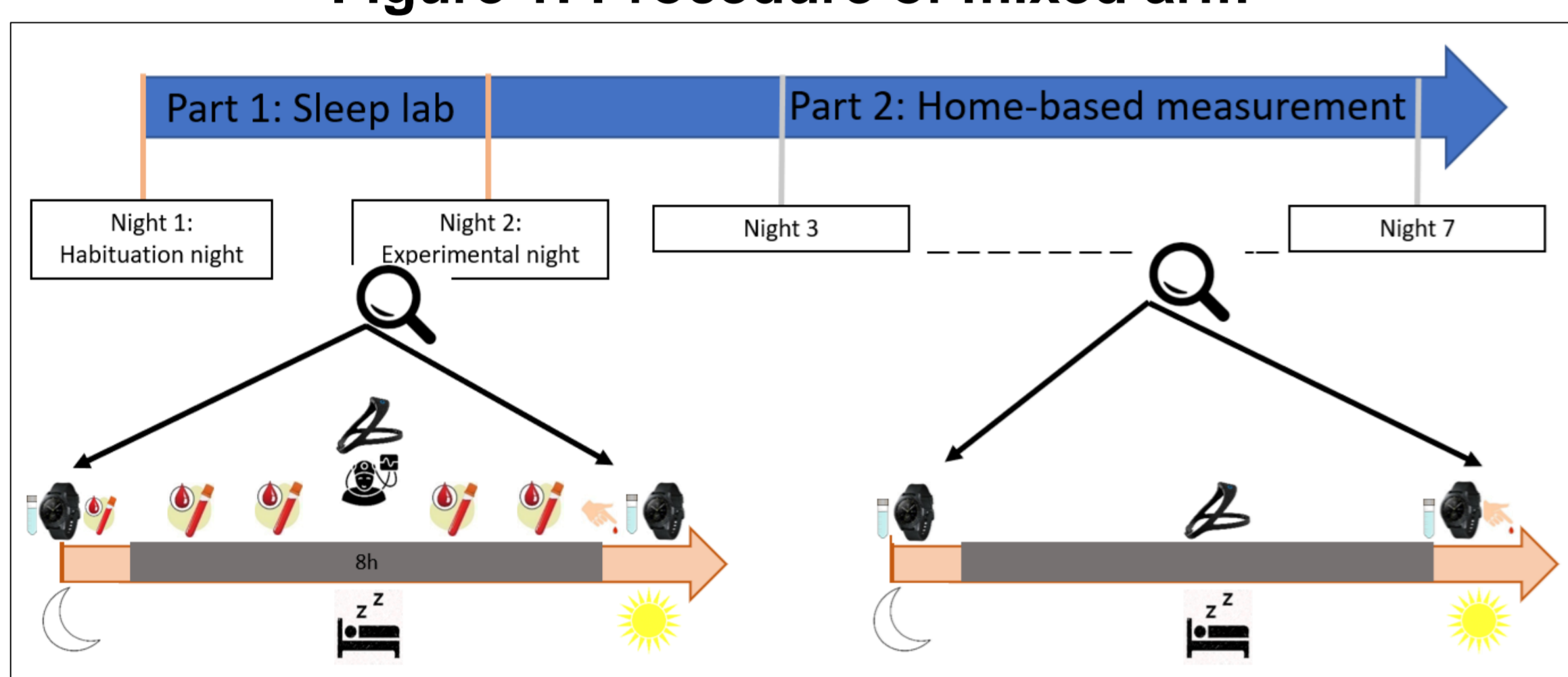
- The prevalence of sleep disorders in the general population is getting to an all-time high<sup>1</sup>
- Sleep disorders are frequently associated with other diseases and can also partly serve as precursors for later comorbidities<sup>2</sup>
- Due to sleep's significant importance in the context of combating stress-related pathologies, the focus of this study is the investigation of the underlying mechanisms of stress-related sleep disturbances

### Our aim:



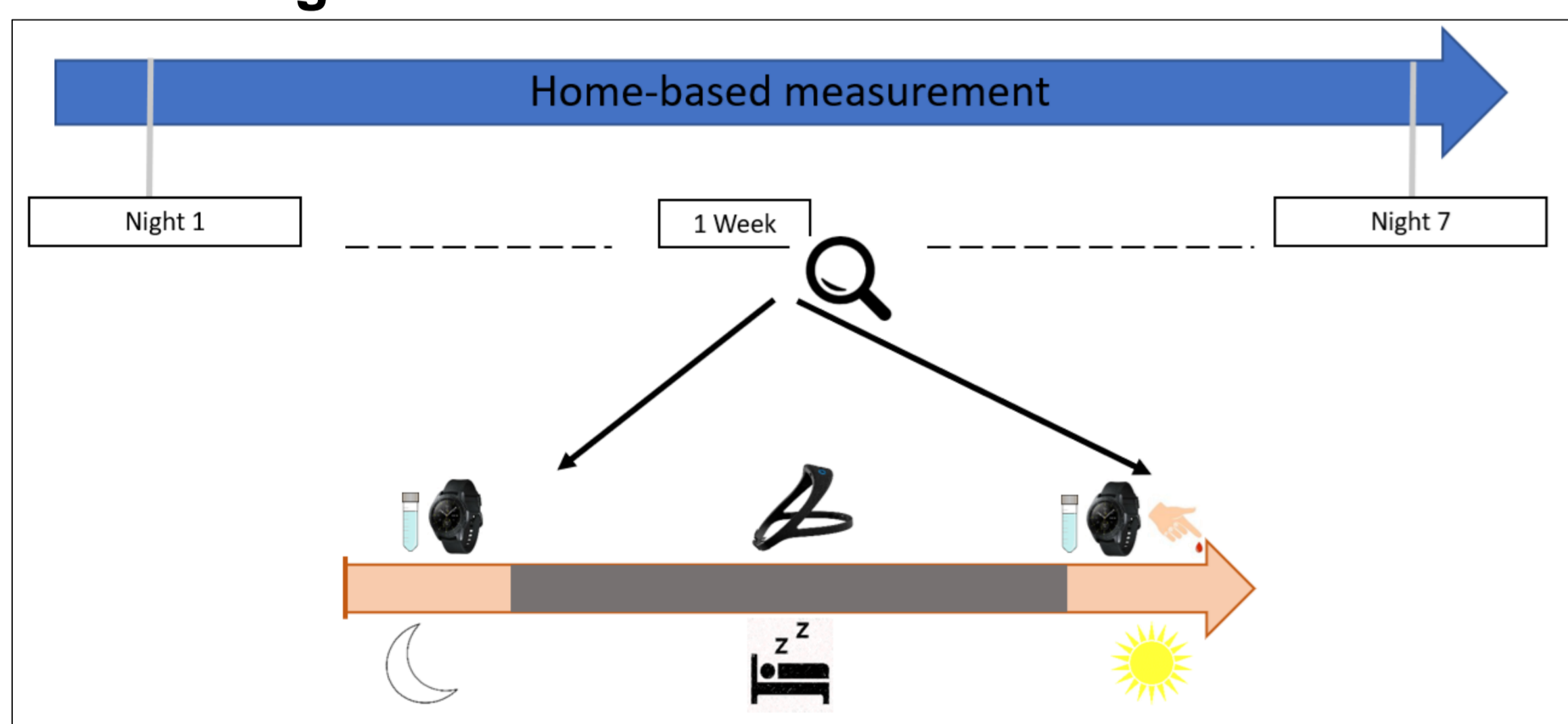
## METHOD

**Figure 1: Procedure of mixed arm**



**Figure 1:** The mixed arm of the study consists of two consecutive nights (habituation, experimental) in the sleep lab (orange bars) followed by five home-based nights. During the first two nights, evening and morning subjective questionnaires are filled out on the smartwatches. During the experimental night, venous blood samples are taken before bedtime and every 2h during sleep. Additionally, evening and morning saliva samples are collected. Sleep is monitored by PSG and an EEG headband. During the second part participants go through the same procedure every day (gray bars). They wear a smartwatch 24/7, evening and morning saliva samples are collected, evening and morning questionnaires are filled out on the smartwatch and capillary blood samples are collected every morning. Sleep is monitored by the EEG headband.

**Figure 2: Procedure of home-based arm**



**Figure 2:** In the home-based arm, participants go through the same procedure as the second part in the mixed arm. In this case participants follow the protocol for seven days at home.

### Participants descriptive statistics:

- **N = 90**
  - Controls: n = 32, mean<sub>Age</sub> = 23.9, sd<sub>Age</sub> = 3.3, 19 male
  - Stress: n = 58, mean<sub>Age</sub> = 24.8, sd<sub>Age</sub> = 3.6, 25 male

### EEG:

- **Dreem2:** 6 dry electrodes (Fp1, Fp2, F7, F8, O1, O2) + PPG  
→ 4 channels (F7-O1, F8-O2, F8-F7, Fp1-F8)
- **PSG:** 11 electrodes (F3, F4, C3, Cz, C4, P3, P4) + EOG + EMG  
→ 6 channels (F3-A2, F4-A1, C3-A2, C4-A1, P3-A2, P4-A1)

### Sleep-Analysis: (macrostructure)

- **Dreem2:** Automatic sleep scoring by Dreem<sup>3</sup>
- **PSG:** Sleep stages were scored manually by trained experts, according to the standardized criteria<sup>4</sup>



**Smartwatch:** Ecological momentary assessment via subjective questionnaires

**Surveys:** CTQ, FIRST, LEC, MCTQ, PCL-5, PHQ, STAI-T, MADRE, PSQI, DMEQ, Health Questionnaire

**Saliva-Analysis:** Alpha-Amylase + Cortisol<sup>†</sup>

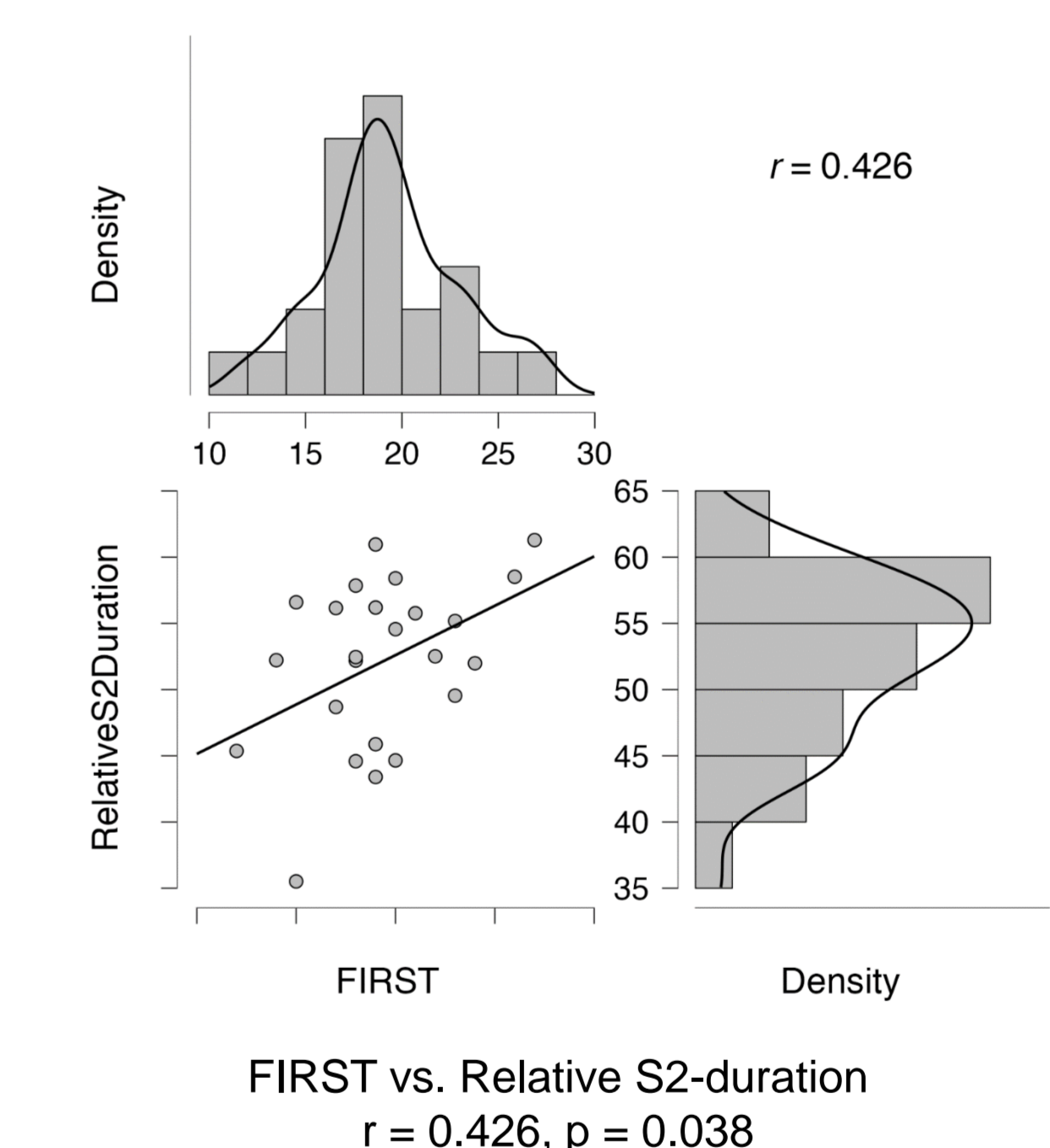
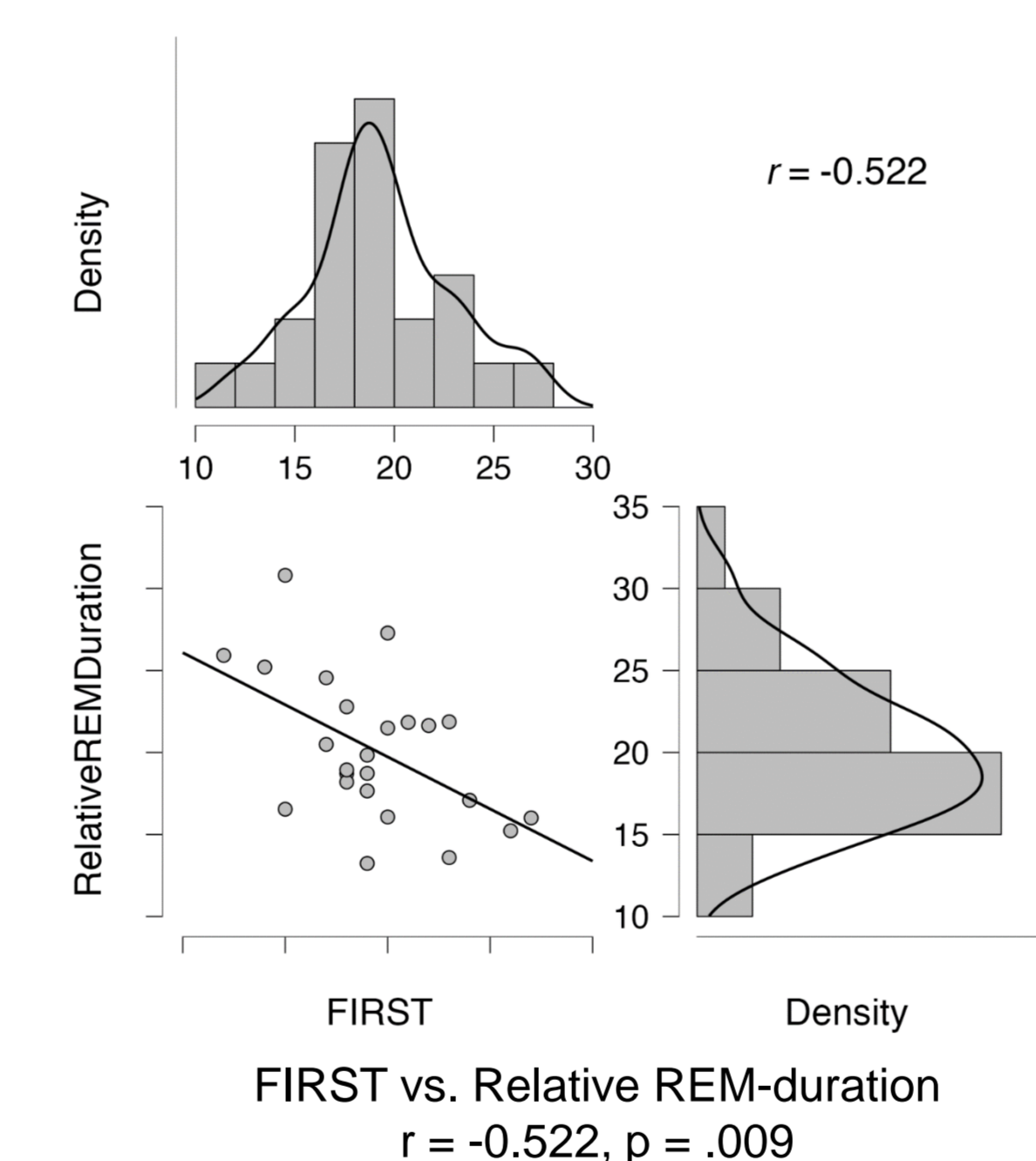
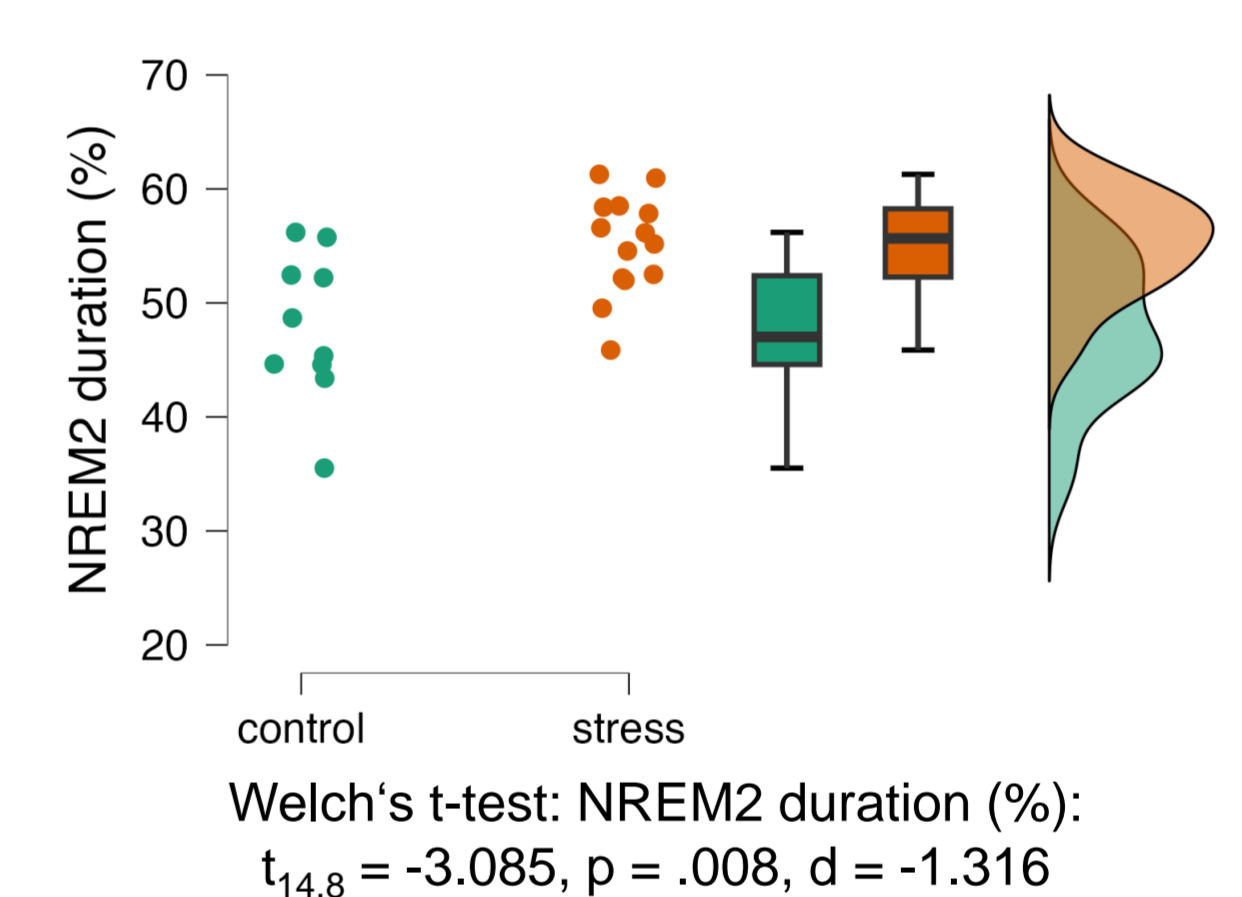
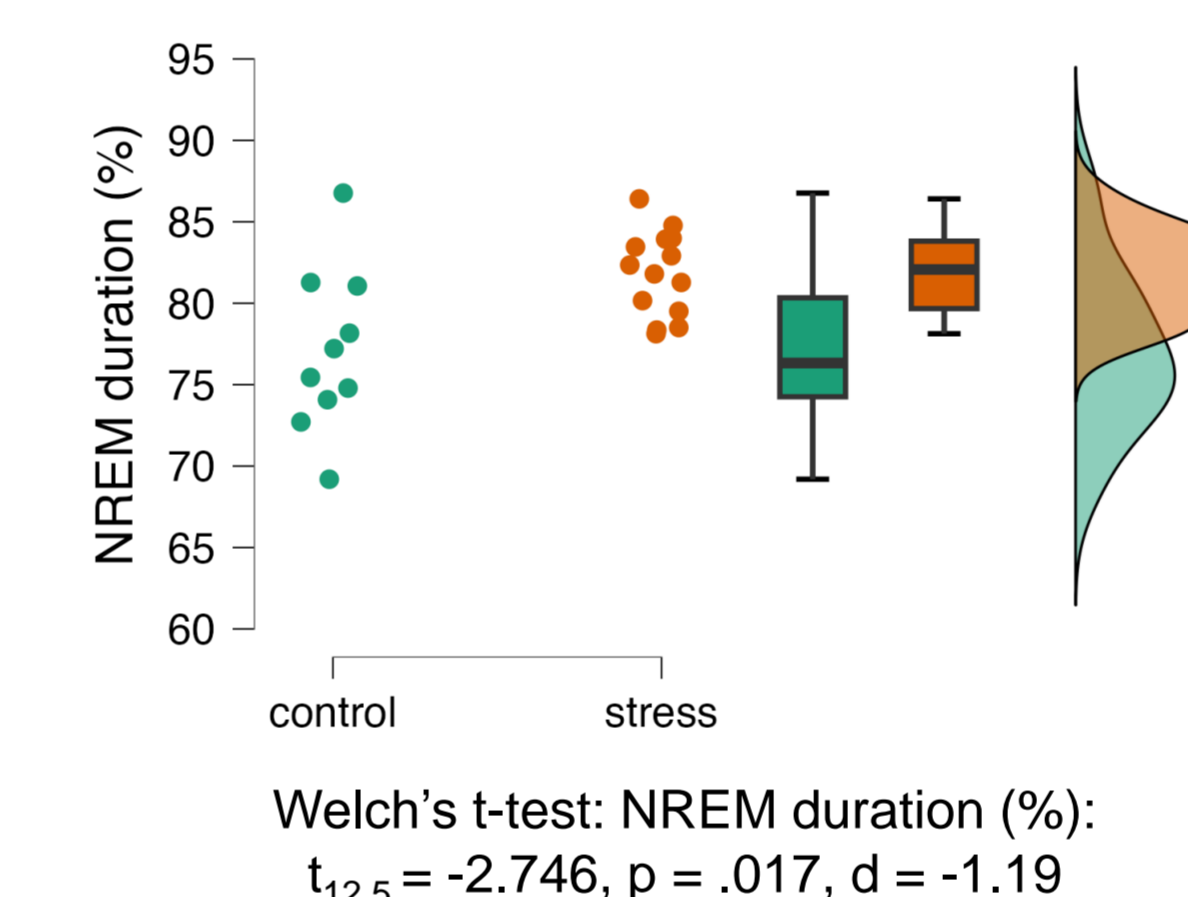
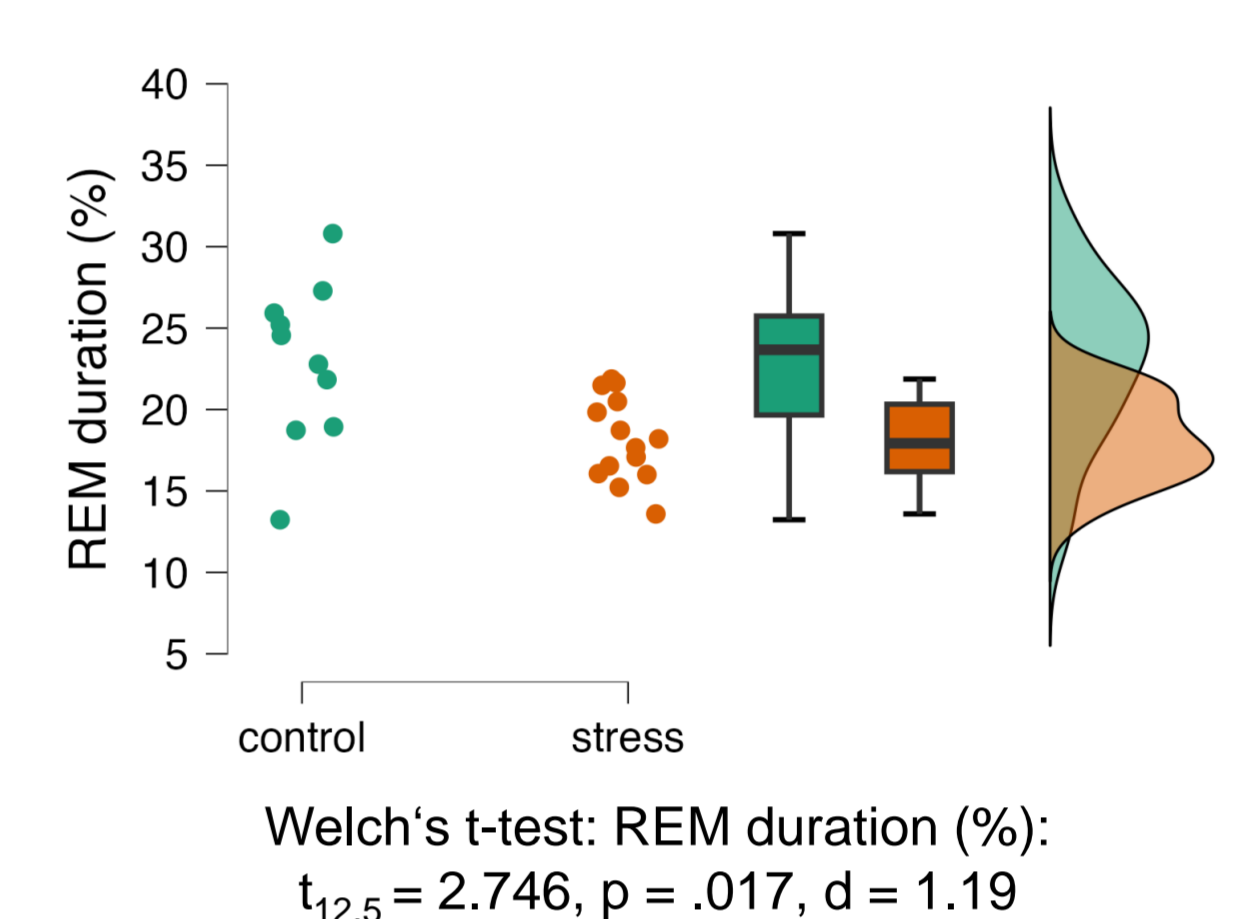
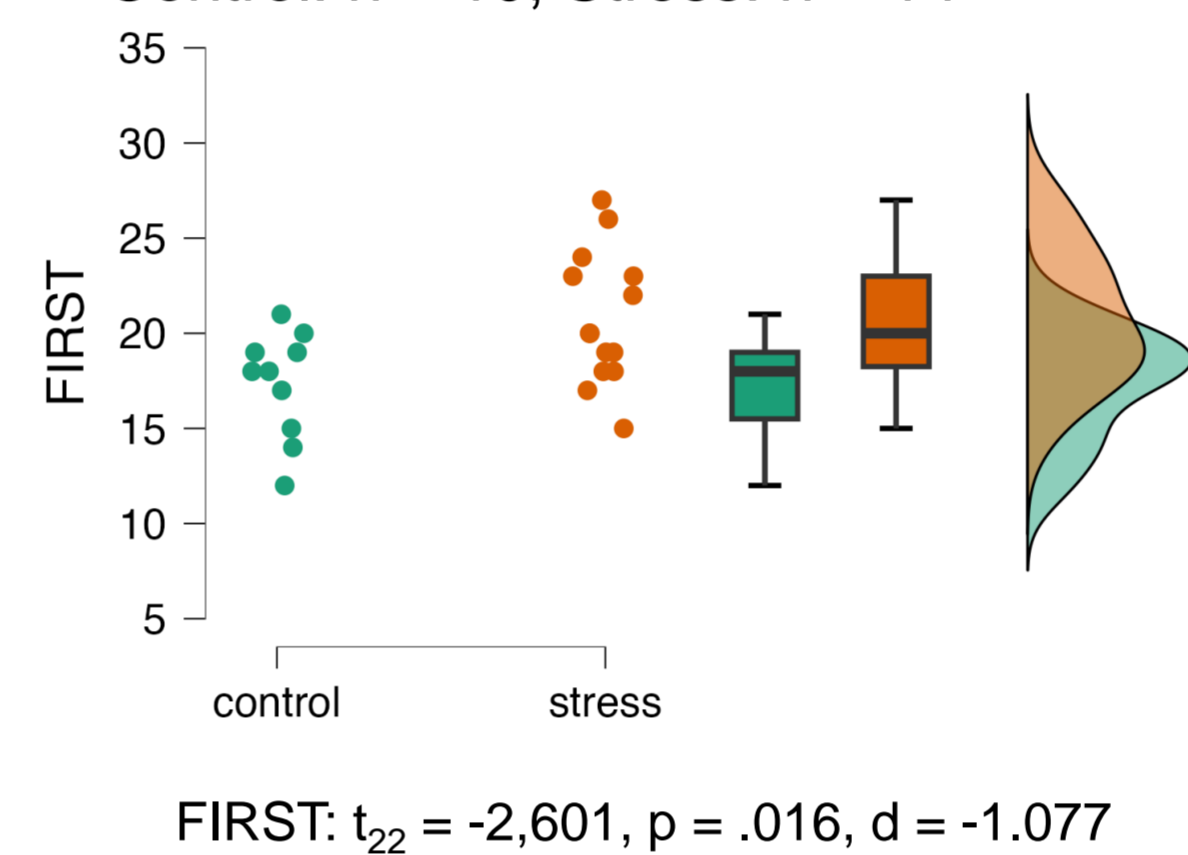
**Blood-Analysis:** hsCRP, IL-1 $\beta$ , IL-6, TNF- $\alpha$

**Statistical-Analysis:** Group comparison: ANOVA, t-Tests, Pearson's correlation

## PRELIMINARY RESULTS

Data analysis at early stages → Below presented preliminary analysis from using experimental night from the sleep lab. → All traditional macrostructural values were tested, only significant results are presented here.

- Control: n = 10, Stress: n = 14



## CONCLUSION

The results from this project will help us characterize underlying mechanisms behind stress-related sleep disturbances, which could serve as early markers of potential risk-factors of psychiatric disorders as well as help to envision more process-specific, targeted prevention techniques, interventions and treatments in clinical psychology and psychiatry.

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## CONTACT

[borbala.blaskovich@med.uni-muenchen.de](mailto:borbala.blaskovich@med.uni-muenchen.de)